State of Alaska
Department of Fish and Game
Division of Sport Fish

Nomination Form
Anadromous Waters Catalog

Region: Southwest

USGS Quad(s): Cold Bay A-1

Anadromous Waters Catalog Number of Waterway: 283-34-11000 - 2009

Name of Waterway: Waterfall Creek

☐ USGS Name ☑ Local Name - by HDR, contractor to City of King Cove

☑ Addition ☐ Deletion ☐ Correction ☐ Backup Information

For Office Use

Nomination #	09-1514	Fisheries Scientist	10/30/09 Date
Revision Year:	2010	Habitat Operations Manager	10/30/09 Date
Revision to:	Atlas ____ Catalog ____ Both ✓	AWC Project Biologist	22OCT09 Date
Revision Code:	A-2, B2	Cartographer	12/18/09 Date

OBSERVATION INFORMATION

Species	Date(s) Observed	Spawning	Rearing	Present	Anadromous
Pink Salmon	8/23/2007			10	✓
Dolly Varden	various in 2006 & 2007			77	☐ ?
					☐
					☐
					☐

IMPORTANT: Provide all supporting documentation that this water body is important for the spawning, rearing or migration of anadromous fish, including: number of fish and life stages observed; sampling methods, sampling duration and area sampled; copies of field notes; etc. Attach a copy of a map showing location of mouth and observed upper extent of each species, as well as other information such as: specific stream reaches observed as spawning or rearing habitat; locations, types, and heights of any barriers; etc.

Comments:

Pink salmon and Dolly Varden sampled at two sites. Location data found in attached Report, "The City of King Cove Waterfall Creek Hydroelectric Project, Fish Resources Study, 2006 and 2007, Final Report, February 2008" on pages tabbed with yellow Post-it notes and highlighted. Adornestum 283-34-11000 2009 w/ pink salmon present. Dolly Varden pink salmon present to 283-34-11000

Name of Observer (please print): Gayle Martin

Nominator Signature: Gayle Martin

Date: 10/15/09

Agency: ADF&G - Habitat

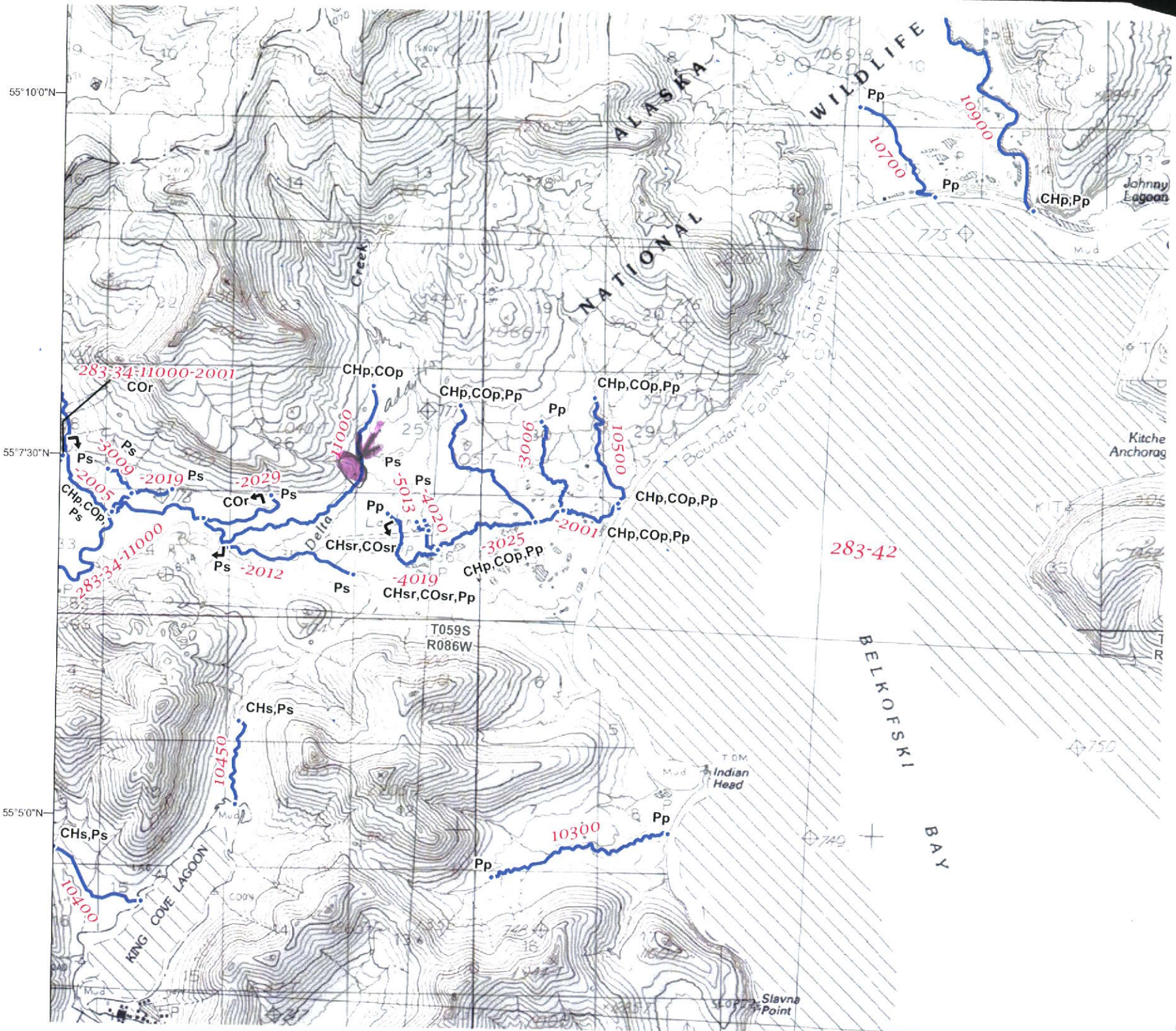
Address: Anchorage

This certifies that in my best professional judgment and belief the above information is evidence that this waterbody should be included in or deleted from the Anadromous Waters Catalog.

Signature of Area Biologist: _____ Date: _____ Revision

02/08

from Cold Bay A-1 sheet (AWC 2009)



The City of King Cove
Waterfall Creek Hydroelectric Project

Fish Resources Study
2006 and 2007

Final Report

February 2008

Prepared for:

Alaska Energy and Engineering, Inc.
P.O. Box 111405
Anchorage, Alaska 99511

Prepared by:

HDR, Inc
2525 C Street, Suite 305
Anchorage, Alaska 99503

Table of Contents

Table of Contents i
Introduction 1
Methods 1
    Electrofishing 1
    Foot Surveys 1
Results 2
Discussion 2
Acknowledgements 3
References 4

Figures

Figure 1. General Study Area: Waterfall Creek Fish Resources Study
Figure 2. Field Sampling Locations: Waterfall Creek Fish Resources Study

Appendices

Appendix A, Data
Appendix B, Photographs
Appendix C, Scanned Field Data

Introduction

Alaska Energy and Engineering, Inc. (AE&E) is performing a power and fuel facilities investigation for the City of King Cove, Alaska (King Cove). A small tributary located directly west of the existing hydroelectric facility on Delta Creek is being considered by AE&E for supplemental hydroelectric power generation (Figure 1). The tributary stream is referred to as Waterfall Creek. This report presents the findings of the fish resources study conducted in support of an ongoing feasibility study and is based on data collected in 2006 and 2007.

