Technical Report No. 11-05

Cataloging Anadromous Waters in Northern Southeast Alaska: Juneau Road System, 2010

by

Tess Quinn

August 2011

Alaska Department of Fish and Game **Division of Habitat**

Cover: Tess Quinn pulls a minnow trap from a tributary to Montana Creek in August, 2010. Photo by Matt Kern. All photos in this report are copyright Alaska Department of Fish and Game.

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This document should be cited as:
Quinn, Tess. 2011. Cataloging anadromous waters in Southeast Alaska: Juneau road system, 2010. Alaska Department of Fish and Game, Technical Report No.11-05, Douglas, Alaska.

TECHNICAL REPORT NO. 11-05

CATALOGING ANADROMOUS WATERS IN NORTHERN SE ALASKA: JUNEAU ROAD SYSTEM, 2010

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August 2011

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Habitat, Sport Fish and Commercial Fisheries: Technical Reports, Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, Special Publications and the Division of Commercial Fisheries Regional Reports. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES

LIST OF APPENDICES

Appendix **Page**

ACKNOWLEDGEMENTS

The Division of Habitat thanks the Alaska Sustainable Salmon Fund for the financial support of this Anadromous Waters Cataloging project. Specifically, thank you to Division of Commercial Fisheries staff Peter Bangs, Molly McCafferty and Debbie Maas for their excellence in program administration.

I want to thank the Division of Habitat Southeast Regional Supervisor and Principle Investigator Jackie Timothy for the project design, grant fund acquisition, executive summary, introduction, final editing and for providing the staff participation and other support necessary to ensure the success and completion of the project.

Thank you Alaska Department of Fish and Game Divisions of Habitat and Sport Fish staff for helping with fieldwork, including biologists Katie Eaton, Joe Hitselberger, Caroline Jezierski, Jackie Timothy, and Johnny Zutz, and Fish and Wildlife Technicians Matt Kern, David Leonard, and Kris S'Gro. Sport Fish Research Analyst Kathy Smikrud provided ArcGIS expertise and support, Commercial Fisheries Publications Specialist Amy Carroll edited the report and prepared it for publication, and Division of Administration Project Coordinator Sheila Cameron posted it on our website.

And finally, a great big thank you to Eric Prestegard and Rick Focht of DIPAC for providing the many buckets of gorgeous salmon eggs we used for bait.

EXECUTIVE SUMMARY

Pacific salmon and steelhead habitats in Alaska have been protected to some degree since 1889 with territorial laws implemented in 1919. Shortly after statehood in 1959, territorial laws protecting Pacific salmon and steelhead were imitated and then codified at AS 16.05.870 in 1962. The statutes remain unchanged to this day, except for the numbering; they are now found at AS 16.05.871. Though the law required ADF&G to specify water bodies important for anadromous fish, the department did not compile a list. Instead, ADF&G asserted authority to regulate all water bodies up to the second order from a known anadromous water body. Policy interpretation varied, occasionally providing protection to non-fish bearing tributaries. In 1980, the legislature ordered ADF&G to list the water bodies that contained any life stage of Pacific salmon, as the law required, and imposed a deadline. ADF&G was tasked to complete the list, covering 1,717,856 square kilometers of land and 1.2 million kilometers of streams, in just two years. To complete the work, ADF&G relied heavily on the field experience of biologists throughout the State, but there was not time to field verify nominations.[1]

The *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* and its companion *Atlas*[2] are the documents the ADF&G now uses to list the water bodies considered important for use by anadromous fish. Fish habitat in undocumented water bodies is not afforded protection under State law.

Documenting anadromous waters in Northern Southeast Alaska is a project that provides field verification to the *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* and its companion *Atlas* for water bodies located along the Juneau, Haines, and Sitka road systems and is made possible by a grant from the Alaska Sustainable Salmon Fund. This three-year project started May 1, 2010 and will continue through June 30, 2013. This publication is the first of the series and documents the work conducted along the Juneau road system in 2010.

We conducted the Juneau stream surveys between May and September. Two teams of two biologists and technicians tracked the streams with a Garmin GPS and sampled salmonids using minnow traps, hand nets, visual identification, and a backpack electrofisher. Stream routes were digitized using ArcGIS mapping software. In total, we documented the status of 113 streams and tributaries. The additions and corrections are now published in the 2011 Anadromous Waters Catalog (AWC). If we only captured non-anadromous species or no fish at all, we still digitized the streamcourse in ArcGIS and listed it for further investigation. We will update this technical report annually to include new documentation.

We will apply for Alaska Sustainable Salmon funds to continue this work until all water bodies along the road systems in southeast Alaska communities are field verified. Since economic development activities largely occur along the roads in established communities, this

[1] Frank, M. J., C. M. Rozen, and E. W. Weiss. 2000. Legislative history of Alaska Statutes pertaining to the protection of anadromous fish. Unpublished report. Alaska Department of Fish and Game, Division of Habitat, Anchorage, Alaska.

[2] Johnson, J. and P. Blanche. 2010 Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Southeastern Region, Effective June 1, 2011. Alaska Department of Fish and Game, Special Publication No. 11-07, Anchorage, Alaska.

documentation is the best opportunity to afford protection to the fish habitat most likely to be impacted by development projects.

Key words: *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes*; Northern Southeast Alaska; Stream Cataloging; Stream Survey; Juneau; Haines; Sitka; Coho (*O.kisutch*); Pink (*O. gorbuscha*); Sockeye (*O. nerka*); Chum (*O.keta*); Chinook (*O. tshawytscha*); Steelhead trout (*O. mykiss*); DV (*S. malma*); CT (*O. clarkii*)

INTRODUCTION: JUNEAU 2010

PURPOSE

The purpose of this project is to update the *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes* and its companion *Atlas* along the Juneau road system.

LOCATION AND SURVEY SCHEDULE

Juneau, the state capital, hugs the side of Mounts Juneau and Roberts and is built upon old mine tailings from town's early gold mining days. Although Juneau is one of the nation's largest cities in area,[3] Juneau and its 30,275 residents[4] are the most geographically secluded of any state capital in the country. The city is accessible only by boat or plane, as it is not connected to the state highway system.

One main road stretches 45.563 miles[5] from the south at Thane to the north at Echo Cove and crosses numerous anadromous water bodies (Figure 1). There are a few other connecting roads that cross andromous water bodies and are shown in more detail on the ArcGIS maps in this report.

Anadromous water bodies contain salmon species that include: coho, *Onchorynchus kisutch*; pink, *O. gorbuscha*; sockeye, *O. nerka*; chum, *O.keta*; and Chinook, *O. tshawytscha.* To document anadromous use of a newly identified stream, or to add an anadromous salmonid, two of the same specie must be captured during one sampling event. Other potential anadromous salmonid species that may be present, but cannot be used as a sole indicator of anadromy[6], include: rainbow trout, *O. mykiss*; DV, *S. malma*; and CT *O. clarkii*.[7]

We completed the Juneau Road system stream survey work between May and September, 2010. In total, we surveyed 113 streams; 51 of those were tributaries. We made 31 additions and 25 route corrections to the AWC, and have tagged 49 streams for further investigation. In all, there are only eight streams documented on the Juneau road system that do not require any edits. Of note, we encountered 60 road crossings; 7 bridge crossings and 53 culvert crossings. The Division

[3] U.S. Census Bureau. 2010. Borough/Census area maps for Juneau city and borough. 2010 Census: Alaska demographic profiles. Retrieved from: http://labor.alaska.gov/research/alari/images/maps/5_11_0map.pdf (Accessed July 7, 2011).

[4] U.S. Census Bureau. 2010. Demographic profile for Juneau city and borough. 2010 Census: Alaska demographic profiles. Retrieved from: http://live.laborstats.alaska.gov/cen/dparea.cfm (Accessed July 7, 2011).

[5] C.H. Morehouse, Alaska Department of Transportation and Public Facilities, Juneau, personal communication.

[6] Since the life history of many individuals and populations is completed in fresh water without a salt water phase.

[7] J. Johnson, Alaska Department of Fish and Game, Anchorage, personal communication.

of Sport Fish is currently using the information in this technical report as a guide for surveying these stream crossings for inclusion in the ADF&G Fish Passage Inventory Database.[8]

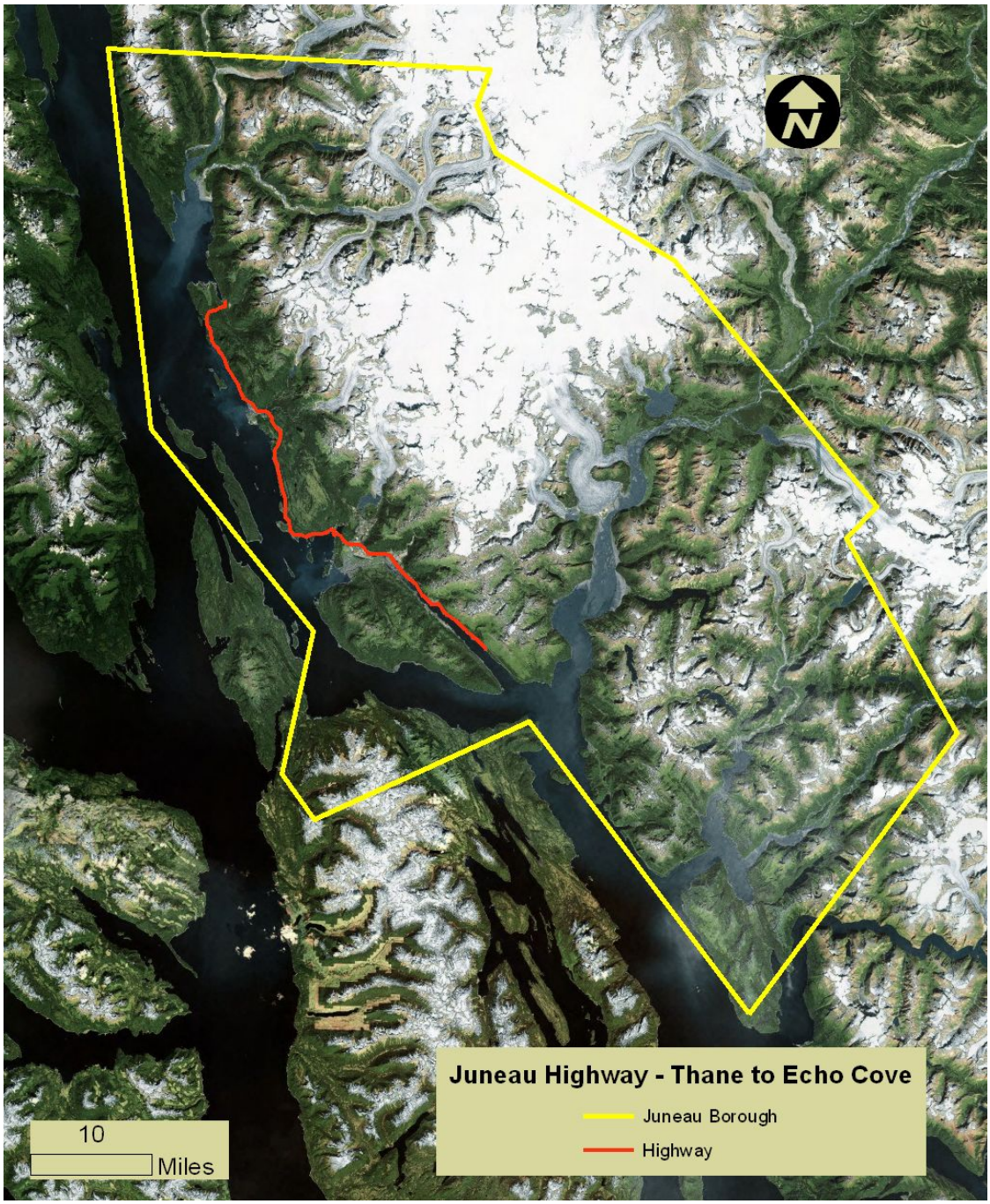

Figure 1: Juneau Highway from Thane to Echo Cove (image created by Johnny Zutz)**.**

[8] State of Alaska, Alaska Department of Fish and Game. 2010. Fish Passage Improvement Program Fish Passage Inventory Database. Retrieved from: http://www.adfg.alaska.gov/index.cfm?adfg=fishpassage.mapping (Accessed July 7, 2011).

METHODS

FIELD METHODS

We planned the logistics for our fieldwork using the AWC and Bethers Report[9] as a guide. Two survey teams of biologists and fish and wildlife technicians tracked the mainstem and all tributaries, from the mouth to a suspected barrier on foot using a Garmin GPS 76CSx or Trimble Nomad 800L. We relied on the Anadromous Fish Block guide from the Alaska Forest Resources & Practices Regulations handbook[10] to determine whether fish can pass a suspected barrier using formulas at high water that include the maximum fall height, pool depth, channel distance and gradient, and jumping capability of each species of salmon (Table 1). If a barrier exceeded that height, or if the channel gradient exceeded a specific distance, we marked the end of anadromy.

Table 1: Anadromous Fish Block (11 AAC 95.265(g) Table A).

	Species Requirements (in feet)				
Criterion	Coho	Steelhead	Sockeye	Chinook	Pink/Chum
Maximum Fall Height. A blockage may be presumed if fall height in feet exceeds:	11	13	10	11	a) 4 with deep jump pool b) 3 without pool
Pool depth. A blockage may be presumed if the unobstructed water column depth in feet within the pool is less than:	1.25 × jump height, except that no minimum pool depth exists for falls as follows: a) less than 4 in the case of coho and steelhead; and b) less than 2 in the case of other anadromous fish species.				
Steep channel. A blockage may be presumed at the upper end of the reach if channel steepness in feet is equal to or greater than the following without resting places for fish:	>225 at 12 percent gradient >100 at 16 percent gradient >50 at 20 percent gradient >25 at 24 percent gradient				>100 at 9% gradient

When we encountered noncataloged streams, we sampled for salmonids using baited minnow traps,[11] backpack electrofishers[12] and hand nets for juveniles, and visually identified adults. We took GPS waypoints at each sampling site, recorded species and life stage, and then photographed and released the fish. Salmonids that couldn't be identified in the field[13] were verified under a Motic Digital Microscope, Model DM143, in our lab.

[9] Bethers, M., K. Munk, and C. Seifert. 1993. Revised June 1995. Juneau Fish Habitat Assessment. Alaska Department of Fish and Game, Division of Sport Fish, Douglas, Alaska.

[10] Alaska Forest and Resources Practices Regulations, 2007, 11 AAC 95.265. Classification of surface water bodies, subpart (g), Table A: Anadromous Fish Blockage.

[11] Magnus, D. L., D. Brandenburger, K. F. Crabtree, K.A. Pahlke, and S. A. McPherson. 2006. Juvenile salmon capture and coded wire tagging manual. Alaska Department of Fish and Game, Special Publication No. 06-31, Anchorage, Alaska.

[12] Smith-Root, Inc. User's Manual, LR-24 Electrofisher. Technology for Fisheries Conservation. Vancouver, Washington.

[13] Pollard, W.R., G.F. Hartman, C. Groot, and P. Edgell. 1997. Field Identification of Coastal Juvenile Salmonids. Department of Fisheries and Oceans, Vancouver, BC, Canada.

GIS MAPPING METHODS

We generated the maps we are using in this technical report using ArcGIS mapping software. We uploaded geo-referenced satellite imagery into the software's data frame and then uploaded the AWC layer[14] on top of the imagery. This provided us a base onto which we could add features.

The stream survey documentation in this technical report includes the stream location, a table of survey data, photos of fish and habitat, and a map of the new or corrected stream route. Our hope is that this technical report provides precise and concise stream survey information for the reader and can accurately inform habitat permitting decisions.

SPECIES CODES

K	=	Chinook salmon
CH	=	chum salmon
CO	=	coho salmon
CT	=	cutthroat trout (anadromous and non-anadromous juveniles and adults)
DV	=	Dolly Varden char
OU	=	eulachon
GS	=	green sturgeon
P	=	pink salmon
RT	=	rainbow trout (unknown juvenile or non-anadromous adult)
SC	=	sculpin-unspecified
SH	=	steelhead salmon (known adult)
TS	=	threespine stickleback

LIFESTAGE CODES

s	=	spawning
r	=	rearing
p	=	presence

[14] State of Alaska, Alaska Department of Fish and Game. 2010. GIS data downloads, Anadromous Waters Catalog. Retrieved from http://www.adfg.alaska.gov/index.cfm?adfg=maps.data (Accessed July 7, 2011).

STREAM SURVEY RESULTS

Bay Creek Route Correction (111-50-10390)

Stream: Bay Creek (111-50-10390 cataloged for COr and Ps).
Watershed: Auke Creek.
USGS Quadrangle: Juneau B-2 Northwest.
MTRS: CRM, Township 40S, Range 65E, NW ¼ of Section 22.
Date surveyed: June, 2010. Bay Creek map.
Sampling method: Baited minnow traps. Bay Creek survey data (Table 2).
Findings: We captured DV and CT (Figures 2, 3) above the cataloged upper limit and though we did not find any barriers to anadromous fish passage we did not catch known anadromous fish.
Recommendations: Correct route in the AWC (Figure 4). Continue to investigate upper portion of stream for anadromy.
Nomination submitted: Yes.
Nomination Status: Pending.
Notes: Waypoints 1 and 2 are the lower and upper limit of the updated route for the species presently listed in the AWC.

Table 2: Bay Creek survey data.

Waypoint	Lat	Long	Species	Effort
1	58.387058	-134.648145		
2	58.38957	-134.650309		
3	58.390394	-134.649846	DV	Minnow trap
4	58.390463	-134.649608	DV	Minnow trap
5	58.390704	-134.649446	DV, CT	Minnow trap
6	58.391528	-134.647759	DV	Minnow trap
7	58.391824	-134.647842	DV	Minnow trap
8	58.392218	-134.647288	DV, CT	Minnow trap
9	58.385233	-134.658566	DV	Minnow trap

Figure 2: CT and DV at waypoint 8.

Figure 3: CT and DV at waypoint 5.

