State of Alaska
Department of Fish and Game
Sportfish Division

Nomination Form
Fish Distribution Database

Region: SEA

USGS Quad(s): See attached

Fish Distribution Database Number of Waterway: See attached

Name of Waterway: See atttached ☐ USGS Name ☐ Local Name

☐ Addition ☐ Deletion ☐ Correction ☑ Backup Information

For Office Use

Nomination #: 07-244

Revision Year: 2008

Revision to: Atlas ____ Catalog ____ Both ____

Revision Code: F-1

ADF&G Fisheries Scientist	Date
ADNR OHMP Operations Mgr.	Date
FDD Project Biologist	10/15/07 Date
Cartographer	Date

OBSERVATION INFORMATION

Species	Date(s) Observed	Spawning	Rearing	Present	Anadromous
Steelhead trout				X	☑
					☐
					☐
					☐
					☐

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: Information from Southeast AK Steelhead Snorkel Surveys or Regional Index Streams, 2002 and 2003 (FDS 05-74) and Operational Plan Southeast AK Steelhead Trout Escapement Surveys 01 April 2007 - 30 June 2007 (Project: F-10-22, Study R, Job 1-4) supports inclusion of Steelhead Trout in FDD/AWC for cited water bodies.

Name of Observer (please print): J. Johnson

Signature: _____ Date: 10/15/2007

Agency: ADF&G - SF

Address: 333 Raspberry Road

Anchorage, AK 99518

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 Fish Distribution Database.

Signature of Area Biologist: _____ Date: _____

Name of Area Biologist (please print):

Revision 02/05

Water bodies listed from Fishery Data Series Report No. 05-74 Appendix A1 (page 14)
Southeast Alaska Steelhead Snorkel Surveys of Regional INdex Streams, 2002 and 2003

Index Streams	Listed Anadromous Stream Number	Stream Name Listed in AWC/FDD	FDD dB Stream Number	Steelhead trout listed in AWC/FDD	Steelhead trout presence substantiated w/nomination
Ford Arm Creek	**113-73-10030**	**local name not listed**	113-73-10030	yes	**no**
Sitkoh Creek	**113-59-10004**	Sitkoh Creek	**113-59-10040**	yes	**no**
Peterson Creek	**111-50-10010**	Peterson Creek	**111-50-10100**	yes	**no**
Pleasant Bay Creek	**111-12-10005**	**Pleasant Creek**	**111-12-10050**	yes	**no**
Petersburg Creek	106-44-10600	Petersburg Creek	106-44-10600	yes	**no**
Slippery Creek	**109-43-10030**	**local name not listed**	109-43-10030	**no**	**no**
Eagle Creek	**107-40-10055**	Eagle Creek	**106-10-10300**	yes	yes
Harris Creek	102-60-10820	Harris Creek	102-60-10820	yes	**no**
McDonald Creek	**101-80-10068**	**Wolverine Creek**	**101-80-10680**	yes	**no**
White River	101-44-10024	White River	101-45-10024	yes	yes

Sitka B-6
Sitka C-4
Juneau B-3
Sumdum C-6
Petersburg D-4
Petersburg C-6
Craig D-3
Craig D-3
Ketchikan B-6
Ketchikan B-5

Fishery Data Series No. 05-74

Southeast Alaska Steelhead Snorkel Surveys of Regional Index Streams, 2002 and 2003

by

Roger D. Harding

December 2005

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries

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 Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. 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 Department of Fish and Game	ADF&G
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

FISHERY DATA REPORT NO. 05–74

SOUTHEAST ALASKA STEELHEAD SNORKEL SURVEYS OF REGIONAL INDEX STREAMS, 2002 AND 2003

by
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December 2005

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The Division of Sport Fish Fishery Data Series was established in 1987 for the publication of technically oriented results for a single project or group of closely related projects. Since 2004, the Division of Commercial Fisheries has also used the Fishery Data Series. Fishery Data Series reports are intended for fishery and other technical professionals. Fishery Data Series reports are available through the Alaska State Library and on the Internet: http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm This publication has undergone editorial and peer review.

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ABSTRACT

Surveys to investigate the spawning abundance of steelhead *Oncorhynchus mykiss* in 10 index streams in Southeast Alaska have been conducted annually since 1997 and were conducted again during 2002 and 2003. Ten index streams in Southeast Alaska Surveys were surveyed by a two- or three-person team using snorkel gear during April and May 2002 and 2003. During the 2002 snorkel surveys, observers obtained a peak count bracketed by lower counts for only four of the 10 index streams; during the 2003 snorkel surveys peak counts were obtained during seven of the index surveys. The peak survey counts in index streams in 2002 were similar to the low counts during 2000 and 2001 but steelhead counts during 2003 were higher and comparable to the highest counts since the project's inception year of 1997.

Key words: steelhead, *Oncorhynchus mykiss*, emigration, abundance, Eagle Creek, Harris River, Humpback Creek, Ketchikan Creek, McDonald Lake Creek, White River, Slippery Creek, Petersburg Creek, Sitkoh Creek, Ford Arm Creek, Peterson Creek, Pleasant Bay Creek, weir, sex, length, abundance indices, snorkel survey, index stream

INTRODUCTION

Southeast Alaska has 271 uniquely identified steelhead *Oncorhynchus mykiss* systems, and an additional 60 tributaries flow into these systems for a total of 331 known water bodies containing steelhead. Most populations are believed to contain 200 or fewer spawning adults. Major sport fisheries occur on larger systems such as the Naha, Karta, and Thorne rivers near Ketchikan, which support up to 1,000 spawning steelhead, and on the Situk River, which has had annual returns of 5,000 to 9,000 or more steelhead. Steelhead harvests in Southeast Alaska generally increased from the late 1970s through 1989, but then began to decline (Mills 1993). As fishery managers and participants reported lower escapements, an Emergency Order (EO) prohibiting steelhead harvests in the Situk River was enacted in 1991. In 1992, harvests were prohibited by EO in 24 popular systems, and in 1993, the Situk and 47 other systems were closed to steelhead harvest. In 1994, the Alaska Board of Fisheries enacted conservative regulations for steelhead in Southeast Alaska, and since 1994, anglers have been limited regionwide to a harvest of 2 steelhead per year with a minimum size limit of 36 inches (914 mm).

Intensive research on steelhead stocks in Southeast Alaska has largely been limited to Petersburg Creek (Jones 1972, 1973, 1974, 1975, 1976, 1983) and the Situk River (Johnson 1990, 1991, 1996; Didier and Marshall 1991; Johnson and Marshall 1991; Glynn 1992; Glynn and Elliott 1993; Bain et al. 2003; Johnson and Jones 2003). Estimates of migratory timing, abundance, and age composition have also been made for a few other systems (Harding and Jones 1990, 1991, 1992; Jones et al. 1991; Yanusz 1997). Creel surveys of steelhead fisheries have also been conducted (Freeman and Hoffman 1989, 1990, 1991; Hubartt 1989, 1990; Hoffman et al. 1990; Harding and Jones 1991, 1993, 1994; Schmidt 1992), and enhancement has been studied in one system (Freeman 1992, 1995).

Although counts of adult steelhead have been conducted in a few select systems for many years, consistent foot surveys to monitor peak abundance were not initiated until 1994. Since then, survey methodology has evolved, and the streams and reaches selected to survey have changed as observers gained experience with each system (Johnson and Jones 1998, 1999, 2000, 2001, 2003).

Substantial changes in survey methods were also instituted in 1997 to increase the proportion of steelhead observed in index streams and to better identify dates of peak instream abundance (Johnson and Jones 1998). All surveys were converted to snorkel surveys because Shardlow et al. (1987) found that among the most common survey methods, snorkel surveys by experienced observers yield the highest proportion counted (i.e. the number of fish observed/number of known fish in stream). During late April through the end of May 2002 and 2003, the primary objective of the steelhead survey project was to conduct weekly counts of steelhead, for a minimum of three weeks, in standardized sections

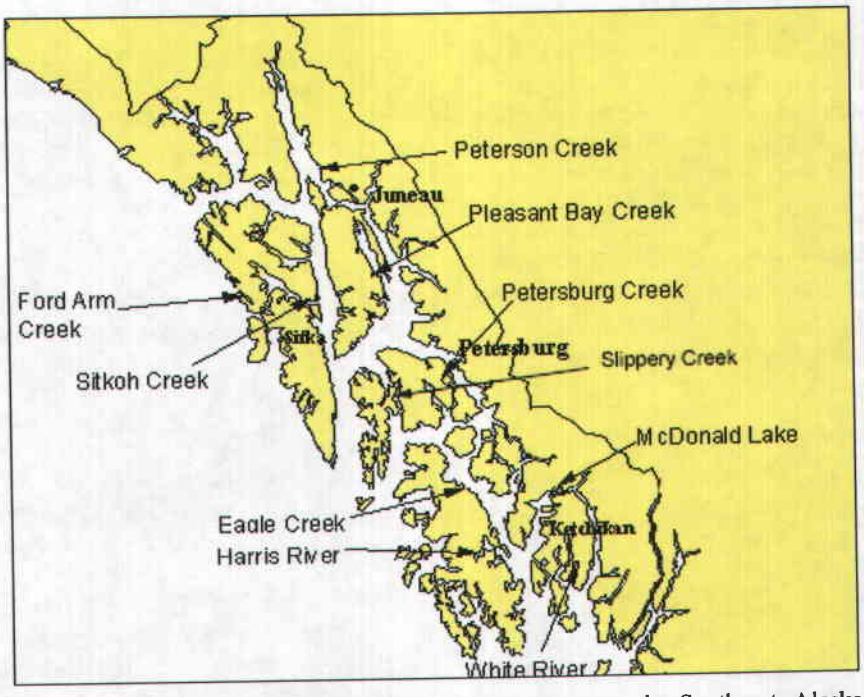

Figure 1.–Locations of the steelhead index systems in Southeast Alaska surveyed in 2002 and 2003.

of 10 index streams. The 10 index streams surveyed for steelhead in 2002 and 2003 were dispersed across Southeast Alaska (Figure 1).

METHODS

SOUTHEAST ALASKA SNORKEL SURVEYS

Snorkel surveys were scheduled to provide indices of peak steelhead abundance for 10 streams in Southeast Alaska in 2002 and 2003 (Figure 1). All streams, with the exception of Slippery Creek, had been surveyed for steelhead since 1997 (Johnson and Jones 1998, 1999, 2000, 2001). The percentage of available stream area surveyed (feet surveyed/feet of anadromous stream) annually averages 54% and ranges from 19% in Ford Arm Creek to 100% in McDonald Lake Creek (Appendix A1).

As in prior years, surveys of index streams were conducted weekly, up to four times (depending on the stream), from late April through the end of May when instream abundance was expected to peak. A peak count is successfully achieved if it is bracketed by lower counts; if the highest count occurred during the last survey, an additional survey was attempted to obtain a peak count. In many cases a final survey was unable to be completed, thus a final lower count was not obtained and the count is considered a "high" count.

Surveys were conducted by at least two employees wearing dry suits and snorkel gear. One surveyor was always a senior trained observer. Data from each survey in each stream were recorded for discrete sections (reaches) of the river (Appendix A1). If a shore-side (third) party was available, counts were verbally conveyed to them, and they tabulated and then recorded the counts by reach as the survey progressed. When a shore-side party was not available, one or both snorkelers recorded the counts by stream-reach with a waterproof (wax-based) marker on a small plastic diver's slate until it could be transcribed to conventional data forms.

Observers, as a team, counted all adult steelhead seen during the survey. The surveyors attempted to stay abreast of each other in the stream and coordinated their observations to obtain maximum coverage. When passing through high concentrations of steelhead, both observers counted the number of steelhead in their area of responsibility before consulting with each other on their counts. If either or both surveyors felt that a questionable count was made in a particular pool or stretch of river, the area was recounted. Typically, steelhead were minimally disturbed on the first snorkel pass so second counts of a pool or run were usually possible.

During 2002, the level of surface illumination, subsurface light transmission at a depth of 0.5 m, surface water temperature (°C), and weather conditions (cloud cover, wind, and precipitation) were recorded at the beginning of the survey. Surface illumination and subsurface light transmission were recorded using a Sekonic L-188WH light meter[1] protected by a waterproof underwater housing. The meter was set to an ASA value of 100, and the EV (exposure value) scale at the bottom of the light meter was recorded. On each index system, water levels were recorded at a permanent benchmark established in 1997. This benchmark was either a permanent mark on a bridge abutment, a U.S. Geological Survey (USGS) gauging station, or a mark carved in bedrock. The same habitat variables were recorded during 2003 with the exception that water clarity was measured using a Sechii Disk. The Sechii Disk was held underwater by one observer approximately eight inches below the surface. The second snorkel observer then backed away underwater keeping visual contact with the disk while feeding out the line. The point at which the Sechii Disk disappeared is the distance which was recorded.

Stream Temperature Monitoring

Temperature data loggers (HOBO® temp logger model H8) were installed in nine of the ten snorkel index streams to provide information on temperature versus peak abundance (no temperature logger was installed in McDonald Lake Creek). The temperature loggers were scheduled to be installed during the first survey in each of the systems during 2002 and retrieved with replacements during the first survey of 2003. The temperature loggers were programmed to record and store temperatures every 2 hours.

[1] Product names used in this report are included for scientific completeness, but do not constitute a product endorsement.

RESULTS

Southeast Alaska Snorkel Surveys, 2002

Twenty-four snorkel surveys were conducted on the 10 steelhead index streams during April and May 2002 (Table 1 and Appendix A2). This was an overall reduction in the number of surveys from prior years. As a result, observers obtained a peak count bracketed by lower counts for only four of the index streams. Four streams were only surveyed twice and McDonald Lake Creek was only surveyed once. Peak or high steelhead counts ranged from 13 in Peterson Creek to 200 in Harris River.

Southeast Alaska Snorkel Surveys, 2003

Thirty-six snorkel surveys were conducted on the 10 steelhead index streams during April and May 2003 (Table 2 and Appendix A2). This is a relatively higher number of surveys than in previous years. Consequently, observers obtained a peak count bracketed by lower counts for seven of the 10 index streams. Two Prince of Wales Island streams were only surveyed twice (Eagle and Harris); personnel issues prevented a third survey in each system. The peak or high 2003 steelhead counts ranged from 36 in Peterson Creek to 296 in Sitkoh Creek.

In addition, surveys were made on three additional Ketchikan area systems (Appendix A3). Three snorkel surveys of Humpback Creek yielded a high count of 105 steelhead, just slightly above the historic peak of 101 during 2001. Three surveys conducted in Ketchikan Creek yielded an all time high peak count compared to peak counts of 15 and 24 during 2000 and 2001, respectively. Ketchikan Creek is on the Ketchikan road system and has an extensive history of stocking by the Deer Mountain Hatchery, which is located on that

Table 1.–Steelhead index streams surveyed in 2002 along with dates of peak (P=bracketed) or high (H= unbracketed) counts and numbers of steelhead counted.

Stream name	No. of surveys	Peak/high count date	Peak/high count of steelhead	General location
Eagle Creek	3	14 May	36 (P)	Prince of Wales I.
Harris River	2	7 May	200 (H)	Prince of Wales I.
White River	3	10 May	37 (P)	Revillagigedo I.
McDonald Lake Creek	1	2 May	14 (H)	Southern mainland
Slippery Creek	2	1 May	31 (H)	Kuiu Island
Petersburg Creek	2	20 May	41 (H)	Kupreanof Island
Pleasant Bay Creek	3	17 May	36 (P)	Admiralty Island
Ford Arm Creek	3	22 May	122 (H)	Chichagof Island
Sitkoh Creek	2	20 May	65 (H)	Chichagof Island
Peterson Creek	3	16 May	13 (P)	Northern mainland

Table 2.–Steelhead index streams surveyed in 2003 along with dates of peak (P=bracketed) or high (H= unbracketed) counts and numbers of steelhead counted.

Stream name	No. of surveys	Peak/high count date	Peak/high count of steelhead	General location
Eagle Creek	2	22 May	95 (H)	Prince of Wales I.
Harris River	2	1 May	195 (H)	Prince of Wales I.
White River	3	7 May	77 (P)	Revillagigedo I.
McDonald Lake Creek	3	16 May	79 (P)	Southern mainland
Slippery Creek	3	1 May	76 (H)	Kuiu Island
Petersburg Creek	6	29 April	188 (P)	Kupreanof Island
Pleasant Bay Creek	4	1 May	50 (P)	Admiralty Island
Ford Arm Creek	4	19 May	181 (P)	Chichagof Island
Sitkoh Creek	5	30 April	296 (P)	Chichagof Island
Peterson Creek	4	13 May	36 (P)	Northern mainland

stream. One survey was conducted on Ward Creek and 143 adult steelhead were counted.

STREAM TEMPERATURE MONITORING

Three of the nine temperature loggers set in index streams were lost: Sitkoh, Eagle, and Slippery. The Pleasant Bay Creek temperature logger was recovered but was full of water, apparently bitten by a bear.

Since the temperature loggers were generally set during early surveys in 2002 and retrieved during snorkel surveys in 2003, we do not have a complete temperature profile for either year during steelhead surveys. Temperature data from May 8–June 10, 2002, and from April 1–May 6, 2003 are presented in Figure 2 to correspond with our index surveys. There is temperature data available for the Harris River during 2002 but not for 2003; the temperature logger was not deployed during 2003 until June 7.

Ambient temperatures were colder during the 2002 snorkel surveys than during 2003 and several surveys were delayed as a result of streams remaining frozen until after May 1. The Peterson Creek 2002 temperature graph (Figure 3) illustrates that mean daily temperature did not reach 4° C until May 25. By contrast, in 2003 the Peterson Creek temperature had nearly reached 4° C by May 1.

Table 3.–Peak or high steelhead survey counts for Southeast Alaska index streams, 1997–2003.

	1997		1998		1999		2000		2001		2002		2003	
Stream Name	**Peak**	**High**	**Peak**	**High**	**Peak**	**High**	**Peak**	**High**	**Peak**	**High**	**Peak**	**High**	**Peak**	**High**
Peterson Creek	26			29		38		27	41		13		36	
Pleasant Bay Creek		155	81			132	48			48	36		50	
McDonald Lake Creek	145		86			100	47			74[b]		14[b]	79	
White River		84	93			60	38		48		37			77
Petersburg Creek		123	152		115			68		64		41	188	
Slippery Creek[a]	NA	NA	NA	NA	NA	NA	NA	42		41		31		76
Eagle/Luck Creek		90	56			118	82		NA	NA	36			95
Harris River		104	156			192	79			53[b]		200		195
Ford Arm Creek		296		103		89	134			28[b]		122	181	
Sitkoh Creek		329[b]		154		120		112		115		65	296	

[a] Slippery Creek not sampled in 1997–1999.

[b] Based on only one survey count.