Waterfall Creek has not been identified in the Alaska Department of Fish and Game (ADF&G) Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes as an anadromous water body. Waterfall Creek is tributary to Delta Creek. Delta Creek is listed as an anadromous stream in the catalog (water body number 283-34-11000) for coho (*Oncorhynchus kisutch*), pink (*O. gorbuscha*), and chum (*O. keta*) salmon. Six other tributaries to Delta Creek are also identified as anadromous habitat. The fish resources study was initiated in 2006 to document fish presence and species composition, and to determine if spawning or rearing of anadromous fish occurs in Waterfall Creek.

Methods

Field methods used to document species composition in Waterfall Creek included electrofishing and direct observation using foot surveys to locate spawning fish.

Electrofishing

Field sampling was conducted on February 23, 2006 using a Smith Root LR-24 back pack electrofisher (HDR, Inc., 2006). Two sample sites were established: the "upstream site" and the "confluence site" (Figure 2).

Approximately 25 meters (82 feet) of stream was sampled at each site, with additional effort used in habitats expected to be suitable for fish, such as pools and glides. Sampling was conducted using multiple passes through the stream with the electrofisher working in a "Z" pattern. All fish captured were enumerated, measured to fork length (FL), and released in the vicinity of capture.

Foot Surveys

Field sampling to document fish adult presence was conducted from July/August through October/November of 2006 and 2007 using foot survey observations. The foot surveys consisted of a 2 person crew walking two control sections of the creek; a 200 foot long section immediately upstream from the confluence of Waterfall Creeks with Delta Creek and a 200 foot long section located near an existing weir approximately 500 feet upstream of the confluence. Field personnel enumerated fish by species, estimated total fish length (TL), recorded fish observation locations using a handheld Global Positioning System (GPS), and noted if evidence of spawning was observed. Total fish length estimates were recorded in inches and later converted to centimeters.

In 2006, visual observation surveys were conducted monthly from July through November. In order to account for the annually alternating run size of pink and chum salmon, foot surveys were repeated in 2007 on a biweekly basis from August through October, per resource management agencies recommendations (HDR, Inc., 2007).

Results

In February 2006, eleven Dolly Varden (*Salvelinus malma*) were captured using the backpack electrofisher; no other species was captured or observed. Fork lengths of the eight fish captured from the upstream site ranged from 4.4 to 12.3 cm (1.7 to 4.8 inches), with a mean fork length of 7.0 cm (2.8 inches) and a standard deviation of ±2.7 (±1.1). The three fish captured from the confluence site were measured at 14.7, 15.2, and 16 cm.

In 2006, a total of 41 Dolly Varden were observed during five foot surveys that were completed from late July through early November. In 2007, seven foot surveys were completed, during which time a total of 36 Dolly Varden and 10 adult pink salmon were observed. For the two years of visual observation data, total fish lengths of Dolly Varden were estimated between two and 12 inches (5.1 and 30.5 cm), with a mean length of 5.2 inches (13.4 cm) and standard deviation of ±2.5 (±6.2).

Estimated fish counts were relatively similar between the two sample areas for both species, indicating fish are more or less equally distributed between the two areas. All 10 pink salmon observed were observed on the August 23, 2007 sampling event. In both years, the largest numbers of Dolly Varden were observed during August and September. No fish were observed on the last surveys of each year, which were conducted on November 3, 2006 and October 17, 2007.

In summary, one electrofishing and twelve visual observation surveys were completed during the two-year study period. Species captured or observed included Dolly Varden and pink salmon. Dolly Varden was the most abundant species observed during foot surveys throughout the study period comprising 77 of the 87 fish observed. Dolly Varden was also the only species captured during the February 2006 electrofishing event. No evidence of spawning was noted during any one of the surveys. Field sampling results are provided in Appendix A and are summarized below. It should be noted that the confluence site was not surveyed on September 17, 2007.

Discussion

Waterfall creek is a steep, confined, first order tributary subject to "flashy" high flows. It is approximately 1.5 miles long and ranges in elevation from approximately 3,000 feet at the headwaters, 700 feet at the top of the waterfall, to 190 feet where it drains into Delta Creek. Substrate in the creek predominately consists of medium to small sized colluvium and bedrock out crops. All of these conditions create less than optimal salmon spawning and rearing habitat. However, this type of habitat is often times suitable for small populations of Dolly Varden. It is not known if the Dolly Varden in Waterfall Creek are anadromous. Appendix B, photo 3 shows Waterfall Creek during July of 2006.

In 2007, adult pink salmon were observed in low numbers (N=10) during one sampling event in August; none was observed in 2006. Pink salmon runs generally alternate annually with a larger run returning one year and a smaller run returning the next. During the 1990's in Cold Bay, pink salmon runs were larger during even years and a smaller during odd years; however this trend has changed over time. The large run now typically occurs during odd years (Russ, ADF&G, personal communication). Because adult pink salmon were only observed during one survey, in low numbers and during a high return year it is plausible that these salmon were strays. Based on low numbers and less than optimal spawning conditions, it appears that Waterfall Creek provides low value spawning habitat for pink salmon.

Coho and chum salmon were not observed during any one of the sampling events in 2006 and 2007. Based on the general timing of spawning for these species, it is expected that adults would have been observed during the visual observation surveys if Waterfall Creek provided important spawning habitat for either species. Similarly, it appears the creek does not provide important rearing and/or overwintering habitat for coho salmon as none was captured during the February 2006 event.

Acknowledgements

We thank Harlen, Mike, Seward, and Lennie at The City of King Cove for their cooperation and hard work in collecting the visual observation data at Waterfall Creek during 2006 and 2007. The fisheries information they provided will allow resource managers to make informed decisions regarding future development of Waterfall Creek's hydropower.

References

HDR Alaska, Inc. 2006. Waterfall Creek Fisheries Investigation and Data Logger Installation: Technical Memorandum, February 2006.

HDR Alaska, Inc. 2007. Meeting Notes January 11, 2007 re: King Cove, Waterfall Creek Hydroelectric Project.

Johnson J. and E. Weiss, 2007. Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes – Southwestern Region, Effective June 1, 2007. Special Publication No. 07-07. Alaska Department of Fish and game and Alaska Department of Natural Resources.