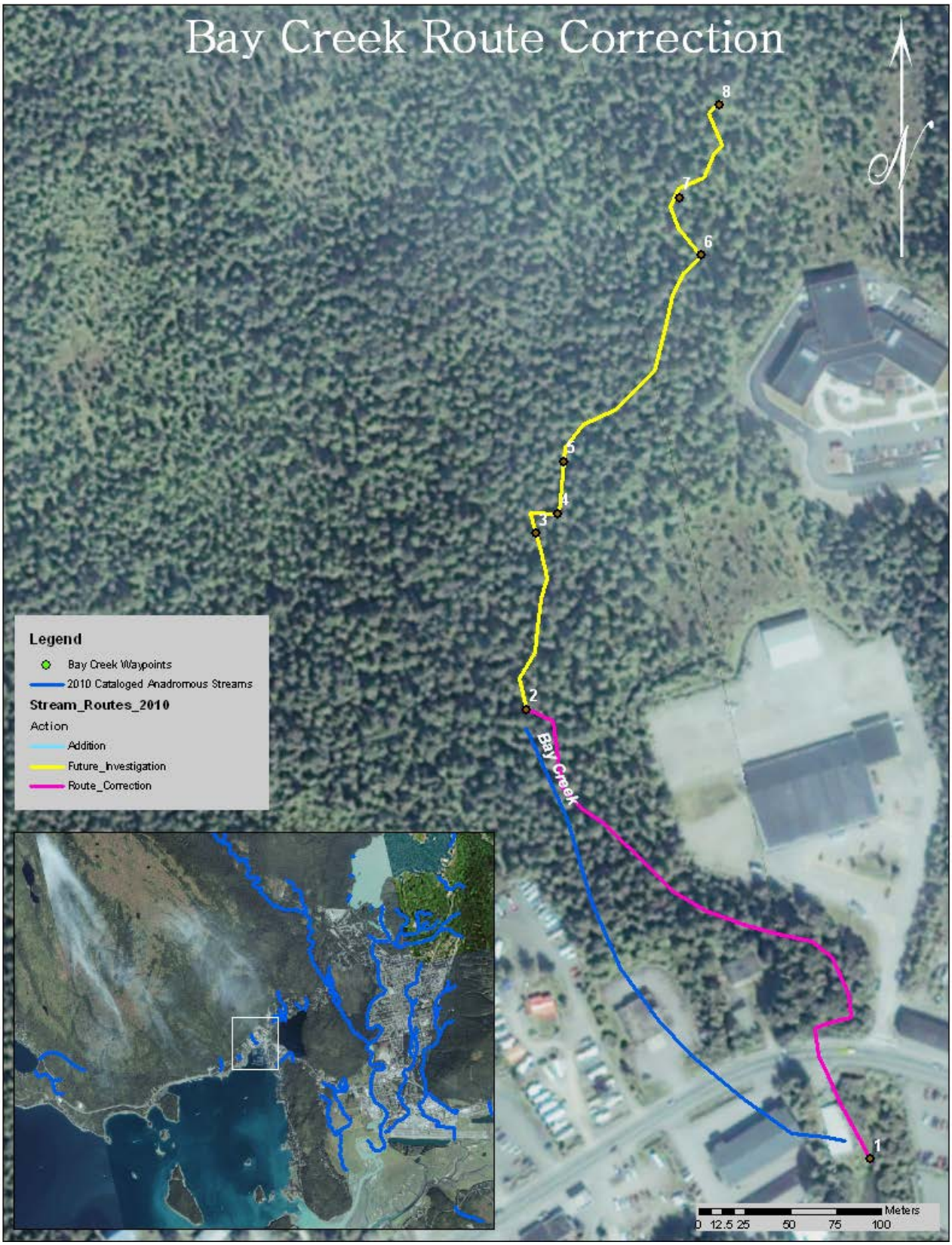

Figure 4: Bay Creek Route Correction.

Bessie Creek Route Correction (115-10-10250)

Stream: Bessie Creek (115-10-10250 cataloged for CHp, COr, Ps (115-10-10250; Figures 5, 6, 7).
Watershed: Bessie Creek.
USGS Quadrangle: Juneau C-3, Southwest.
MTRS: CRM, Township 39S, Range 64E, Section 24.
Date Surveyed: July 14, 2010.
Sampling Method: GPS tracking to determine stream route accuracy. Bessie Creek survey data in Table 3.
Findings: The physical stream route is inconsistent with the route mapped in the AWC.
Recommendations: Update the stream route in the AWC.
Nomination form submitted: Yes. 9/29/2010.
Nomination Status: Change.
Notes: The following table (Table 3) and map (Figure 8) provide survey data and feature locations. The coordinates given for the upper and lower extents are for the species presently listed in the AWC.

Table 3: Bay Creek survey data.

Waypoint	Name	Comments	Lat	Long
1	Begin tracking	Tracking above the tide line.	58.590301	-134.901992
2	Culvert		58.592399	-134.902999
3	Barrier falls	16–20 foot Barrier Falls.	58.5928	-134.901992
4	Upper falls	Upper Barrier Falls. Beauty.	58.593399	-134.899993

Figure 5: Barrier falls on Bessie Creek.

Figure 6: Field staff measuring pool depth at Barrier Falls.

Figure 7: Field staff at culvert on Bessie creek.

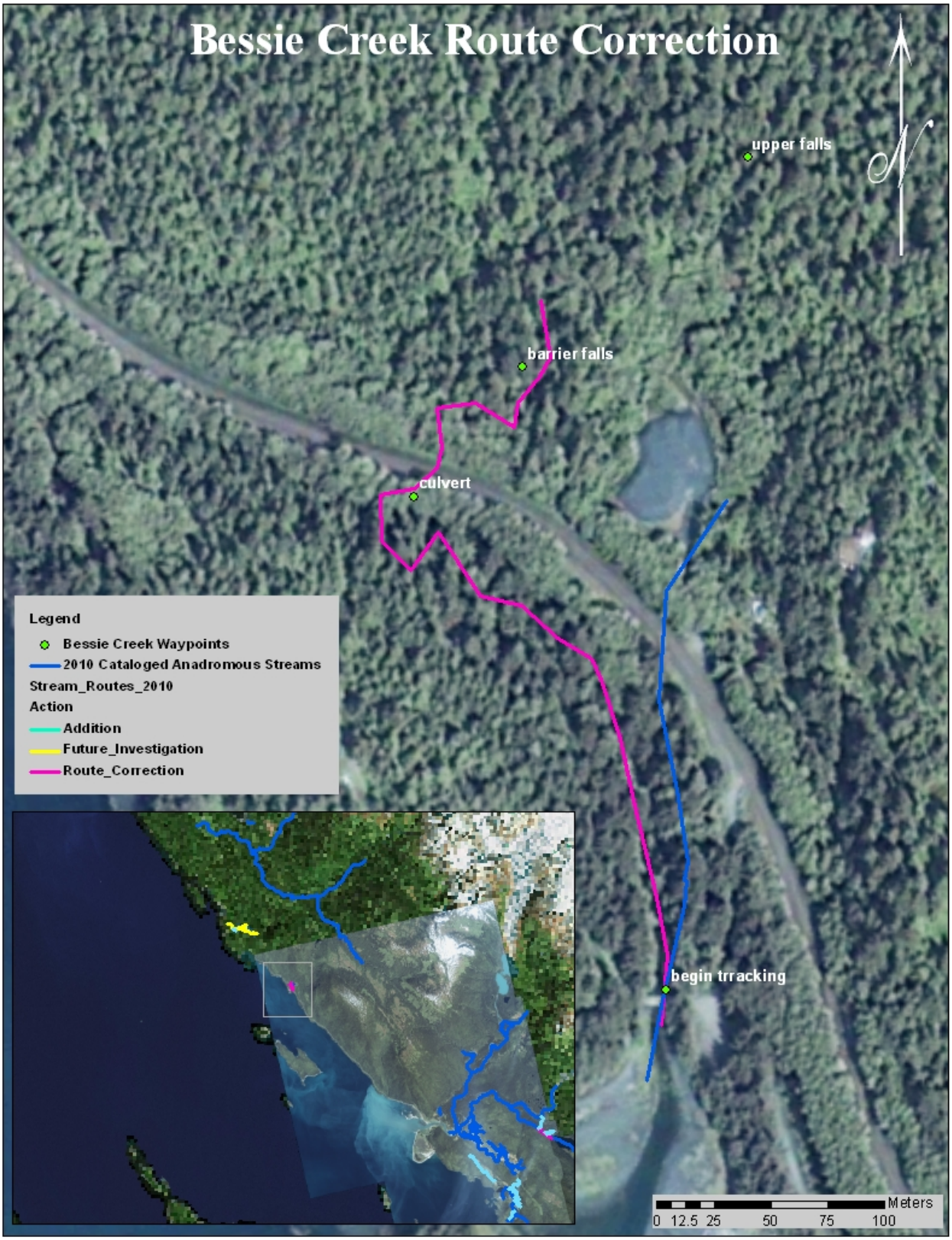

Figure 8: Bessie Creek Route Correction.

DOT No Name Creek Stream Addition (111-40-10050)

Stream: No Name Creek (111-40-10050 cataloged for COsr). Located about 7-mile between Department of Transportation (DOT) building and Switzer Creek trailer park.
Watershed: Sunny Point.
USGS Quadrangle: Juneau B-2, Southwest.
MTRS: CRM, Township 40S, Range 66E, Section 33.
Date Surveyed: September, 2010.
Sampling Method: Minnow traps.
Findings: The stream is anadromous up to waypoint 49 where the last CO was captured.
Recommendation: Add the stream to the AWC. Conduct further surveys of the upper reach to determine anadromy.
Nomination form submitted: Yes. 9/29/2010.
Nomination Status: Change.
Notes: The stream is diverted under Egan expressway and Sunny Point road through a culvert that is approximately 300 feet long. CO smolts were captured at the inlet and outlet of the culvert using baited minnow traps (Figures 9, 10). This stream is littered with trash bears drag into the woods. The following table (Table 4) and map (Figure 11) provide sample data and trap locations and features.

Table 4: DOT No Name Creek Survey Data.

Waypoint	Lat	Long	Description	Effort	Species
21	58.35902	-134.5258	Set trap at inlet of long culvert spanning expressway.	Minnow trap	9 CO
22	58.358032	-134.5251	Set trap at outlet of culvert that spans Egan Expressway. Must be 300 ft long.	Minnow trap	2 DV, 5 CO
47	58.358975	-134.5258	Begin track. Caught many CO smolts here last week.		
48	58.359101	-134.5251	Set trap next to overhanging spruce. Just met a gentleman who said fish used to spawn here before the road was built. Hasn't seen any since.	Minnow trap	1 DV, 3 CO
49	58.35934	-134.5243	Set trap under leaning alder over stream. Outskirts of trailer park. Good spawning gravels.	Minnow trap	1 DV, 1 CO
50	58.360163	-134.5236	End survey. Trash everywhere. Will return with backup.		

Figure 9: CO, DV and TS captured at outlet of 300' culvert.

Figure 10: CO captured at inlet of 300' culvert.

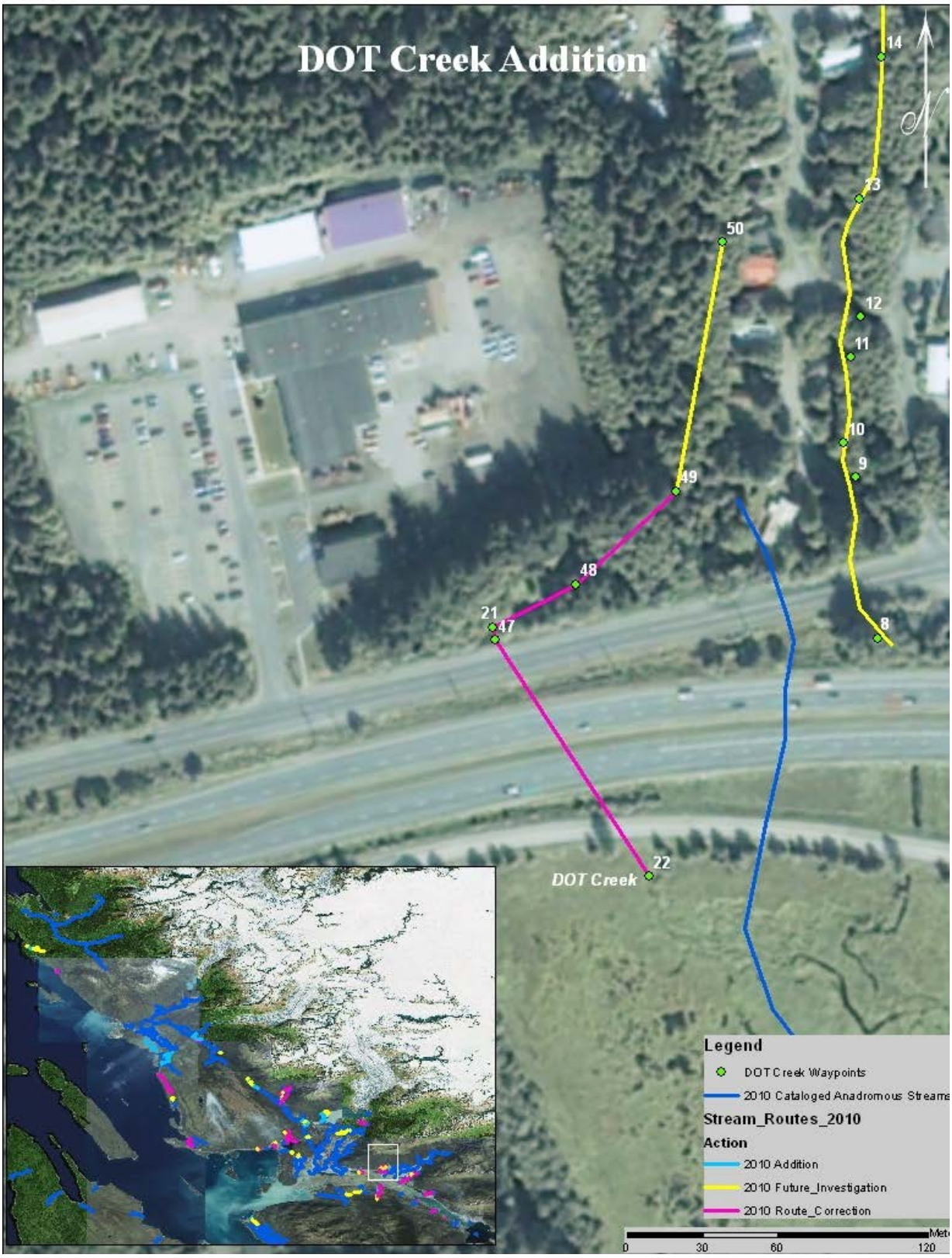

Figure 11: DOT No Name Creek Addition.

East Auke Lake Stream Addition

Stream: East Auke Lake Stream (not cataloged).
Watershed: Auke Creek.
USGS Quadrangle: Juneau B-2, Northwest.
MTRS: CRM, Township 40S, Range 65E, Section 23.
Date Surveyed: July 2007, August 2010.
Sampling Method: Minnow traps.
Findings: This stream was surveyed in July of 2007 and again in August of 2010. One CO was captured at each attempt (Figure 12).
Recommendations: Add the stream to the AWC. Continue to investigate fish presence.
Nomination form submitted: Yes. 9/27/2010.
Nomination Status: No Change. Does not meet ADF&G standard for addition at this time.
Notes: This stream was previously trapped by habitat biologist Carl Schrader in July, 2007. He captured one CO in the lower reach. The stream was sampled again in August, 2010, and one CO was captured in the upper reach. The following table (Table 5) and map (Figure 13) provide sample data and trap locations and features.

Table 5: East Auke Lake survey data.

Waypoint	Lat	Long	Description	Effort	Species
53	58.381208	-134.6304	Mouth of stream into Auke Lake. Begin track line.		
54	58.380797	-134.62969	Set trap in small pool. Lots of subsurface flows through root wads and vegetation up to this point.	Minnow trap	8 DV
55	58.380128	-134.62881	Pulled trap set by Fish and Wildlife along highway last week.	Minnow trap	1 CO, 7 DV
56	58.379941	-134.62733	End survey. Steep channel, flows just a trickle, nowhere to set trap.		
57	58.380085	-134.62819	Set trap in very shallow pool under mossy log. Water just a trickle.	Minnow trap	Empty
58	58.388966	-134.62444	Point at bridge across trail.		
59	58.389379	-134.62499	Set trap at plank on old trail. Previously caught DV with Carl Schrader.	Minnow trap	Empty
60	58.389303	-134.62527	2' vertical falls at lakeshore. Barrier to juveniles.		

Figure 12: CO and DV captured in upper reach, August 2010.

