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Situk River Steelhead: A Review of Historical Data through 1996

by

Cheryl Bain,

Steven T. Elliott,

Robert E. Johnson,

and

Gordon Woods

September 2003

Alaska Department of Fish and Game

Division of Sport Fish



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Weights and measures (metric)		General		Mathematics, statistics, fisheries	
centimeter	cm	all commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis	H_A
deciliter	dL			base of natural logarithm	e
gram	g	all commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	catch per unit effort	CPUE
hectare	ha	and	&	coefficient of variation	CV
kilogram	kg	at	@	common test statistics	F, t, χ^2 , etc.
kilometer	km	compass directions:		confidence interval	C.I.
liter	L			correlation coefficient	R (multiple)
meter	m	east	E	correlation coefficient	r (simple)
metric ton	mt	north	N	covariance	cov
milliliter	ml	south	S	degree (angular or temperature)	$^\circ$
millimeter	mm	west	W	degrees of freedom	df
		copyright	©	divided by	\div or / (in equations)
		corporate suffixes:		equals	=
		Company	Co.	expected value	E
		Corporation	Corp.	fork length	FL
		Incorporated	Inc.	greater than	>
		Limited	Ltd.	greater than or equal to	\geq
		et alii (and other people)	et al.	harvest per unit effort	HPUE
		et cetera (and so forth)	etc.	less than	<
		exempli gratia (for example)	e.g.,	less than or equal to	\leq
		id est (that is)	i.e.,	logarithm (natural)	ln
		latitude or longitude	lat. or long.	logarithm (base 10)	log
		monetary symbols (U.S.)	\$, ¢	logarithm (specify base)	\log_2 , etc.
		months (tables and figures): first three letters	Jan,...,Dec	mid-eye-to-fork	MEF
		number (before a number)	# (e.g., #10)	minute (angular)	'
		pounds (after a number)	# (e.g., 10#)	multiplied by	x
		registered trademark	®	not significant	NS
		trademark	™	null hypothesis	H_0
		United States (adjective)	U.S.	percent	%
		United States of America (noun)	USA	probability	P
		U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	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
				standard length	SL
				total length	TL
				variance	var
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	$^\circ\text{C}$				
degrees Fahrenheit	$^\circ\text{F}$				
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	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

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Cheryl Bain,

Steven T. Elliott,

Robert E. Johnson,
Division of Sport Fish, Yakutat

and

Gordon Woods
Commercial Fisheries Division, Yakutat

Alaska Department of Fish and Game
Division of Sport Fish
333 Raspberry Road
Anchorage, AK 99518-1599

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*Cheryl Bain
Texas Medical Foundation
Barton Oaks Plaza Two, Suite 200
901 S. Mopac, Austin, TX 78746, USA*

*Steven T. Elliott
Walla Walla, WA, USA*

*Robert E. Johnson¹
Alaska Department of Fish and Game, Division of Sport Fish
P. O. Box 49, Yakutat, AK 99689-0049, USA*

*Gordon Woods
Alaska Department of Fish and Game, Commercial Fisheries Division
P. O. Box 49, Yakutat, AK 99689-0049, USA*

¹*Author to whom all correspondence should be addressed:
e-mail: bob_johnson@fishgame.state.ak.us*

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AUTHORS

Cheryl Bain, formerly a Fishery Biologist for the Alaska Department of Fish and Game, Division of Sport Fish, is now employed by the Texas Medical Foundation as a Biostatistician in Austin, Texas.

Steven T. Elliott, formerly the Southeast Alaska Regional Research Coordinator for the Alaska Department of Fish and Game, Division of Sport Fish, is now retired from state service and is living in Walla Walla, Washington.

Robert E. Johnson is the Area Management Biologist for the Alaska Department of Fish and Game, Division of Sport Fish, in Yakutat, Alaska.

Gordon Woods is the Area Management Biologist for the Alaska Department of Fish and Game, Commercial Fisheries Division, in Yakutat, Alaska.

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ABSTRACT

Historical counts of adult steelhead *Oncorhynchus mykiss* collected at weirs and by float surveys on the Situk River, Alaska, through 1996 were compiled and checked for errors. The resulting data are contained in the appendices of this report. Also included are brief discussions of steelhead life history and fishery catches in the Situk River based on investigations from the past several decades.

Key words: steelhead, *Oncorhynchus mykiss*, Situk River, Yakutat, escapement, abundance, harvest, total catch, age, sex, length, smolt, weir counts, float surveys.