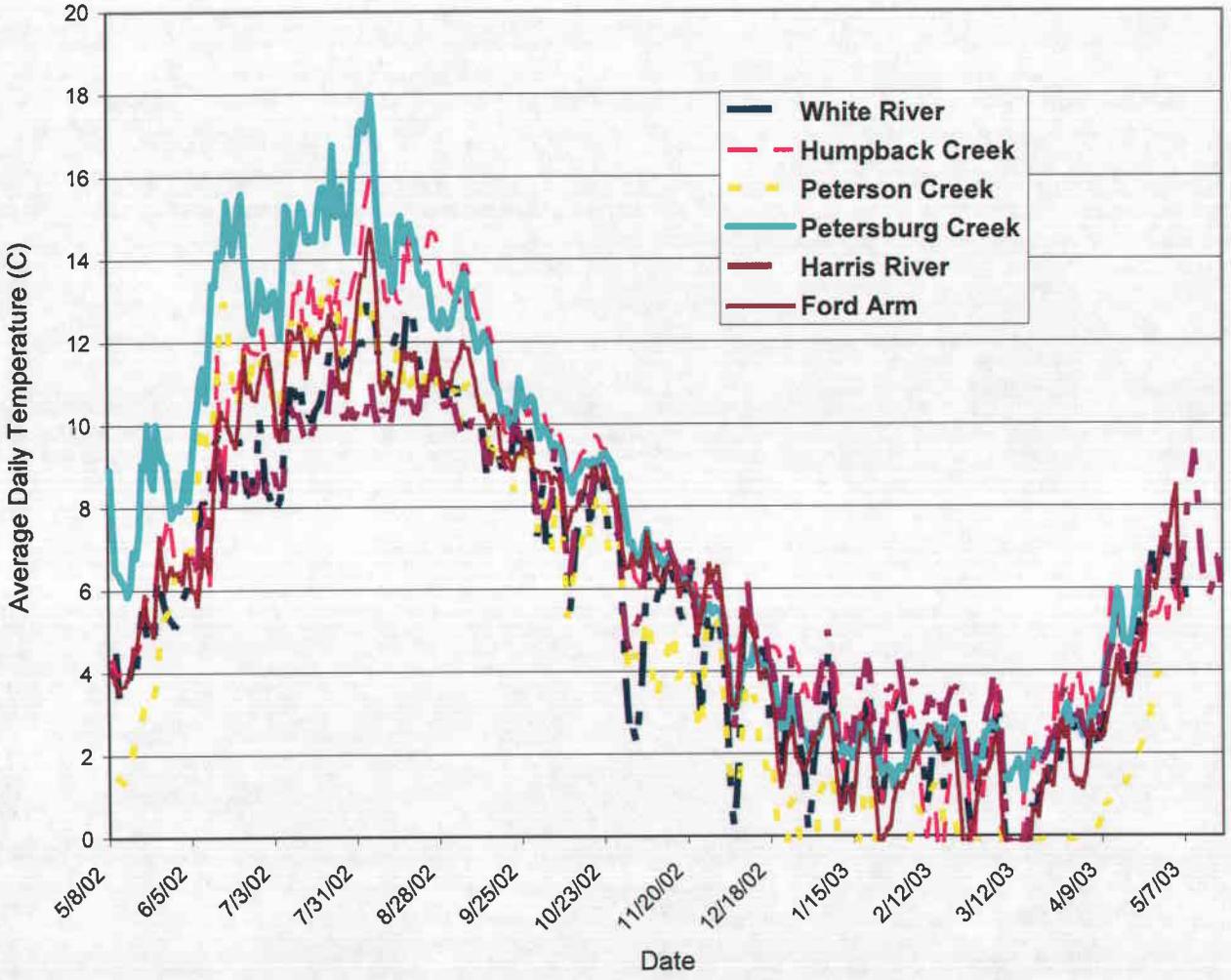

Figure 2.–Stream water temperature for steelhead snorkel streams during 2002 and 2003.

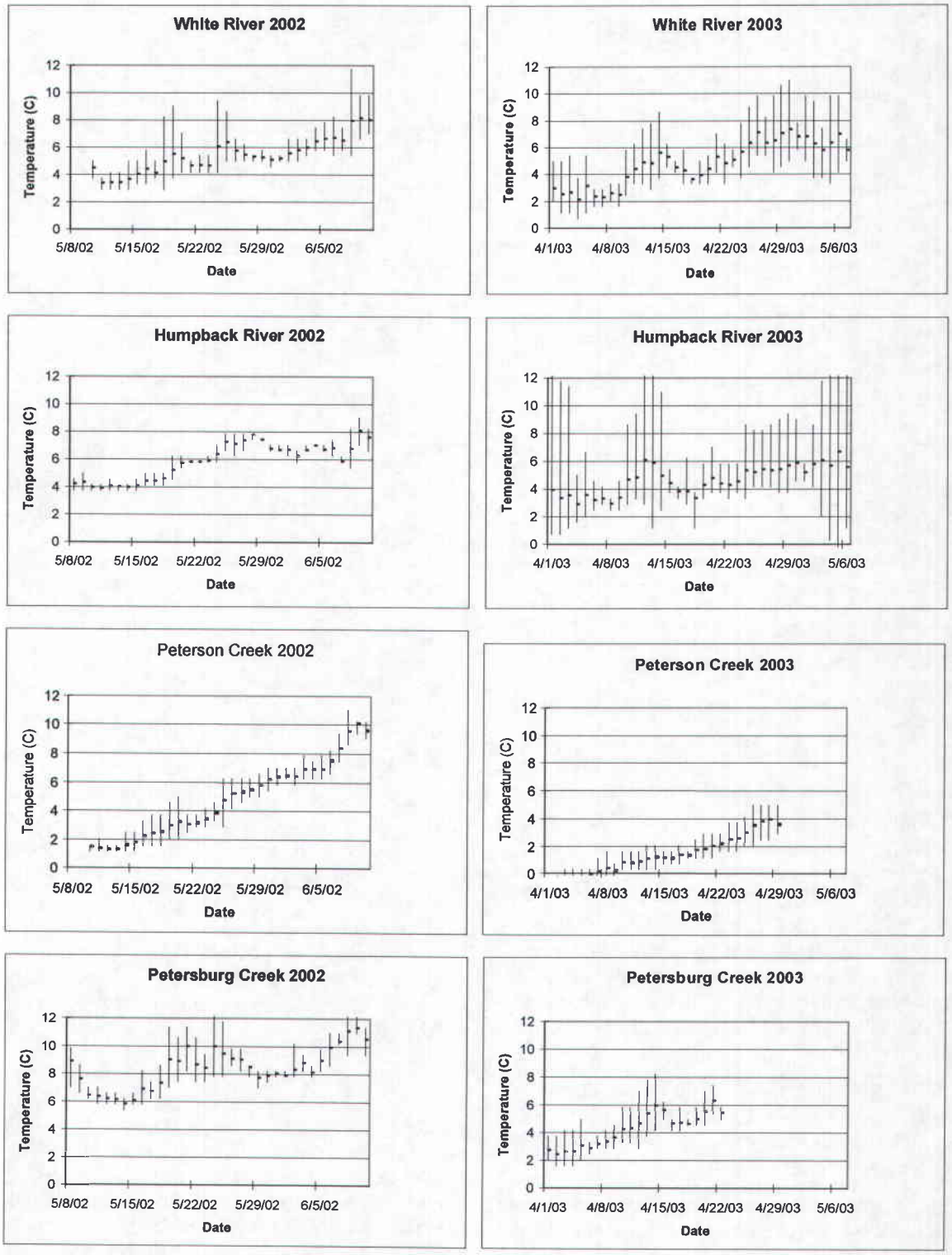

Figure 3.–The daily average and high and low water temperatures recorded at steelhead index streams during our 2002 and 2003 Southeast Alaska steelhead snorkel surveys.

-continued-

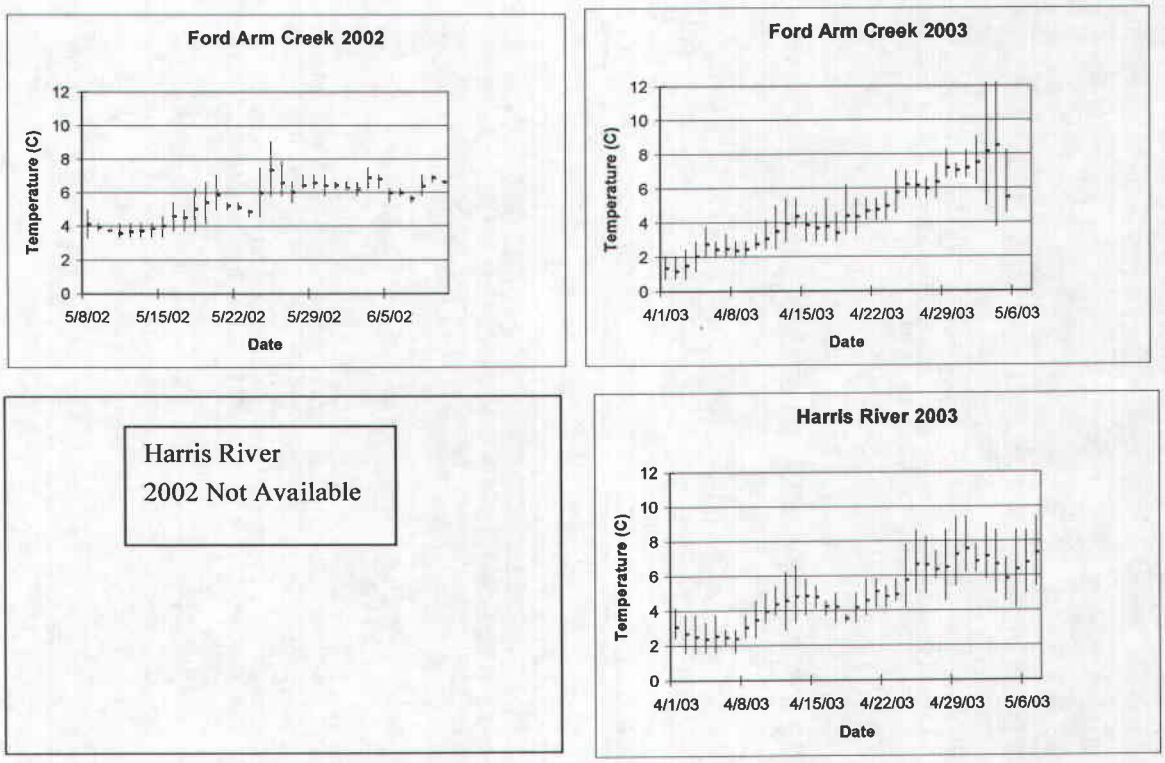

Figure 3.–page 2 of 2.

DISCUSSION

We have consistent snorkel survey data for 8 index streams from 1997 through 2003 (Table 4). Reviewing the peak surveys for index streams in all years reveals that the 2002 counts were similar to the low counts during 2000 and 2001. However, counts were higher during 2003 and were generally comparable to our highest counts seen during the project's inception year of 1997. Snorkel conditions during 2002 were complicated by extremely low water levels and prolonged cold temperatures.

Six of the nine streams surveyed in 2002 had peak or high counts below the 2001 counts while all nine index streams surveyed in 2003 had higher counts than in 2002.

During 2002 concerns about low steelhead abundance were raised and discussed by Sport Fish Area Management Biologists (AMB). The continued trend in 2002 of low snorkel counts was consistent with counts observed over the previous several years. However it was agreed that no additional conservative management action was deemed necessary.

The increase in steelhead observed during the 2003 snorkel counts was consistent with anecdotal angler reports made to Sport Fish AMBs regarding increased steelhead abundance. There was consensus among AMBs and anglers that steelhead abundance was higher in 2003 throughout most of Southeast Alaska. However, only Slippery Creek posted a new high peak snorkel count in 2003 and this came with only 4 prior years of surveys (2000–2003).

ACKNOWLEDGMENTS

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APPENDIX A

Appendix A1.–Steelhead index stream name, anadromous stream number, management area, length and percent of stream surveyed, number of survey reaches, and approximate dates for start of weekly surveys for steelhead in 2002 and 2003.

Index Streams	Anadromous Stream Number	Area	Dist. to be surveyed in feet[a]	Percent of Stream Surveyed	Number of Reaches	Target Survey Start[b]
Ford Arm Creek	113-73-10030	Sitka	4,582/24,002	19%	2	30-Apr
Sitkoh Creek	113-59-10~~004~~	Sitka	16,192/20,136	80%	3	30-Apr
Peterson Creek	111-50-10~~010~~ 10100	Juneau	3,663/7,553	48%	1	30-Apr
Pleasant Bay Creek	111-12-10~~005~~ 10050	Juneau	6,630/12,405	54%	2 [c]	30-Apr
Petersburg Creek	106-44-10600	Petersburg	22,401/72,983	31%	2	30-Apr
Slippery Creek	109-43-10030	Petersburg	9,618/11,491	84%	3	30-Apr
Eagle Creek	~~107-40-10055~~ 106-10-10300	POW	28,716/49,136	58%	4	23-Apr
Harris River	102-60-10820	POW	38,758/96,466	40%	5	23-Apr
McDonald Lake Creek	101-80-~~10068~~ 10660	Ketchikan	11,259/11,259	100%	4	23-Apr
White River	101-44-10024	Ketchikan	19,719/35,750	55%	3	23-Apr

[a] Feet to be surveyed/feet of anadromous stream.

[b] Additional surveys are required if highest counts occur during last of three surveys.

[c] Stream reach 3 dropped in 2000 due to safety concerns and because <10% of steelhead were ever observed in this section of river.

Appendix A2.–Counts of steelhead from 2002 surveys by stream, date, and reach of stream along with measured habitat variables.

Stream name	Date	Reach	Distance surveyed	Survey type[a]	Live	Redds	Weather codes[b]	Observers[c]	Codes[d]	Light Level[e]	Light Trans	Temp (C)	Comments
Eagle Creek	05/08/02	1	13712	S	0	1	O	SM, JN	21, 33				
	05/08/02	2	6253	S	2	4	O	SM, JN	21, 33				
	05/08/02	3	5044	S	8	0	O	SM, JN	21, 33				
	05/08/02	4	3707	S	5	0	O	SM, JN	21, 33				
	05/14/02	1		S	5		C	SM, MS	22, 31				
	05/14/02	2		S	20		C	SM, MS	22, 31				
	05/14/02	3		S	11		C	SM, MS	22, 31				
	05/14/02	4		S	0		C	SM, MS	22, 31				No count, high water
	05/23/02	1		S	0		O	MS, DB	22, 31				
	05/23/02	2		S	20		O	MS, DB	22, 31				
	05/23/02	3		S	14		O	MS, DB	22, 31				
	05/23/02	4		S			O	MS, DB	22, 31				No count, high water
Ford Arm	05/07/02	1	Length	S	4	0	O	REC, TT	43, 33			3.0	
	05/07/02	2	Length	S	11	0	O	REC, TT	43, 33			3.0	
	05/13/02	1	Length	S	58	6	R	REC, TT, RH	23, 32			3.5	
	05/13/02	2	Length	S	37	0	R	REC, TT, RH	23, 32			3.5	
	05/22/02	1	Length	S	74		R	TT, LE, PE	22, 32			5.5	
	05/22/02	2	Length	S	48		R	TT, LE, PE	22, 32			5.5	
Harris River	05/07/02	1		S	3	0	C	SM	21, 33				
	05/07/02	2		S	101	10	C	SM	21, 33				
	05/07/02	3		S	84		C	USFS	21, 33				
	05/07/02	4		S	12		C	USFS	21, 33				
	05/07/02	5		S	0		C	USFS	21, 33				
	05/15/02	1		S	3		O	MS, DB	22, 32				Total=154
	05/15/02	2		S	89		O	MS, DB	22, 32				
	05/15/02	3		S	60		O	USFS	22, 32				Count reaches 3 and 4 combined
	05/15/02	4		S			O	USFS	22, 32				
	05/15/02	5		S	2		O	USFS	22, 32				

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Stream name	Date	Reach	Distance surveyed	Survey type[a]	Live	Redds	Weather codes[b]	Observers[c]	Codes[d]	Light Level[e]	Light Trans	Temp (C)	Comments
Humpback Creek	04/25/02	1		S	22	0	C	GF,AP	21		10.0	3.5	Water level=33; very low/clear
	04/25/02	2		S	23	0	C	GF,AP	21		10.0	3.5	Water level=33; very low/clear
	04/25/02	3		S	30	2	C	GF,AP	21		10.0	3.5	Water level=33; very low/clear
	04/25/02	4		S	0	0	C	GF,AP	21		10.0	3.5	Water level=33; very low/clear
	05/08/02	1		F	3	0	O	SNH	22, 32			5.0	
	05/08/02	2		F	91	0	O	SNH	22, 32			5.0	
	05/08/02	3		F	0	0	O	SNH	22, 32			5.0	
	05/08/02	4		F	0	0	O	SNH	22, 32			5.0	
Ketchikan Creek	04/29/02	1		S	0	0	C	ABH, AP	21		10.0	3.5	Level 33; water level 3" below marker extremely low water
	04/29/02	2		S	0	0	C	ABH, AP	21		10.0	3.5	Level 33; water level 3" below marker extremely low water
	04/29/02	3		S	5	0	C	ABH, AP	21		10.0	3.5	2 RB
	05/09/02	1		S	1	0	C	SNH	22, 33			7.0	8 RB, 6-8"
	05/09/02	2		S	2	0	C	SNH	22, 33			7.0	3 RB, 6-8"
	05/09/02	3		S	2	0	C	SNH	22, 33			7.0	1 RB, 6-8"
McDonald Lake Creek	05/02/02	1	0.5	S	6	0	C	GF,AP	23, 31			3.5	Water dark
	05/02/02	2	0.5	S	0	0	C	GF,AP	23, 31			3.5	Poor visibility
	05/02/02	3	0.3	S/F	6	0	C	GF,AP	23, 31			3.5	1 @ Lake Outlet
	05/02/02	4	0.8	S	2	0	C	GF,AP	23, 31			3.5	
Petersburg Creek	05/07/02	1		S	13	0	O	DB, VG	21, 33			4.5	Water level = 20"
	05/07/02	2		S	27	1	O	DB, VG	21, 33			4.5	Water level = 20"
	05/20/02	1		S	14	1	C	DB, VG	22, 32			8.5	Water level = 14"
	05/20/02	2		S	27	0	O	DB, VG	22, 32			8.5	
Peterson Creek	05/10/02	1	Length	S	0			MS, BG	22			2.0	Cold, water a little high; Depth 23.0 cm
	05/16/02	1	Length	S	13		O	BG, NZ	22			3.5	Water level 31 (9 3/8");2 small SH included in total
	05/31/02	1	Length	S	5	0	O	MS, BG	22			6.5	Water level 35.5 cm

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Stream name	Date	Reach	Distance surveyed	Survey type[a]	Live	Redds	Weather codes[b]	Observers[c]	Codes[d]	Light Level[e]	Light Trans	Temp (C)	Comments
Pleasant Bay	05/08/02	1	Length	S	6			BG, MS, RH	21, 33			4.0	Water level=19 inches; lowest water ever seen
	05/08/02	2	Length	S	22			BG, MS, RH	21, 33			4.0	21 SH gage pool, 1 SH bedrock pool
	05/17/02	1	Length	S	15	0	C, O	MS, R Holmes	22			3.5	Water level=21.5 inches
	05/17/02	2	Length	S	21	0	C, O	MS, R Holmes	22			3.5	Water level=21.5 inches
	05/24/02	1	Length	S	10		C	MS, RH, JD	32			6.0	
	05/24/02	2	Length	S	11		C	MS, RH, JD	32			6.0	Water level=8.5 inches
Sitkoh Creek	05/14/02	1	Length	S	8		O/R	BC, TT, RH	21, 31			4.0	74 RBT, 4 CT, 1 DV
	05/14/02	2	Length	S	10		O/R	BC, TT, RH	21, 31			4.0	Ran into Italian film crew
	05/14/02	3	Length	S	29		O/R	BC, TT, RH	21, 31			4.0	
	05/20/02	1	Length	S	23		C	BC, TT, SC	32			5.5	
	05/20/02	2	Length	S	17		C	BC, TT, SC	32			5.5	
	05/20/02	3	Length	S	25		C	BC, TT, SC	32			5.5	
Slippery Creek	05/01/02	1	0.5 mi	S	1	0	O	DB, UG, EJ	21,33	9.5	8.5	6.0	Water level 8"
	05/01/02	2	1 mi	S	30	1	O	DB, UG, EJ	21,33	9.5	8.5	6.0	Water level 8"
	05/01/02	3	0.5 mi	S	0	0	O	DB, UG, EJ	21,33	9.5	8.5	6.0	Water level 8"
	05/15/02	1	0.5 mi	S	9	0	R	ST, VG	22, 32	10.0	9.5	6.0	Water level 1.3ft
	05/15/02	2	1 mi	S	19	0	R	ST, VG	22, 32	10.0	9.5	6.0	Water level 1.3ft
	05/15/02	3	0.5 mi	S	1	0	R, W	ST, VG	22, 32	10.0	9.5	6.0	Water level 1.3ft
White River	05/01/02	1		S	8	0	C	ABH, AP	22, 23, 31			5.0	Water rising due to snowmelt
	05/01/02	2		S	2	0	C	ABH, AP	22, 23, 31			5.0	Water rising due to snowmelt
	05/01/02	3		S	3	0	C	ABH, AP	22, 23, 31			5.0	Water rising due to snowmelt
	05/10/02	1		S	7	0	O	SNH	22, 32			8.0	
	05/10/02	2		S	14	0	O	SNH	22, 32			8.0	
	05/10/02	3		S	16	0	O	SNH	22, 32			8.0	
	05/22/02	1		S	7	0	O	ABH, MAW	22, 31			8.0	1 RB

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[a] S = snorkel, F = foot, R&R = rod and reel.

[b] C = clear, O = overcast, R = rain, O/C = Overcast with breaks.

[c] Primary observer(s): MS (Mark Schwan), BG (Brian Glynn), KK (Kurt Kondzela), DJ (Doug Jones), MW (Mike Wood), BC (Bob Chadwick), GF (Glenn Freeman), TB (Tom Brookover), TT (Troy Tydingco), AP (Andy Piston), VG (Vera Goudima), DB (Dean Beers), TQ (Todd Qualls), DM (Dave Magnus).