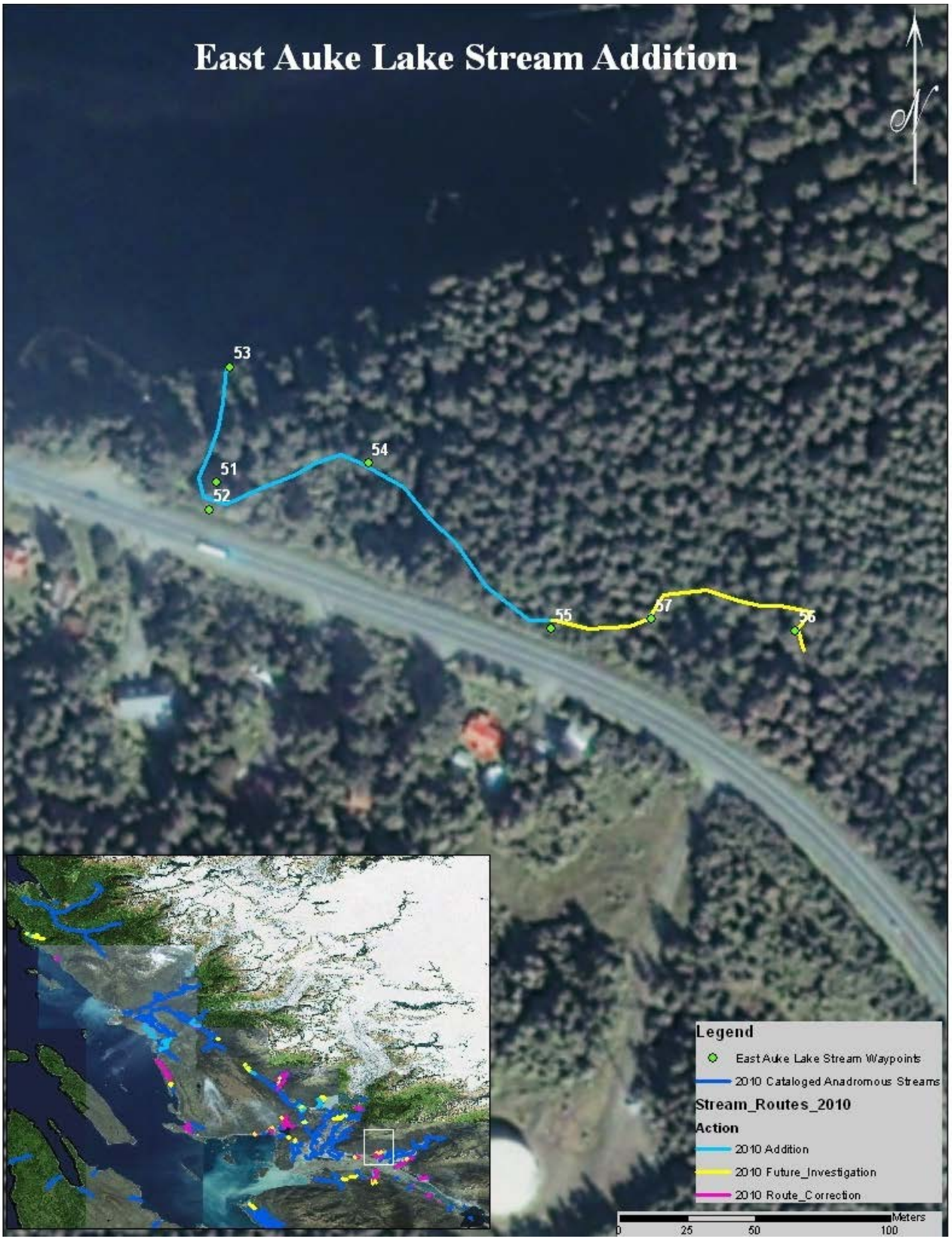

Figure 13: East Auke Lake Stream Addition.

Falls Creek Route Correction (111-40-10940)

Stream: Falls Creek (111-40-10940 information in catalog incorrect listing only DVp).
Watershed: Bear Creek.
USGS Quadrangle: Juneau B-2, Southeast.
MTRS: CRM, Township 41S, Range 67E, Section 8.
Date Surveyed: June, 2010.
Sampling Method: Minnow trap.
Findings: A culvert perched 5.5 feet passing beneath North Douglas highway is a barrier to anadromous fish (Figure 14). Minnow traps set above the culvert and below a large log jam yielded three DV (Figure 15).
Recommendations: Update the stream route in the AWC to reflect the shortened route and culvert barrier. Continue to investigate lower portion of stream for anadromy.
Nomination form submitted:Yes.
Nomination Status: Pending.
Notes: A trap set above the culvert yielded DV. The anadromous portion of the stream has intermittent spawning gravels, large wood debris, and large boulders with overhanging vegetation. Waypoint 8 indicates the upper limit to anadromy for the species presently listed in the AWC. Waypoint 9 is the mouth of the stream entering saltwater. The following table (Table 6) and map (Figure 16) provide sample data and trap locations and features.

Table 6: Falls Creek survey data.

Waypoint	Lat	Long	Notes	Species
6	58.322798	-134.48246	Set trap 75' above culvert, below 4' falls created by large woody debris.	3 DV
7	58.323383	-134.48176	Inside mouth of 90' culvert with 8% gradient and a 5.5' perch.	
8	58.323233	-134.48186	Base of perched culvert with large boulders beneath, and 2' deep plunge pool.	
9	58.323677	-134.48139	Begin track log in lower extent of stream.	

Figure 14: Perched culvert on Falls Creek.

Figure 15: Elevated streambed and log jam on Falls Creek.

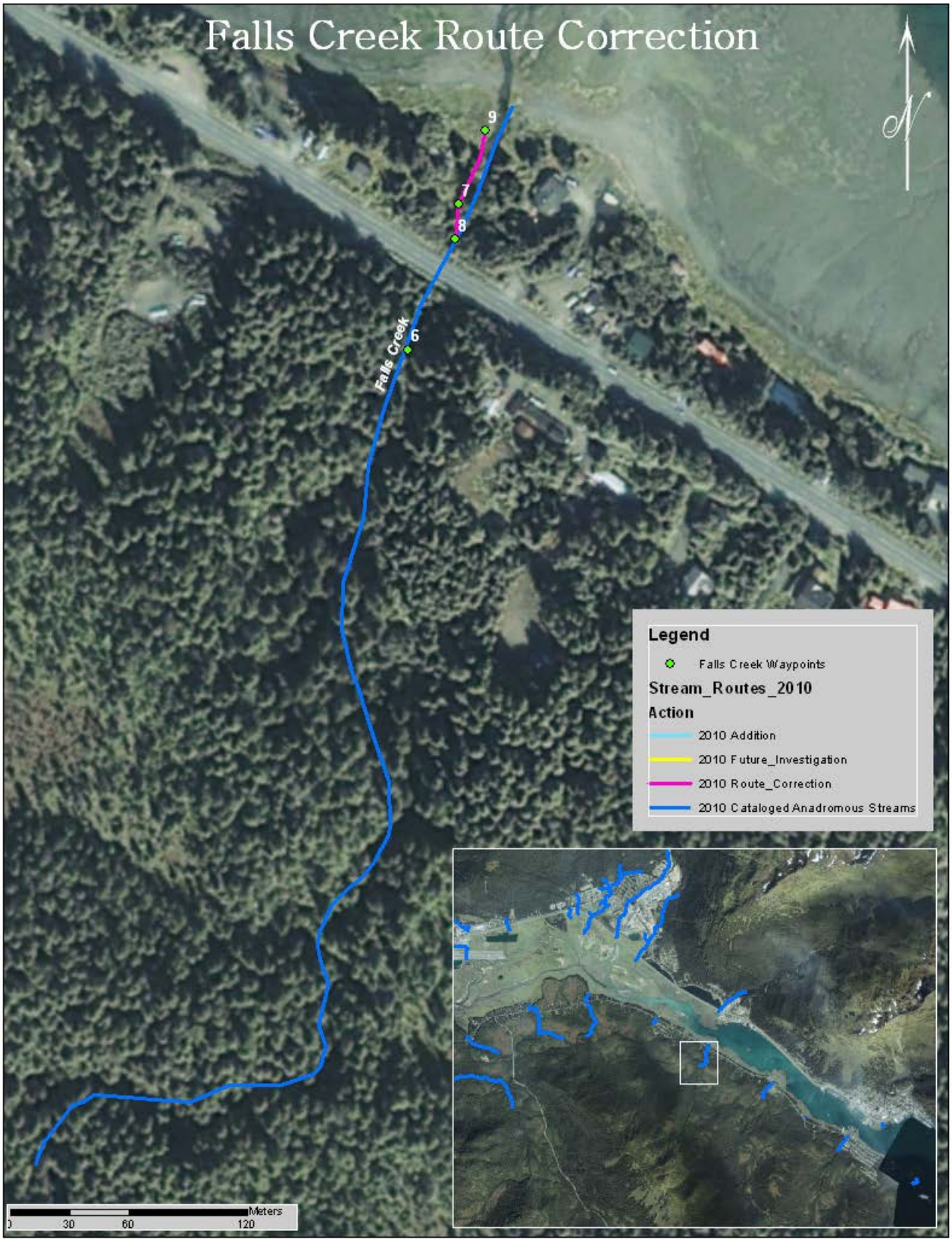

Figure 16: Falls Creek Route Correction.

Grant Creek Route Correction (111-40-10910)

Stream: Grant Creek (111-40-10910 cataloged for COp).
Watershed: Bear Creek.
USGS Quadrangle: Juneau B-2, Southwest.
MTRS: CRM, Township 41S, Range 67E, Section 22.
Date Surveyed: June, 2010.
Sampling Method: GPS tracking for stream route accuracy.
Findings: Potential fish habitat terminates at a poorly placed culvert that passes under North Douglas highway (Figure 17). The outlet is perched and the inlet is set two feet below the streambed.
Recommendations: Update the stream route in the AWC. This culvert would be a good one for replacement someday.
Nomination form submitted: Yes.
Nomination Status: Pending.
Notes: The upper portion of the stream maintains a 15% gradient with some areas for rearing, while spawning would most likely take place in the intertidal (Figure 18). Waypoint 1 indicates the mouth of Grant Creek and waypoint 4 indicates the upper limit for species presently listed in the AWC. The following table (Table 7) and map (Figure 19) provide sample data and terrain locations and features.

Table 7: Grant Creek survey data.

Waypoint	Lat	Long	Notes
1	58.303905	-134.44943	Begin trackline at mouth of stream where it empties out into the wetlands.
2	58.30387	-134.44963	Base of bedrock reach 30 feet long, 15% gradient.
3	58.303757	-134.44983	End of bedrock stretch, large boulders and cobbles. Good rearing, not spawning.
4	58.303434	-134.45021	Outlet of culvert that crosses under North Douglas Hwy. Stream maintains a 15% gradient from bedrock reach to inlet of culvert.
5	58.303256	-134.45081	Inlet of culvert. Stream bed is 2 feet higher than culvert inlet. Strange placement.

Figure 17: Perched culvert outlet.

Figure 18: Looking upstream toward road crossing on Grant Creek.

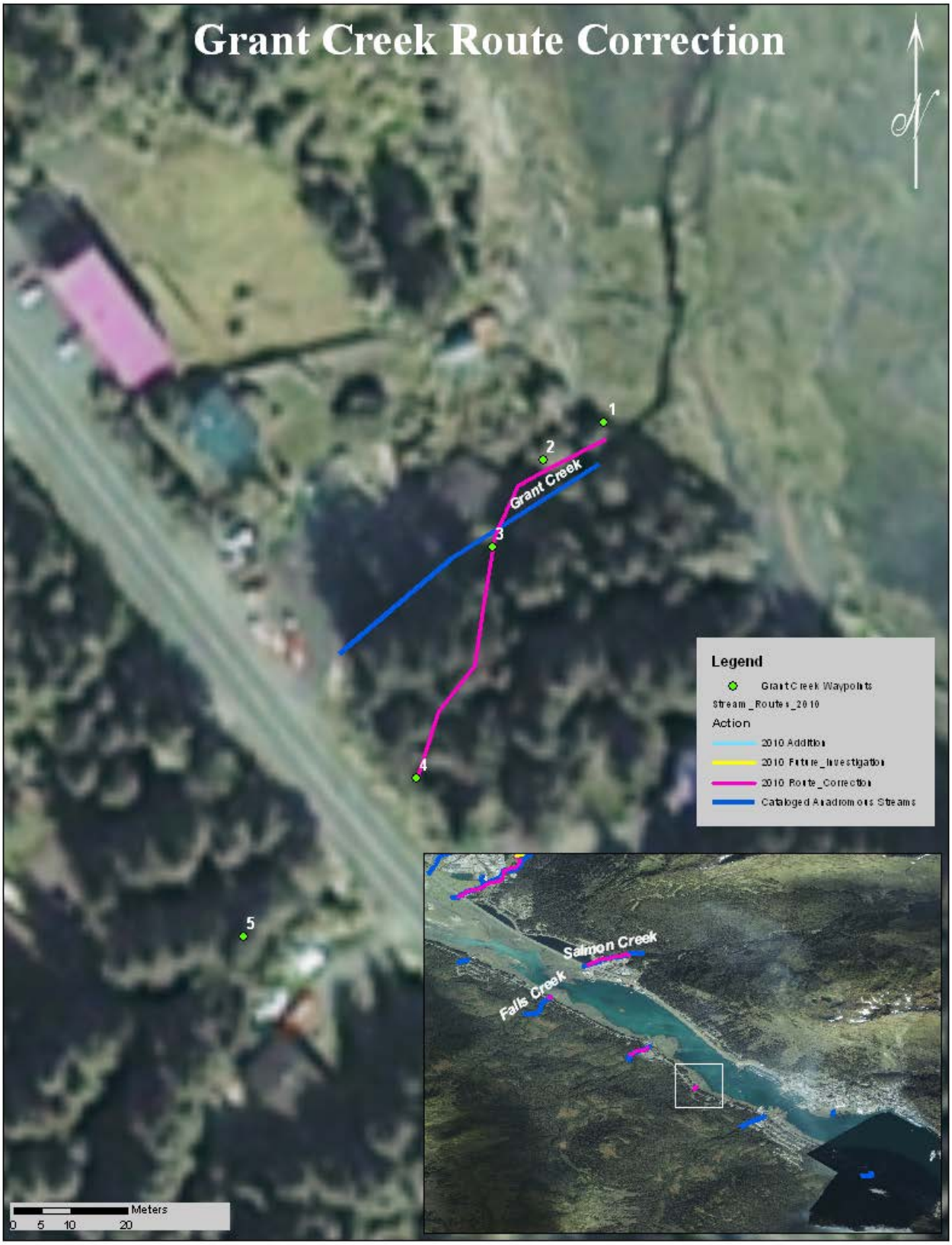

Figure 19: Grant Creek Route Correction.

Hendrickson Creek Route Correction (111-40-10980)

Stream: Hendrickson Creek (111-40-10980 cataloged for COr, Ps, CTr, DVp).
Watershed: Bear Creek.
USGS Quadrangle: Juneau B-2, Southwest.
MTRS: CRM, Township 41S, Range 67E, Section 6.
Date Surveyed: June, 2010.
Sampling Method: GPS tracking of stream route accuracy.
Findings: The mapped stream route in the AWC is inconsistent with the actual physical stream route. CO and CT are in the creek (Figures 20, 21).
Recommendations: Update the stream route in the AWC. Document the new tributary for anadromous extent.
Nomination for submitted: Yes. 9/3/2010.
Nomination Status: Change.
Notes: The following table (Table 8), and map (Figure 22) provide sample data and trap locations and features.

Table 8: Hendrickson Creek survey data.

Waypoint	Lat	Long	Trap Stat	Soak Time	Description	Species LE	Lifestage	Name
1	58.340327	-134.52355	N/A	N/A	Begin trackline above tidally influenced reach.	N/A	N/A	Hendrickson Creek
2	58.339866	-134.52498	N/A	N/A	Took point at mouth of uncataloged tributary.	N/A	N/A	Hendrickson Creek
3	58.337025	-134.52481	Non-salmon minnow trap	4 hr	Set trap in deep pool with gravels and cobbles below mossy log and large boulder.	3 CT, 2 DV	N/A	Hendrickson Creek
4	58.335068	-134.52407	E-fished	15 sec	Electrofished in deep pool below a loggy cascade.	1 CT	N/A	Hendrickson Creek
5	58.32948	-134.5275	N/A	N/A	Point taken at tributary; tracked by Katie E.	N/A	N/A	Hendrickson Creek
6	58.32858	-134.52652	E-fished	15 sec	Fished in pool below bedrock cascade.	1 CT	N/A	Hendrickson Creek
7	58.327813	-134.52529	E-fished	15 sec	Fished in shallow riffle above barrier.	1 CT	N/A	Hendrickson Creek
8	58.327781	-134.52537	Empty minnow trap	1 hr	Set trap in shallow pool below barrier.	N/A	N/A	Hendrickson Creek
9	58.327124	-134.52505	N/A	N/A	Ended survey due to time and stream size decreasing. No fish caught last three attempts.	N/A	N/A	Hendrickson Creek
10	58.329135	-134.52827	E-fished	15 sec	Fished small tributary; saw unidentified trout fry.	CT	N/A	Hendrickson Creek

Figure 20: CT captured in Hendrickson Creek.

Figure 21: CT captured in Hendrickson Creek.

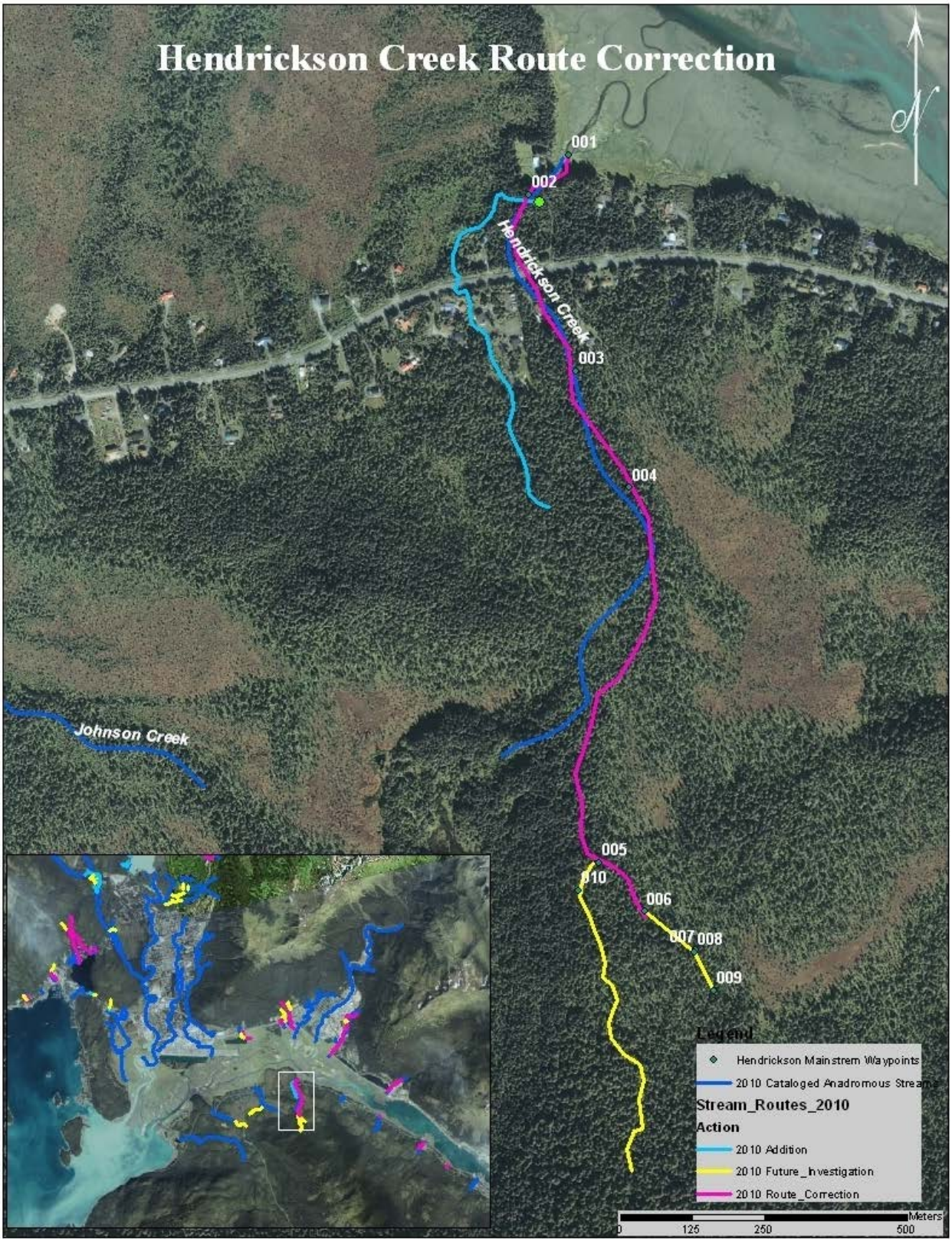

Figure 22: Hendrickson Creek Route Correction.