Russ, Elisa. 2007 ADF&G Asst. Area Biologist, Kodiak. Personal Communication with Heidi Weigner, HDR

Figures

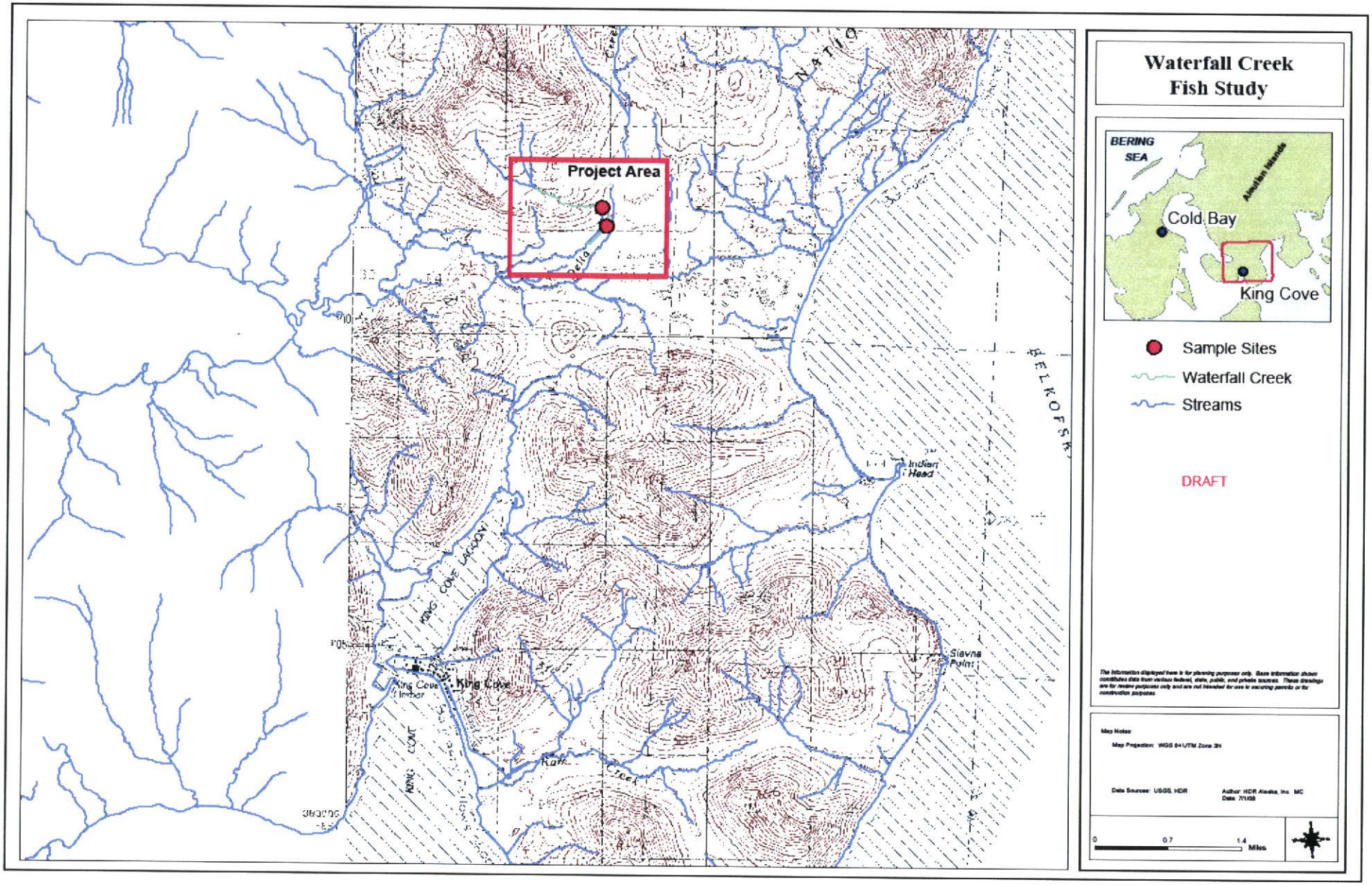


Figure 1. General Study Area: Waterfall Creek Fish Resources Study

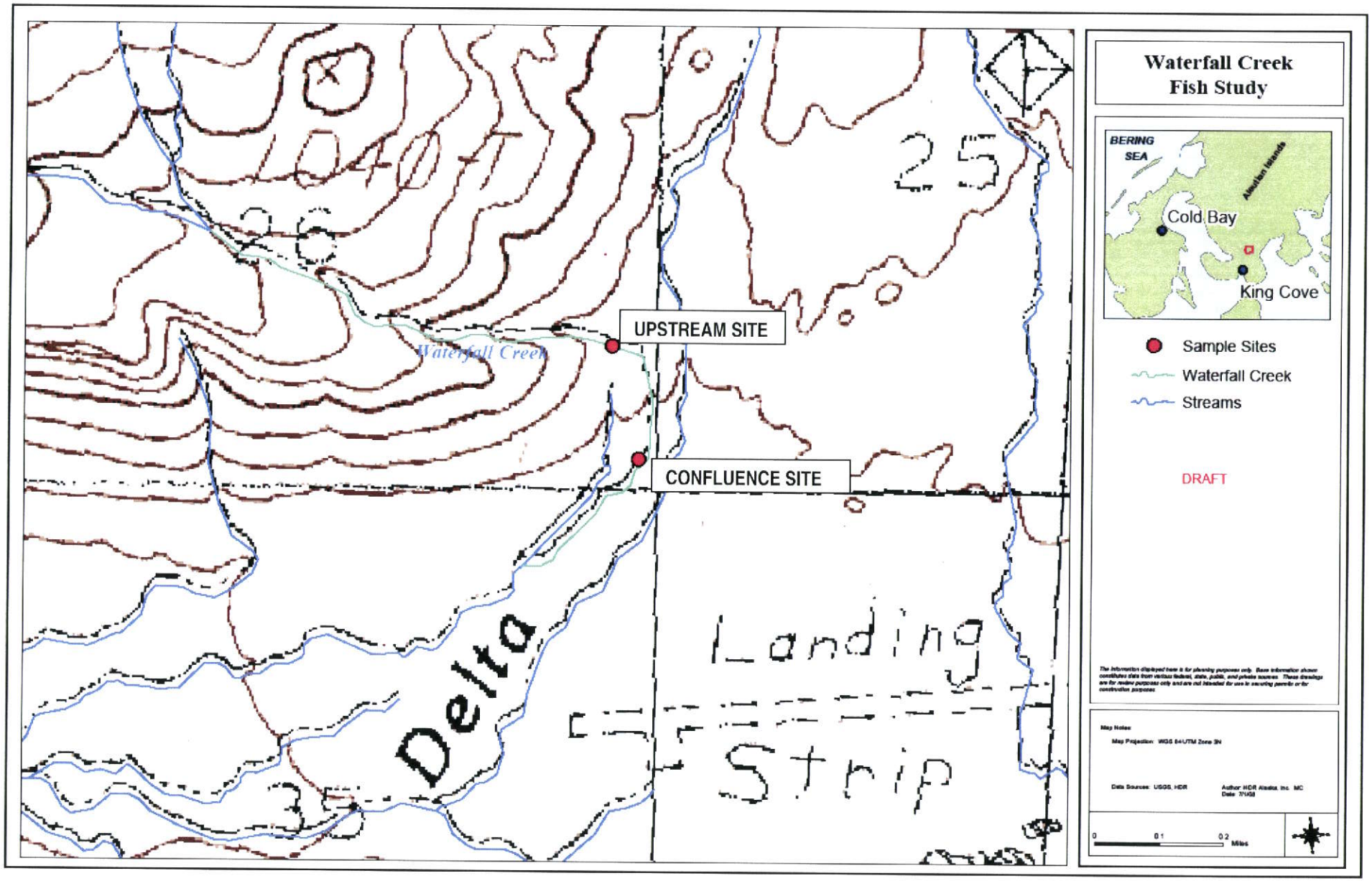


Figure 2. Sample Site Locations: Waterfall Creek Fish Resources Study

Appendix A
Data

Stream	Site Name	Date	Species	FishCount	FishLength_inches[1]	FishLength_cm[1]	Method	Waypoint	Latitude	Longitude	Crew
Waterfall Creek	Upstream Site	2/23/2006	Dolly Varden	1	4.8	12.3	electrofish	na	55.12453	-162.27554	Paul McLarnon
Waterfall Creek	Upstream Site	2/23/2006	Dolly Varden	1	2.0	5.0	electrofish	na	55.12453	-162.27554	Paul McLarnon
Waterfall Creek	Upstream Site	2/23/2006	Dolly Varden	1	3.4	8.6	electrofish	na	55.12453	-162.27554	Paul McLarnon
Waterfall Creek	Upstream Site	2/23/2006	Dolly Varden	1	2.4	6.2	electrofish	na	55.12453	-162.27554	Paul McLarnon
Waterfall Creek	Upstream Site	2/23/2006	Dolly Varden	1	1.7	4.4	electrofish	na	55.12453	-162.27554	Paul McLarnon
Waterfall Creek	Upstream Site	2/23/2006	Dolly Varden	1	2.2	5.5	electrofish	na	55.12453	-162.27554	Paul McLarnon
Waterfall Creek	Upstream Site	2/23/2006	Dolly Varden	1	2.1	5.4	electrofish	na	55.12453	-162.27554	Paul McLarnon
Waterfall Creek	Upstream Site	2/23/2006	Dolly Varden	1	3.5	8.8	electrofish	na	55.12453	-162.27554	Paul McLarnon
Waterfall Creek	Confluence Site	2/23/2006	Dolly Varden	1	5.7	14.6	electrofish	na	55.12170	-162.27464	Paul McLarnon
Waterfall Creek	Confluence Site	2/23/2006	Dolly Varden	1	6.3	15.9	electrofish	na	55.12170	-162.27464	Paul McLarnon
Waterfall Creek	Confluence Site	2/23/2006	Dolly Varden	1	5.9	15.1	electrofish	na	55.12170	-162.27464	Paul McLarnon
Waterfall Creek	Upstream Site	7/26/2006	Dolly Varden	1	6	15.2	visual	4	55.12453	-162.27554	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	7/26/2006	Dolly Varden	1	6	15.2	visual	5	55.12445	-162.27587	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	7/26/2006	Dolly Varden	1	6	15.2	visual	6	55.12447	-162.27549	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	7/26/2006	Dolly Varden	1	7	17.8	visual	7	55.12444	-162.27543	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	7/26/2006	Dolly Varden	1	8	20.3	visual	8	55.12443	-162.27508	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	7/26/2006	Dolly Varden	1	7	17.8	visual	9	55.12215	-162.27409	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/15/2006	Dolly Varden	1	5	12.7	visual	11	55.12445	-162.27546	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/15/2006	Dolly Varden	1	2	5.1	visual	12	55.12441	-162.27534	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/15/2006	Dolly Varden	1	3	7.6	visual	13	55.12440	-162.27518	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/15/2006	Dolly Varden	1	5	12.7	visual	14	55.12443	-162.27512	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/15/2006	Dolly Varden	1	3	7.6	visual	14	55.12443	-162.27512	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/15/2006	Dolly Varden	1	3	7.6	visual	15	55.12449	-162.27499	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/15/2006	Dolly Varden	1	3	7.6	visual	16	55.12451	-162.27558	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/15/2006	Dolly Varden	1	3	7.6	visual	18	