[d] 12 = fish present in the intertidal but not counted, 21 = excellent visibility, 22 = normal visibility, 23 = poor visibility, 31 = high water, 32 = normal water, 33 = low water.

[e] Light levels are EV values from a light meter calibrated to ASA 100.

Appendix A3.–Counts of steelhead from 2003 surveys by stream, date, and reach of stream along with measured habitat variables.

Stream name	Date	Reach	Distance surveyed	Survey type[a]	Live	Redds	Weather codes[b]	Observers[c]	Codes[d]	Light Level[e]	Light Trans	Temp.	Comments
Eagle Creek	05/16/03	1		S	2		C	SM, MS	21, 33				Secchi disk 11'
	05/16/03	2		S	9		C	SM, MS	21, 33				Secchi disk 11'
	05/16/03	3		S	59		C	SM, MS	21, 33				Secchi disk 11'
	05/16/03	4		S	3		C	SM, MS	21, 33				Secchi disk 11'
	05/22/03	1		S	4	1	C	SHN, MS	22, 33				Secchi disk 12'
	05/22/03	2		S	15	12	C	SHN, MS	22, 33				Secchi disk 12'
	05/22/03	3		S	56	40	C	SHN, MS	22, 33				Secchi disk 12'
	05/22/03	4		S	20	2	C	SHN, MS	22, 33				Secchi disk 12'
Ford Arm	04/28/03	1	Length	S	28	0	C	REC, TT, RH	22, 32,42			4.5	Secchi disk 13'
	04/28/03	2	Length	S	106	0	C	REC, TT, RH	22, 32,42			4.5	Secchi disk 13'
	05/05/03	1	1723.0	S	48	0	C/W	REC, TT,TB	21,33			4.5	Secchi disk 13-14'
	05/05/03	2	2859.0	S	79	0	C/W	REC, TT, TB	21,33, 42			4.5	Secchi disk 13-14'
	05/19/03	1	1723.0	S	107	12 +	C/W	REC, TT, PE	22,33			6.0	Secchi disk 9-18'
	05/19/03	2	2859.0	S	74	12 +	C/W	REC, TT, PE	22,33			6.0	Secchi disk 9-18'
	05/29/03	1	1723.0	S	63	27	O/R	REC, TT, TM	22,32			6.0	Secchi disk 13-15'
	05/29/03	2	2859.0	S	24	177	O/R	REC, TT, TM	22,32			6.0	Secchi disk 13-15'
Harris River	05/01/03	5		S	0		C	SHN, MS	21, 33			5.0	Secchi disk 25'
	05/01/03	4		S	13	4	C	SHN, MS	21, 33			5.0	
	05/01/03	3		S	62		C	SHN, MS	21, 33			5.0	
	05/01/03	2		S	109		C	SHN, MS	21, 33			5.0	Secchi disk 25'
	05/01/03	1		S	11		C	SHN, MS	21, 33			5.0	Secchi disk 25'
	05/19/03	1		S	2	3	C	SM, SHN	21			8.0	Secchi disk 23'
	05/19/03	2		S	3	14	C	SM, SHN	21			8.0	Secchi disk 23'
	05/19/03	3		S	22	12	C	SM, SHN	21			8.0	Secchi disk 23'
	05/19/03	4		S	60	8	C	SM, SHN	21			8.0	Secchi disk 23'
	05/19/03	5		S	7	0	C	SM, SHN	21			8.0	Secchi disk 23'

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Stream name	Date	Reach	Distance surveyed	Survey type[a]	Live	Redds	Weather codes[b]	Observers[c]	Codes[d]	Light Level[e]	Light Trans	Temp	Comments
Humpback Creek	04/23/03	1		S	10			O/R	GF,ABH	22.0			NA
	04/23/03	2		S	49		O/R	GF, ABH	22			NA	Secchi disk 33'
	04/23/03	3		S	11		O	GF, ABH	22			NA	Secchi disk 33'
	04/23/03	4		S	0		O	GF, ABH	22			NA	Secchi disk 33'
	05/28/03	1		S	2	6	R	SNH, NZ	23			11	Secchi disk 32'
	05/28/03	2		S	11	18	R	SNH, NZ	23			11	Secchi disk 32'
	05/28/03	3		S	2	4	R	SNH, NZ	23			11	Secchi disk 32'
	05/06/03	1		S	6	2	C	SHN, AH	21			NA	Secchi disk 33'
	05/06/03	2		S	99	23	C	SHN, AH	21			NA	Secchi disk 33'
	05/06/03	3		S	0	12	C	SHN, AH	21			NA	Secchi disk 33'
Ketchikan Creek	05/14/03	1		S	28	0	C	SH, NZ	22			9.0	Secchi disk 35'
	05/14/03	2		S	20	0	C	SH, NZ	22			9.0	Secchi disk 35'
	05/14/03	3		S	5	0	C	SH, NZ	22			9.0	Secchi disk 35'
	05/20/03	1		S	34	0	C	SH, NZ	22			10.5	Secchi disk 35'
	05/20/03	2		S	17	6	C	SH, NZ	22			10.5	Secchi disk 35'
	05/20/03	3		S	9	0	C	SH, NZ	22			10.5	Secchi disk 35'
	05/27/03	1		S	19	2	O	SH, TB	22			9.0	Secchi disk 32'
	05/27/03	2		S	15	15	O	SH, TB	22			9.0	
	05/27/03	3		S	7	0	O	SH, TB	22			9.0	
McDonald Lake Creek	04/29/03	1		S	10		C	SH, GF	22	10.0	9.0	4.0	Secchi disk 23'
	04/29/03	2		S	10		C	SH, GF	22	10.0	9.0	4.0	Secchi disk 23'
	04/29/03	3		S	13		C	SH, GF	22	10.0	9.0	4.0	Secchi disk 23'
	04/29/03	4		S	6		C	SH, GF	22	10.0	9.0	4.0	Secchi disk 23'
	05/16/03	1		S	28	2	C	SH, GF	22			8.0	Secchi disk 23'
	05/16/03	2		S	25	6	C	SH, GF	22			8.0	Secchi disk 23'
	05/16/03	3		S	20	3	C	SH, GF	22			8.0	Secchi disk 23'
	05/16/03	4		S	6	1	C	SH, GF	22			8.0	Secchi disk 23'
	06/04/03	1		S	18	6	O	SHN, NZ	22			10.0	Secchi disk 22'

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Appendix A3.–Page 3 of 5.

Stream name	Date	Reach	Distance surveyed	Survey type[a]	Live	Redds	Weather codes[b]	Observers[c]	Codes[d]	Light Level[e]	Light Trans	Temp (C)	Comments
McDonald Lake Creek	06/04/03	2		S	20	4	O	SHN, NZ	22			10.0	Secchi disk 22'
	06/04/03	3		S	11	2	O	SHN, NZ	22			10.0	Secchi disk 22'
	06/04/03	4		S	12	4	O	SHN, NZ	22			10.0	Secchi disk 22'
Petersburg Creek	04/22/03	1		S	40	15 ?	O	DF, KK, VG	22, 13			6.0	Secchi disk 14'
	04/22/03	1[af]	1500.0		8								
	04/22/03	2		S	70	5 ?	O	DF, KK, VG	22, 12			6.0	Secchi disk 14'
	04/29/03	1		S	38	0	C	DF, VG, DG	21, 33			7.0	Secchi disk 21'
	04/29/03	2		S	78	0	C	DF, VG, DG	21, 33	10.0		7.0	Secchi disk 21'
	04/29/03	Pool cabins		S	30	0	C	DF, VG, DG	21, 33	10.0		7.0	
	05/06/03	1		S	48	51	C	DF, VG, MS	21, 33	8.5		8.5	Secchi disk 17.5'
	05/06/03	2		S	75	60	C	DF, VG, MS	21, 33	8.5		8.5	Secchi disk 17.5'
	05/06/03	Pool cabins		S	65	nd	C	DF, VG, DG	21, 33	10		7.0	
	05/06/03	Hoagies Hole		S	0	nd	C	DF, VG, MS	21, 33	8.5		8.5	
	05/19/03	1		S	17	25	C	DF, VG, MS	21, 32	nd		9.0	Secchi disk 20'
	05/19/03	2		S	66	34	C	DF, VG, MS	21, 32	nd		9.0	Secchi disk 20'
	05/19/03	Pool cabins		S	8	nd	C	DF, VG, MS	21, 33	8.5		8.5	
Peterson Creek	04/29/03	1	Length	S	17	NA	C	BG, JS	22			6.5	
	05/06/03	1	Length	S	13	NA	C	BG, JS	22			6.5	
	05/13/03	1	Length	S	36		O, R	BG, KK	22,23			6.5	
	05/21/03	1	Length	S	5		C	BG, KK, CS, RH	21			9.0	
Pleasant Bay	04/25/03	1	Length	S	11		C	BG, JS	21			4.0	Secchi disk 8.5'
	04/25/03	2	Length	S	8		C	BG, JS	21			4.0	Secchi disk 8.5'
	05/01/03	1	Upper	S	27		C	BG, JS	21			5.0	
	05/01/03	2	Lower	S	23		C	BG, JS	21			5.0	
	05/08/03	1	Upper	S	22		C	BG, JS	21			6.5	
	05/08/03	2	Lower	S	23		C	BG, JS	21			6.5	
	05/19/03	1	Upper	S	11		C	BG, RH, CS	21				
	05/19/03	2	Lower	S	13		C	BG, RH, CS	21				

-continued-

Appendix A3.–Page 4 of 5.

Stream name	Date	Reach	Distance surveyed	Survey type[a]	Live	Redds	Weather codes[b]	Observers[c]	Codes[d]	Light[e]	Trans	Temp.	Comments
Sitkoh Creek	04/15/03	1	3264'	S	0		R/O	BC, TT, DB	21, 12			1.0	
	04/15/03	2	6128'	S	1		R/O	BC, TT, DB	21, 12			1.0	
	04/15/03	3	6800'	S	9		R/O	BC, TT, DB	21, 12			1.0	
	04/15/03	Below weir	Length	S	7		R/O	BC, TT, DB	21, 12			1.0	
	04/22/03	1	3264'	S	2		O/W	BC, TT, LE	22/21, 32			2.5	
	04/22/03	2	6128'	S	22		O/W	BC, TT, LE	22/21, 32			2.5	
	04/22/03	3	6800'	S	48	0	O/W	BC, TT, LE	22/21, 32			2.5	
	04/22/03	Below weir	Length	S	33	0	O/W	BC, TT, LE	22/21, 32			2.5	
	04/29/03	1	3264'	S	18	0	C	BC, TT, JW	22, 32/31			4.0	Secchi disk 12'
	04/29/03	2	6128'	S	41	0	C	BC, TT, JW	22, 32/31			4.0	Secchi disk 12'
	04/29/03	3	6800'	S	101	0	C	BC, TT, JW	22, 32/31			4.0	Secchi disk 12'
	04/29/03	Below weir	Length	S	22	0	C	BC, TT, JW	22, 32/31			4.0	Secchi disk 12'
	04/30/03	1	3264'	S	28	0	C	BG, JS, LE	21			4.5	
	04/30/03	2	6128'	S	58	0	C	BG, JS, LE	21			4.5	
	04/30/03	3	6800'	S	160	0	C	BG, JS, LE	21			4.5	
	04/30/03	Below weir	Length	S	50	0	C	BG, JS, LE	21			4.5	
	05/20/03	1	3264'	S	5	15+	C	BC, TT, LE	22/21, 33			7.0	Secchi disk 14'
	05/20/03	2	6128'	S	45	20+	C	BC, TT, LE	22/21, 33			7.0	Secchi disk 14'
	05/20/03	3	6800'	S	55	11	C	BC, TT, LE	22/21, 33			7.0	Secchi disk 14'
	05/20/03	Second hole above weir		S	93	0	C	BC, TT, LE	22/21, 33			7.0	Secchi disk 14'
	05/20/03	Run above weir		S	47	0	C	BC, TT, LE	22/21, 33			7.0	Secchi disk 14'
	05/20/03	Below weir	Length	S	8	0	C	BC, TT, LE	22/21, 33				
	05/20/03	1	3264'	S	2	0	C	AH, GF					
	05/20/03	2	6128'	S	48	0	C	AH, GF					
	05/20/03	3	6800'	S	71	0	C	AH, GF					
	05/20/03	Second hole above weir		S	68	0	C	AH, GF					
	05/20/03	Run above weir		S	52	0	C	AH, GF					
	05/20/03	Below weir	Length	S	4	0	C	AH, GF					

-continued-

Appendix A3.–Page 5 of 5.

Stream name	Date	Reach	Distance surveyed	Survey type[a]	Live	Redds	Weather codes[b]	Observers[c]	Codes[d]	Light Level[e]	Light Trans	Temp	Comments
Slippery Creek	05/01/03	1	Length	S	3	0	C	DF, VG	22	nd		11.0	Secchi disk 20'
	05/01/03	2	Length	S	69	0	C	DF, VG	21	nd		11.0	Secchi disk 20'
	05/01/03	3	Length	S	4	0	C	DF, VG	22	nd		11.0	
	05/08/03	1	Length	S	4	0	C	DF, VG	22	nd		11.0	Secchi disk 24'
	05/08/03	2	Length	S	61	18 +	C	DF, VG	21	10.0		8.5	Secchi disk 20'
	05/08/03	3	Length	S	5	nd	C	DF, VG	21	nd		11.0	
	05/16/03	1	Length	S, F	2	0	C	DF, VG	22	nd		11.0	Secchi disk 24'
	05/16/03	2	Length	S, F	25	many	C	DF, VG	21	10.0		8.5	Secchi disk 20'
	05/16/03	3	Length	S, F	0	nd	C	DF, VG	21	nd		11.0	
Ward Creek	05/21/03	1	Length	S	28	6	R	SHN,MW,NZ	23			10.0	Secchi disk 13'
	05/21/03	2	Length	S	40	10	R	SHN,MW,NZ	23			10.0	Secchi disk 13'
	05/21/03	3	Length	S	75	4	R	SHN,MW,NZ	23			10.0	Secchi disk 13'
White River	04/24/03	1		S	27	2	C	GF/MW	21, 32				
	04/24/03	1		S	20	4	C/O	GF/MW	22, 32				
	04/24/03	1		S	28	0	C	GF/MW	21, 32				
	05/07/03	1		S	13	22	C	SHN, AH	21				Secchi disk 25'
	05/07/03	2		S	12	8	C	SHN, AH	21				Secchi disk 25'
	05/07/03	3		S	49	4	C	SHN, AH	21				Secchi disk 25'
	05/07/03	4		S	3	0	C	SHN, AH	21				Secchi disk 25'
	05/15/03	1		S	8	6	O	SHN,MW	22			8.0	Secchi disk 20'
	05/15/03	2		S	8	4	O	SHN,MW	22			8.0	Secchi disk 20'
	05/15/03	3		S	29	0	O	SHN,MW	22			8.0	Secchi disk 20'
	05/15/03	4		S	2	0	O	SHN,MW	22			8.0	Secchi disk 20'

[a] S = snorkel, F = foot, R&R = rod and reel.

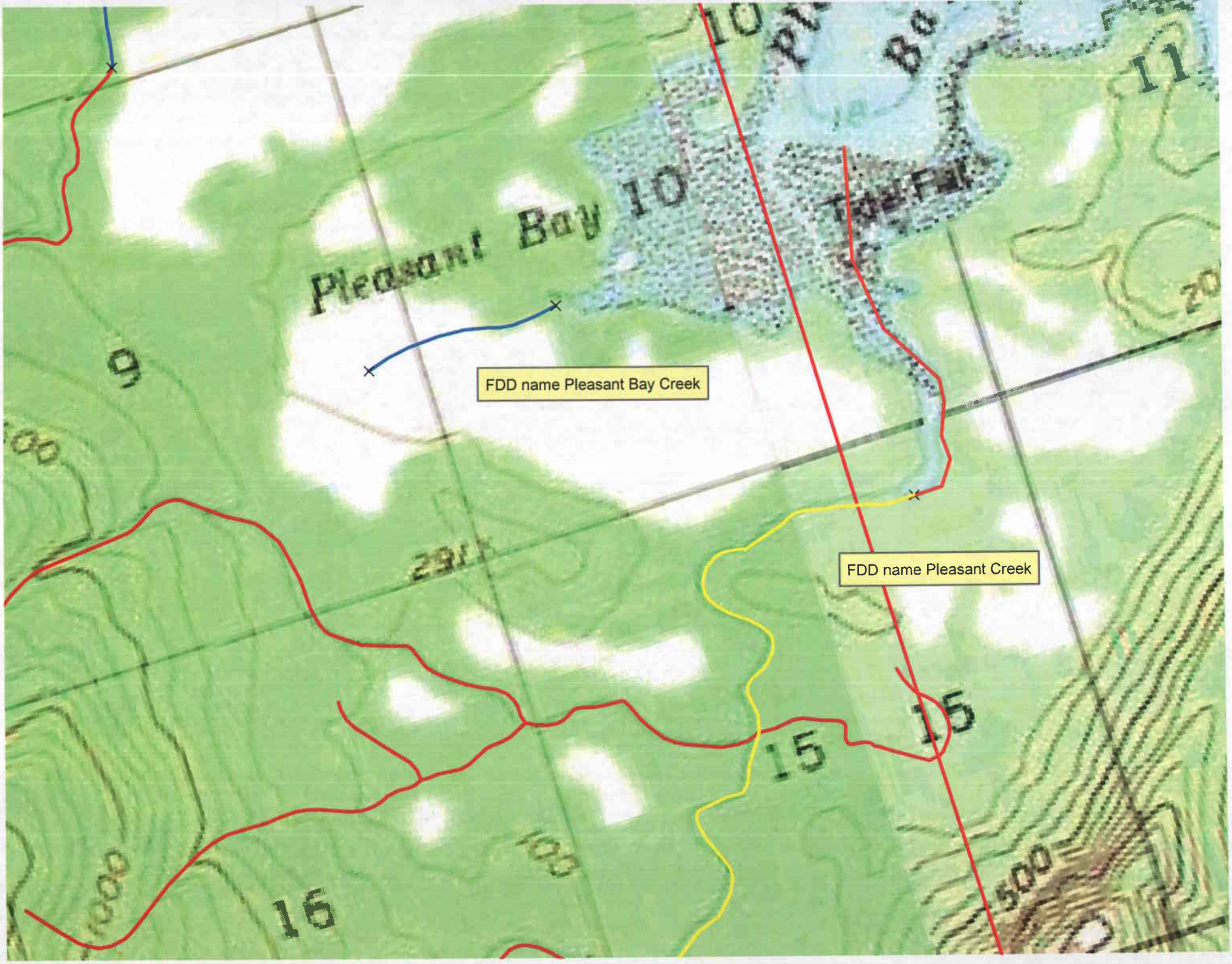
[b] C = clear, O = overcast, R = rain, O/C = overcast with breaks.

[c] Primary observer(s): MS (Mark Schwan), BG (Brian Glynn), KK (Kurt Kondzela), DJ (Doug Jones), MW (Mike Wood), BC (Bob Chadwick), GF (Glenn Freeman), TB (Tom Brookover), TT (Troy Tydingco), AP (Andy Piston), VG (Vera Goudima), DB (Dean Beers), TQ (Todd Qualls), DM (Dave Magnus).

[d] 12 = fish present in the intertidal but not counted, 21 = excellent visibility, 22 = normal visibility, 23 = poor visibility, 31 = high water, 32 = normal water, 33 = low water.

[e] Light levels are EV values from a light meter calibrated to ASA 100.