Hendrickson Creek Tributary (111-40-10980-2002)

Stream: Hendrickson Creek tributary (111-40-10980-2002 cataloged for COr).
Watershed: Bear Creek.
USGS Quadrangle: Juneau B-2, Southwest.
MTRS: CRM, Township 41S, Range 67E, Section 6.
Date Surveyed: May, 2010.
Findings: Minnow traps were set along the anadromous length of the uncataloged tributary, which yielded 19 coho smolts (Figures 23, 24, 25), 26 DV, and 1 sculpin.
Recommendations: Add the Hendrickson Creek tributary to the AWC.
Nomination form submitted: Yes. 9/3/2010.
Nomination Status: Change.
Notes: The stream was walked to the end of anadromous habitat which terminates at a gradient of 20% and subsurface trickle from a forested wetland. The stream's substrate consists of fines, organics, and gravels, punctuated with small cascades created by woody debris. The upper reach flows through a steep forested muskeg and further exploration was limited due to extremely low water flow. The following table (Table 9), and map (Figure 26) provide sample data and trap locations and features.

Table 9: Hendrickson Tributary survey data.

Waypoint	Lat	Long	Trap Stat	Soak Time	Description	Species LE	Lifestage	Name
4	58.337189 Lower reach	-134.526989 Lower reach	Nonsalmon	4 hr	Set trap in deep pool below 1' cascade, below french drain.	9 DV	p	Uncataloged Hendrickson tributary
5	58.337048	-134.526851	No trap	N/A	Took point in middle of road; owner created a rough french drain that water is trickling out of. Approximately 14 feet across.	N/A	N/A	Uncataloged Hendrickson tributary
6	58.336896	-134.526829	No trap	N/A	Stream seeps into gravels…very low flows (May 28, 2010)	N/A	N/A	Uncataloged Hendrickson tributary
7	58.335066	-134.526596	No trap	N/A	End of potential anadromy. Stream just a seep and flows subsurface and gradient steepens to 20%.	N/A	N/A	Uncataloged Hendrickson tributary
8	58.338835	-134.527550	Salmon	4 hr	Set trap in scour pool below culvert on North Douglas Hwy.	6 CO, 3 DV	r	Uncataloged Hendrickson tributary
9	58.338637	-134.527750	Salmon	4 hr	Set trap above North D. culvert in shallow pool w/ fines, cobbles.	4 CO, 3 DV	r	Uncataloged Hendrickson tributary
10	58.338433 Upper reach	-134.527443 Upper reach	Salmon	4 hr	Set trap in deep pool below 1' cascade, below french drain.	9 CO, 12 DV 1 SC	r	Uncataloged Hendrickson tributary
11	58.336999	-134.526911	Nonsalmon	4 hr	Set trap above french drain in small pool w/ fines, gravels.	5 DV	p	Uncataloged Hendrickson tributary

Figure 23: CO captured in Hendrickson Creek tributary.

Figure 24: CO and DV captured in Hendrickson Creek tributary.

Figure 25: CO captured in Hendrickson Creek tributary.

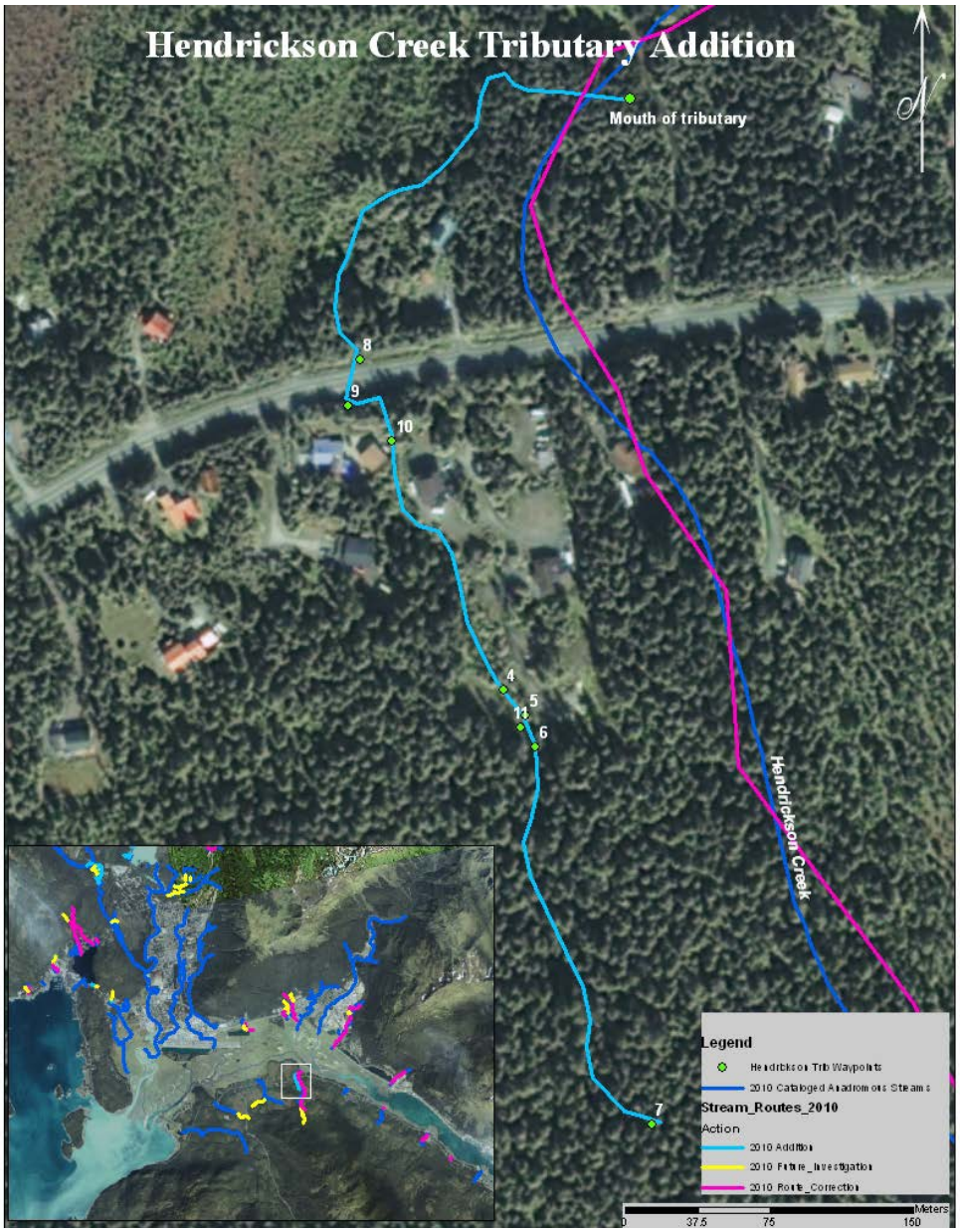

Figure 26: Hendrickson Creek Tributary Addition.

Lake Creek Upper Extent Addition (111-50-10420-2010)

Stream: Lake Creek (111-50-10420-2010 cataloged for COpr, Ps).
Watershed: Auke Creek.
USGS Quadrangle: Juneau B-2 Southeast.
MTRS: CRM, Township 40S, Range 65E, Section 23.
Date Surveyed: August, 2010.
Findings: The mapped upper extent of this stream is inaccurate and the stream was extended. We captured juvenile CO and CT (Figures 27, 28).
Recommendations: Update the current upper extent of Lake Creek.
Nomination form submitted: Yes. 9/3/2010.
Nomination Status: Change.
Notes: The following table (Table 10), and map (Figure 29) provide sample data and other features.

Table 10: Lake Creek survey data.

Name	Date	Comments	Lat	Long
Begin track of lake creek	7/27/2010	Begin track on gravel spit in Auke Lake.	58.3908 0	-134.632995
Tributary on river left	7/27/2010	Saw CO; will try to trap with minnow traps.	58.400001	-134.634002
End of tributary	7/27/2010	Tributary ends in organic seepy mud.	58.400501	-134.634002
Barrier tributary	7/27/2010	Awesome little barrier on river right. Channel steepens; set trap in deep pool below series of cascades.	58.4038 0	-134.638
CO	7/27/2010	Trapped 2 CO, 2 CT, and a bunch of DV.	58.401798	-134.636001
CO	7/27/2010	Trapped over a dozen CO smolts and juvenile salmon in organic pool w/ good overhanging vegetation.	58.403744	-134.637949
CO	7/27/2010	Coho in tributary trapped in large woody debris, overhanging vegetation, organics.	58.399898	-134.634002
CO	7/27/2010	Trapped 5 CO smolts in tributary.	58.400001	-134.634002
CO	7/27/2010	Trapped 8 CO smolts, 2 CT, and a couple of DV.	58.395599	-134.632995

Figure 27: CO in Lake Creek.

Figure 28: CT and CO in Lake Creek.

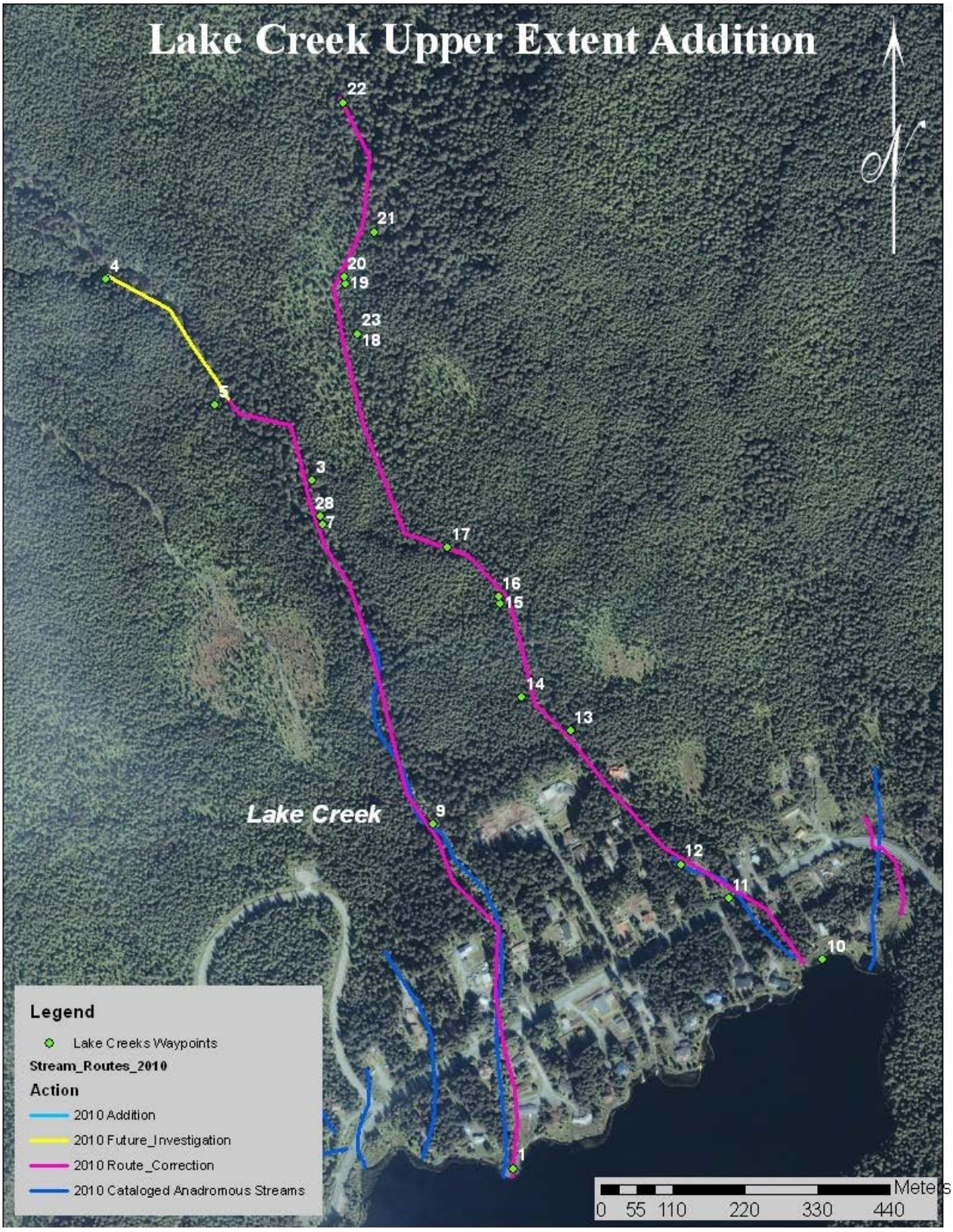

Figure 29: Lake Creek Upper Extent Addition.

Lake 2 Creek Extension (111-50-10420-2008)

Stream: Lake 2 Creek (111-50-10420-2008 cataloged for CHs,COsr,Ps,Ss,CTs).
Watershed: Auke Creek.
USGS Quadrangle: Juneau B-2 Southeast.
MTRS: CRM, Township 40S, Range 65E, Section 23.
Date Surveyed: July, 2010.
Findings: The mapped upper extent of the stream is inaccurate and was extended.
Recommendations: Update the stream route and upper extent in the AWC. We captured CT and CO in the creek (Figures 30, 31).
Nomination form submitted: Yes. 9/3/2010.
Nomination Status: Change.
Notes: The upper extent of this stream extends beyond what is currently cataloged. The following table (Table 11), and map (Figure 32) provide sample data and other features.

Table 11: Lake 2 Creek extension survey data.

Waypoint	Name	Date	Comments	Latitude	Longitude
10	Mouth of Lake Creek 2	7/28/2010		58.392601	-134.623992
11	Culvert on Back Loop Rd.	7/28/2010	Double w/1 higher, 6' embedded.	58.393699	-134.626007
Stream	Bank stabilization project	7/28/2010	Road right bank is propped up by boards in an attempt to stabilize and keep land. Pinching stream. Below ordinary high water.	58.394298	-134.626998
13	Lake Creek 2, trap 1	7/28/2010	Pulled 1633, 1 CT, 12 DV, 13 CO (50-110 mm). Huge DV w/big belly.	58.3964	-134.628997
14	Lake Creek 2, trap 2	7/28/2010	Pulled 1619, 3 CT, 10 DV, 6 CO. No fish in trap 3. No photos.	58.396999	-134.630004
15	Lake Creek 2 Tributary on river left	7/28/2010	Very small and shallow.	58.3983	-134.630004
16	Trap 3	7/28/2010		58.398399	-134.630004
17	Lake Creek 2, Trap 4	7/28/2010	Pulled at 1530. 3 CT, 16 DV, 4 CO (70-120 mm). One photo.	58.3992	-134.630996
18	Trap 5	7/28/2010		58.402301	-134.632003
19	Lake Creek Tributary on road right	7/28/2010	Very small and shallow.	58.402999	-134.632003
20	Trap 6	7/28/2010	Pulled 1439. 11 CT, 2 DV, 7 CO (80-120 mm). Took photos.	58.403099	-134.632003
21	Lake Creek 2 end-not yet	7/28/2010	No end of anadromy yet. 1 CO caught w/net.	58.403598	-134.630996
22	Lake Creek 2 end of survey	7/28/2010	Hasn't been a barrier yet but extremely brushy and difficult to walk channel .	58.405399	-134.630996
23	Trap 5	7/28/2010	Pulled 1458. 7 CT, 8 DV, 8 CO (60-100 mm).	58.402301	-134.632003

Figure 30: CO and CT in Lake 2 Creek.

Figure 31: CO caught in Lake 2 Creek.