55.12184	-162.27447	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/15/2006	Dolly Varden	1	3	7.6	visual	19	55.12185	-162.27442	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/15/2006	Dolly Varden	1	3	7.6	visual	19	55.12185	-162.27442	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/15/2006	Dolly Varden	1	5	12.7	visual	19	55.12185	-162.27442	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/15/2006	Dolly Varden	1	5	12.7	visual	19	55.12185	-162.27442	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/15/2006	Dolly Varden	1	3	7.6	visual	20	55.12191	-162.27428	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/15/2006	Dolly Varden	1	3	7.6	visual	22	55.12207	-162.27425	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/15/2006	Dolly Varden	1	3	7.6	visual	23	55.12215	-162.27414	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/15/2006	Dolly Varden	1	3	7.6	visual	24	55.12224	-162.27409	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	4	10.2	visual	26	55.12454	-162.27554	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	12	30.5	visual	27	55.12445	-162.27547	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	5	12.7	visual	28	55.12449	-162.27544	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	4	10.2	visual	29	55.12447	-162.27543	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	4	10.2	visual	30	55.12441	-162.27540	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	4	10.2	visual	30	55.12441	-162.27540	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	4	10.2	visual	30	55.12441	-162.27540	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	12	30.5	visual	30	55.12441	-162.27540	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	4	10.2	visual	31	55.12445	-162.27536	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	8	20.3	visual	32	55.12448	-162.27533	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/7/2006	Dolly Varden	1	6	15.2	visual	33	55.12431	-162.27515	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	9/7/2006	Dolly Varden	1	5	12.7	visual	35	55.12182	-162.27453	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	9/7/2006	Dolly Varden	1	4	10.2	visual	36	55.12181	-162.27446	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	9/7/2006	Dolly Varden	1	4	10.2	visual	37	55.12200	-162.27421	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	10/3/2006	Dolly Varden	1	4	10.2	visual	38	55.12450	-162.27536	Seward B., Harlen N.
Waterfall Creek	Upstream Site	10/3/2006	Dolly Varden	1	4	10.2	visual	39	55.12440	-162.27527	Seward B., Harlen N.
Waterfall Creek	Upstream Site	10/3/2006	Dolly Varden	1	12	30.5	visual	40	55.12443	-162.27510	Seward B., Harlen N.
Waterfall Creek	Confluence Site	10/3/2006	Dolly Varden	1	12	30.5	visual	41	55.12165	-162.27467	Seward B., Harlen N.
Waterfall Creek	Confluence Site	10/3/2006	Dolly Varden	1	4	10.2	visual	42	55.12450	-162.27556	Seward B., Harlen N.
Waterfall Creek	Upstream Site	11/3/2006	No Fish	0			visual	na			Harlen N., Lennie, B.
Waterfall Creek	Confluence Site	11/3/2006	No Fish	0			visual	na			Harlen N., Lennie, B.

1. fish lengths: fork length *measured* in metric units for fish captured during electrofish surveys; total length *estimated* in english units for fish observed during visual observation surveys.