[f] Surveyed upper part of fast section not normally surveyed and observed 8 steelhead in 1,500 feet.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FDD name Pleasant Bay Creek
FDD name Pleasant Creek
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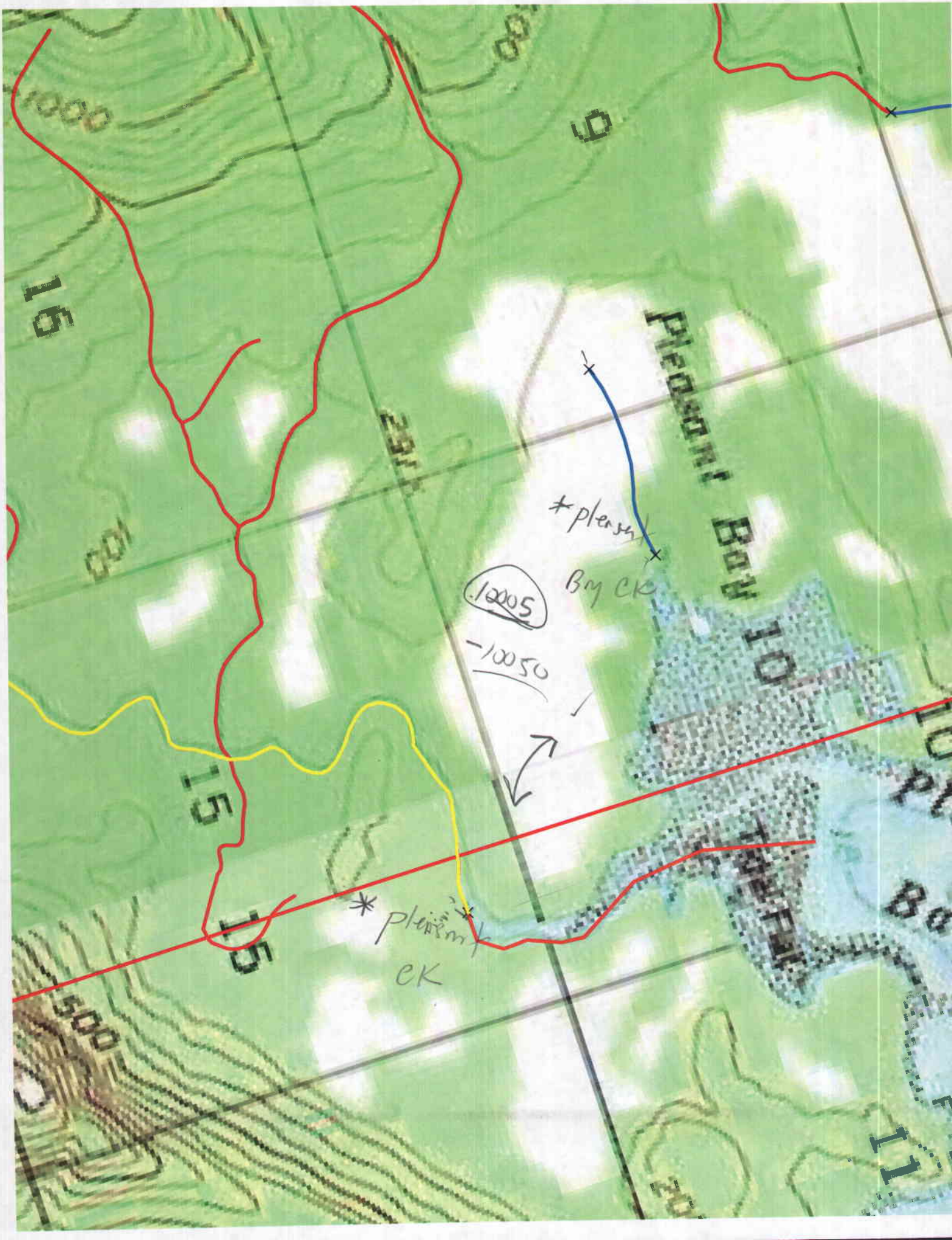
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Johnson, J D (DFG)

From: Johnson, J D (DFG)
Sent: Wednesday, July 18, 2007 8:55 AM
To: Roger D Harding (Doug)
Subject: SEA Steelhead trout locations
Attachments: sea_sht_sites_07.xls; sea_sht_sites_07.pdf; pleasant.zip

Tracking:

Recipient	Delivery	Read
Roger D Harding (Doug)		
Harding, Roger D (DFG)	Delivered: 7/18/2007 8:56 AM	Read: 7/18/2007 9:04 AM

Doug

The attached spreadsheet lists Steelhead trout index streams that I have some questions about (bold).
Nothing too urgent here as I am sure you have many more important and interesting tasks to deal with.

Ford Arm Creek – local name not listed in AWC/FDD – I think it is important to include as many local water bodies in AWC/FDD where USGS name does not exist.
No nomination exists to indicate how Steelhead trout and other anadromous fish species came to be listed in AWC/FDD

Sitkoh Creek – AWC number in table does not match AWC/FDD dB
No nomination exists to indicate how Steelhead trout and other anadromous fish species came to be listed in AWC/FDD

Peterson Creek – AWC number in table does not match AWC/FDD dB
No nomination exists to indicate how Steelhead trout and other anadromous fish species came to be listed in AWC/FDD

Pleasant Bay Creek – AWC number in table does not match AWC/FDD dB
Refer to zipped file (PDF) for this one, FDD lists Pleasant Bay Creek as 111-12-10100 w/Coho salmon and Dolly Varden presence (no Steelhead trout, blue arc). On the other hand – FDD lists Pleasant Creek (red & yellow arc) as 111-12-10050 w/CHp,COp,Pp,Sp,CTp,DVp,SHp. I believe that AWC has the names wrong and need to be swapped. No nomination exists to indicate how Steelhead trout and other anadromous fish species came to be listed in AWC/FDD

Petersburg Creek - No nomination exists to indicate how Steelhead trout and other anadromous fish species came to be listed in AWC/FDD

Slippery Creek - local name not listed in AWC/FDD, AWC number in table does not match AWC/FDD dB
Steelhead trout presence not listed in AWC/FDD

Eagle Creek - AWC number in table does not match AWC/FDD dB
Nomination does substantiate Steelhead Trout presence in water body

Harris Creek – No nomination exists to indicate how Steelhead trout and other anadromous fish species came to be listed in AWC/FDD

McDonald Creek - AWC number in table does not match AWC/FDD dB
Name does not match AWC/FDD listing (Wolverine Creek)
No nomination exists to indicate how Steelhead trout and other anadromous fish species came to be listed in AWC/FDD

White River – Nomination does substantiate Steelhead Trout presence in water body

If you could clear up the Pleasant Creek vs Pleasant Bay Creek discrepancy, I can revise FDD dB as needed.
Same applies to McDonald Creek vs Wolverine Creek.
I can also add local names to FDD dB for Slippery Creek & Ford Arm Creek unless there is some reason not too.
Differences in AWC numbers between table and FDD dB are FYI – if I have something wrong or ya would like to see maps, let me know.

For all the water bodies that currently lists Steelhead trout but lack nomination substantiation, I would like to put together for your review and signature nominations which would include data from referenced report as well as any other info to substantiate

Steelhead trout and other anadromous fish presence in stream. If I am able to offer up some Line 100 monies for tech time later in the fiscal year, would someone on your staff be able to put together supporting data for the unsubstantiated water bodies? Or could you provide references to reports I could use to substantiate anadromous fish presence in these water bodies which would be included with each nomination? Or perhaps is there weir or other observations that can be utilized to substantiate continued anadromous fish presence?

Finally Slippery Creek Steelhead trout presence is not listed in AWC/FDD, other anadromous fish species presence substantiated by nominations.
I can put together a nomination w/map for you to indicate upper most extent of Steelhead trout observations.

Give me a call if ya have any questions, any assistance you can provide will be appreciated.

J. Johnson
ADF&G
Fish Distribution Database
Project Biologist
907-267-2337

Johnson, J D (DFG)

From: J Johnson [j_johnson@fishgame.state.ak.us]
Sent: Thursday, May 24, 2007 9:45 AM
To: 'Roger Harding'
Subject: RE: Eagle Creek

Thx Roger.

Guess I should have been a bit clearer
SH are listed in AWC for Eagle Creek, the problem is that there is not nomination form or other info in this office that supports that inclusion.
Since the dept monitors escapement and regularly reports anadromous fish in Eagle Creek, creating a supporting nomination will ensure that if ever someone wanted to conduct activities in Eagle Creek that might require a permit, the dept can easily show that AWC listing is valid and consistent w/present day observations.
I'll put together a nomination form for ya after I've had a change to review the 2002-2003 report.
thx

From: Roger Harding [mailto:roger_harding@fishgame.state.ak.us]
Sent: Thursday, May 24, 2007 9:24 AM
To: j_johnson@fishgame.state.ak.us
Cc: 'Steve McCurdy'
Subject: RE: Eagle Creek

The latest FDS report is for 2002-2003 and link is below; years 2004-2005 should be sent to peer review soon. If you need more recent data for Eagle the 2006 Trout Report to the BOF is available. As Kelly mentioned the report on the joint FIS-ADFG weir project on Eagle is a ways off but you could probably cite it as in prep.

I am not quite sure what you are asking but if you are asking should steelhead be added as a species present in AWC, then yes and I or Steve McCurdy can sign a nomination form.

http://www.sf.adfg.state.ak.us/FedAidPDFs/fds05-74.pdf\

Please let me know if you need anything else.
Roger

From: J Johnson [mailto:j_johnson@fishgame.state.ak.us]
Sent: Thursday, May 24, 2007 7:15 AM
To: Harding, Roger D (DFG)
Subject: FW: Eagle Creek

Roger

Ya interested in signing a nomination form?
Are you the principle author for any recent Eagle Creek reports which included Steelhead trout escapement counts?
If so, I'll see if copies are available thru ARLISS, unless ya have some extras, or can point me at a link thru DocuShare.

Thx

JJ

From: Kelly Reppert [mailto:kelly_piazza@fishgame.state.ak.us]
Sent: Tuesday, May 22, 2007 9:11 AM
To: j_johnson@fishgame.state.ak.us
Cc: Harding, Roger D (DFG)
Subject: RE: Eagle Creek

Hi,
Eagle Creek has been monitored for steelhead escapement for the past ten years. The project is run by Roger Harding in the Douglas office. There are FDS reports that cite monitoring efforts at Eagle Creek. The dept report you refer to below may not be finalized by your timeline for inclusion.
Kelly

From: J Johnson [mailto:j_johnson@fishgame.state.ak.us]
Sent: Monday, May 14, 2007 7:08 AM
To: Reppert, Kelly S (DFG)
Subject: Eagle Creek

Hi Kelly

I also received a report for Steelhead Trout work in Eagle Creek (attached). Aside from adding new water bodies to the FDD/AWC, part of my job is substantiating water bodies listed in the AWC where little data exist (at least in this office) to indicate why a specific water body was originally listed. Eagle Creek is one such water body (although I have info that suggests it is monitored for escapement). What I would like to do is prepare a "back-up" nomination for you to review and sign. Included will be the attached report and study plan. If you would like to wait until dept report is finalized, that works for me. I would like to include Eagle Creek data in dB NLT the end of Sept. Let me know if you have any questions and thx

J. Johnson
ADF&G
Fish Distribution Database
Project Biologist
907-267-2337

Appendix A1.–Steelhead index stream name, anadromous stream number, management area, length and percent of stream surveyed, number of survey reaches, and approximate dates for start of weekly surveys for steelhead in 2002 and 2003.

Index Streams	Anadromous Stream Number	Area	Dist. to be surveyed in feet[a]	Percent of Stream Surveyed	Number of Reaches	Target Survey Start[b]
Ford Arm Creek	113-73-10030	Sitka	4,582/24,002	19%	2	30-Apr
Sitkoh Creek	113-59-10004	Sitka	16,192/20,136	80%	3	30-Apr
Peterson Creek	111-50-10010	Juneau	3,663/7,553	48%	1	30-Apr
Pleasant Bay Creek	111-12-10005	Juneau	6,630/12,405	54%	2 [c]	30-Apr
Petersburg Creek	106-44-10600	Petersburg	22,401/72,983	31%	2	30-Apr
Slippery Creek	109-43-10030	Petersburg	9,618/11,491	84%	3	30-Apr
Eagle Creek	107-40-10055	POW	28,716/49,136	58%	4	23-Apr
Harris River	102-60-10820	POW	38,758/96,466	40%	5	23-Apr
McDonald Lake Creek	101-80-10068	Ketchikan	11,259/11,259	100%	4	23-Apr
White River	101-44-10024	Ketchikan	19,719/35,750	55%	3	23-Apr

[a] Feet to be surveyed/feet of anadromous stream.

[b] Additional surveys are required if highest counts occur during last of three surveys.

[c] Stream reach 3 dropped in 2000 due to safety concerns and because <10% of steelhead were ever observed in this section of river.

PROJECT: F-10-22
STUDY: R
JOB: 1-4

OPERATIONAL PLAN

SOUTHEAST ALASKA STEELHEAD TROUT ESCAPEMENT SURVEYS

PERIOD COVERED: 1 APRIL 2007 TO 30 JUNE 2007

Principal Investigator:

Roger Harding Fishery Biologist III

Assisting Personnel:

Dan Reed	Biometrician III	John Der Hovanisian	Fishery Biologist IV
Charlie Swanton	Fishery Biologist IV	Brian Glynn	Fishery Biologist III
Doug Fleming	Fishery Biologist III	Mike Woods	Fishery Technician IV
Bob Chadwick	Fishery Biologist III	Troy Tydingco	Fishery Biologist II
Carol Coyle	Fishery Biologist I	Dave Love	Fishery Biologist II
Steve McCurdy	Fishery Biologist II	Heather Riggs	Fishery Biologist I
Kelly Reppert	Fishery Biologist I	Amy Holm	Fishery Technician IV
Kurt Kondzela	Fishery Technician IV	Vera Goudima	Fishery Technician III
Peter Bangs	Fishery Biologist II		

Date Submitted: March 8, 2007
Date Final Revision: April 3, 2007

Signatures:	**Approved**	**Date**
Project Biologist	_____	_____
Biometrician	_____	_____
Regional Research Supervisor	_____	_____
Regional Management Coordinator	_____	_____
Regional Supervisor	_____	_____
Final Biometrics Review	_____	_____

INTRODUCTION

Southeast Alaska has 271 uniquely identified steelhead *Oncorhynchus mykiss* systems and an additional 60 tributaries flow into these 271 systems for a total of 331 known water bodies containing steelhead. Most populations are believed to contain 200 or fewer spawning adults. Major sport fisheries occur on some of the larger systems like the Naha, Karta, and Thorne rivers, which may support up to 1,000 spawning steelhead, and on the Situk River, which supports annual returns of 3,000 to over 12,000 steelhead.

Steelhead harvests in Southeast Alaska generally increased from the late 1970s through 1989, then began to decline (Howe et al. 1999). After fishery managers and participants reported lower escapement, emergency regulations prohibiting steelhead harvests in the Situk River were enacted in 1991. In 1992, harvests were prohibited in 24 popular systems, and in 1993 the Situk and 47 other systems were closed to harvest of steelhead. Steelhead harvests dropped from a high of 5,409 in 1989 to 1,249 in 1993. In 1994, the Alaska Board of Fisheries passed conservative regulations that limited steelhead sport harvest to 2 fish per angler per year with a minimum size limit of 36 inches.

The new regulations have reduced steelhead harvests in Southeast Alaska to an average of 190 for 1994 to 2005 (Jennings et al. *in prep*). Total annual catches of steelhead in the region averaged 15,867 for the same period, an increase of approximately 17% over the 1990 to 1993 period (catch estimates only became available starting in 1990). Incidental hooking mortality is not thought to have a detrimental impact on steelhead stocks as the use of bait was also prohibited during the spring fishing season in all systems and year around in 23 streams with fall steelhead. The hooking mortality for steelhead caught on artificial gear is only about 2-3% (Hooton 1989).

Steelhead have never been an important commercial species and little information is available from commercial harvest statistics, but steelhead are a very important sport and subsistence species. Historically, little emphasis has been placed on annual evaluations of steelhead populations in Southeast Alaska. However, in light of the stock declines observed in the early 1990s, a cost-effective method to monitor steelhead stock status and trends became necessary.

This study is designed to monitor steelhead escapements in a number of index systems located throughout the region. Repeated snorkel survey counts of steelhead escapement are made each year at each index stream to provide a count of peak steelhead escapement. These surveys are intended to continue indefinitely to provide a long-term database for evaluating trends in escapement. Because

standardization of methodology and streams to count began in 1997, the database through 2006 remains too short to fully illustrate long-term trends in abundance. However, results from the last 10 years of standardized surveys (Table 1) suggest relatively constant, or slightly declining, steelhead escapement through 2002, but with most streams in the region seeing an increase since 2003.

There are no substantive changes in the methods of the survey program planned for 2007. This (2007) is the fourteenth year of the steelhead survey project. Between 1994 and 1996, foot surveys were conducted, while snorkel surveys began in 1997. The 10 streams to be surveyed in 2007 are well dispersed across Southeast Alaska (Figure 1). Humpback Creek, though not a formal index stream, will continue to be surveyed by the Ketchikan staff due to local management interest. Ward Creek has been compromised as a wild-stock indicator due to past hatchery enhancement, but may also be surveyed due to local management interest. Bear Creek in the Petersburg area may also be surveyed due to local management interest; a commercial fishery may be opened in the Petersburg area this spring that could intercept steelhead migrating to/from the Bear Creek area. Petersburg management personnel are planning to snorkel Bear Creek and look for net-scarred fish and potentially provide input to the commercial fisheries manager regarding steelhead run strength.

Logistical problems prevented snorkel surveys from being completed on Slippery Creek during 2005. No reliable pilots were available in the Petersburg area during 2005 that were willing to fly into Slippery Lake. Surveys were successfully completed in 2006 using a combination of helicopter/float plane. Attempts will again be made in 2007 to locate a reliable pilot or an alternative means of accessing the snorkel area, i.e., via helicopter or foot. If these logistical problems cannot be solved, then Slippery Creek will be dropped as a regional index stream.

A series of snorkel surveys will be conducted by on the same day by three survey teams on approximately May 15th at Sitkoh Creek. These surveys are designed to contribute information to calibrate weir counts to snorkel surveys.

OBJECTIVES

The research objective for 2007 is to:

1. Count the number of steelhead once a week until a peak is detected and for a minimum of three weeks in established index sections of 10 stream systems in Southeast Alaska (see Tables 2 and 3) from late-April through May, 2007 using snorkel-dive surveys by trained observers.

An associated task with this project is to:

1) Calculate an expansion factor for converting future and past snorkel survey counts in Sitkoh Creek to estimates of escapement above the weir. Multiple years of data, including 2007, will be used to calculate the expansion factor.

STUDY DESIGN

Snorkel surveys will provide inseason indices of peak steelhead abundance in 10 streams in Southeast Alaska in 2007 (Table 2). Weir data from eight streams across the region suggest in-stream abundance peaks in May (Table 3). Tagging studies at weirs (Hoffman et al. 1990; Love *in prep*) and information on instream abundance over time (Table 4) suggest residence times for individuals and instream abundance "peaks" usually last a week or more. Thus, efforts will be made to survey study streams weekly from late-April through May and, at a minimum, each stream will be surveyed three times. If the peak count occurs during the last survey, an additional survey will be done. Snorkel surveys will be done using dry suits and snorkel gear. If a survey is missed because of unsuitable weather, the missed survey will be performed as soon as conditions permit. If an entire survey is not completed, the sections surveyed will be marked on maps (Appendix A) and the distances surveyed estimated using the GIS system in the Douglas office. The survey schedule will be adjusted such that a near-weekly counting interval is maintained. Other streams may be evaluated by management staff for potential use as index systems as time and funding permit.

There are several underlying assumptions when using snorkel counts as an index of population abundance. It assumed that there is no interannual variation in observer efficiency, arrival timing, and the duration of the time spawners spend in the system (Korman et al. 2002). Even if all of these assumptions hold, one still has to assume that there is no change in detection probabilities as changes in absolute abundance occur. No objective quantitative tools are available to evaluate these assumptions for systems when only snorkel counts are available. Evaluation of the utility of snorkel counts as indices of population abundance is large dependant on the experience, perceptions, and opinions of survey personnel and, where available, on extrapolations from similar systems where both snorkel counts and counts or estimates of abundance are available.

Surveys will be conducted by at least two employees, and one surveyor will always be a senior, trained observer. In the most challenging systems, teams will consist of two snorkelers and one person walking with safety equipment and a firearm. The observers will count all steelhead observed within each of the index reaches of each stream, and record counts by reach. A descriptive account of each index location is found in Table 5. Data for each survey in each stream will be recorded by discrete sections (reaches)

of the river (numbers of sections are tabulated in Table 2, reaches are described and mapped in Table 3 and Appendix A). If a shore-side third party is available, they can record the counts by reach on survey forms (Table 6) as the survey progresses. If a shore-side party is not available, one or both snorkelers will record the counts by reach on a small plastic diver's slate using a waterproof marker until data forms are accessible.

Observers will count adult steelhead as a team during the survey. The surveyors should attempt to stay abreast of each other in the stream and coordinate their observations to obtain maximum coverage. The total number of steelhead seen will be temporarily recorded on either hand-counters (tallywackers) or on a small plastic diver's slate using a waterproof marker. When passing through high concentrations of steelhead, both observers will count the number of steelhead in their area of responsibility before consulting with each other on their counts. If either or both surveyors feel that a questionable count was made in a particular pool or stretch of river, the area will be recounted. Counts agreed upon by both observers will be recorded at the end of each reach (Appendix A, Table 6). In addition, steelhead redds may also be counted and recorded, however, redd counts are not required.