INTRODUCTION

The steelhead *Oncorhynchus mykiss* population in the Situk River is the largest in Southeast Alaska and supports an important and internationally recognized recreational fishery. A recent (1999) count of emigrant (post-spawning) steelhead topped 9,000 fish (Johnson and Jones 2000), whereas a historical count exceeded 25,000 (USFWS 1952). This fishery is unique in the region because of its accessibility and high productivity.

Despite the acknowledged value of this fishery, no systematic assessment of the steelhead stock was ever conducted prior to 1989. Projects were generally informal, methods for data collection were seldom reported, and data were not checked for errors or archived for reference. In 1991 and 1992, low abundance of steelhead created considerable concern among the public as to the accuracy of Alaska Department of Fish and Game (ADF&G) data. The credibility of our program was not improved when errors were found in data sets and when various data sets produced conflicting results.

To address public concerns, the ADF&G Division of Sport Fish (SF) began requiring comprehensive and detailed operational plans for Situk River projects each year. The Situk River weir was improved and methods for collecting abundance indices and reporting results were standardized. All historical steelhead count data through 1996 were compiled, error checked, corrected if necessary, and now constitute the body of this report. While some age, size, and sex data have been collected over the years, they are described and summarized, but not detailed, in this review.

Beginning in 1997, steelhead data collected from the Situk River have been reported consistently and archived in ADF&G SF reports (Johnson and Jones 1998, 1999, 2000, 2001). These reports should be consulted for more recent data on steelhead runs in the Situk River.

LOCATION AND DESCRIPTION OF THE SITUK RIVER

The Situk River is located 18 km east of Yakutat, Alaska (Figure 1) and is 35.4 km long, originating at Situk Lake. The river has an average summer flow of 6 m³/s (Clark and Paustian 1989), averages 25 m wide, and drains about 200 km² (USFS 1985) of the Yakutat Foreland. There are two major tributaries: the Old Situk River, which is spring fed, and the West Fork which drains Redfield Lake. Prior to entering the sea, the river flows into an estuary that is shared with the Ahrnklin River. Detailed descriptions of the drainage can be found in NMFS (1993) and Riffe (1987). NMFS (1993) also compiled useful data on climate, stream temperature, and discharge.

For its size, the Situk River is the most productive watershed in Southeast Alaska. It produces abundant returns of pink salmon *Oncorhynchus gorbuscha*, sockeye salmon *O. nerka*, coho salmon *O. kisutch*, and chinook salmon *O. tshawytscha* with annual historical salmon harvests ranging to over 600,000 (Figure 2); as well as large runs of Dolly Varden *Salvelinus malma* and steelhead. Studies by the National Marine Fisheries Service (NMFS 1993) concluded that the Situk River's unusually high salmonid productivity is derived primarily from the river's stable hydrologic regime, high base flow, low gradient, and high levels of dissolved nutrients.