Stream	Site Name	Date	Species	FishCount	FishLength_inches[1]	FishLength_cm[1]	Method	Waypoint	Latitude	Longitude	Crew
Waterfall Creek	Upstream Site	8/2/2007	Dolly Varden	1	6	15.2	visual	1	55.124500	-162.275533	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/2/2007	Dolly Varden	1	6	15.2	visual	2	55.124450	-162.275500	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/2/2007	Dolly Varden	1	6	15.2	visual	3	55.124467	-162.275417	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/2/2007	Dolly Varden	1	6	15.2	visual	4	55.124417	-162.275300	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	2	5.1	visual	7	55.121750	-162.274583	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	2	5.1	visual	7	55.121750	-162.274583	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	7	55.121750	-162.274583	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	8	55.121783	-162.274583	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	9	55.121817	-162.274500	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	9	55.121817	-162.274500	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	9	55.121817	-162.274500	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	9	55.121817	-162.274500	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	9	55.121817	-162.274500	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	9	55.121817	-162.274500	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	10	55.121867	-162.274433	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/2/2007	Dolly Varden	1	4	10.2	visual	10	55.121867	-162.274433	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/23/2007	Dolly Varden	1	8	20.3	visual	12	55.124400	-162.275533	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/23/2007	Pink Salmon	1	adult	adult	visual	12	55.124400	-162.275533	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/23/2007	Pink Salmon	1	adult	adult	visual	12	55.124400	-162.275533	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/23/2007	Pink Salmon	1	adult	adult	visual	12	55.124400	-162.275533	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/23/2007	Pink Salmon	1	adult	adult	visual	12	55.124400	-162.275533	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	8/23/2007	Pink Salmon	1	adult	adult	visual	12	55.124400	-162.275533	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/23/2007	Pink Salmon	1	adult	adult	visual	13	55.122050	-162.274150	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/23/2007	Pink Salmon	1	adult	adult	visual	14	55.122100	-162.274133	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/23/2007	Pink Salmon	1	adult	adult	visual	14	55.122100	-162.274133	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/23/2007	Pink Salmon	1	adult	adult	visual	15	55.122167	-162.274117	Seward B., Mike B., Harlen N.
Waterfall Creek	Confluence Site	8/23/2007	Pink Salmon	1	adult	adult	visual	16	55.122250	-162.274117	Seward B., Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/17/2007	Dolly Varden	1	6	15.2	visual	17	55.124600	-162.275267	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/17/2007	Dolly Varden	1	6	15.2	visual	18	55.124600	-162.275267	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/17/2007	Dolly Varden	1	6	15.2	visual	18	55.124600	-162.275100	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/17/2007	Dolly Varden	1	6	15.2	visual	18	55.124600	-162.275100	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/17/2007	Dolly Varden	1	6	15.2	visual	18	55.124600	-162.275100	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/17/2007	Dolly Varden	1	6	15.2	visual	18	55.124600	-162.275100	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/17/2007	Dolly Varden	1	6	15.2	visual	18	55.124600	-162.275100	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/17/2007	Dolly Varden	1	6	15.2	visual	19	55.124600	-162.275100	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/17/2007	Dolly Varden	1	6	15.2	visual	19	55.124600	-162.275100	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/21/2007	Dolly Varden	1	12	30.5	visual	20	55.124500	-162.275483	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/21/2007	Dolly Varden	1	3	7.6	visual	21	55.124400	-162.275333	Mike B., Harlen N.
Waterfall Creek	Upstream Site	9/21/2007	Dolly Varden	1	3	7.6	visual	22	55.124400	-162.275067	Mike B., Harlen N.
Waterfall Creek	Confluence Site	9/21/2007	Dolly Varden	1	6	15.2	visual	23	55.122000	-162.274150	Mike B., Harlen N.
Waterfall Creek	Confluence Site	9/26/2007	Dolly Varden	1	12	30.5	visual	25	55.124467	-162.275417	Seward B., Mike B.
Waterfall Creek	Confluence Site	9/26/2007	Dolly Varden	1	6	15.2	visual	26	55.124417	-162.275350	Seward B., Mike B.
Waterfall Creek	Confluence Site	9/26/2007	Dolly Varden	1	8	20.3	visual	26	55.124417	-162.275350	Seward B., Mike B.
Waterfall Creek	Confluence Site	9/26/2007	Dolly Varden	1	4	10.2	visual	28	55.122167	-162.274100	Seward B., Mike B.
Waterfall Creek	Upstream Site	10/8/2007	Dolly Varden	1	6	15.2	visual	29	55.124467	-162.275433	Seward B., Harlen
Waterfall Creek	Upstream Site	10/8/2007	Dolly Varden	1	6	15.2	visual	29	55.124467	-162.275433	Seward B., Harlen
Waterfall Creek	Confluence Site	10/8/2007	No Fish	0			visual	na			
Waterfall Creek	Upstream Site	10/17/2007	No Fish	0			visual	na			Seward B., Mike B.
Waterfall Creek	Confluence Site	10/17/2007	No Fish	0			visual	na			Seward B., Mike B.

1. fish lengths: fork length *measured* in metric units for fish captured during electrofish surveys; total length *estimated* in english units for fish observed during visual observation surveys.

Appendix B
Photos

Photo 1. Electrofishing the Upstream Site on Waterfall Creek, February 2006.

Photo 2. Electrofishing the Confluence Site on Waterfall Creek, February 2006.

Photo 3. Typical Waterfall Creek fish habitat, July 2006.

Appendix C
Scanned Field Data Sheets

Aug 07

Waterfall Creek Hydroelectric Project	Site Name: WEIR DAM
Salmon Count: Ø	52° MARK 005 Site Coordinates: N5507469 W16216530
Team Members: HARLEW, SEWARD, MIKE	
Date: 8-2-07 2:00pm START	

Upstream Section LOOKED 100 FT UP

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

N/A NONE FOUND

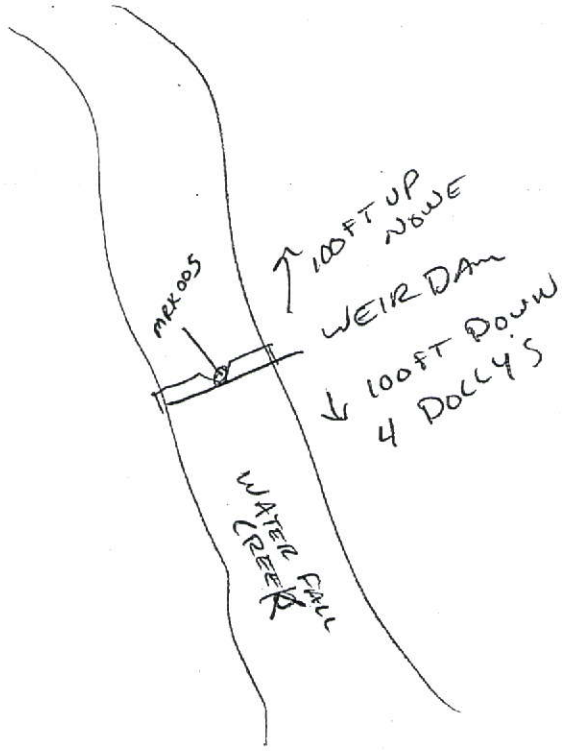
Downstream Section LOOKED 100FT DOWN

Species	~~No. Of Adult Fish~~ SIZE	Actual Spawning Y/N	Notes (GPS cord.)
~~Chinook~~ DOLLY	6"	N	MARK 001 N5507470 W16216532 10FT DOWN
~~Coho~~ DOLLY	6"	N	MARK 002 N5507467 W16216530 50FT DOWN
~~Sockeye~~ DOLLY	6"	N	MARK 003 N5507468 W16216525 50FT DOWN
~~Chum~~ DOLLY	6"	N	MARK 004 N5507465 W16216518 70FT DOWN
~~Pink~~			
Other			

Site:

Site Notes:

Generalized site drawing:



Waterfall Creek Hydroelectric Project	Site Name: WYE CONFLUENCE
Salmon Count: Ø	Site Coordinates: 520 MARK 006 N5507299 W16216478

Team Members: HARLEN, SEWARD, MIKE

Date: 8-2-07 2:20PM START

~~Upstream Section~~ DELTA CREEK WYE MIX with LIL DELTA WATER (SEE BACK OF PAGE)

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
~~Chinook~~ DOLLY	2-2" 1-4"	N	MARK 007 N5507307 W16216475 30FT UP
~~Coho~~ DOLLY	4"	N	MARK 008 N5507307 W16216475 70FT UP
~~Sockeye~~ DOLLY	6-4"	N	MARK 009 N5507309 W16216470 80FT UP
~~Chum~~ DOLLY	2-4"	N	MARK 010 N5507319 W16216448 100FT UP
Pink			
Other			

GOING TO CALL TO SEE WHAT AREA WE ARE NEEDING TO CHECK.