Particular attention should be given to spotting steelhead along wide, brushy-edged sections where fish commonly seek shelter. Steelhead tend to remain in the pools or reaches where they are encountered, generally schooling towards the downstream end of a pool bounded by a riffle. Past snorkel surveys in the Situk River (Bob Johnson, Alaska Department of Fish and Game, Division of Sport Fish, Yakutat, personal communication) indicate steelhead typically do not hold beneath logjams, however, they frequently hold directly downstream of such structures.

Habitat variables that will be recorded on the form at the beginning of each survey include surface water temperature in degrees Celsius, and weather conditions (cloud cover, wind, and precipitation). Water clarity will be measured at some point in the survey using a Secchi disk. The Sechii disk will be held underwater by one observer approximately 8 inches below the surface or the diameter of the Secchi disk. The second snorkel observer will then back away underwater keeping visual contact with the disk and feeding out the line as he goes. The point at which the Sefchi disk disappears and then reappears is the distance that should be recorded on data form (Table 6). Some streams may not be wide enough to accommodate this method but crews are encouraged to try and find a wide spot and do the measurement.

A permanent benchmark for water levels was established on each index system in 1997 and 1998 (description in Table 5); a permanent benchmark was established on Bear Creek during 2006. The

purpose of the permanent benchmark was to allow water levels to be compared from one year to the next. On each steelhead survey during 2007, the water level will be recorded from the benchmark.

If rain, wind, or turbidity obscure subsurface visibility, the survey will be halted temporarily until conditions improve. In addition, if the conditions are such that any member of the snorkel team is uncomfortable with conducting or continuing the survey, it will be postponed until conditions are more favorable. If conditions continue to deteriorate or do not improve, the survey will be postponed and repeated in its entirety as soon as possible. Safety is a primary consideration and observers should train with experienced personnel before conducting surveys. A safety class in whitewater survival and rescue is required for all snorkelers.

Additional surface and subsurface light meter readings will be taken to document degradation of subsurface visibility as necessary and recorded in the "Comments" section of the survey form. Also, any deviations from standard procedures will be noted in "Comments" field of the survey recording form. Quantitative environmental data (i.e., light levels, depth, temp) need be collected only once during each survey, and should be recorded in the data form in the reach where it was collected. If the environmental data are not thought to be representative for the whole area surveyed, suitable comments to that affect can be recorded in subsequent rows.

Snorkel Count Escapement Expansion Factor

The Sitkoh Creek weir will allow us to match peak snorkel counts to our weir count thereby allowing calculation of an escapement expansion factor (π) for steelhead in 2007. The cumulative weir count will not be known in advance by the observer teams in order to minimize potential bias. A peak expansion factor is calculated as the weir count N at the time of the peak snorkel survey count (less any adults already passed downstream and any known mortalities at the time) divided by the peak snorkel survey count C (i.e., $\pi_t = N_t / C_t$) for an observer team in year t. The average of several yearly estimates of π could then be used (for a given observer team) to estimate abundance when weir counts are unavailable but peak snorkel counts are obtained.

In order to use an average expansion factor (see equations 4) to estimate steelhead abundance for a year when only a peak snorkel count is available (equation 2), certain assumptions must be made about the snorkel surveys during the year for which abundance is being estimated and for those years from which average expansion factor is calculated. The observations of π_t from years when it can be calculated (thus contributing to the estimate of an average expansion factor $\hat{\pi}$) are assumed to be a representative

sample for a "population" of possible individual expansion factors. Further, any year for which $\hat{\pi}$ is used to estimate abundance from a peak snorkel count must be assumed to be drawn from the same "population". It is not critical to assume that there is no interannual variation in observer efficiency, arrival timing, and the duration of the time spawners spend in the system. However, variation in these factors would likely result in a "population" of annual expansions factors that has higher variance than if these factors were relatively stable between years. The variance of any estimate of abundance using $\hat{\pi}$ is proportional to the variance in the "population" of expansion factors (see equation 3). It is critical to assume that there is no change in detection probabilities as changes in absolute abundance occur. It is also critical to assume that there are not trends over time in observer efficiency. This will be the fifth year that snorkel surveys will be conducted upstream of the Sitkoh weir. Each additional year allows us to further address the concerns stated above.

Sample Sizes

Precision of estimates of abundance, based on an average expansion factor (π), depends on *interannual* variation in π_t (see Data Analysis below for details). Four years of weir (N_t) and peak snorkel counts (C_t) are available at this time from Sitkoh Creek. In 1996, the peak snorkel survey yielded $\pi_t = 1.75$ (Yansuz 1997). In 2003, the peak snorkel survey yielded $\pi_t = 2.49$, and in 2004, $\pi_t = 1.78$. Initial analysis of 2005 data suggests an expansion factor of $\pi_t = 1.67$. Thus we assume for planning purposes a value of $\hat{\pi} = 1.92$ (equation. 4) and $\hat{\text{var}}(\pi_t) = 0.1453$ (equation 5). Using this estimate of sample variance, setting 80% as the confidence level on future projections, and a confidence interval based on Student's t distribution with 5 degrees of freedom (6 years of observations of π_t), we expect 80% confidence intervals around future projections of abundance to be approximately ±30% of the projected value. Data collected in future years will refine these estimates of $\hat{\pi}$ and $\hat{\text{var}}(\pi_t)$.

DATA REDUCTION

Survey personnel will be responsible for checking forms for accuracy following each survey. Counts by discrete survey section will be compared to the total counts to insure counts by section are correctly totaled. Environmental data will be compared with expected and historical trends to insure correct recording (degreeS C vs. degrees F, etc.). The area management biologist, if not a member of the survey team, will later inspect data for legibility and completeness. Survey forms will be forwarded bi-weekly to the Douglas office, preferably by FAX or electronic mail, to be included in the regional steelhead

survey database. Survey data will be entered into an Excel spreadsheet and into the Commercial Fisheries ALEX/IFDB escapement survey database.

Snorkel Count Escapement Expansion Factor

Snorkel survey personnel will be responsible for recording snorkel counts conducted at Sitkoh Creek and checking forms for accuracy following each survey. At the conclusion of each Sitkoh Creek survey, the snorkel crew will confer with the weir personnel and record on their data form the number of adult steelhead above the weir, and the date and time of survey completion. Each count by discrete survey section will be compared to the total counts to insure counts by section are correctly totaled.

ANALYSIS

Counts for each river will be tabulated by stream reach and date. All environmental data collected will also be tabulated by date to facilitate interpretation of the relative quality of count data by stream. Counts over time will be compared with environmental data collected over time to bracket dates of peak in-river abundance, as possible.

Snorkel Count Escapement Expansion Factor

System-specific snorkel-survey expansion factors (π) are calculated as:

$$\pi_t = \mathrm{N}_t / \mathrm{C}_t \tag{1}$$

where N_t is the weir count of steelhead trout and C_t is the peak snorkel survey count by survey date in year *t*. If multiple years of data suggest expansion factors are similar among years, then for the purpose of computing expansion factors for use in estimating abundance $\hat{N}_p$ in the future when a weir is not present, C_p is the *peak count* obtained using the methods described in this operational plan. In particular, this operational plan specifies at least 3 weekly surveys will be conducted in Sitkoh Creek, with the first survey occurring on or about April 30th. Such an expansion may be motivated by economics (no weir) or by the failure of a weir to operate successfully across a whole migration.

An estimator for expanding snorkel counts to estimate abundance for a year *p* when a weir count is unavailable is:

$$\hat{N}_p = \hat{\pi}\, \mathrm{C}_p \tag{2}$$

$$\hat{\mathrm{var}}(\hat{N}_p) = \mathrm{C}_p^2\ \hat{\mathrm{var}}(\pi_t) \tag{3}$$

where $\hat{\pi}$ is the average of *k* available yearly expansion factors:

$$\hat{\pi} = \sum_{t=1}^{k} \pi_t \; / \; k \tag{4}$$

The sample variance of the π_t is the appropriate measure of uncertainty for an individual predicted value of π when N is unknown:

$$\hat{\text{var}}(\pi_t) = \sum_{t=1}^{k} (\pi_t - \hat{\pi})^2 \; / \; (k-1) \tag{5}$$

2007 SCHEDULES AND REPORTS

Week of April 23 - 29	Complete the first weekly survey on each of the early systems (Table 2)
Week of April 30-May 6	Complete the first weekly survey on each of the later systems (Table 2)
Mid-to-late May	Complete all snorkel surveys
Bi-Weekly	Insure survey data are forwarded to Douglas office
April 15, 2008	Draft FDS report covering 2006 and 2007

DELIVERABLES

This project will produce an FDS report with counts for each of the survey sections.

RESPONSIBILITIES

List of personnel and duties:

Roger Harding, Fishery Biologist III.
Duties: Prepare operational plan, enter survey results into the regional steelhead survey database, write report, and assist with snorkel surveys.

John Der Hovanisian, Fishery Biologist IV; Regional Research Coordinator.
Duties: Assist with plan preparation and with snorkel surveys; review operational plan and data analysis, and review all reports.

Dan Reed, Biometrician III.
Duties: Provide input to sampling design and evaluation. Assist in data analysis and report writing. Review operational plan and data analysis.

Charlie Swanton, Fishery Biologist IV, Regional Management Coordinator.
Duties: Coordinate index surveys in all Management Areas.

Brian Glynn, Fishery Biologist III, Area Management Biologist.
Duties: Conduct index surveys in the Juneau Management Area.

Bob Chadwick, Fishery Biologist III
Duties: Conduct index surveys in the Sitka Management Area.

Kelly Reppert, Fishery Biologist I, Acting Area Management Biologist.
Duties: Conduct and/or supervise staff that conduct index surveys in the Ketchikan Management Area.

Steve McCurdy, Fishery Biologist II, Area Management Biologist, Prince of Wales (POW).
Duties: Conduct and/or supervise staff who conduct index surveys in the POW Management Area.

Doug Fleming, Fishery Biologist III
Duties: Conduct index surveys in the Petersburg Management Area.

Peter Bangs, Fishery Biologist II.
Duties: Assist with snorkel surveys.

Dave Love, Fishery Biologist II.
Duties: Assist with snorkel surveys.

Troy Tydingco, Fishery Biologist II.
Duties: Assist with snorkel surveys.

Carol Coyle, Fishery Biologist I.
Duties: Assist with snorkel surveys.

Heather Riggs, Fishery Biologist II.
Duties: Assist with snorkel surveys.

Kurt Kondzela, Fish and Game Technician IV
Duties: Assist with snorkel surveys.

Mike Wood, Fish and Game Technician IV
Duties: Assist with snorkel surveys.

Vera Goudima, Fish and Game Technician III
Duties: Assist with index surveys in the Petersburg Management Area.

Amy Holm, Fish and Game Technician IV
Duties: Assist with snorkel surveys.

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Table 1.–Steelhead snorkel surveys conducted in Southeast Alaska, 1997 – 2006, by stream and management area. Peak count (bold) is defined as a bracketed count or a count having a lower count before and after the high or "peak" count; high count (italicized) defined as an unbracketed count and is the highest count for that year/system.

		Year									
Management		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Area	Stream Name	**Peak** / *High*	**Peak** / *High*	**Peak** / *High*	**Peak** / *High*	**Peak** / *High*	**Peak** / *High*	**Peak** / *High*	**Peak** / *High*	**Peak** / *High*	**Peak** / *High*
Juneau	Peterson Creek	**26**	*29*	*38*	*27*	**41**	**13**	**36**	*39*	**22**	**36**
	Pleasant Bay (Seymour)	*155*	**81**	*132*	**48**	*48*	**36**	**50**	**51**	47	*59*
Ketchikan	Humpback Creek	**91**	*24*	*4*	*7*	*101*	*94*	**105**	*65*	**38**	*112*
	Ketchikan Creek	*48*	*47*	*19*	**15**	*24*	*5*	**60**	*53*	94	NA
	McDonald Lake	**145**	**86**	*100*	**47**	*74* [a]	*14* [a]	**79**	*76*	**134**	**100**
	White River	*84*	**93**	*60* [a]	**38**	**48**	**37**	*77*	*35*	67	**41**
Petersburg	Petersburg Creek	*123*	**152**	**115**	*68*	*64*	*41*	**146**	**330**	**369**	**241**
	Bear (Big) Creek	NA	NA	NA	NA	NA	NA	NA	NA	132	NA
	Marten Creek	*14*	*17*	*18*	NA	NA	NA	NA	NA	NA	NA
	Slippery Creek	NA	NA	NA	NA	*41*	*31*	*76*	*92*	NA	*79*
Prince of Wales	Eagle/Luck Creek	*90*	**56**	*118*	**82**	NA	**36**	*95*	*67*	102	*154*
	Harris River	*104*	**156**	*192*	**79**	*53* [a]	*200*	*195*	**124**	**122**	*92*
Sitka	Ford Arm Creek	*296*	*103*	*89*	**134**	*28* [a]	*122*	**181**	**379**	**364**	**428**
	Sitkoh Creek	*329* [a]	*154*	*120*	*112*	*115*	*65*	**296**	**354**	*259*	**213**

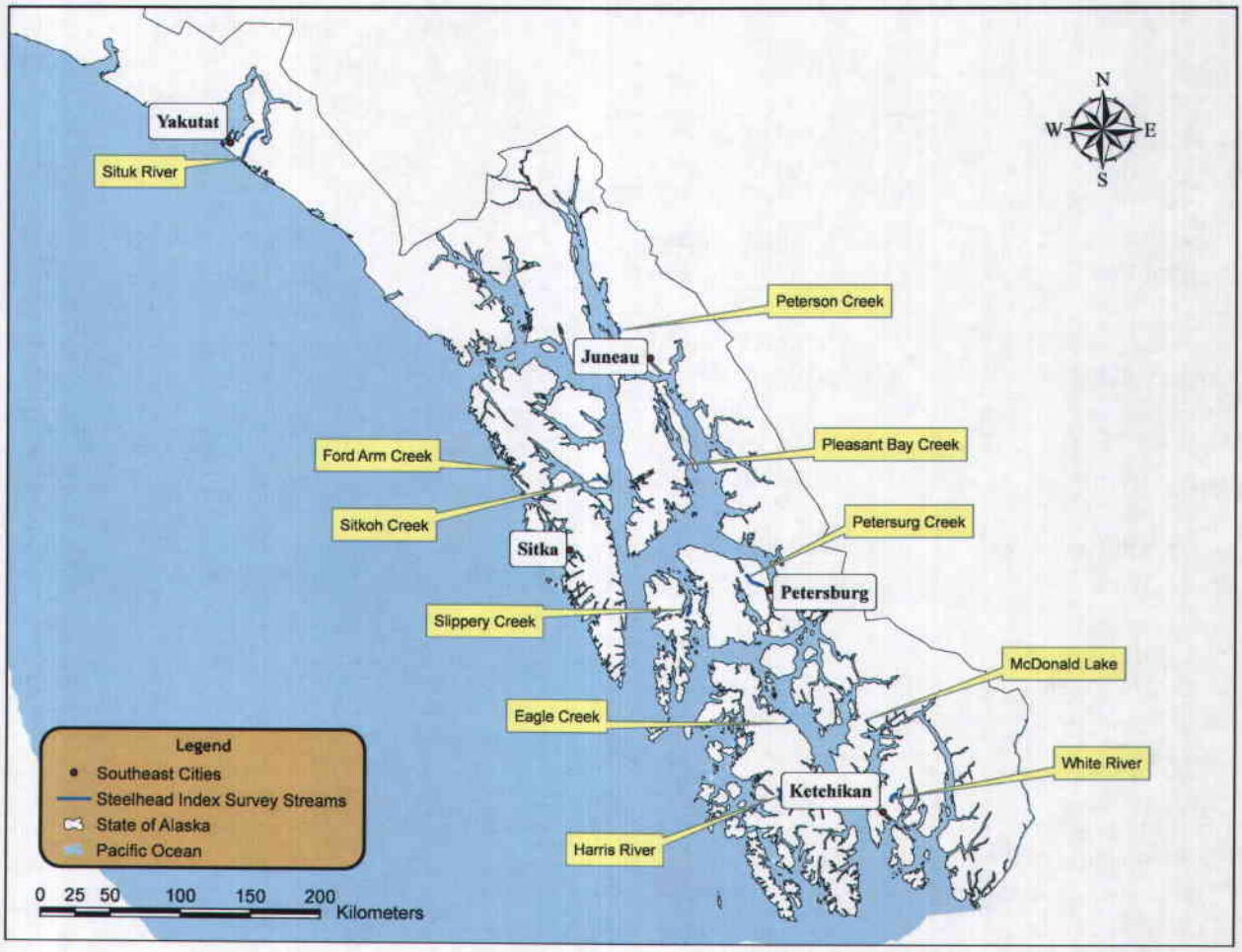


Figure 1.–Location of the ten survey streams in Southeast Alaska and the Situk River near Yakutat.

Table 2.–Index stream name, stream number, length and percent of stream surveyed, number of survey reaches, and dates for start of weekly surveys[1] for steelhead in 2007.

Index Stream Name	Stream number	Area	Distance to be surveyed in feet[1]	Percent of stream surveyed	Number of reaches[2]	Target survey start[3]
Ford Arm Creek[4]	113-73-10030	Sitka	4,582/24,002	19%	2	30-Apr
Sitkoh Creek[4]	113-59-10004	Sitka	16,192/20,136	80%	3	30-Apr
Peterson Creek[4]	111-50-10010	Juneau	3,663/7,553	48%	1	30-Apr
Pleasant Bay Creek[4]	111-12-10005	Juneau	6,630/12,405	54%	2[5]	30-Apr
Petersburg Creek[4]	106-44-10600	Petersburg	22,401/72,983	31%	2	30-Apr
Slippery Creek[4]	109-43-10030	Petersburg	9,618/11,491	84%	3	30-Apr
Eagle Creek[5]	107-40-10055	POW	28,716/49,136	58%	4	23-Apr
Harris River[5]	102-60-10820	POW	38,758/96,466	40%	5	23-Apr
McDonald Lake Creek[5]	101-80-10068	Ketchikan	11,259/11,259	100%	4	23-Apr
White River[5]	101-44-10024	Ketchikan	19,719/35,750	55%	3	23-Apr
Non-Index Streams						
Ketchikan Creek[5]	101-47-10250	Ketchikan	4,096/4,096	100%	3	23-Apr
Humpback Creek[5]	101-30-10080	Ketchikan	3,696/3,696	100%	4	23-Apr
Bear Creek[6]	108-50-10030	Petersburg	13,260/35,516	37%	3	30-Apr

[1] Feet to be surveyed/feet of anadromous stream.
[2] See Appendix A for maps showing reach boundaries.
[3] Additional surveys are required if highest counts occur during last of three surveys.
[4] Considered "late" run systems.
[5] Considered "early" run systems.
[6] Area 3 dropped in 2000 due to safety concerns and because <10% of steelhead were observed in area.

Table 3.–Steelhead run timing past weirs in Southeast Alaska including dates when 75% and 90% of the upstream immigrations were complete and, where available, the estimated peak of inriver abundance (immigration counts minus emigration counts).

Stream	Year	Immigration 75%	Immigration 90%	Peak of in-river abundance
Karta River	1989[1]	30-Apr	11-May	16-May
	1992[2]	1-May	9-May	2-May
	2005[18]	30-Apr	15-May	5-May
Ward Creek	1993[3]	10-May	15-May	17-May
	1994	8-May	20-May	21-May
Sitkoh Creek	1936[4]	19-May	23-May	-
	1937[4]	23-May	28-May	-
	1982[5]	17-May	22-May	-
	1990[6]	11-May	17-May	15-May
	1993[7]	11-May	18-May	19-May
	1996[8]	15-May	24-May	19-May
	2003[17]	7-May	18-May	11-May
	2004[17]	8-May		17-May
	2005[17]	8-May	17-May	9-May
	2006[17]	21-May	26-May	26-May
Peterson Creek	1989[9]	16-May	25-May	21-May
	1990[10]	20-May	26-May	24-May
	1991[11]	16-May	20-May	22-May
Petersburg Creek	1973[12]		-	25-May
	1974[13]	18-May	24-May	25-May
	1975[13]	21-May	28-May	29-May
Situk River	1994[14]	-	-	21-May
	1996[14]	-	-	18-May
	1997[15]	-	-	5-May
Windfall Creek	1997[16]	8-May	12-May	24-May
12 Mile Creek	2004[18]	18-Apr	26-April	

Notes:
1 - Hoffman et al. (1990).
2 - Harding and Jones (1993).
3 - Freeman (1995).
4 - Reported in 5-day intervals, Chipperfield (*Unpublished*).
5 - Jones (1983).
6 - Jones et. al. (1991).
7 - Harding and Jones (1994).
8 - Yanusz (1997).
9 - Harding and Jones (1990).
10 - Harding and Jones (1991).
11 - Harding and Jones (1992).
12 - Petersburg Creek, Jones (1972, 1973, and 1974).
13 - Jones (1975 and 1976) daily counts upstream and downstream.
14 - Float counts used to identify peak run timing, Johnson (1996).
15 - Bain et al (2003).
15 - Float counts used to identify peak run timing, Johnson and Jones (1998-2001)
16 - Yanusz (1998).
17 Love (*in prep*)
18 Hoffman et al. (*in prep*)

•	Peak Count
↑	Unbracketed Peak
↓	Unbracketed Peak
←--→	2 Similar Counts
W	Estimated Peak inriver abundance from weir counts
S	Target start date for snorkel surveys

Table 4. Historical run timing information for steelhead index streams in Southeast Alaska.