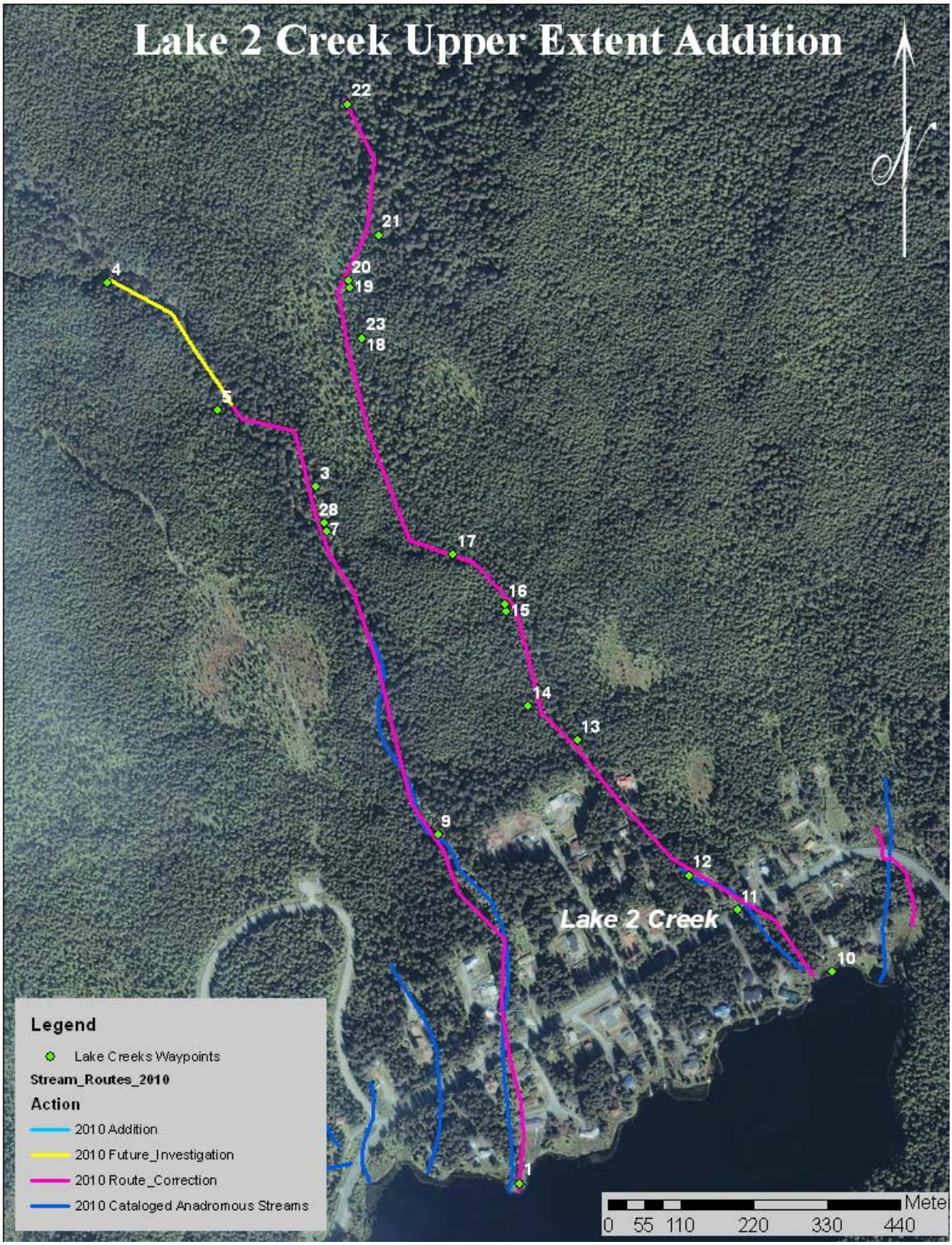

Figure 32: Lake 2 Creek Upper Extent Addition.

Lena Creek Route Correction (111-50-10300)

Stream: Lena Creek (111-50-10300 cataloged for CHp,COr,Pp,DVp).
Watershed: Auke Cape.
USGS Quadrangle: Juneau B-3 Northeast.
MTRS: CRM, Township 40S, Range 65E, Section 18.
Date Surveyed: June, 2010.
Findings: A waterfall barrier exists on Lena Creek and terminates anadromous fish habitat at a shorter distance from the mouth than is currently mapped in the AWC.
Recommendations: Update this stream in the AWC by shortening the cataloged length to stop at the waterfall.
Nomination form submitted: Yes. 9/3/2010.
Nomination Status: Change.
Notes: The waterfall barrier measures a gradient of 45 to 50% over approximately 140 feet and is just upstream of Glacier Highway. The following table (Table 12), and map (Figure 33) provides route correction data.

Table 12: Lena Creek survey data.

Waypoint	Lat	Long
7	58.39549	-134.74851
8	58.39591	-134.74584

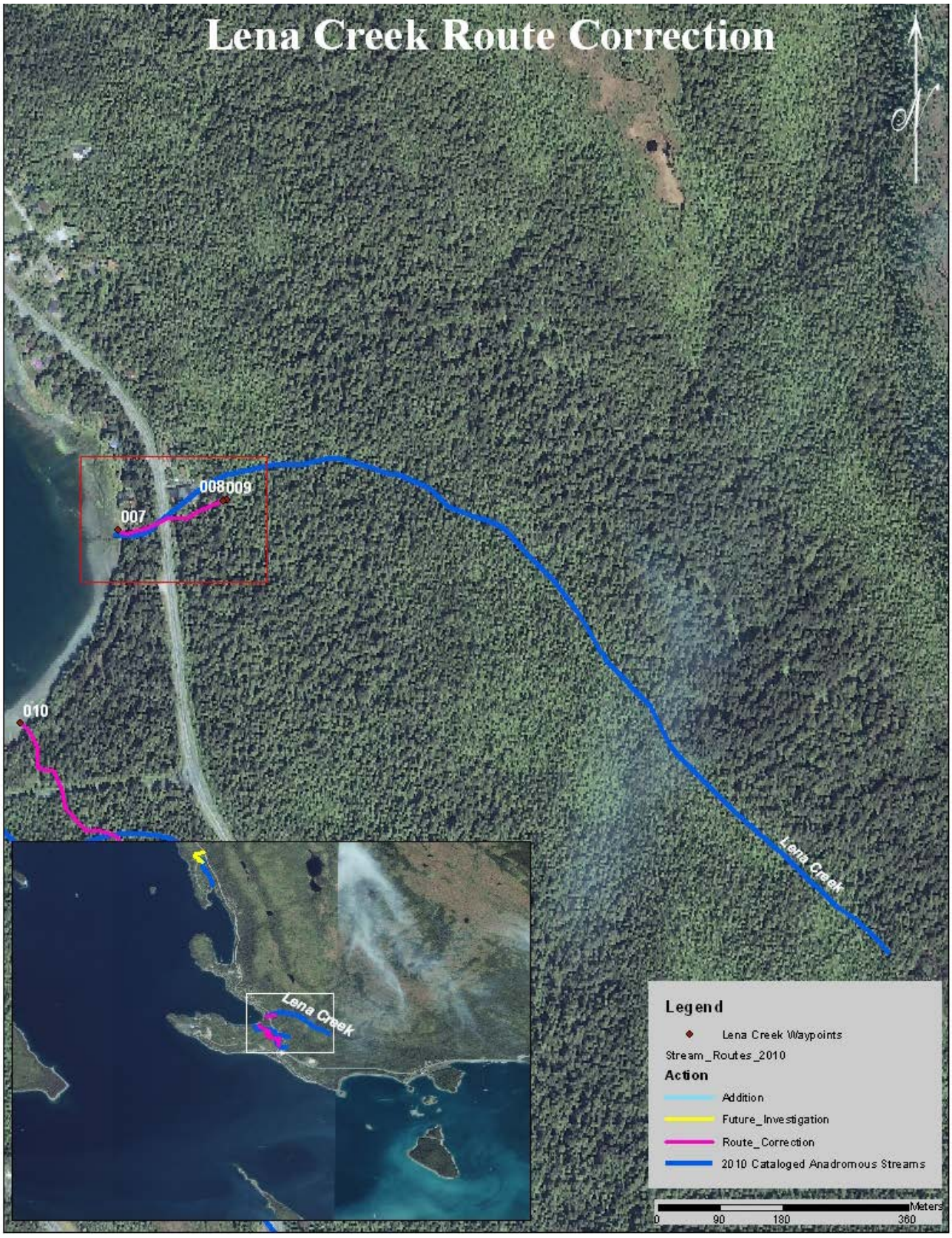

Figure 33: Lake Creek Route Correction.

Little McGinnis Creek Route Correction (111-50-10500-2003-3054)

Stream: Little McGinnis Creek (111-50-10500-2003-3054 cataloged for CHs,COs).
Watershed: Arastra Creek.
USGS Quadrangle: Juneau B-2 Northwest.
MTRS: CRM, Township 39S, Range 65E, Section 35.
Date Surveyed: July, 2010.
Findings: This stream extends past the cataloged upper limit.
Recommendations: Update the stream in the AWC.
Nomination form submitted: Yes.
Nomination Status: Pending.
Notes: This stream is a tributary to McGinnis Creek and is impacted by ATV use. There were several crossings and tracks that had filled with water and in one instance we observed fish in these tracked areas (Figures 34, 35, 36, 37). The following table (Table 13), and map (Figure 38) provide additional data and features.

Table 13: Little McGinnis Creek survey data.

Waypoint	Name	Comments	Lat	Long
1	Test	Test	58.4361	-134.642
2	Tributary	Tributary on road left.	58.442699	-134.63699
3	Tributary	Tributary on road left. Future exp.	58.446498	-134.634
4	CO	Positive ID CO.	58.446399	-134.634
5	CO	2 CO netted.	58.4468	-134.634
6	ATV	ATV disturbance. Saw fish, unidentified.	58.4477	-134.634
7	Tributary	Tributary on road left.	58.448501	-134.633
8	End of stream		58.448699	-134.633
9	CO		58.447799	-134.633
10	CO	CO and CT netted.	58.447898	-134.633
11	End of Tributary		58.448101	-134.633
12	ATV crossing	Unidentified fish observed.	58.442798	-134.63901
13	Dewatered channel		58.441398	-134.64

Figure 34: ATV trails through Little McGinnis Creek Tributary.

Figure 35: CO in Little McGinnis Creek Tributary.

Figure 36: Bank and riparian disturbance on Little McGinnis Creek Tributary.

Figure 37: CT in Little McGinnis Creek Tributary.

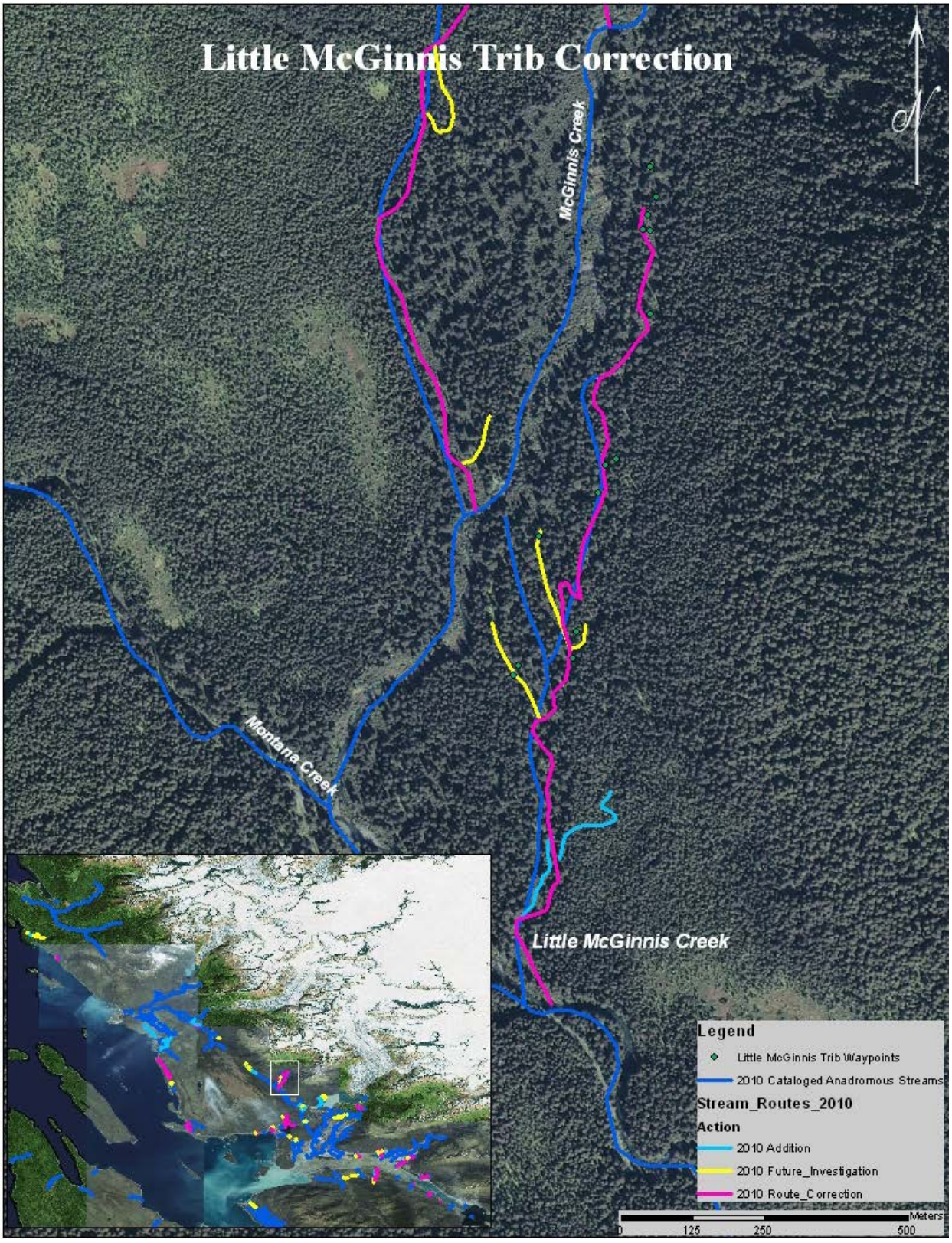

Figure 38: Little McGinnis Creek Tributary Correction.

Salmon Creek Route Correction (111-40-10150)

Stream: Salmon Creek (111-40-10150 cataloged for CHs,COs,Pp,DVr).
Watershed: Salmon Creek.
USGS Quadrangle: Juneau B-2 Southeast.
MTRS: CRM, Township 41S, Range 67E, Section 9.
Date Surveyed: June, 2010.
Findings: The anadromous reach of this stream terminates at a falls measuring 23% gradient over 30 feet. Another falls is upstream and is 15 feet tall with a gradient of 30% (Figures 39, 40, 41, 42).
Recommendation: Update the stream route in the AWC, ending anadromy at the lower falls.
Nomination form submitted: Yes. 9/26/10.
Nomination Status: Change.
Notes: The falls were measured using a clinometers and rangefinder to determine fall height. The following table (Table 14), and map (Figure 43) provide additional data.

Table 14: Salmon Creek survey data.

Waypoint	Lat	Long	Location
1	58.330475	-134.47362	Lower Extent
2	58.332437	-134.46595	Upper Extent

Figure 39: Looking down from Barrier Falls on Salmon Creek.

Figure 40: Second set of falls on Salmon Creek.

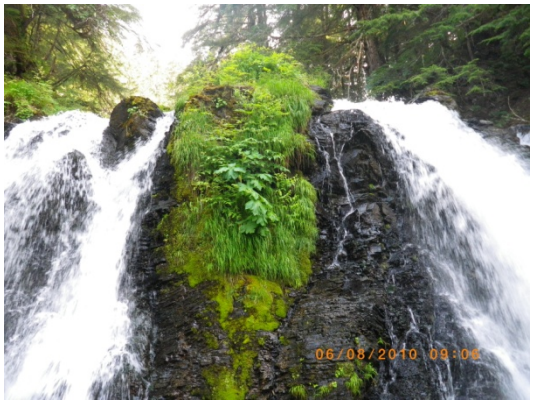

Figure 41: Looking up at Barrier Falls on Salmon Creek.

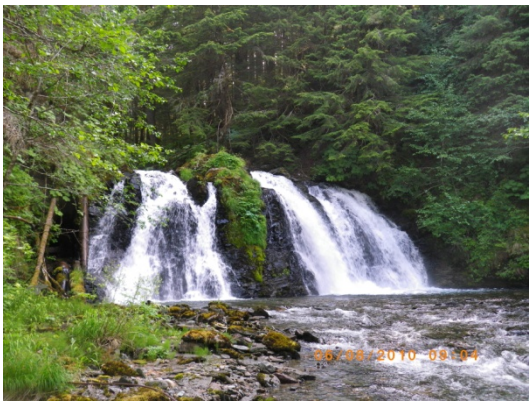

Figure 42: Barrier Falls on Salmon Creek.

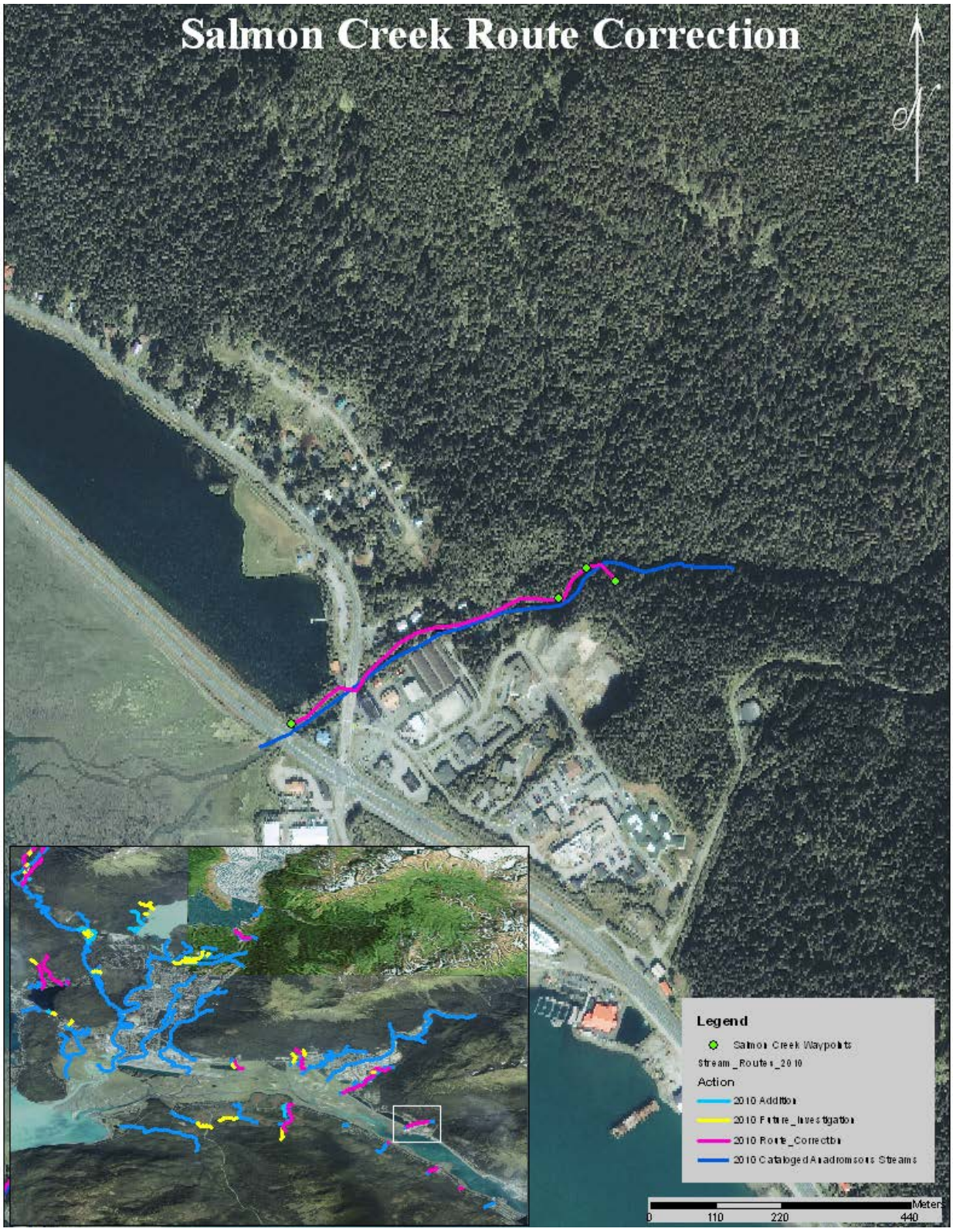

Figure 43: Salmon Creek Route Correction.