~~Downstream Section~~ 2ND DELTA CREEK WYE ONLY WATERFALL CREEK WTR (SEE BACK OF PAGE)

MARK 011 N5507319 W16216448

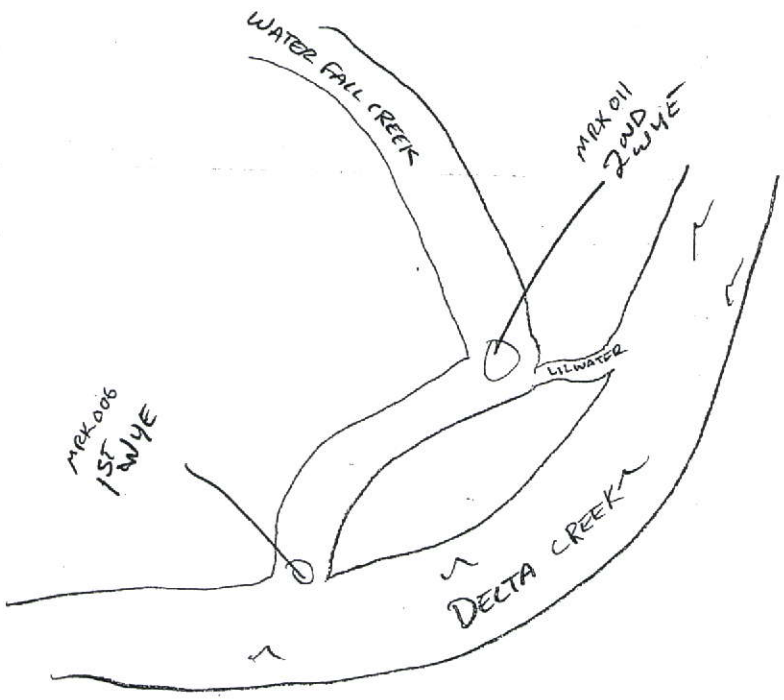
Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

N/A NONE FOUND

Site:

Site Notes:

Generalized site drawing:



Aug 23rd

Waterfall Creek Hydroelectric Project	Site Name: WEIR DAM MARK 005 FROM 8-2-07
Salmon Count: ~~22~~ 5	Site Coordinates:
Team Members: MIKE, HARLEW, SEWARD	
Date: 8-23-07	

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink	~~5~~	~~N~~	~~MARK N55 07.464 012 W162° 16.532~~ 10
Other ~~DOLLY~~	~~1~~		

NONE FOUND IN AREA

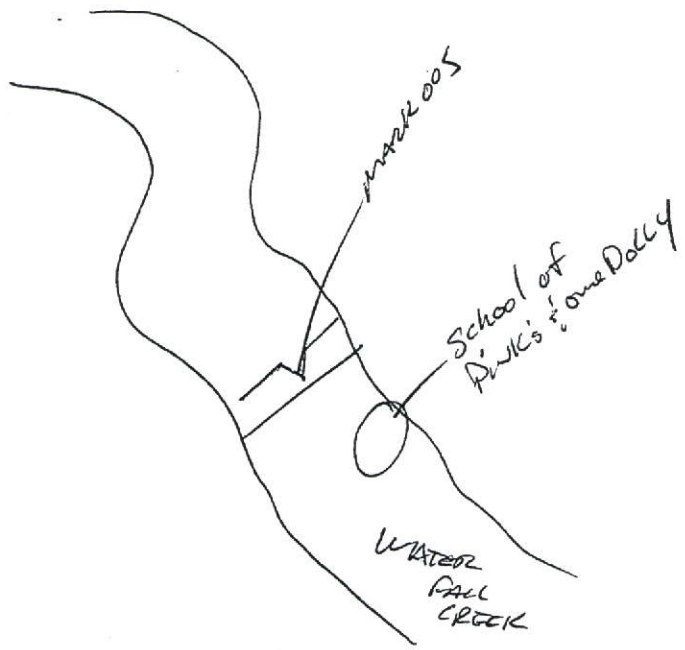
Downstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink	5	N	MARK 012 N55 07.464 W162° 16.532 10 FT DOWN fish were SCHOOLED UP
Other DOLLY	1		with one 8" DOLLY

Site:

Site Notes:

Generalized site drawing:



Waterfall Creek Hydroelectric Project	Site Name: W4E FROM WATER FALL CREEK
Salmon Count: 5	Site Coordinates: MARK 011 N5507319 W16216448
Team Members: SEWARD, HARLEW, WILKE	
Date: 8-23-07	

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink	5	N	MRK 013 N5507323 W16216449 @mouth MRK 014 N5507326 W16216448 20ft up MRK 015 N5507330 W16216447 2 pinks 50ft up MRK 016 N5507335 W16216447 80ft up
Other			all Salmon were just swimming & doing nothing got scared once they seen us & went down the creek

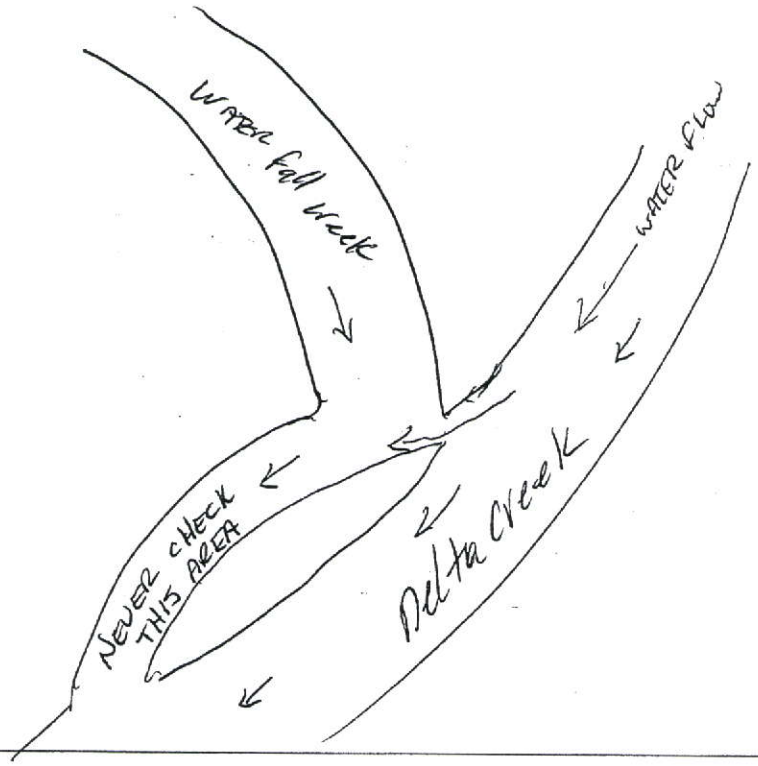
Downstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

Site:

Site Notes:

Generalized site drawing:



Sept 17th

Waterfall Creek Hydroelectric Project	Site Name: Weir Dam
Salmon Count: 0	Site Coordinates: MARK 005 8-2-07
Team Members: MIKE, HARLEN	
Date: 9-17-07 3:10pm	

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook	0		
Coho	0		
Sockeye	0		
Chum	0		
Pink	0		
Other	0		

NONE

Downstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook	0		
Coho	0		
Sockeye	0		
Chum	0		
Pink	0		
Other	Dollys	N	MARK 017 6" Dolly 10ft Down 5507476 16216516 018 6-Dollys 6" 15ft Down 5507476 16216506 019 2-Dollys 6" 20ft Down 5507476 16216506? Loss of SAT.