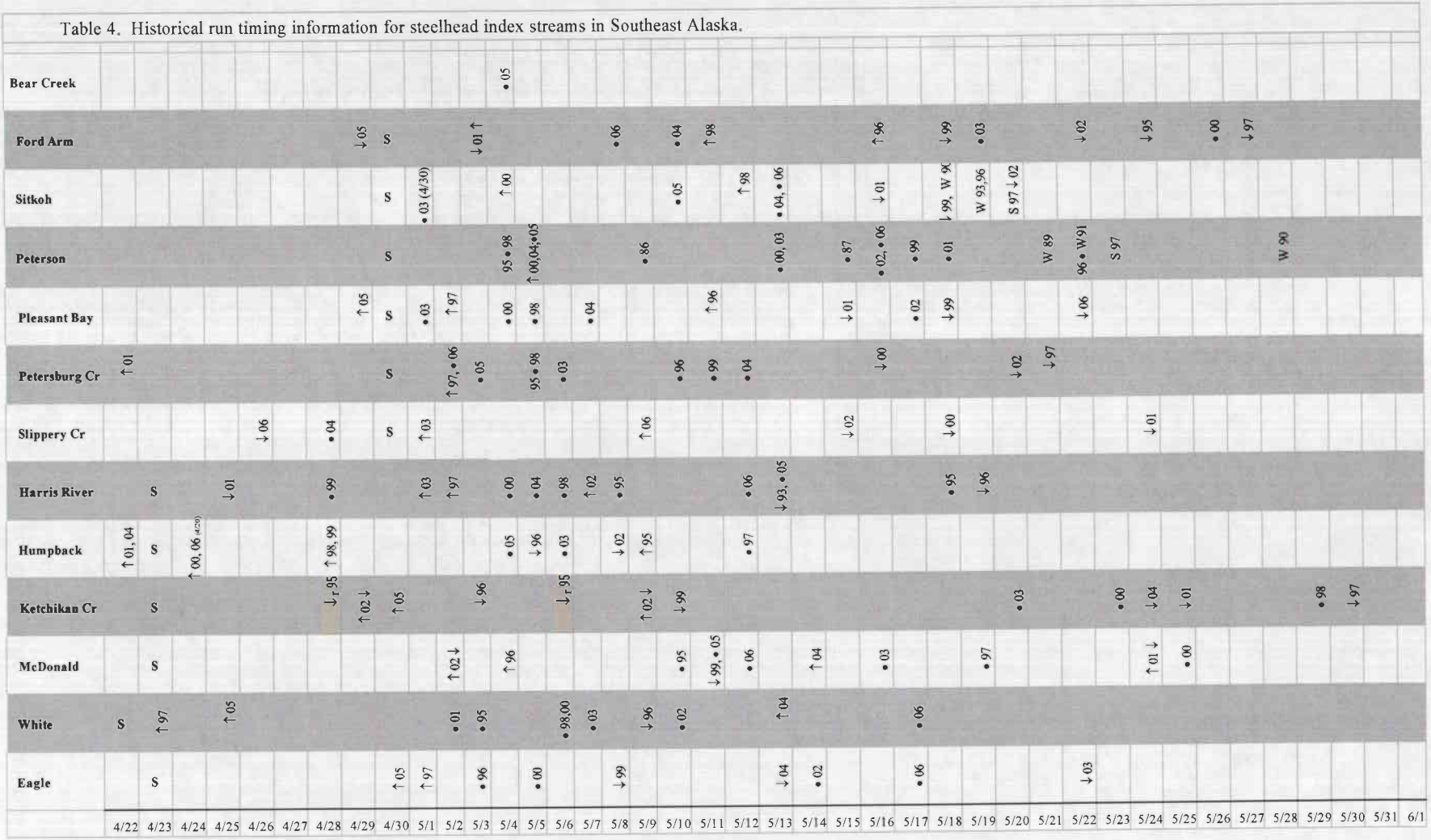


Table 5.–Site specific information for steelhead index systems.

Management Area: Stream Name	Description of Index Area
POW: Eagle Creek	Monitor CB radio for large truck traffic. From the Luck Lake outlet, Survey downstream to saltwater. Hike back to vehicle and drive into upper Luck Creek on road 30334 and survey downstream to Luck Lake. Stream reaches were permanently marked and photographed in 2000.
POW: Harris River	Drive to the Hydaburg Road crossing on the Harris and survey downstream 7 miles to saltwater. Stream reaches change at each logging bridge as you snorkel downstream. Hike back to lower footbridge road crossing to retrieve stashed vehicle. Permanent water level benchmark is drilled into the rock just upstream of the Hydaburg highway bridge.
Ketchikan: Ketchikan Creek	Drive to upper creek and park adjacent to the Fair Street bridge at the KPU building. Begin survey in pool upstream from bridge and survey downstream miles to the Stedman Street bridge at Thomas Basin. Water height gauge is the Harris Street bridge footing. Area 1 starts at pool above Fair street bridge and goes downstream to Park Avenue bridge. Area 2 runs downstream from this bridge to top of fish ladder. Area 3 runs downstream from fish ladder to Stedman Street bridge.
Ketchikan: Humpback Creek	Fly-in via floatplane near stream mouth in Mink Bay. Plan around tides, which dictate drop-off & pick-up points. Hike upstream to barrier falls, then survey from falls downstream to mouth. Hike to pick-up point along north shore of Mink Bay, depending on tide. The water height gauge is the rock face on the left side of the falls as you look upstream. Area 1 runs from barrier falls downstream to first right hand tributary that is orange in color. Area 2 runs from this tributary downstream to bottom of large clay bank hole. Area 3 runs from this spot downstream to left tributary looking downstream. Area 4 runs from left tributary downstream to trail head marker at saltwater.
Ketchikan: McDonald Lake Creek	Fly to McDonald Lake. Survey inlet stream (Wolverine Creek) from falls downstream to lake confluence (1 mile). Then, boat 4 miles to lake outlet, survey downstream from lake to start of canyon at the old weir site. Hike back upstream along trail to lake. Water height gauge is large rock located in the first pool of this section current goes around both sides of this rock. Area 1 starts at large deep corner hole with large log across stream just below falls & runs downstream to hole with large rock in middle which is stream height gauge. Area 2 runs from this point downstream to where creek enters McDonald Lake. Area 3 runs from outlet of McDonald Lake downstream to log jam at bottom of 3-sided shelter hole. Area 4 runs from this point downstream to top of canyon just below old F&G weir site.
Ketchikan: White River	Obtain key from Cape Fox Corporation to access locked gate. Drive out Ward Lake Road to locked gate accessing Cape Fox property. Area 1 starts in upper reach of creek at merger of three forks and continues downstream to second large logjam going downstream. The top of this section is reached by walking down first right hand spur road driving down into this drainage. Area 2 runs from log jam downstream to pulled logging bridge. Area 3 runs from pulled bridge downstream to ¼ mile below lower bridge crossing of White River. Survey is facilitated by leaving second vehicle or motorcycle at lower bridge crossing of White River. The water level gauge is downstream bridge abutment on lower bridge crossing of White River located in area 3.

Table 5.–Page 2 of 2.

Petersburg: Slippery Creek	Fly-in from Petersburg via floatplane to the outlet creek at Slippery Lake on Kuiu Island. Survey reach 1 downstream .5 mile to the smolt trap site. Record depth at the bedrock wall staff gauge on the west side of the creek below the smolt trap. Survey reach 2 (1.5 miles) from the smolt trap to the fish pass (note any upstream fish passage problems). Hike around 18 ft waterfalls to the beginning of reach 3. Survey reach 3 one half mile to canyons. Hike one half mile to beach for saltwater floatplane pick up in Port Camden.
Petersburg: Petersburg Creek	The best option is to jet boat upstream at high tide to Hammer Slough (the upper extent of tide water), adjacent to two cabins the day prior to the survey. Leave the jet boat overnight and return to town via motorized raft. Fly to the lake outlet the next day. Reach 1 begins just below the lake outlet and ends at Shakey Franks old cabin site 1.8 miles downstream (near a large tributary). Reach 2 extends 1.2 miles to Hammer Slough, ending at the upper cabin. A benchmark is chiseled into a vertical bedrock wall 500 yards below Shakey Franks cabin sight, measure the distance to the water surface. Time the survey downstream to Hammer Slough so that you arrive at or near high tide. Jet boat back to town.
Petersburg: Bear Creek	Drive from Petersburg along the Mitkof Highway and then out to the Three Lakes Loop Rdto a turnout at Mile 12. Bear Creek survey area is then reached by hiking downhill 0.5 mi to the creek, and then downstream approximately 1,000 ft to a small waterfall. Reach 1 begins below this waterfall and extends downstream 0.95 mi to the confluence with Canyon Creek. Survey next reach downstream 0.4 mi to Lunch Creek (an unofficially named creek), entering from the North. Survey last reach downstream 1.5 mi to tidewater mouth at Frederick Sound. A permanent benchmark was chiseled onto a large boulder mid-way through Reach 3; After reaching the stream mouth, the crew returns by helicopter tothe parked vehicle.
Sitka: Sitkoh Creek	Survey area starts at the lake outlet and extends to tidewater. The stream reach boundary between 1 and 2 is the large logjam just above the canyon where you catch the trail downstream. The boundary between reach 2 and 3 is the stream that enters on the left as you approach the ridge on the left going downstream. The benchmark is in bedrock near tidewater on the left side of the stream going downstream.
Sitka: Ford Arm Creek	Survey area starts at the lake outlet and extends to tidewater. The boundary between the two stream reaches is the tributary that enters on the right as you survey downstream. The permanent benchmark is located just below the lake on the right side looking downstream.
Juneau: Peterson Creek	Peterson Creek is located at 25 mile on Glacier Highway. Park at the main highway bridge and hike upstream to the barrier falls. Survey area goes from the falls downstream to the highway bridge. The permanent benchmark is on the steel piling under the main highway bridge.
Juneau: Pleasant Bay Creek	Charter in to the lake and hike downstream through muskeg meadows on the right side of the stream facing downstream. Survey starts at the barrier falls and continues downstream to the break between Area 2 and Area 3 (approximately 3,000 ft above tidewater). The permanent benchmark is on the large bedrock outcropping on the right side of the stream going downstream between area #1 and area #2.

Table 6.–Sport Fish Steelhead Escapement Survey Form (Ketchikan Creek used as an example.

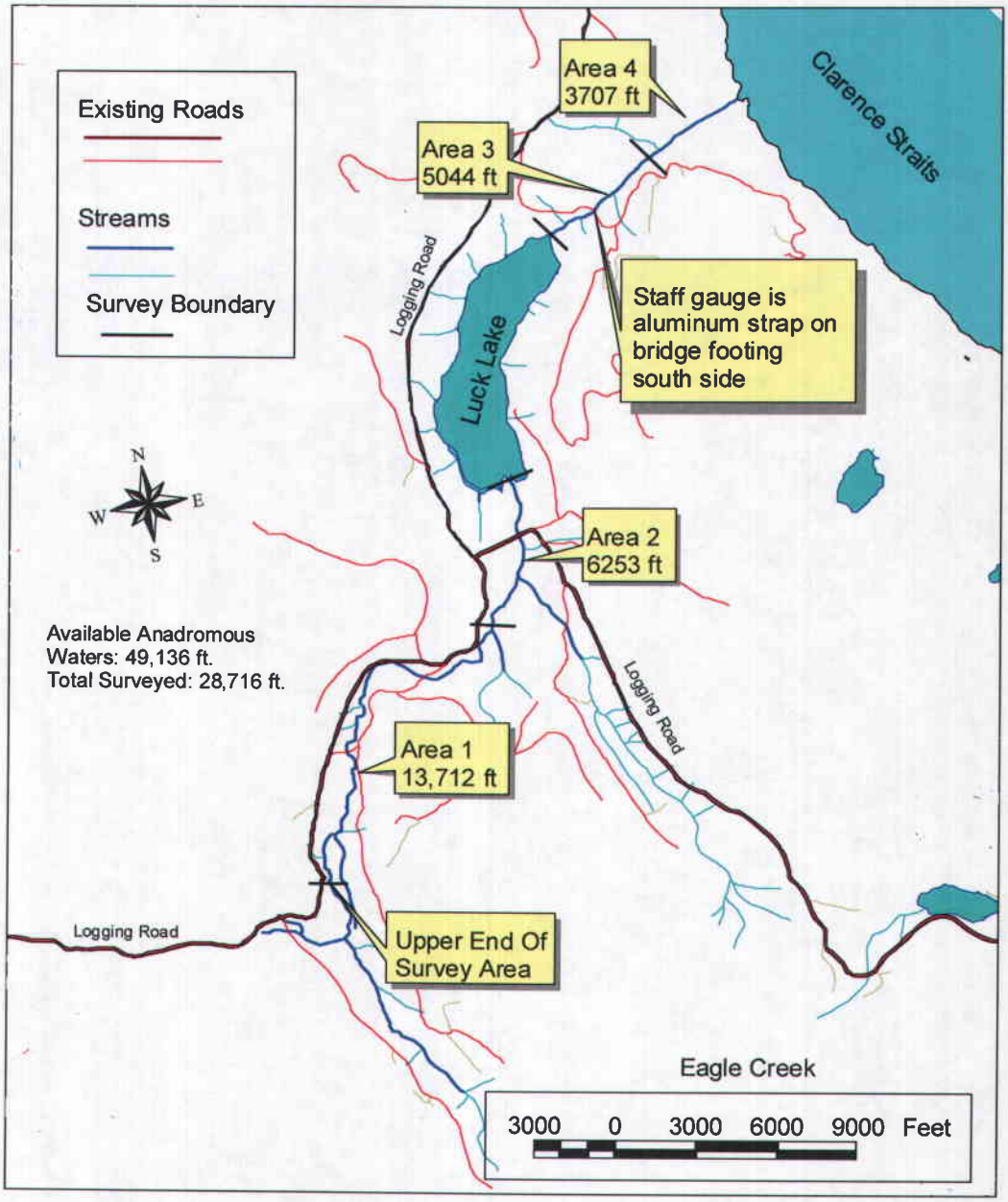
Ketchikan Creek Stream 101-47-025 Survey Date:____/____/07

Reach No. Code	Initials - Primary Observer	Reach Name or Description	Survey Type Code	Distance Surveyed (miles)	Tide Code	Visibility Code	Water Level Code	Weather Code	Staff Gauge Level/Depth (cm)	Secchi Disk (meters)	Water Surface Temp. (cel)	Remark Codes	Steelhead live	Steelhead dead	# Redds	Rainbow	Dolly Varden	Cutthroat	Coho	Comments

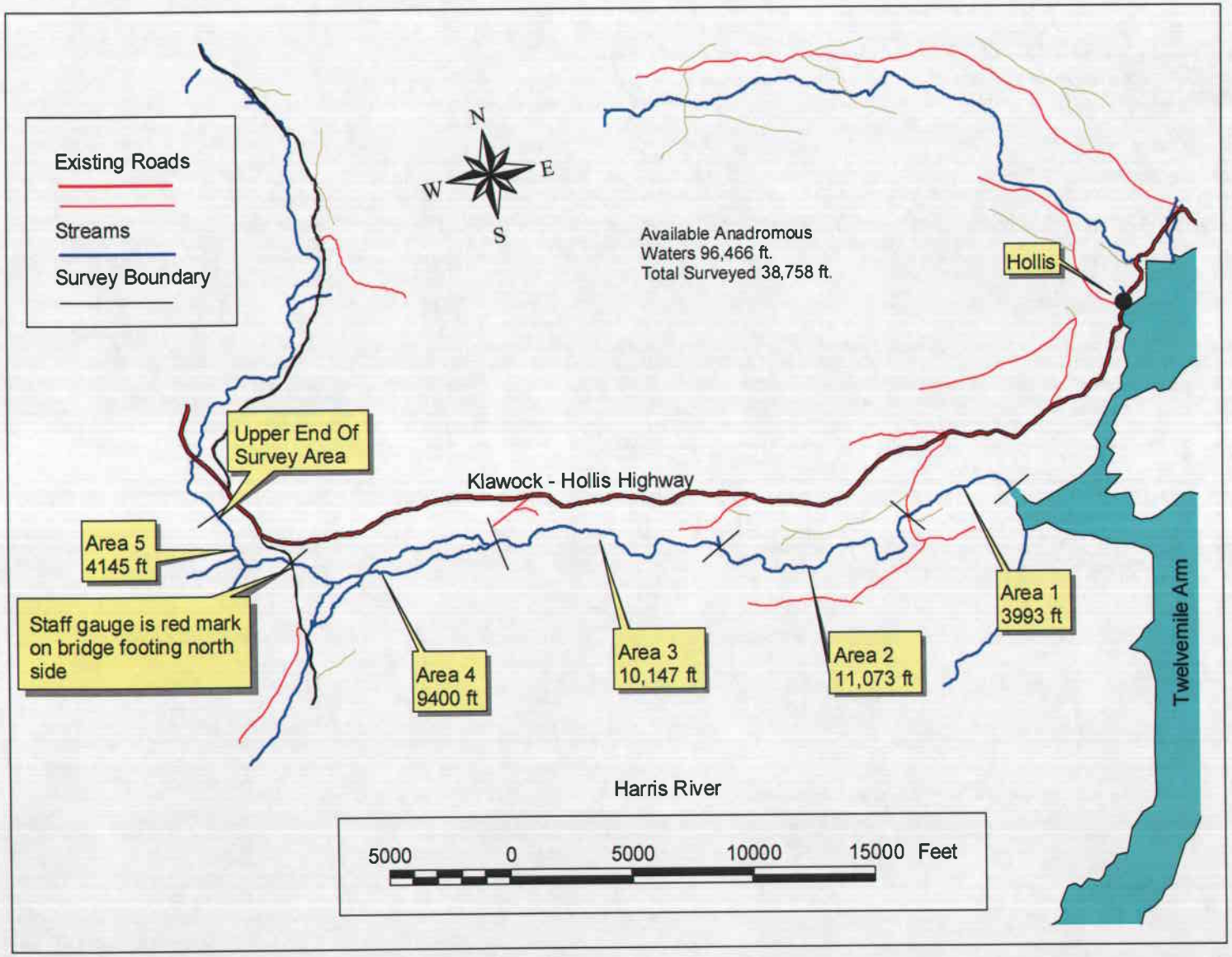
Survey Type Codes	Tide Codes	Visibility Codes	Water Level Codes	Weather Codes	Remark Codes
F = Foot	41 = High	21 = Excellent	31 = High	C = Clear	11 = Fish present but not counted at mouth
S = Snorkel	42 = Low	22 = Normal	32 = Normal	O = Overcast	12 = Fish present but not counted in tidal
B = Boat	43 = Intermed	23 = Poor	33 = Low	R = Raining	13 = Fish present but not counted in stream
				W = Wind on Water surface	

Observer Names:

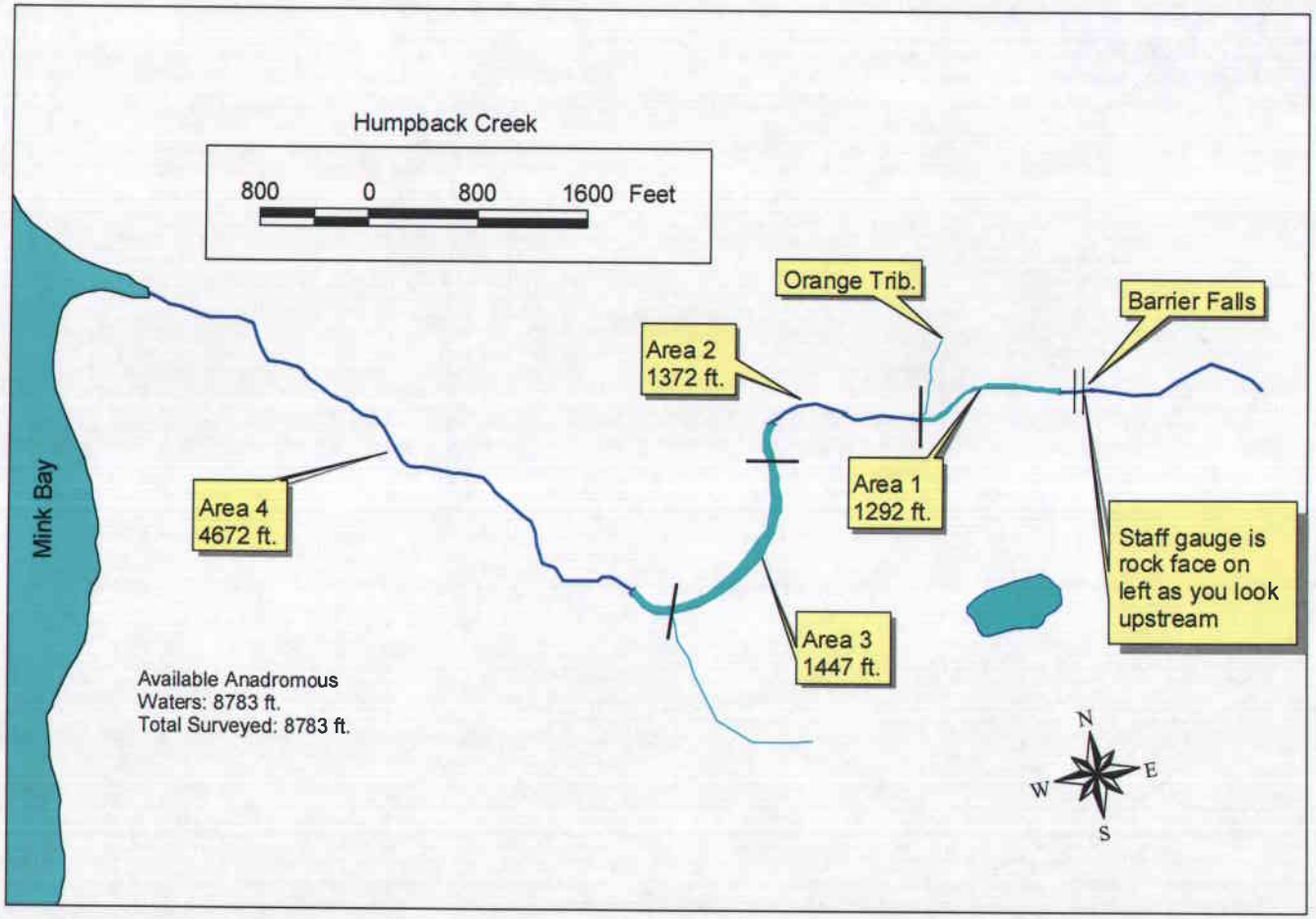
Appendix A: Stream maps showing discrete counting reaches.