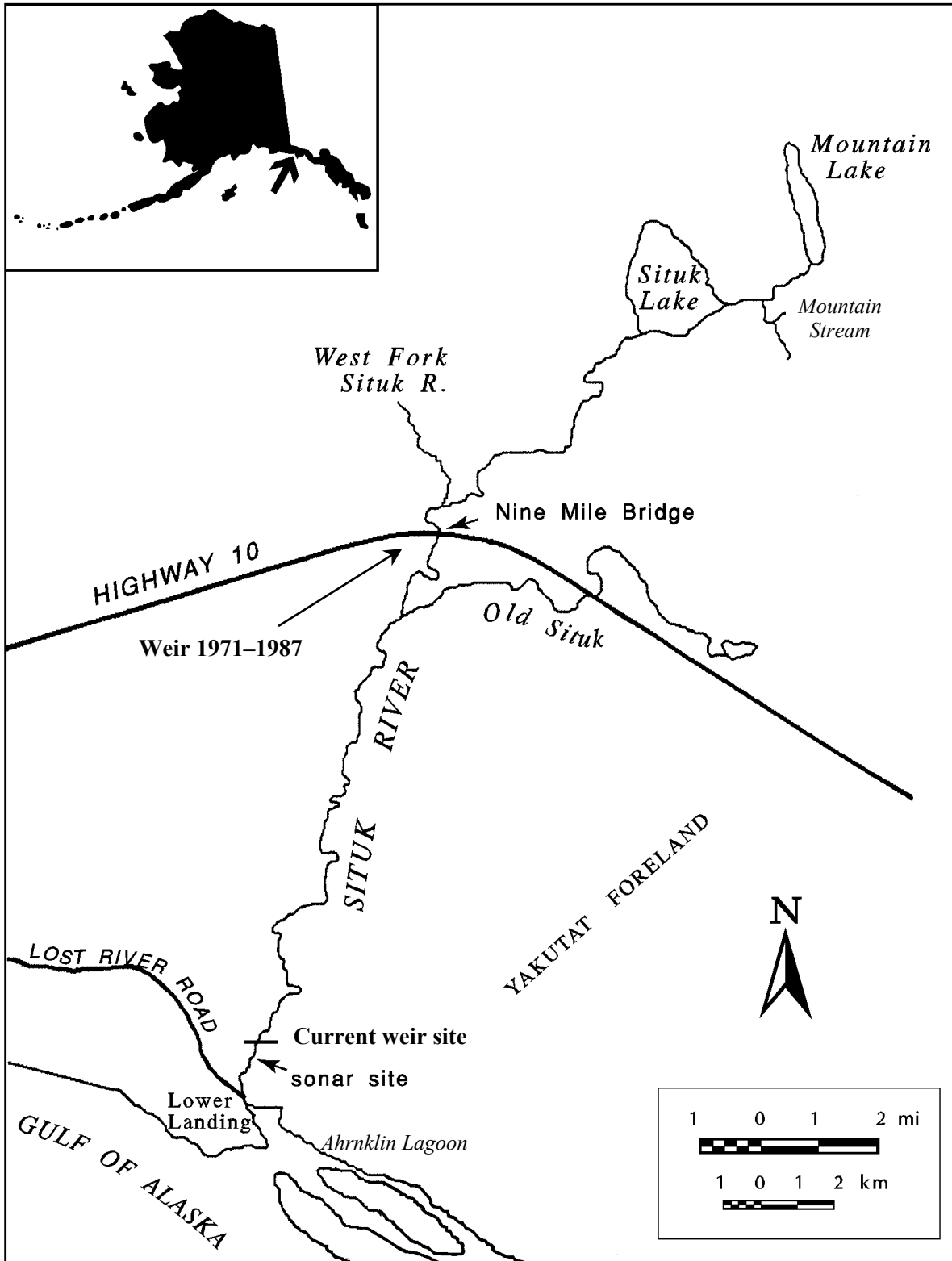


Figure 1.—Situk River, Yakutat, Alaska, showing current and former location of the Situk River weir.

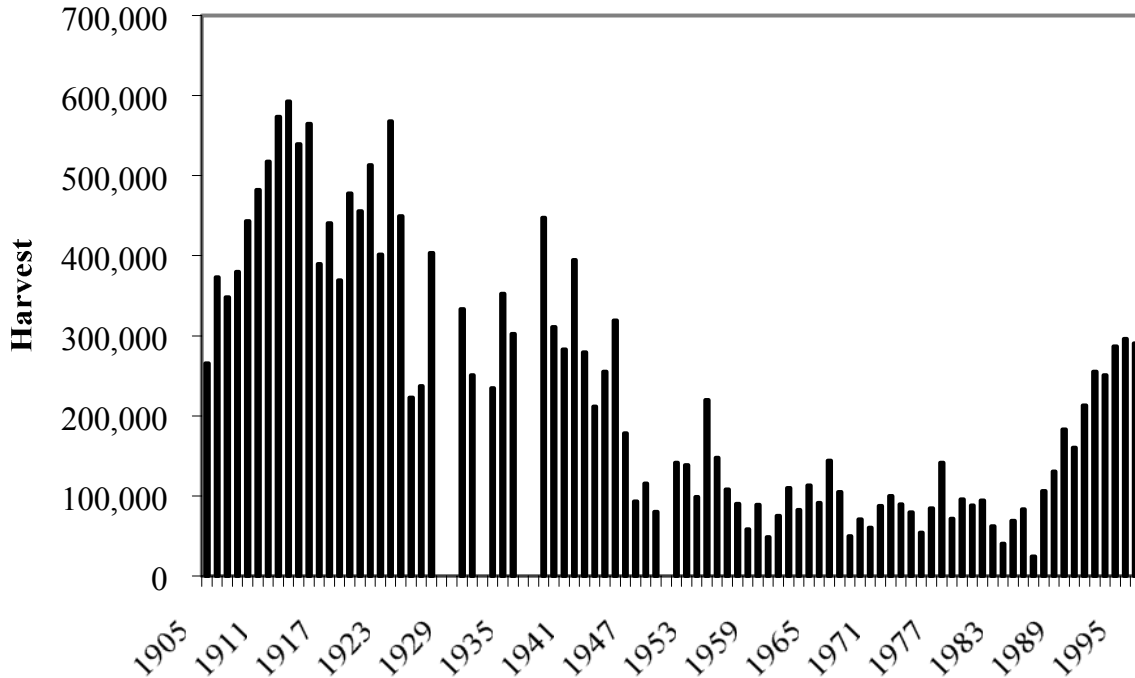


Figure 2.—Number of salmon harvested by commercial fisheries operating in the Situk River/Ahrnklin River estuary, 1905–1996. Data from S. McPherson (ADF&G Sport Fish, Douglas, personal communication) and Commercial Fisheries IFDB database. About 62% of the harvest from 1905 through 1996 were sockeye salmon.