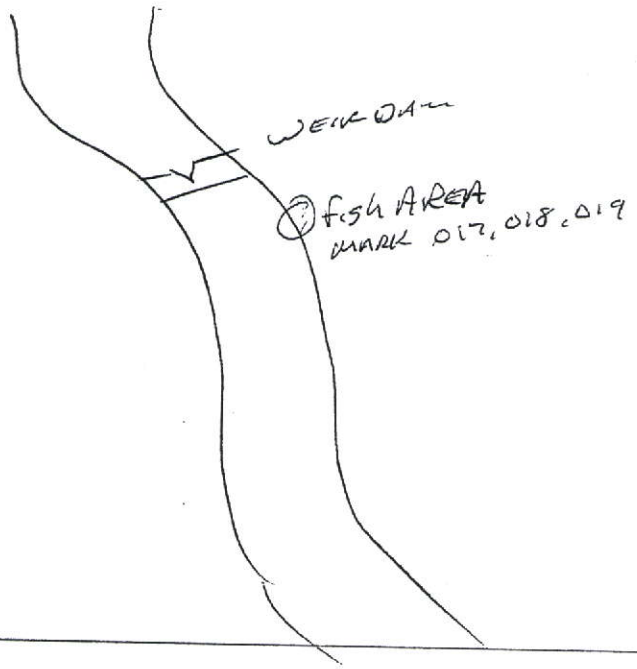
Site: WEIR DAM MARK 005

Site Notes:

RAW LOTS fog DIDN'T PICK UP alot of SAT.

GOT DONE with WEIR DAM & on our way To the WYE THERE WAS A HOUSE fire so WE could not finish the DATA collection. Next couple of DAYS the WEATHER WAS NOT GOOD. :(

Generalized site drawing:



Waterfall Creek Hydroelectric Project	Site Name: W4E
Salmon Count:	Site Coordinates: MRK011
Team Members:	
Date:	

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			HOUSE
Sockeye			FIRE
Chum			DID
Pink			NOT
Other			DO!

Downstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

Site:
Site Notes:
Generalized site drawing:

Sept 21st

Waterfall Creek Hydroelectric Project	Site Name: WEIR DAM ~~[illegible]~~
Salmon Count: 0	Site Coordinates: MARK 005
Team Members: MIKE, HARLEN	
Date: 9-21-2007	

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

NONE

Downstream Section

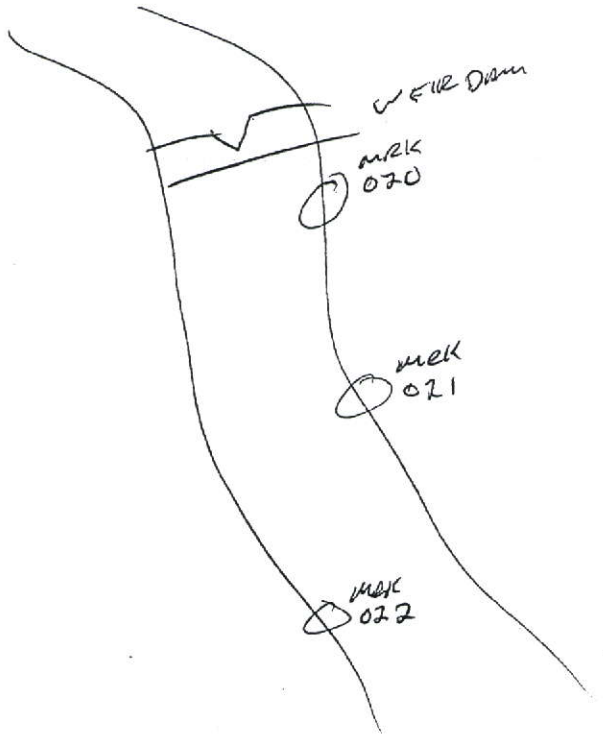
Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook	0		
Coho	0		
Sockeye	0		
Chum	0		
Pink	0		
Other	3 Dollys	N	MARK 070 10ft Down 17" Dolly 5507470 16216529 GREEN 021 40ft Down 3" Dolly 5507464 16216520 – BLACK ONE 022 100ft Down 3" Dolly 5507464 16216504 BROWN ONE

Site: WEIR DAM

Site Notes:

NICE DAY

Generalized site drawing:



Waterfall Creek Hydroelectric Project	Site Name: WYE:
Salmon Count: Ø	Site Coordinates: MRK 011
Team Members: MIKE, HARLEN	
Date: 9-21-07	

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook	0		
Coho	0		
Sockeye	0		
Chum	0		
Pink	0		
Other Dolly	1		MRK 023 6" Dolly 10FT UP 5507320 16216449 ~~[illegible]~~

Downstream Section

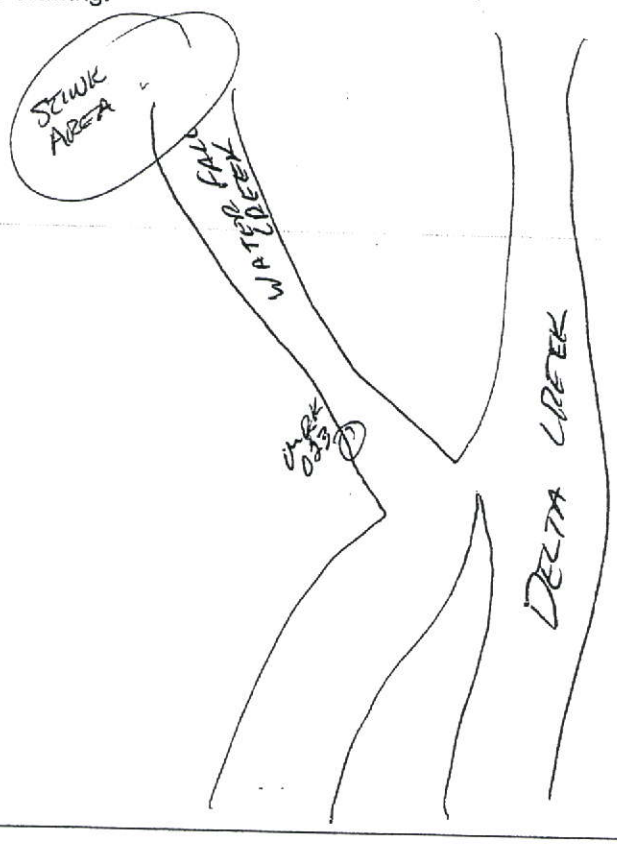
Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

Site: W4E

Site Notes:

Only one fish upper AREA STUNK LIKE Fish (BEAR AREA) GOT OUT of there!