Sheep Creek Route Correction (111-40-10280)

Stream: Sheep Creek (111-40-10280 cataloged for CHp,Pp).
Watershed: Sheep Creek.
USGS Quadrangle: Juneau B-1 Southwest.
MTRS: CRM, Township 41S, Range 68E, Section 32.
Date Surveyed: June, 2010.
Survey Method: Minnow traps, GPS tracking to determine route accuracy.
Findings: The actual upper extent of the stream terminates at a falls of 124.5 feet with a gradient of 30% (Figures 44, 45, 46). Minnow traps were set above the falls and allowed to soak for 2 hours. The traps yielded no fish.
Recommendation: Update the stream route and upper extent in the AWC.
Nomination form submitted: Yes. 9/3/2010.
Nomination Status: Change.
Notes: The following table (Table 15), and map (Figure 47) provide additional data.

Table 15: Sheep creek survey data.

Waypoint	Lat	Long	Location	Effort	Species
1	58.260221	-134.32563	Lower extent	None	None
2	58.260995	-134.32472	Above long series of falls and a concrete dam associated with the fish hatchery below.	Minnow trap	None
3	58.261052	-134.32383	Below a falls.	Minnow trap	None
4	58.261199	-134.32171	Below impassable falls.	Minnow trap	None
5	58.260843	-134.32447	Upper extent.	Minnow trap	None

Figure 44: Looking downstream into the Gastineau Channel from Sheep Creek.

Figure 45: Looking down at the dam above the Barrier Falls on Sheep Creek.

Figure 46: Looking down at the Barrier Falls on Sheep Creek.

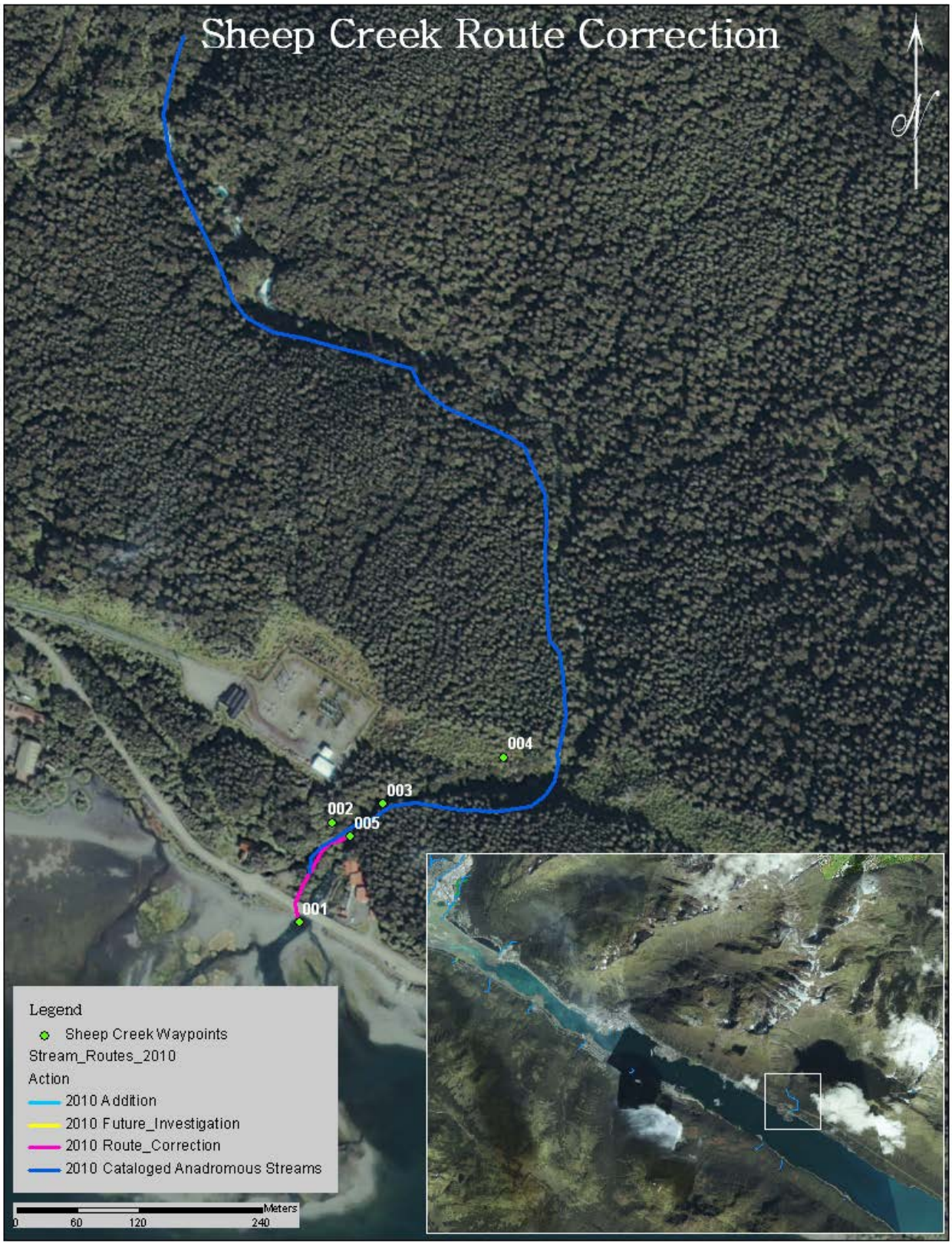

Figure 47: Sheep Creek Route Correction.

Shrine Creek Route Correction (111-50-10140)

Stream: Shrine Creek (111-50-10140 cataloged for COr,Ps,CTp,DVp).
Watershed: Dobson Landing.
USGS Quadrangle: Juneau B-3 Northeast.
MTRS: CRM, Township 39S, Range 64E, Section 25.
Date Surveyed: April, 2010.
Sampling Method: Backpack electrofishing (Smith-Root LR24).
Findings: The upper extent of anadromy extends past the cataloged upper limit. We captured juvenile CO and P, and found an old car (Figures 48, 49, 50, 51, 52).
Recommendation: Update the stream route and upper extent in the AWC.
Nomination form submitted: Yes.
Nomination Status: Pending.
Notes: The stream does not pass under the Glacier Highway at the location in the catalog. It passes through a culvert under the highway farther up the road. The following table (Table 16), and map (Figure 53) provide additional data on the route correction.

Table 16: Shrine Creek survey data.

Waypoint	Lat	Long	Species	Effort
13	58.45534	-134.772732	CO	E-fisher
14	58.455578	-134.772298	CO	E-fisher
15	58.452486	-134.770878	CO	E-fisher
16	58.451539	-134.769715	CO	E-fisher
End	58.449591	-134.769511	CO	E-fisher

Figure 48: CO captured in Shrine Creek.

Figure 49: Old car dumped in Shrine Creek.

Figure 50: Dewatered pink salmon emerging from gravel in Shrine Creek.

Figure 51: CO captured in Shrine Creek.

Figure 52: CO captured in Shrine Creek.

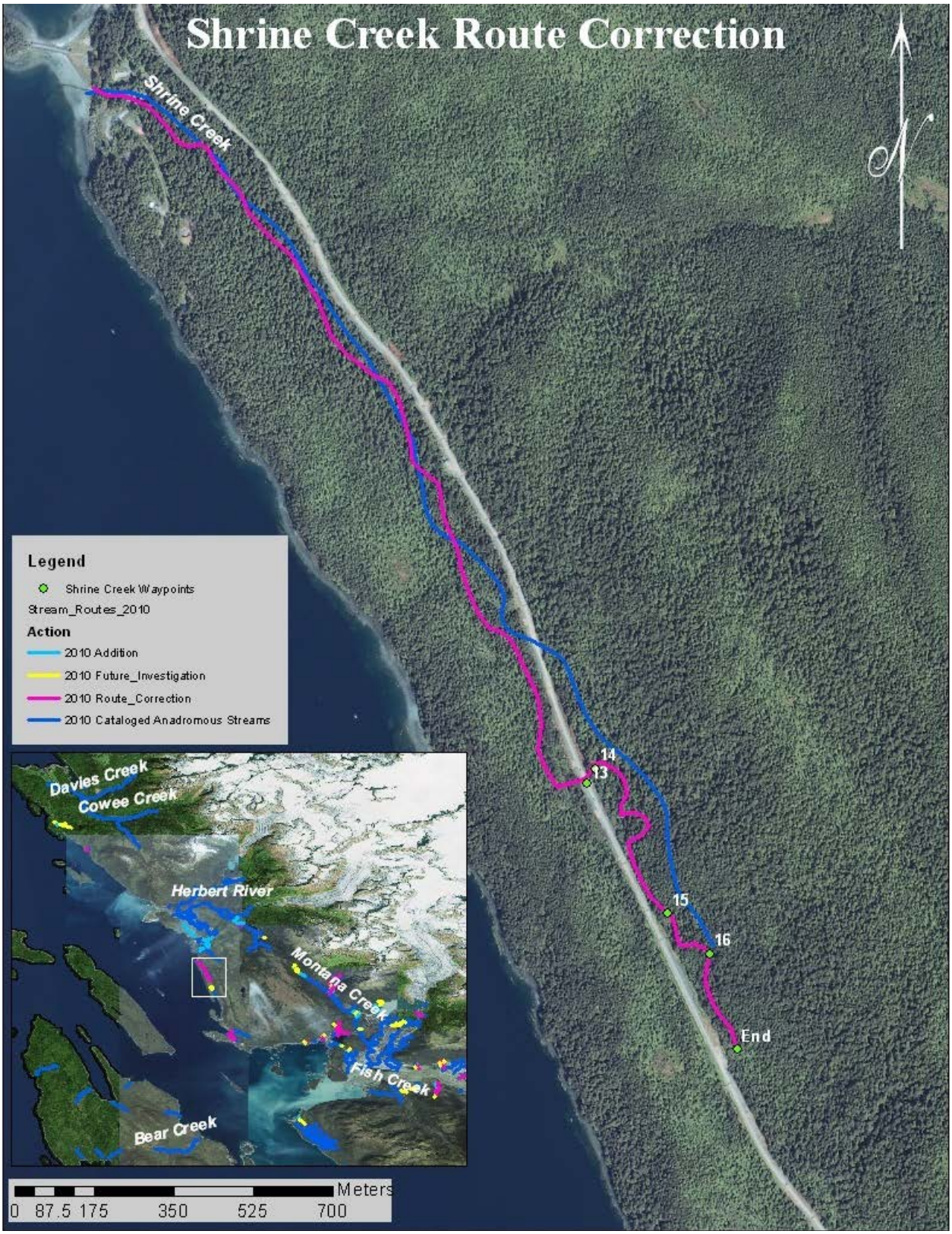

Figure 53: Shrine Creek Route Correction.

Snowslide Creek Addition (111-40-10240)

Stream: Snowslide Creek (111-40-10240 cataloged for COr).
Watershed: Sheep Creek.
USGS Quadrangle: Juneau B-1 Southwest.
MTRS: CRM, Township 41S, Range 68E, Section 32.
Date Surveyed: September, 2010.
Sample Method: Minnow traps.
Findings: This stream was trapped and tracked and is anadromous up to a steepened gradient in an avalanche run-out zone (Figure 54).
Recommendations: Add this stream to the AWC and monitor for riparian regrowth and bank stabilization. Install a fish pipe.
Nomination form submitted: Yes. 9/29/2010.
Nomination Status: Change.
Notes: This stream is interesting in that it is in an avalanche runout zone yet smolting CO were trapped (Figures 55, 56, 57, 58). This stream impacted by brushing activities of road maintenance crews (Figures 54, 59). The following table (Table 17), and map (Figure 60) provide additional data on the creek addition.

Table 17: Snowslide Creek survey data.

Waypoint	Lat	Long	Description	Effort	Trap Data
1	58.282469	-134.37459	Mouth of Snowslide Creek.		
2	58.282826	-134.37462	Culvert under Thane road, perched 1.5' at low tide, 1' to 10' at high tide. Passable. Set baited minnow trap at outlet.	Minnow trap, 24 h	45-50 smolting CO, 4 CO (85-100 mm)
3	58.283002	-134.37458	Inlet of culvert, set baited minnow trap.	Minnow trap, 24 h	3 CO (85-120 mm)
4	58.283166	-134.37435	Sediment catchment pool.		
5	58.283192	-134.37395	End of anadromous reach. Steep rocky cascade. Set baited minnow trap.	Minnow trap	1 CO (140 mm)

Figure 54: Steepened gradient in an avalanche runout zone.

Figure 55: CO captured below steep rocky cascade at waypoint 5 on Snowslide Creek.

Figure 56: Sediment from in-stream work on substrate in Snowslide Creek.

Figure 57: CO captured below culvert on Thane road.

Figure 58: CO captured at outlet of culvert on Thane road.

Figure 59: Footprint in sediment covering substrate in Snowslide Creek.

Figure 60: Snowslide Creek Addition.

Wesley Creek Stream Addition (111-50-10500-2025)

Stream: Wesley Creek (111-50-10500-2025 cataloged for COr,Ss).
Watershed: Arastra Creek.
USGS Quadrangle: Juneau B-2 Northwest.
MTRS: CRM, Township 40S, Range 66E, Section 7.
Date Surveyed: June, 2010.
Sample Method: Minnow traps, hand net.
Findings: This stream supports rearing CO and spawning sockeye salmon, which were visually identified later in the fall. The stream flows under a bridge on the West Glacier Trail and the mouth enters Mendenhall Lake's western shore.
Recommendation: Add this stream to the AWC.
Nomination form submitted: Yes. 9/13/2010.
Nomination Status: Change.
Notes: I set minnow traps and allowed them to soak for 1–3 hours. Net sampling with a small aquarium net was very effective and yielded most of the CO I caught. This stream is extremely productive and has excellent spawning habitat in the lower reaches and good rearing throughout. The substrate consists of gravels, cobbles, and some larger boulders in the upper reach. Spawning sockeye salmon were observed in the lower reaches in August. The following table (Table 18), and map (Figure 61) provide additional data on the creek addition.

Table 18: Wesley Creek survey data.