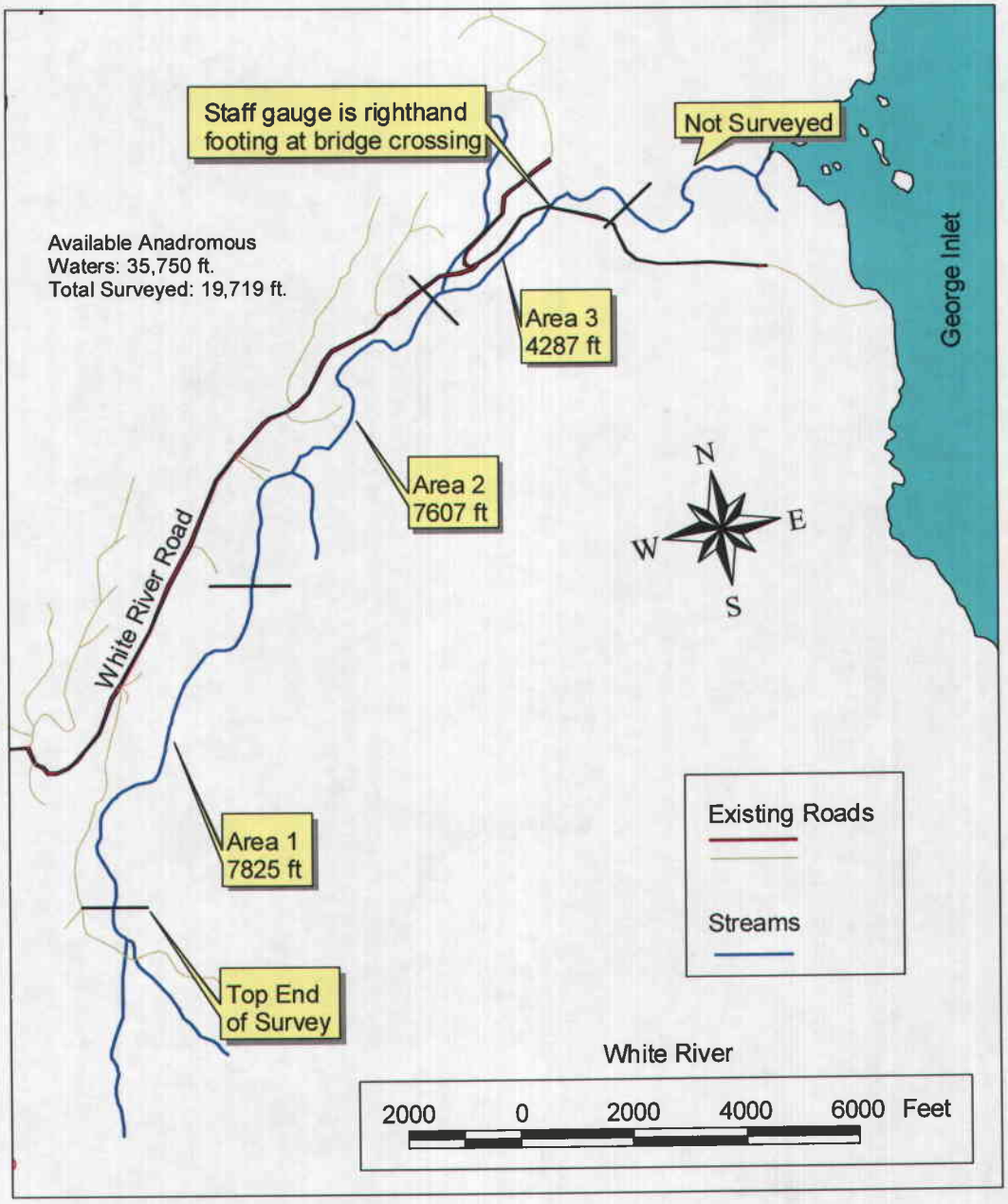
Eagle Creek, Prince of Wales Index Stream.



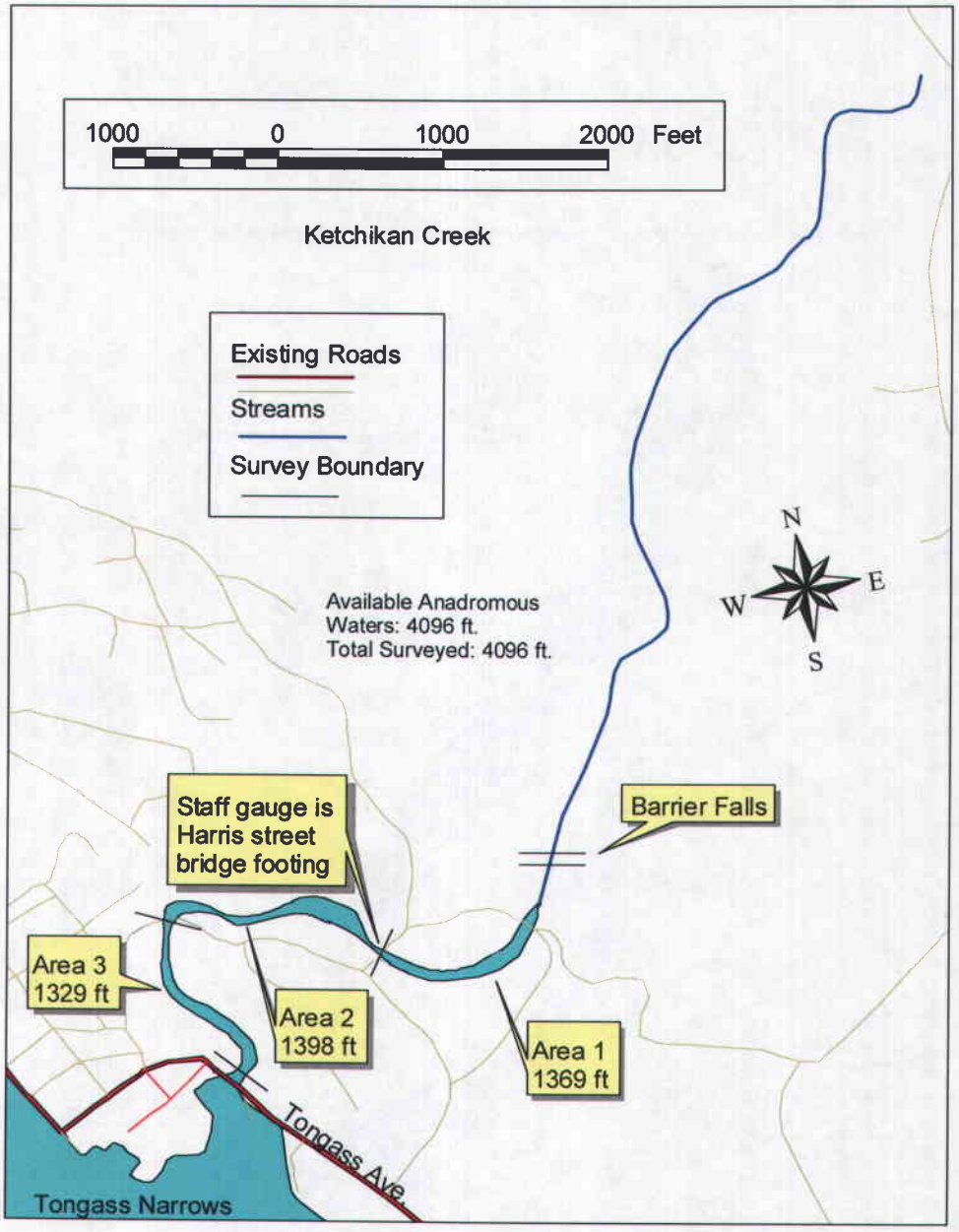
Harris River, Prince of Wales Index Stream.



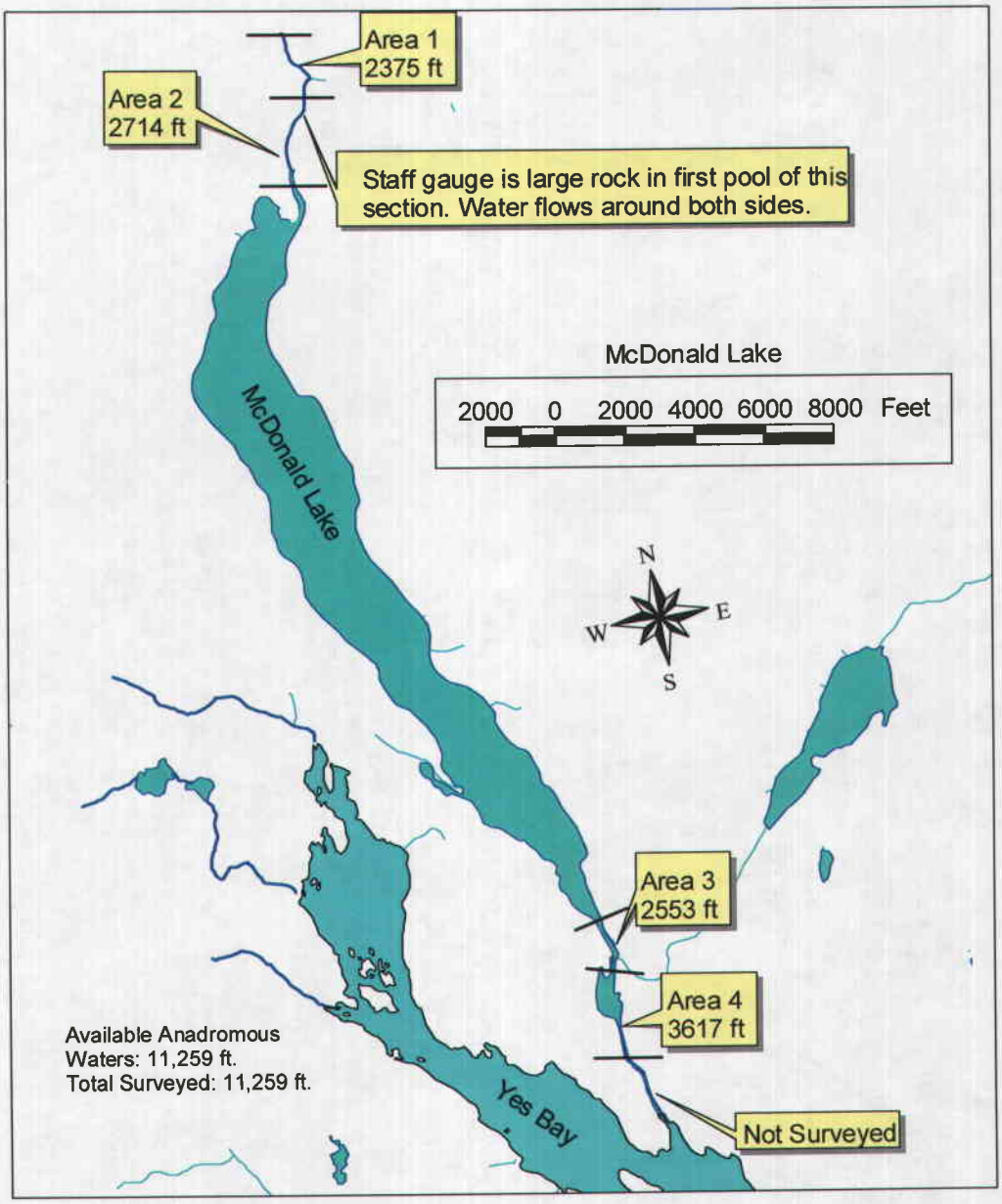
Humpback Creek, Ketchikan Non-Index Stream



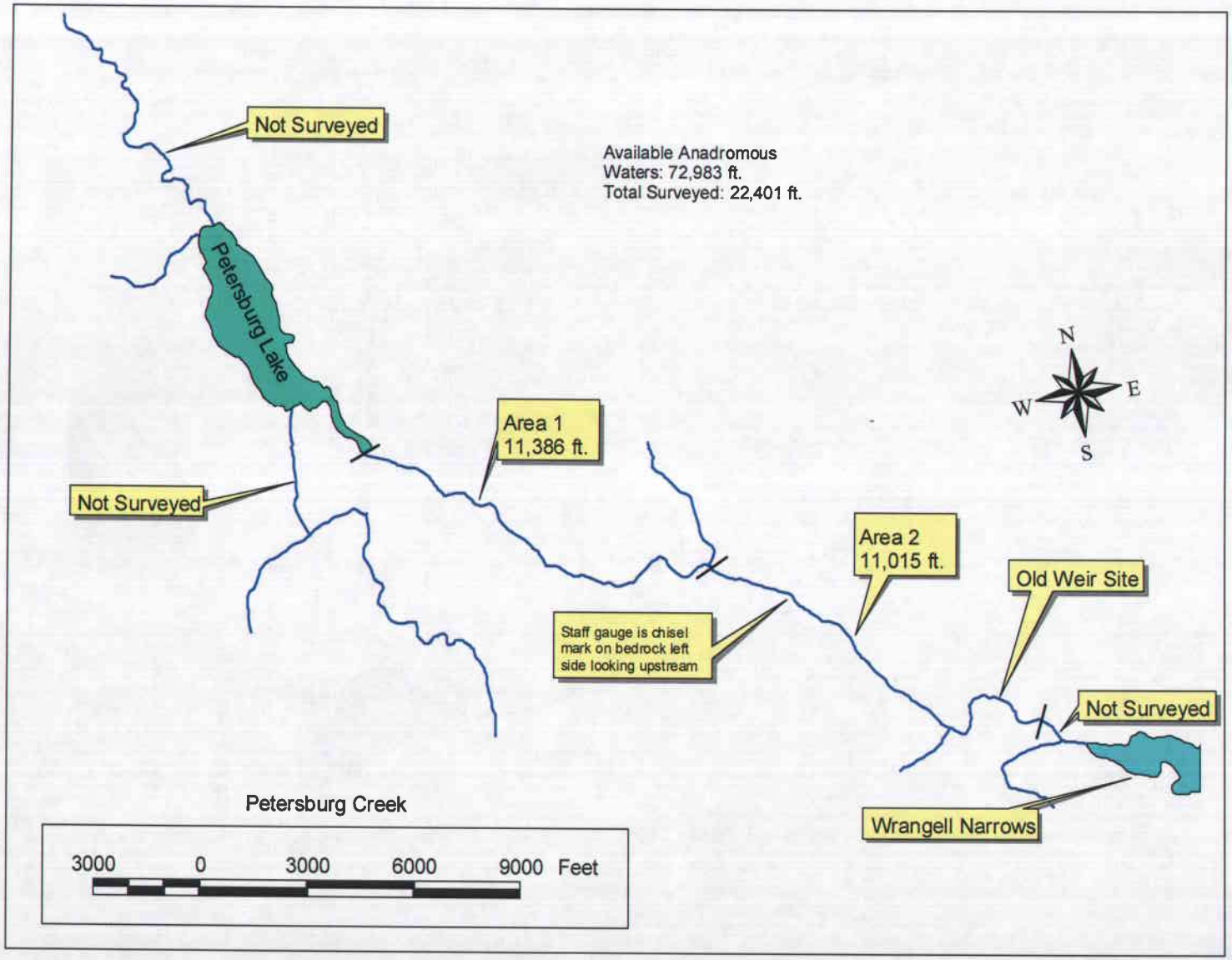
White River, Ketchikan Index Stream.



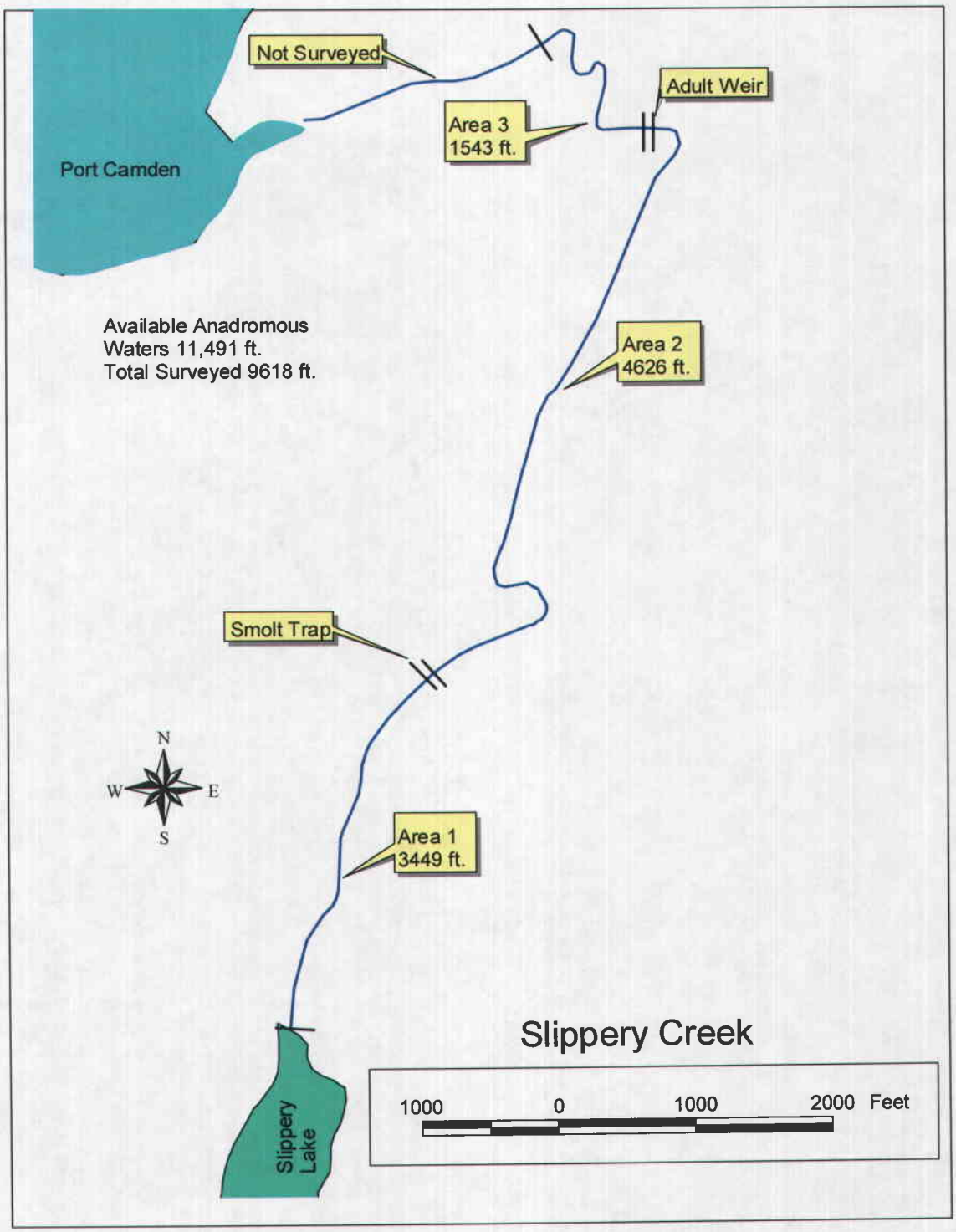
Ketchikan Creek, Ketchikan Non-Index Stream.