Generalized site drawing:



9-26-07
September

Waterfall Creek Hydroelectric Project	Site Name: WATER FALL CREEK
Salmon Count:	Site Coordinates: MARK 005

Team Members: SEWARD, MIKE

Date: 9-26-07

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

NONE

Downstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook	0		
Coho	0		
Sockeye	0		
Chum	0		
Pink	0		MRK 024 DISREGARD TESTING GPS
	3	N	MRK 025 12" Dolly 10 FT DOWN 5507468 16216525 MRK 026 ② 6 & 8" Dolly 40 FT DOWN 5507465 16216521 MRK 027 DISREGARD TESTING GPS

1-6" Dolly
1-8" Dolly

Site:
Site Notes:
Generalized site drawing:

Waterfall Creek Hydroelectric Project	Site Name: W4E
Salmon Count: Ø	Site Coordinates: MRK 011
Team Members: SEWARD, MIKE	
Date: 9-26-07	

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook	Ø		
Coho	Ø		
Sockeye	Ø		
Chum	Ø		
Pink	Ø		
Other Dolly	1	N	MRK 028 80FT UP 4" DOLLY 5507330 16216 446

Downstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

Site:
Site Notes:
Generalized site drawing:

Oct 8th

Waterfall Creek Hydroelectric Project	Site Name: WATER FALL CREEK WEIRDAM
Salmon Count: 0	Site Coordinates: MARK 005
Team Members: SEWARD / HARLOW	
Date: 10-8-07	

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook	0		
Coho	0		
Sockeye	0		NO fish
Chum	0		
Pink	0		
Other	0		

Downstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook	0		
Coho	0		
Sockeye	0		
Chum	0		
Pink	0		
Other Dolly	2	N	MRK 029 2 6" Dolly's 5507468 16216526

Site:
Site Notes:
Generalized site drawing:

Waterfall Creek Hydroelectric Project	Site Name: WYE
Salmon Count:	Site Coordinates: MARK OLA
Team Members: SEWARD / HARLAN	
Date: 10-8-07	

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

fish

Downstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook		NO	
Coho			
Sockeye			
Chum			
Pink			
Other			

Site:
Site Notes:
Generalized site drawing:

10-17-07

Waterfall Creek Hydroelectric Project	Site Name: WATER FALL CREEK
Salmon Count: Ø	Site Coordinates: DAM Site & WYE
Team Members: Seward, MIKE	
Date: 10-17-07	NO fish found!

Upstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

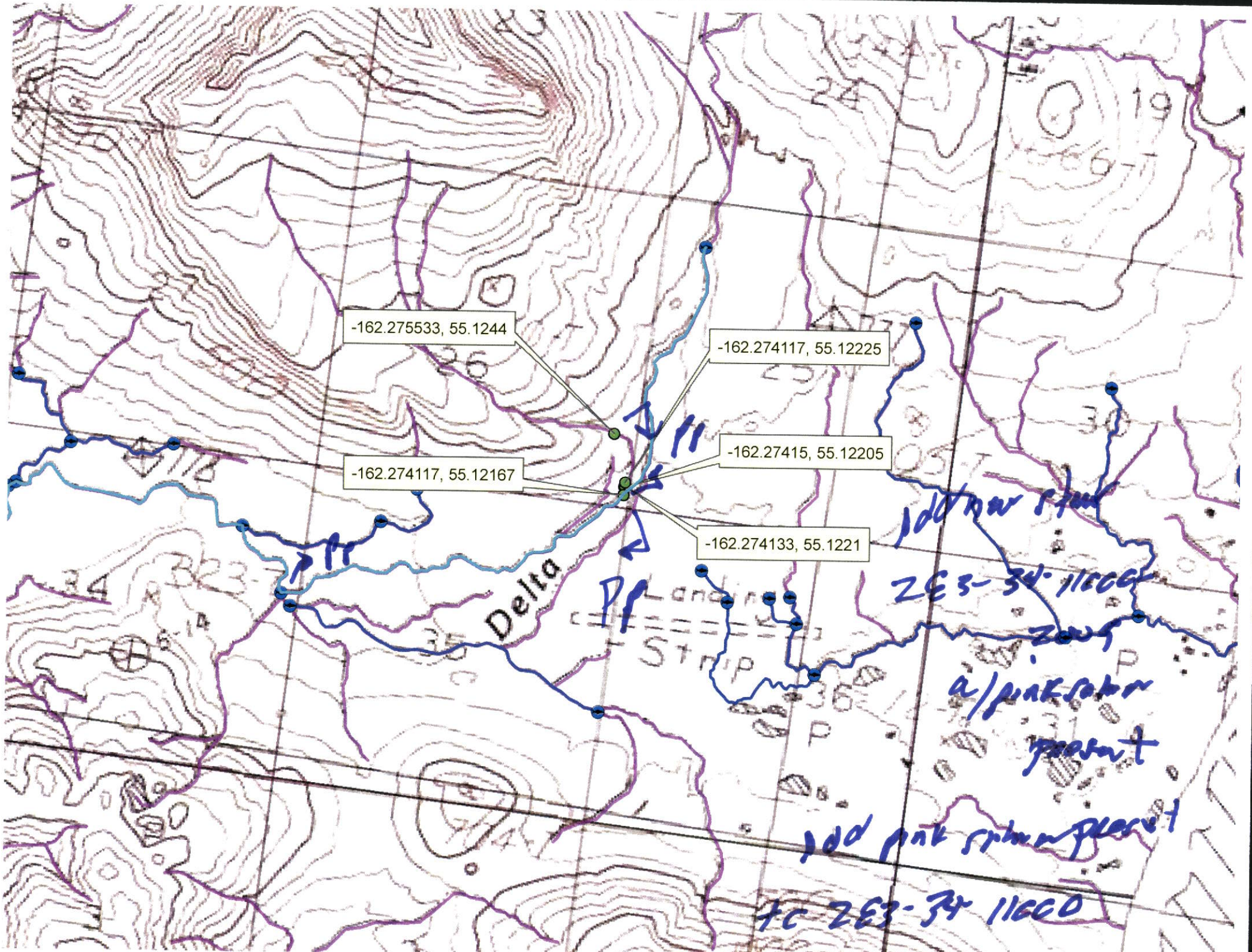
fish anywhere!

Downstream Section

Species	No. Of Adult Fish	Actual Spawning Y/N	Notes (GPS cord.)
Chinook			
Coho			
Sockeye			
Chum			
Pink			
Other			

NO

Site:
Site Notes:
Generalized site drawing: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-162.274117, 55.12225
-162.27415, 55.12205
-162.274117, 55.12167
-162.274133, 55.1221
Delta
Landing
Strip
Pp
Pp
Pp
Pp
Add new stem
2E3-34-11000
2009
a/pink salmon
present
Add pink salmon present
to 2E3-34 11000