Name	Date	Comments	Lat	Long
Uncataloged stream	6/28/2010	On bridge along West Glacier Trail.	58.418998	-134.589004
Trap 1	6/28/2010	Set trap on left bank under leaning alder.	58.4192	-134.589004
Trap 2	6/28/2010	Set trap in small pool below large woody debris cascade.	58.4192	-134.589004
Trap 3	6/28/2010	Set trap in calm pool next to mossy rock. Gravels, fines.	58.420299	-134.589996
Confluence	6/28/2010	Possible tributary or side channel	58.420799	-134.591003
Braided channel	6/28/2010		58.420898	-134.591003
Net sample	6/28/2010	Netted tens of CO fry; saw hundreds .	58.421001	-134.591003
Net sample	6/28/2010	Netted 1 CO under bank.	58.4221	-134.591003
Net sample	6/28/2010	Netted three CO under bank.	58.422298	-134.591003
Observation	6/28/2010	Observed approximately 9 CO.	58.4235	-134.591003
Tributary	6/28/2010	Confluence of tributary and mainstem.	58.423698	-134.591003
Net sample	6/28/2010	Netted two CO in possible tributary.	58.4239	-134.591003
Practice offset	6/28/2010	Mike netting CO in tributary.	58.424098	-134.591003
Tributary cont	6/28/2010	Tributary parallels mainstem .	58.424198	-134.591003
Net sample	6/28/2010	Mike netted 12-15 CO fry.	58.424499	-134.591995
Side channel	6/28/2010	Thought it was a tributary, bit its just a side channel.	58.424499	-134.591995
End of survey	6/28/2010	Stream gradient steepens and begins a continuous climb. Netted 2 CO. Still need future investigation.	58.4248	-134.593994

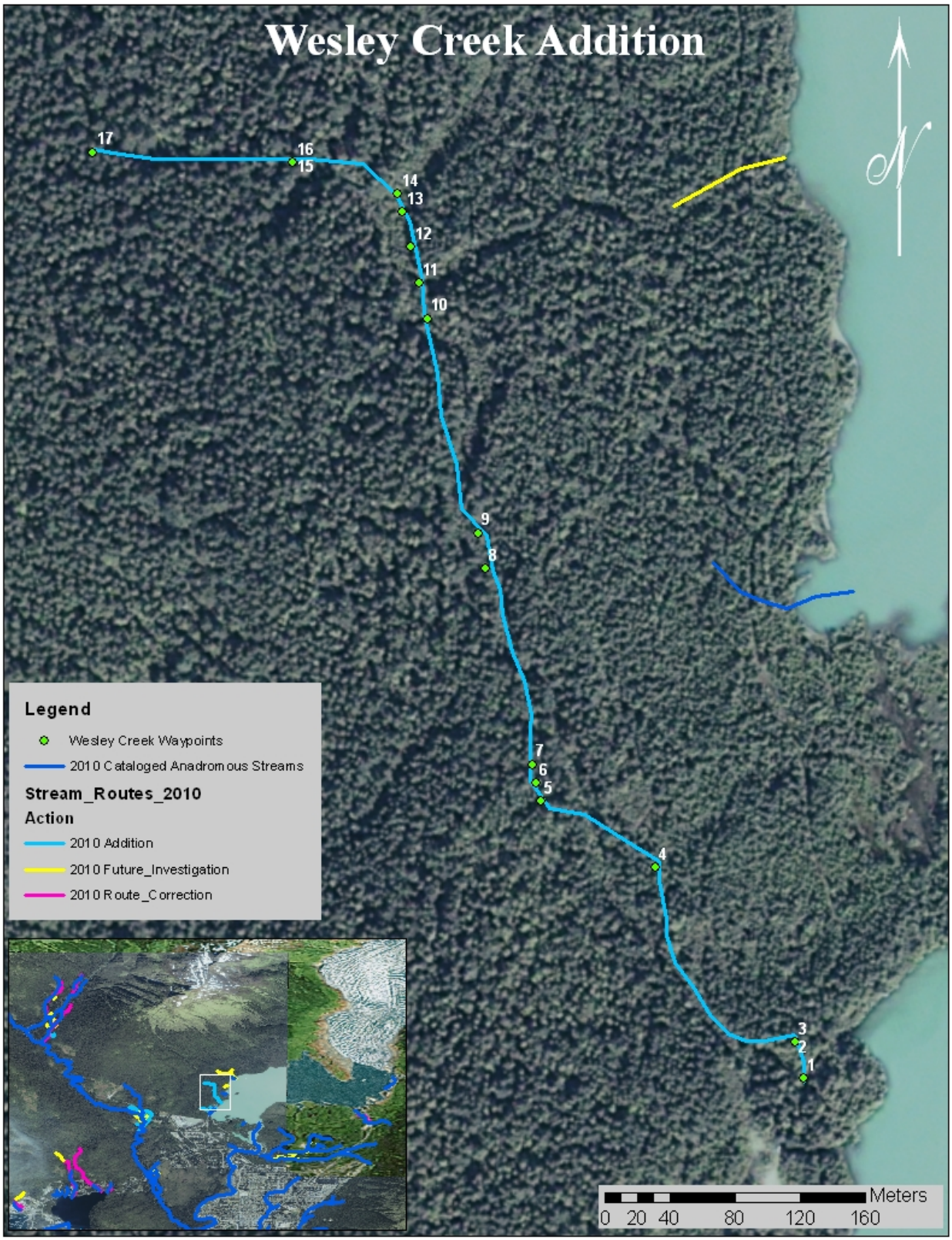

Figure 61: Wesley Creek Addition.

West Mendenhall Stream Upper Extent Addition (111-50-10500-2017)

Stream: West Mendenhall Stream (111-50-10500-2017 cataloged for COr).
Watershed: Arastra Creek.
USGS Quadrangle: Juneau B-2 Northwest.
MTRS: CRM, Township 40S, Range 66E, Section 7.
Date Sampled: July, 2010.
Sampling Method: Hand net.
Findings: This stream's anadromous reach extends past the existing cataloged extent. Juvenile CO were captured throughout with a hand net (Figures 62, 63).
Recommendations: Update the stream's route in the AWC to reflect the true extent.
Nomination form submitted: No.
Nomination Status: N/A.
Notes: This stream flows through a culvert under the road to the West Glacier trailhead. The mouth of the stream enters Mendenhall Lake. The following table (Table 19), and map (Figure 64) provide additional data on the creek addition.

Table 19: West Mendenhall Stream sample data.

Waypoint	Lat	Long	Notes	Effort	Species
1	58.417411	-134.59521	Bridge on Tolch Rock Trail.	Hand net	CO
2	58.417423	-134.59579	Gravels, lots of overhanging alder.		
3	58.41756	-134.59639	Gravel.		
4	58.41794	-134.59697	Thick vegetation, alder and skunk cabbage.		
5	58.418308	-134.59688	Saw lots of CO.	Visual ID	CO
6	58.419145	-134.59602	Becomes braided.		
7	58.419425	-134.5957	Captured CO.	Hand net	CO
8	58.420922	-134.59515			
9	58.421213	-134.59463	Gradient steepens slightly.		
10	58.421532	-134.59462			
11	58.421829	-134.59513	Stream creates a vegetated backwater.		
12	58.421942	-134.59541	Upper extent. Gradient steepens and stream reduces to a mossy seep.	Hand net	CO

Figure 62: Juvenile CO.

Figure 63: Juvenile CO.

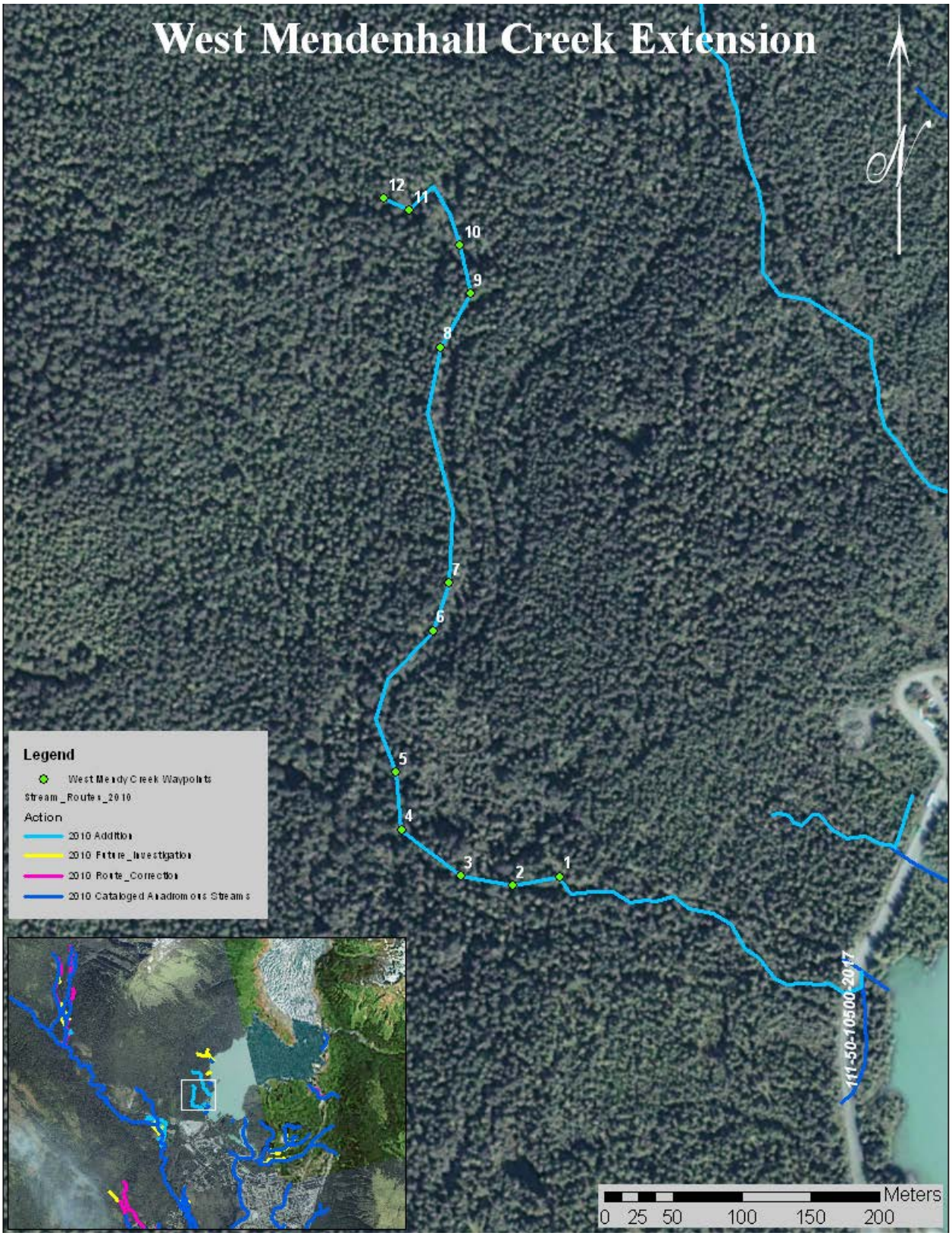

Figure 64: West Mendenhall Creek Extension.

Windfall Creek Tributary 1 Addition (111-50-10070-2004-3006-4001)

Stream: Windfall Creek tributary (111-50-10070-2004-3006-4001 cataloged for CHp,COp,Pp,Sp,CTp,DVpSHp).
Watershed: Boulder Creek.
USGS Quadrangle: Juneau C-3 Southeast.
MTRS: CRM, Township 39S, Range 65E, Section 7.
Date Surveyed: August, 2010.
Findings: This tributary flows into Windfall Creek and supports anadromous fish.
Recommendations: Add this tributary to the AWC.
Nomination form submitted: Yes. 9/29/2010.
Nomination Status: Change.
Notes: The tributary is anadromous up to waypoint 13, after which no CO were captured. The stream flows through a large marsh and the channel becomes more defined as it approaches the mainstem of Windfall Creek. There is a medium-sized beaver dam at the mouth; however, based on the number of CO captured and observed above the dam that fish have no problem passing the dam. The following table (Table 20) and map (Figure 65) provide sample data and effort, and sample and feature locations.

Table 20: Windfall Creek Tributary 1 survey data.

Waypoint	Lat	Long	Description	Effort	Species
1	58.514539	-134.74506	Mouth of Windfall Creek where it merges with the side channel of Herbert River.		
2	58.514628	-134.74482	Backed-up side channel. Lots of CO smolt.	Visual ID	CO
3	58.514514	-134.74381	Restart trackline. Many CO.	Visual ID	CO
4	58.51271	-134.741	Mouth of tributary with beaver dam.		
5	58.512743	-134.7404	Netted two CO with hand net in Beaver Dam Stream.	Hand net	2 CO
6	58.512576	-134.73963	Netted one CO, baited many. Visual ID.	Hand net, Visual ID	1+ CO
7	58.512453	-134.73841	Many CO, visual ID.	Visual ID	CO
8	58.512516	-134.73807	Stream opens into large grassy meadow, many CO, no real defined channel.	Visual ID	CO
9	58.512837	-134.73698	Baited and netted 3 CO. Visual ID many.	Hand net, Visual ID	3+ CO
10	58.513089	-134.73669	End of CO on this side of channel, going back to large marsh area.		
11	58.512793	-134.73653	Lunch.		
12	58.512757	-134.73589	Large CO! Working our way up the marsh.	Visual ID	CO
13	58.512411	-134.73403	Tributary coming in to marsh on left side. Baited and netted CO.	Hand net	CO
14	58.513391	-134.73275	At footbridge on Windfall Lake Trail. Continuing to cabin, then downriver. Did not catch CO, caught DV and stickleback.	Hand net	DV, TS
15	58.510145	-134.73657	Head of Windfall Creek on lake.		
16	58.512005	-134.74006	Tributary on river right. Surveying.		
17	58.512209	-134.73699	Tributary originates at the same grassy marsh. Baited and visual ID of CO all the way up.	Visual ID	CO
18	58.528124	-134.76672	Caught one CO below steepened, rooty gradient in large pool.	Hand net	1 CO

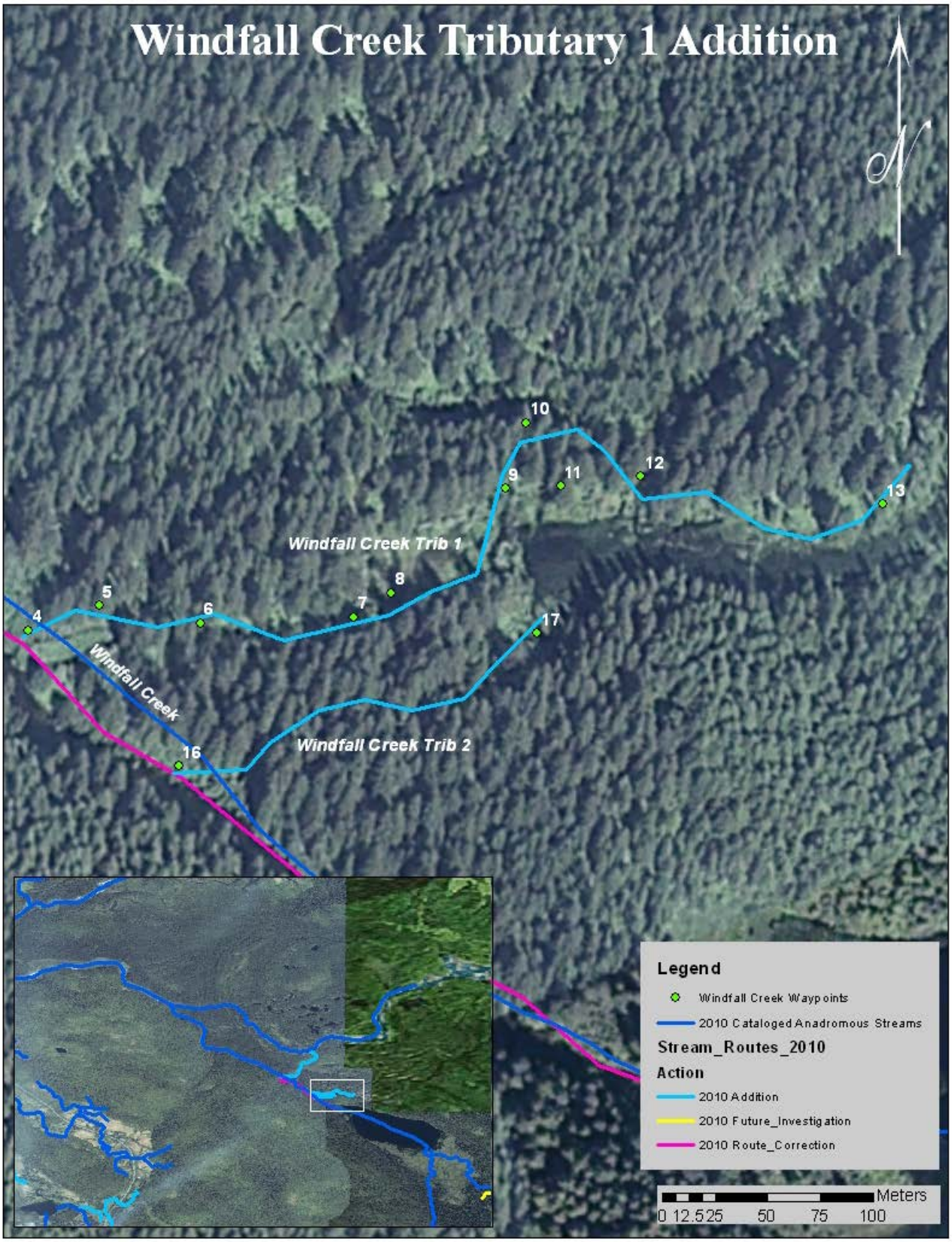

Figure 65: Windfall Creek, Tributary 1 Addition.

Windfall Creek Tributary 2 (111-50-10070-2004-3006-4003)

Stream: Windfall Creek tributary (111-50-10070-2004-3006-4003 cataloged for COp).
Watershed: Boulder Creek.
USGS Quadrangle: Juneau C-3 Southeast.
MTRS: CRM, Township 39S, Range 65E, Section 7.
Date Surveyed: August, 2010.
Findings: This tributary flows into Windfall Creek and supports anadromous fish (Figures 66, 67).
Recommendations: Add this tributary to the AWC.
Nomination form submitted: Yes. 9/29/2010.
Nomination Status: Change.
Notes: This tributary originates in a large grassy marsh and flows to meet Windfall Creek on the right bank. The stream is well-defined after emerging from the marsh. Lots of large woody debris provides good rearing habitat and the substrate is mainly small gravels and sand with intermittent deep organic mud (Figures 68, 69). The tributary was sampled using a hand net and visual identification to determine fish species. Fish were either netted or visually identified up to waypoint 17, where the stream became a seep. The following table (Table 21) and map (Figure 70) illustrate sampling data and locations of upper and lower extent.

Table 21: Windfall Creek Tributary 2 Addition survey data.

Waypoint	Lat	Long	Description	Effort	Species
16	58.512005	-134.74006	Tributary on river right. Surveying.		
17	58.512209	-134.73699	Tributary originates at the same grassy marsh. Baited and visual ID of CO all the way up.	Visual ID	CO

Figure 66: CO captured in Windfall Creek Tributary 2.

Figure 67: CO captured in Windfall Creek Tributary 2.

Figure 68: Windfall Creek Tributary 2.

Figure 69: Mouth of Windfall Creek Tributary 2.