GENERAL STEELHEAD LIFE HISTORY

Both spring (ocean maturing) and fall (freshwater maturing) runs of steelhead occur in the Situk River with the fall run thought to comprise about 16% of the total number of spawners (Johnson 1991). Fall-run fish enter the Situk River from August through December (Jones 1983; Johnson 1990) and overwinter primarily in Situk Lake or secondarily in the upper reaches of the Situk River (Johnson 1991). The spring-run begins in April and peaks sometime in late April to early May, then continues through May with the last stragglers arriving in mid- to late June (Glynn and Elliott 1993, Johnson 1991). Some spring immigrants enter as early as March; in 1990, the first immigrant was observed on March 16 (Johnson 1991). Spring immigration occurs primarily during periods of darkness with a peak between 2000 and 2400 hours, although movement is also somewhat correlated with the daily timing of high tides (Johnson 1991).

The emigration of surviving fall-run and spring-run adults (known as kelts) typically begins in earnest about May 15, peaks by May 31, and is complete by June 30 except for a few fish that remain into July and August. Most fish transit the Situk/Ahrnklin River estuary within 12 hours of passing the Situk River weir at river mile 1.2 by following ebb tides out to sea during an average 13 hour trip (Johnson 1996). It is speculated that fall-run steelhead emigrate first from the river and spawn earlier and generally in separate areas from spring-run fish; however, these life history features have not yet been documented.

Historical information on age, weight, length, and sex ratios of Situk River steelhead is limited because of inconsistent collection of these data. Though samples were collected in the early 1970s and in 1982, (McHugh et al. 1970, 1971; Jones 1983), they were often obtained by hook-and-line and may be biased as to size, age, condition, or sex. Samples were not taken again until 1992; however, these were only representative of the first

portion of the emigration (Glynn and Elliott 1993). No samples were taken in 1993. In 1994, samples were taken from 907 emigrant steelhead (Johnson 1996); however, collection procedures may have oversampled dead or weakened fish. In 1995 and 1996, 392 and 1,028 scale samples, respectively, were also taken at the weir along with otolith samples from weir mortalities. These scale samples have not been aged because aging procedures have not been validated with known age samples. In addition, no methods exist to determine fall-run or spring-run association. In 2000, steelhead kelts were marked with Passive Integrated Transponder (PIT) tags to collect more information on repeat spawners (Johnson and Jones 2001). Because of uncertainty with scale aging methods and inconsistencies in data collection procedures, the representativeness of historical age, sex and length data for Situk River steelhead is questionable.

Most age data are from emigrant steelhead sampled during spring, with an unknown proportion of fish comprising the spring vs. fall runs. Ages of fish sampled in fall can be found in McHugh et al. (1971, 1972). Jones (1983) and Johnson (1996) provide ages for fall-run and spring-run steelhead sampled during spring. It should be noted that Jones (1983) separated fall and spring-run fish on the basis of presence or absence of “clubbed gill filaments” (fall-run steelhead are believed to have this attribute during spring), a technique of unknown validity.

In 1994, Johnson (1996) estimated that adult male steelhead averaged 836 mm FL and females averaged 785 mm FL. Average weights for males (4.5 kg) and females (4.8 kg) were reported in McHugh et al. (1970, 1971). Adults return mostly as age 3-ocean fish, may spawn several times, and can live as long as ten years (McHugh et al. 1971, 1972; Jones 1983; Glynn and Elliott 1993; Johnson 1996; ADF&G unpublished data). An estimated 25% (Jones 1983) to 59% (Johnson 1996) of Situk River steelhead are repeat spawners.

Spawner density, location of spawning, and peak time of spawning have not been documented. However, Johnson (1991; see Appendices A1 and A2) found that radiotagged fall-run steelhead were most frequently located in the upstream half of the reach from Nine Mile Bridge to Situk Lake (Figure 1) during early May, prior to emigration,

suggesting this portion of the river may be an important spawning area. NMFS (1993) lists other spawning areas, including the reach from Nine-Mile Bridge upstream to river mile 16, Mountain Stream, West Fork, and Old Situk River (Figure 1). Johnson (1996), using detailed float count data, which indirectly tracked movements of steelhead in the system, found pronounced temporal and spatial changes in the instream distribution of adults during May 1994.