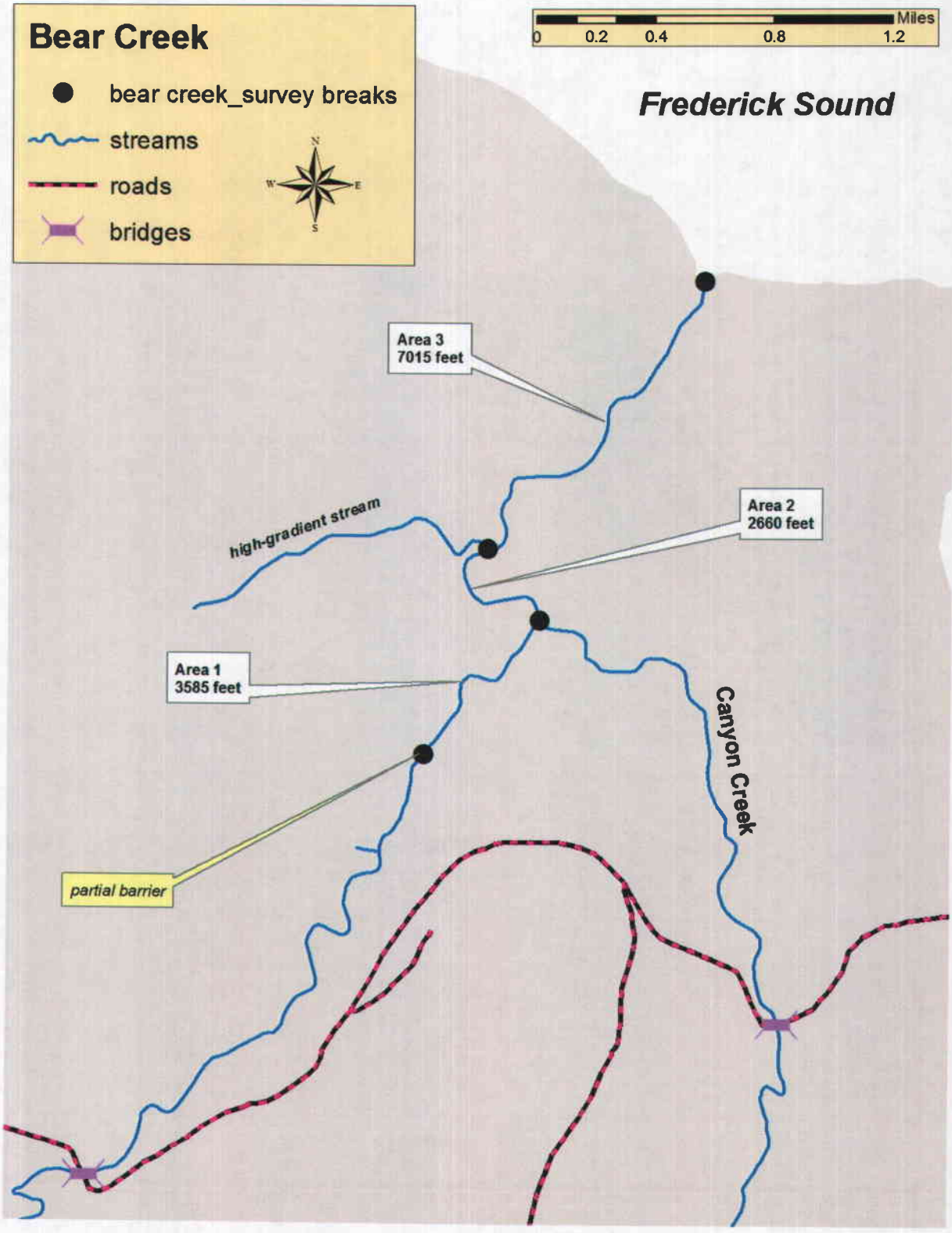
McDonald Creek, Ketchikan Index Stream.



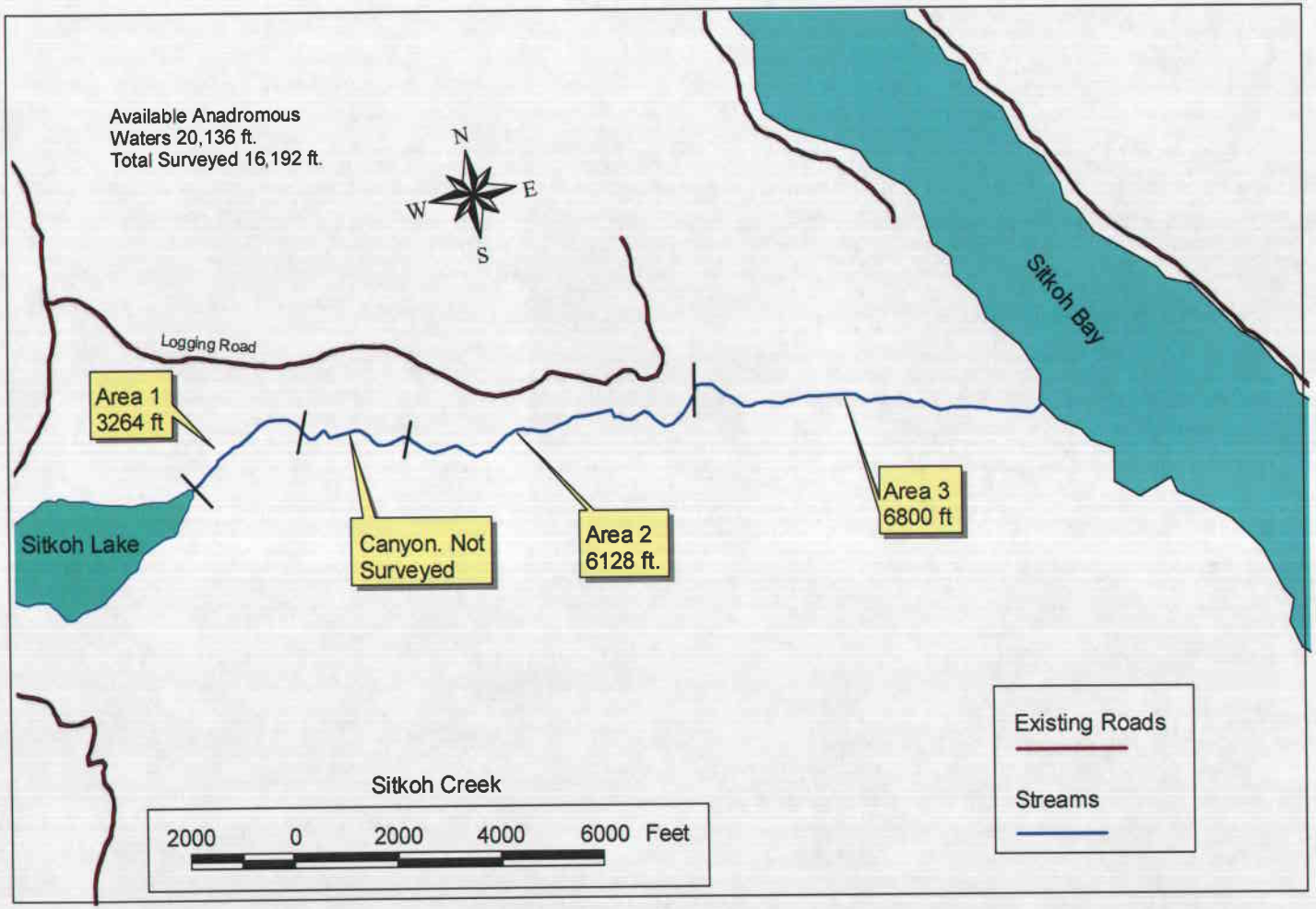
Petersburg Creek, Petersburg Index Stream.



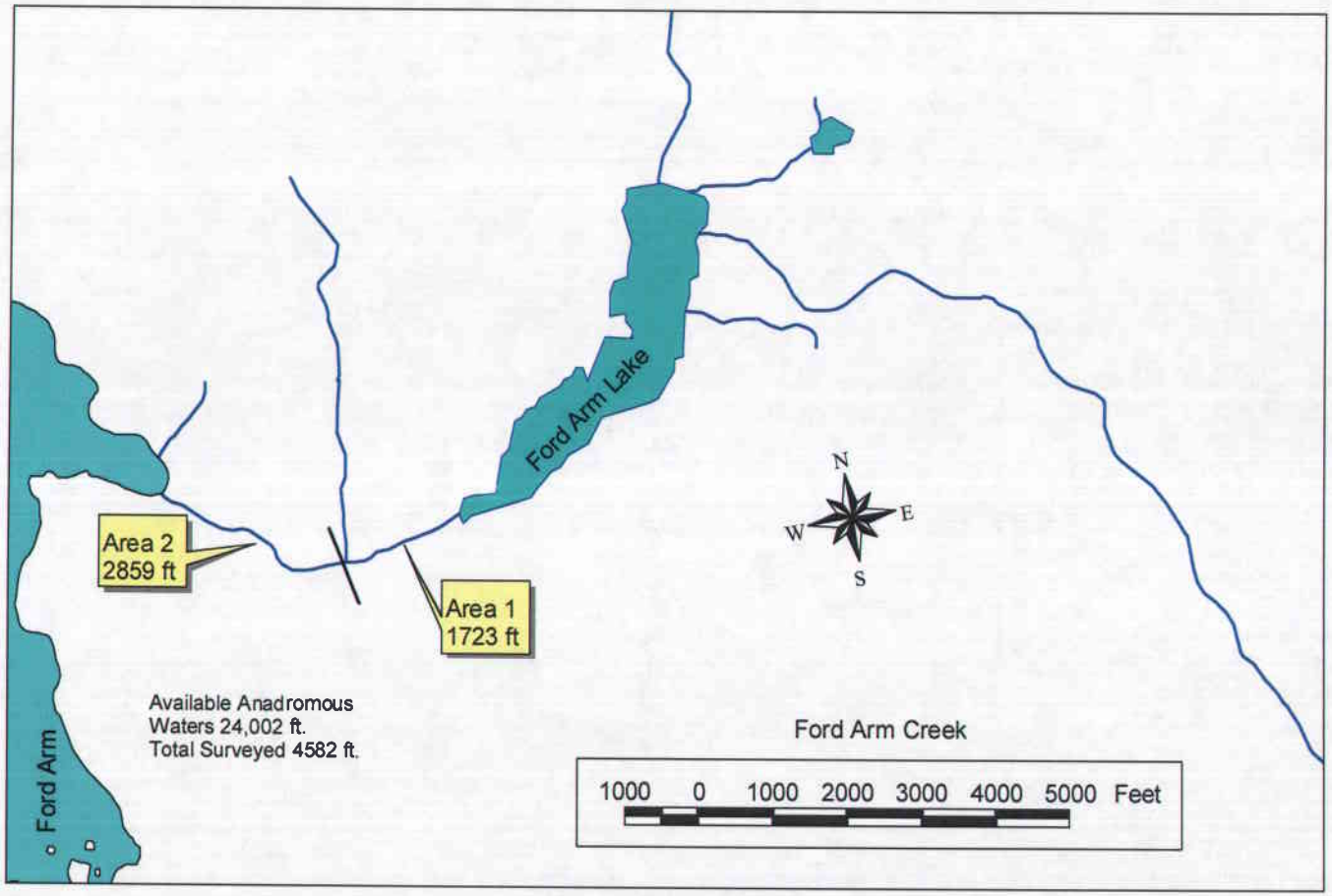
Slippery Creek, Petersburg Index Stream.



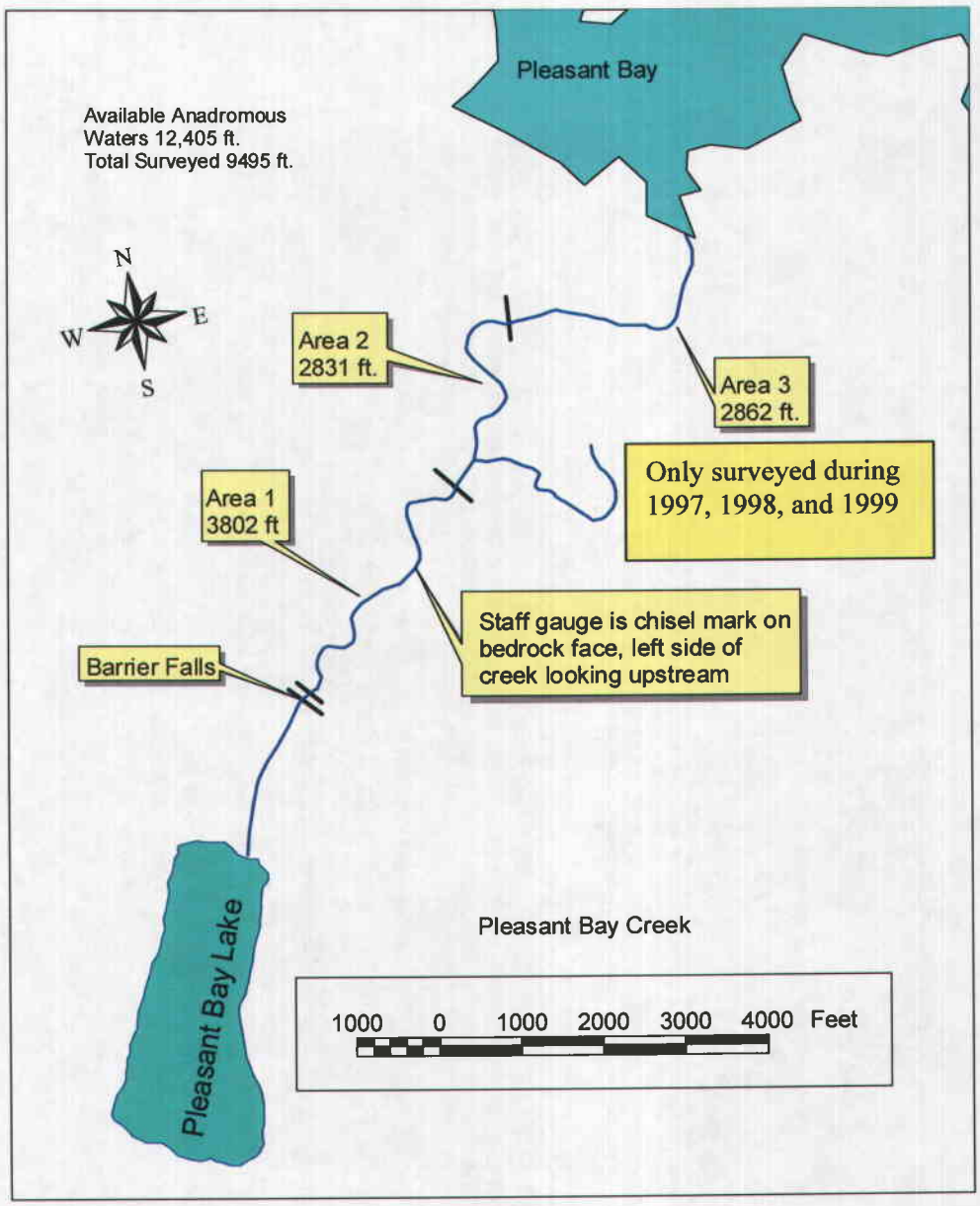
Bear Creek, Petersburg Non-Index Stream.



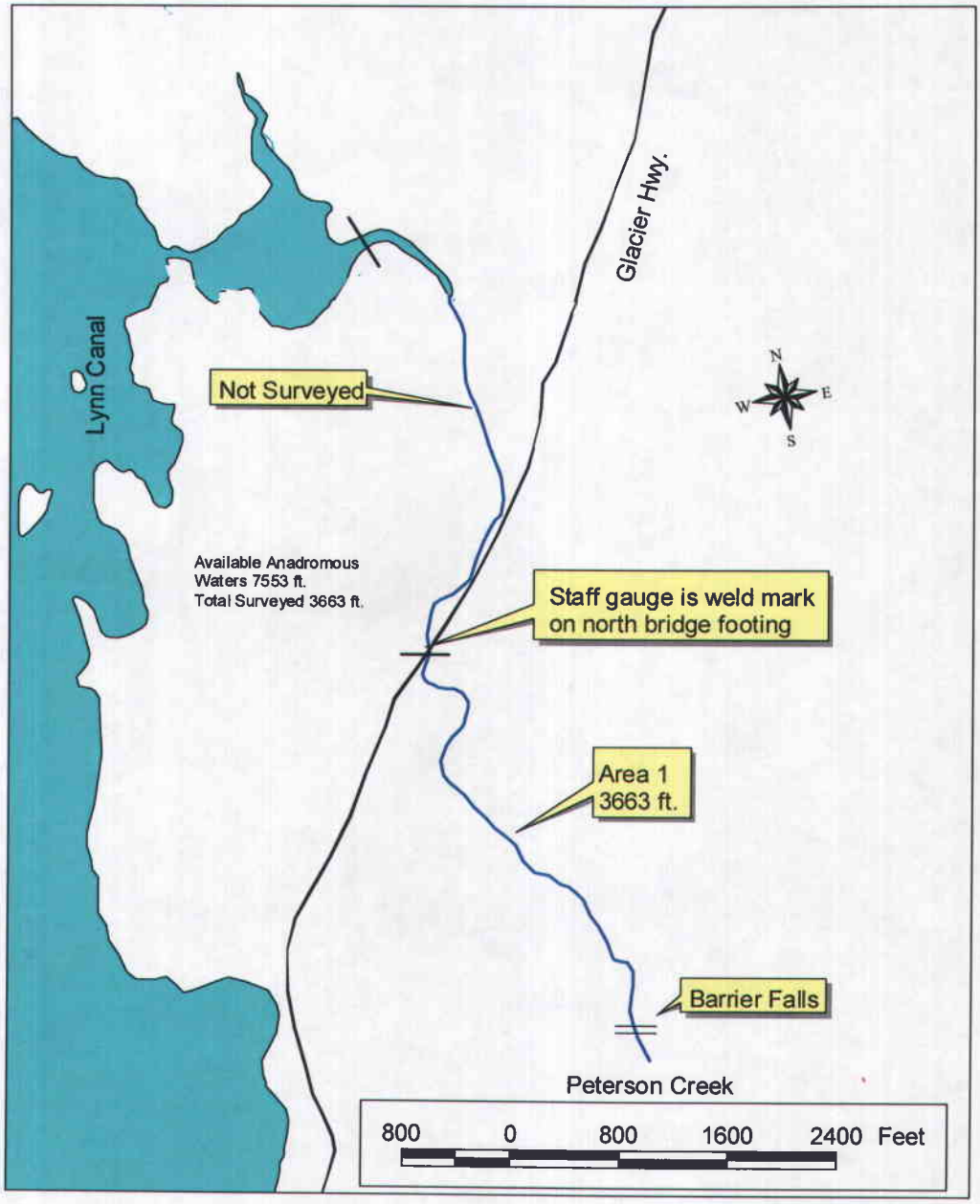
Sitkoh Creek, Sitka Index Stream.



Ford Arm Creek, Sitka Index Stream.



Pleasant Bay Creek, Juneau Index Stream.



Peterson Creek, Juneau Index Stream.