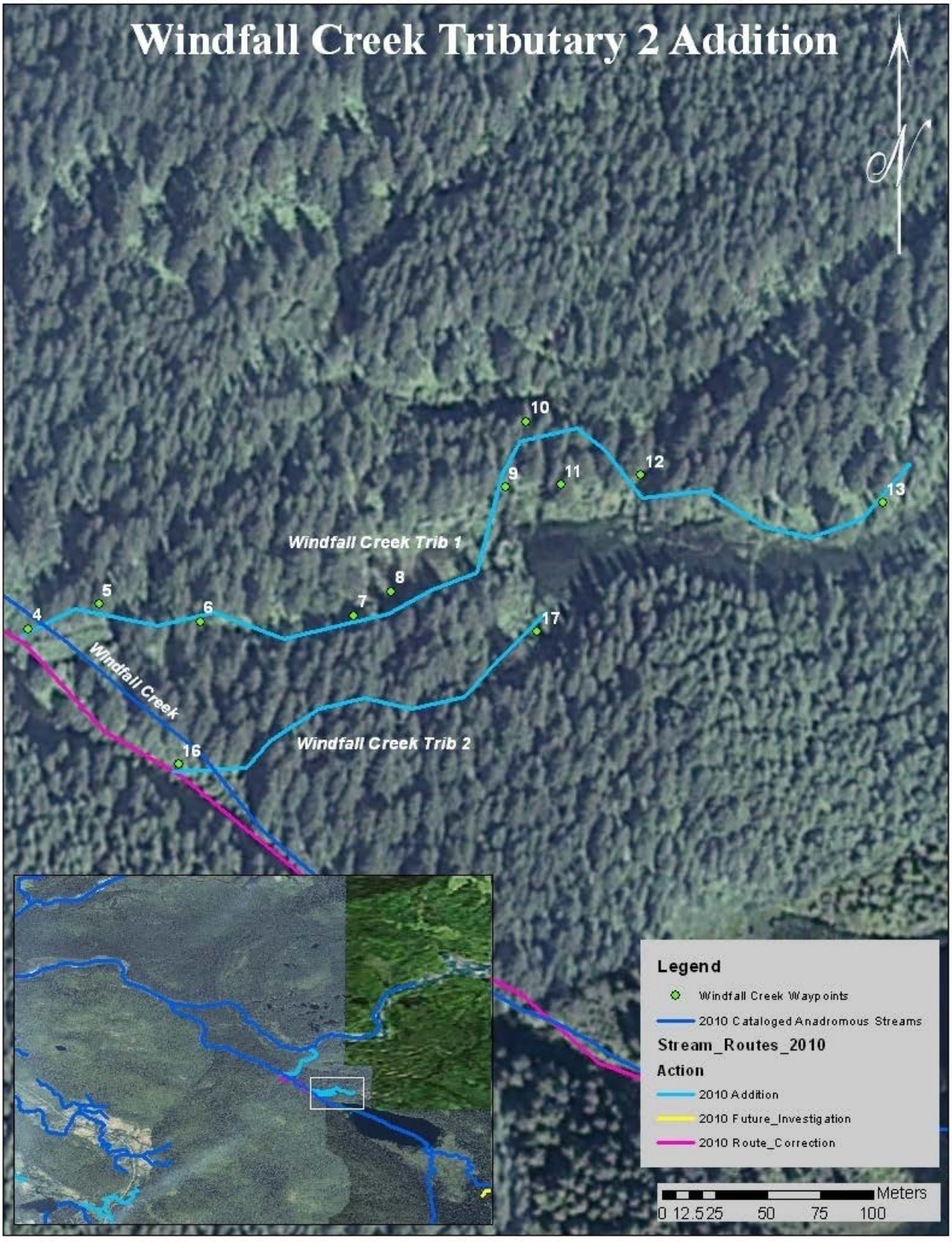

Figure 70: Windfall Creek Tributary 2 Addition.

Vanderbilt Creek Route Correction (111-40-10125)

Stream: Vanderbilt Creek (111-40-10125 cataloged for CHs,COsr,Ps,DVr).
Watershed: Canyon Creek.
USGS Quadrangle: Juneau B-2 Northeast.
MTRS: CRM, Township 41, Range 67E, Section 5.
Date Surveyed: June, 2010.
Sampling Method: Minnow traps.
Findings: The tracked route follows a much more sinuous path than the AWC illustrates. The coordinates provided in the table indicate the upper and lower extents of Vanderbilt Creek for species listed in the AWC.
Recommendations: Update the stream's meandering route in the AWC and continue investigation (Figure 71).
Nomination form submitted: Yes.
Nomination Status: Pending.
Notes: This stream has been adversely impacted by human activity. There were tent camps along the bank as well as a tremendous amount of human excrement, trash, and yard debris. This stream would greatly benefit from a clean-up effort and rehabilitation. The following table (Table 22) and map (Figure 72) provide additional data on the creek correction.

Table 22: Vanderbilt Creek survey data.

Waypoint	LAT	LONG
1	58.351163	-134.49147
12	58.355953	-134.48105

Figure 71: Spawned out chum salmon on stream bank

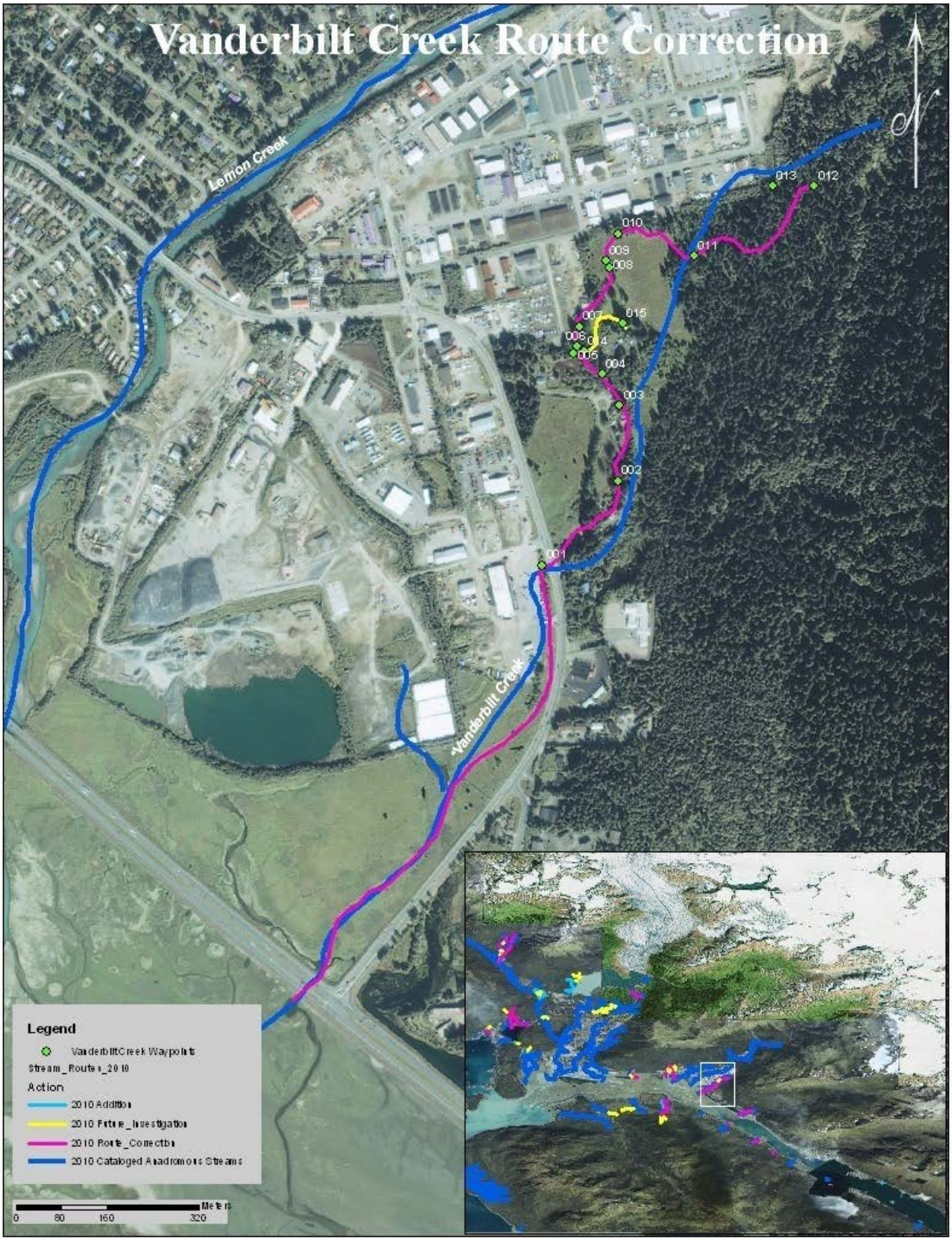

Figure 72: Vanderbilt Creek Route Correction.

Out The Road Creek Tributary Addition (115-10-10230)

Stream: 115-10-10230 Tributary (115-10-10230-2004 cataloged for COr).
Watershed: Bessie Creek.
USGS: Juneau C-3 Southwest.
MTRS: CRM, Township 37S, Range 63E, Section 36.
Date Surveyed: September, 2010.
Sampling Method: Minnow traps.
Findings: The traps yielded rearing CO (Figures 73, 74, 75).
Recommendations: Add the tributary to the AWC.
Nomination form submitted: Yes. 9/24/2010
Nomination Status: Change.
Notes: The tributary closely parallels the road and is vegetated with alder, skunk cabbage, and Devil's club. Substrate consisted of organics, fines, and gravels. There were roots and root wads throughout. The following table (Table 23) and map (Figure 76) provide additional data on the creek addition.

Table 23: Stream #115-10-10230 sample data.

Waypoint	Lat	Long	Description	Species
9	58.621367	-134.93874	Mouth of creek; begin tracklog.	
10	58.619011	-134.93572	Mouth of tributary on river left.	
11	58.619035	-134.9356	Set trap in tannic pool on tributary.	12 CO, 1 CT
12	58.618755	-134.93549	Set trap beside mossy log in tannic pool.	1 DV, 9 CO
13	58.618485	-134.93513	Set trap in tannic pool under overhanging bank.	1 DV, 1 CT, 4 CO
14	58.618261	-134.93461	Set trap in deep tannic pool with large woody debris in bend in stream.	1 DV, 3 CO
15	58.617762	-134.93404	Set trap at 90 degree corner right next to road.	4 CO

Figure 73: CO captured in tributary to stream 115-10-10230.

Figure 74: CO captured at waypoint 15.

Figure 75: CT captured in tributary to stream 115-10-10230.

Figure 76: Out the Road Creek Tributary Addition.

APPENDIX A

Appendix A: Streams requiring further investigation.

Name	Action	Number	Distance	Notes
Johnson Creek Tributary (no salmon)	2010 Future Investigation	111-50-10660	558.869018	This stream is the same width/habitat types as the mainstem of Johnson Creek. CO were sampled in Johnson creek, but not in its tributary, and there were no barriers to fish passage. This stream should be sampled again to determine anadromous fish presence.
Top portion of North Tee Creek	2010 Future Investigation		552.59497	The portion of North Tee Creek above the new bridge was sampled using a backpack electrofisher. DV were captured, but no CO. The upper portion is braided and forms two organic ponds. The culvert under the highway is perched.
Second Hendrickson Tributary	2010 Future Investigation	111-40-10980	610.091979	This tributary was sampled using a backpack electrofisher, which yielded no fish. There is no barrier to fish passage and this stream should be sampled again.
Vanderbilt Tributary	2010 Future Investigation		136.815994	This tributary was tracked but not sampled due to a strong sewage smell and an uncomfortable proximity to a questionable residence. This stream should be sampled again and listed for possible sewage contamination.
Bay Creek	2010 Future Investigation	111-50-10390	406.320007	The upper portion of Bay Creek was sampled using minnow traps, which yielded no fish, although there is no barrier to anadromy. Bay Creek forks, and both forks should be sampled to determine anadromous fish presence.
Ninemile extend	2010 Future Investigation	111-50-10670	590.051025	Ninemile Creek was sampled past the Fish Creek Road crossing (two poorly placed culverts) with minnow traps and no anadromous fish were captured. There is no barrier to anadromy, though the culverts are questionable.
Auke Nu Creek Tributary	2010 Future Investigation	111-50-10350	231.996002	This tributary was sampled using minnow traps, but gradient increases soon after the tributary joins the mainstem.
111-50-10500-2003-3024 Montana Creek Tributary	2010 Future Investigation	111-50-10500-2003	114.238998	This tributary is a mossy seep that was sampled with minnow traps that yielded nothing. It is unlikely that this tributary supports rearing fish.
Montana Creek Tributary	2010 Future Investigation	111-50-10500-2003	151.113998	This tributary is a mossy seep that was sampled with minnow traps that yielded nothing. It is unlikely that this tributary supports rearing fish.
Little McGinnis Tributary	2010 Future Investigation	111-50-10500-2003-3054	220.729003	This stream has no barrier to fish, although hand-net sampling attempts attracted no fish.
Little McGinnis Tributary	2010 Future Investigation	111-50-10500-2003-3054	188.986999	This stream has no barrier to fish, although hand-net sampling attempts attracted no fish.
Little McGinnis Tributary	2010 Future Investigation	111-50-10500-2003-3054	56.029201	This stream has no barrier to fish, although hand-net sampling attempts attracted no fish.
Spring Creek sidechannel	2010 Future Investigation	111-50-10500-2003-3060-4011	206.936996	
Spring Creek Tributary	2010 Future Investigation	111-50-10500-2003-3060-4011	104.224998	
East Creek Tributary	2010 Future Investigation	111-40-10060	302.341003	This tributary to East Creek was sampled using minnow traps which yielded only DV. There is a possible gradient barrier near the footbridge.

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Appendix A. Page 2 of 3.

Name	Action	Number	Distance	Notes
East Creek Tributary	2010 Future Investigation	111-40-10060	302.341003	This tributary to East creek was sampled using minnow traps which yielded only DV. There is a possible gradient barrier near the footbridge.
Upper Montana Creek Tributary	2010 Future Investigation	111-50-10500-2003	270.322998	This tributary was sampled with minnow traps that yielded no fish. It is unlikely that this tiny seep supports rearing fish.
Upper Montana Creek Tributary	2010 Future Investigation	111-50-10500-2003	57.344398	This tributary was sampled with minnow traps that yielded no fish. It is unlikely that this tiny seep supports rearing fish.
Upper Montana Creek Tributary	2010 Future Investigation	111-50-10500-2003	98.744903	This tributary was sampled with minnow traps that yielded no fish. It is unlikely that this tiny seep supports rearing fish.
Upper Montana Creek Tributary	2010 Future Investigation	111-50-10500-2003	34.930099	This tributary was sampled with minnow traps that yielded no fish. It is unlikely that this tiny seep supports rearing fish.
Upper Windfall Tributary	2010 Future Investigation		257.259002	This stream was sampled with minnow traps which yeilded no fish. This stream is very remote and should be resampled as time allows.
Upper Extent of Montana Creek	2010 Future Investigation	111-50-10500-2003	218.787994	This portion of Montana Creek is below a 60' falls and has swift flows and few resting places for fish. This portion was trapped with minnow traps which yielded very healthy DV, but no salmon. Resampled to determine anadromy.
Egan Creek 111-50-10625 Tributary	2010 Future Investigation	111-50-10625	196.158996	
Mendenhall Streams	2010 Future Investigation		74.659896	
Mendenhall Streams	2010 Future Investigation		483.776	
Mendenhall Streams	2010 Future Investigation		164.563995	
Dredge Lakes Stream	2010 Future Investigation		514.020019	Ephemeral
Dredge Lakes Stream	2010 Future Investigation		211.149993	Ephemeral
Dredge Lakes Stream	2010 Future Investigation		138.020996	Ephemeral
Dredge Lakes Streams	2010 Future Investigation		642.002014	Ephemeral
West Creek	2010 Future Investigation	111-40-10050	498.669006	
Upper Lake Creek	2010 Future Investigation	111-50-10420-2010	270.464996	The upper portion of Lake Creek was sampled with minnow traps which yielded no anadromous fish. There is no barrier to fish up to this point and this stream should be sampled further.
Upper Tributary to Pedersen Creek	2010 Future Investigation	111-50-10490	286.833007	

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Name	Action	Number	Distance	Notes
Upper East Auke Lake Stream	2010 Future Investigation		119.597999	This stream reduces to a trickle and anadromy is unlikely. It would be a good stream to sample again if time allows.
Out the road Creek Mainstem	2010 Future Investigation	115-10-10230	1048.37	There is no barrier to anadromy, though minnow traps failed to capture fish.
Out the road tributary	2010 Future Investigation	115-10-10230	928.583007	No barrier, minnow traps caught no anadromous fish.
Out the road tributary	2010 Future Investigation	115-10-10230	121.573997	No barrier, minnow traps caught no anadromous fish.
Middle Montana creek	2010 Future Investigation	111-50-10500-2003	349.934997	Should be part of a polygon.
Middle Montana Creek	2010 Future Investigation	111-50-10500-2003	143.173995	Should be part of a polygon.
Middle Montana Creek	2010 Future Investigation	111-50-10500-2003	120.391998	Should be part of a polygon.
Middle Montana Creek	2010 Future Investigation	111-50-10500-2003	50.8759	Should be part of a polygon.
Middle Montana Creek	2010 Future Investigation	111-50-10500-2003	34.573398	Should be part of a polygon.
North Douglas New Stream	2010 Future Investigation		723.221984	No anadromous fish were sampled in the open grassy marsh portion of this stream. Low water flows were the only barrier to fish. This portion of the stream should be resampled to determine anadromous fish presence.
Upper DOT Creek	2010 Future Investigation		101.161003	This stream should be sampled further as the survey ended due to heavy bear activity and an uncomfortable proximity to questionable residences.
Upper Hendrickson Mainstem	2010 Future Investigation		189.216003	Hendrickson creek reduces to a trickle and steeper gradient, but sampling was hindered by very low water flows. This extent should be revisited during a higher water event.
Thane Drainage	2010 Future Investigation		235.690002	This stream was revisited and was not flowing. Tremendous human impact and trash clogging what is a very ephemeral stream.
Thane Drainage	2010 Future Investigation		50.8162	
Vanderbilt tributary	2010 Future Investigation	111-40-10125	80.760299	Suspect the forested (not ditched) area serves as rearing habitat during high flows that provide connectivity--based on incision, saturation, substrate composition, vegetation types and cover, etc.
Vanderbilt tributary	2010 Future Investigation	111-40-10125	172.940994	Suspect the forested (not ditched) area serves as rearing habitat during high flows that provide connectivity--based on incision, saturation, substrate composition, vegetation types and cover, etc.
Vanderbilt tributary	2010 Future Investigation	111-40-10125	394.540985	Suspect the forested (not ditched) area serves as rearing habitat during high flows that provide connectivity--based on incision, saturation, substrate composition, vegetation types and cover, etc.