There is undoubtedly some spawning mortality of steelhead, but its extent has not been documented in the Situk River. It is assumed that mortalities are consumed by predators or decompose at the bottom of large pools, although it is rare to observe even one or two steelhead carcasses during Situk River float counts (Author R. E. Johnson, personal communication). Estimates derived from other studies of instream spawning survival rates of spring-run steelhead in Southeast Alaska (Table 1) suggest that about 70% survive to emigrate from some Southeast Alaska systems.

NMFS (1993) estimated that steelhead eggs incubate for about 40 days and observed that peak emergence occurred between July 1 and July 10. Their studies found that juveniles rear throughout the watershed except for cut-off sloughs, and that steelhead fry and parr were strongly associated with banks with dense, overhanging willow *Salix* bushes. Juveniles rear for three to five years (Johnson 1996; NMFS 1993) in the river before migrating to sea from May-June at an average 120 mm FL (age 2 smolts) and 180 mm FL (age 4 smolts) (Thedinga et al. 1994). Thedinga et al. (1994) estimated that about 26,000 steelhead smolt emigrated from the river during 1990. ADF&G conducted a mark-recapture experiment to estimate smolt abundance in 1992 (R. P. Ericksen, Alaska Department of Fish and Game, Haines, personal communication); however, insufficient numbers of smolts were captured for an accurate estimate (for methods, see Ericksen and McPherson 1997).

STEELHEAD ADULT ABUNDANCE DATA

Although the steelhead run to the Situk River is now considered a highly valued resource, government fishery biologists of the 1930s and 1940s

Table 1.—Estimated instream spawning survival rates of spring-run steelhead in Southeast Alaska. The average rate is 70.5%.

System	Dates of operation	Marked immigrants	Emigrants		Harvest ^a		Survival rate ^b	Source
			Total	Marked	Total	No. marked		
Karta River	3/24– 6/10/89	1,220	842	742 ^c	50	44	64%	Hoffman et al (1990)
Ward Creek (hatchery)	3/19–7/10/94	53	69	36	14	7	82%	Freeman (1995)
Ward Creek (wild)	3/19– 7/10/94	220	177	129	0	0	59%	Freeman (1995)
Sitkoh Lake/Creek	4/07– 9/06/96	926 ^d	709 ^e	na	0	0	77%	Yanusz (1997)

^a Harvest of marked fish = estimated harvest reported in citation * (marked emigrants /total emigrants)

^b Survival rate = (harvest of marked fish + number of marked emigrants)/number of marked immigrants

^c Tag loss rate is unknown.

^d Immigrants were not marked in this study but all spring immigrants were counted

^e Some emigrants may have been fall-run steelhead so the survival rate is a maximum estimate. Total number larger than reported in Yanusz (1997); as we added two steelhead counted by ADF&G Commercial Fisheries crews in July.

considered steelhead and Dolly Varden simply as effective predators of sockeye salmon. During this period, steelhead and Dolly Varden were trapped and destroyed and bounties were paid in some instances for both species. A summary of historical reports of early fishery work conducted by the U.S. Fish and Wildlife Service in the Situk River through 1960 is presented in Appendix A1.

HISTORY AND DEVELOPMENT OF WEIR COUNTS

Prior to 1988, weir programs in the Situk River were not designed for counting (nor intended to count) steelhead. In nearly all cases, weirs intended to count sockeye salmon were installed too late in the season to achieve complete counts of emigrating steelhead adults and/or were installed upstream of concentrations of spawners. When weirs were subsequently installed earlier in the year, they were often rendered ineffective by floods. Consequently, through 1996, there were only 3 years with complete steelhead emigration counts: 1990, 1995, and 1996 (Table 2 and Appendix B). After experimental use in 1989, sonar was used in 1990 to count immigrant steelhead prior to weir installation, but proved labor intensive and somewhat unreliable (Johnson 1990, 1991).

Only about 1% of the adult steelhead emigration from the river occurs through May 15, but emigration increases rapidly after this time, and about 2/3 of the run emigrates by June 1. During the first half of June, the remainder of the emigration occurs except for the remaining 3-4% of the run which continues through June and early July. A few emigrants have been counted through the weir as late as mid-August. In some years, peaks in emigration coincided with floods. Emigration was delayed about two weeks by a late snow pack and cold water temperatures in 1999 (Johnson and Jones 2000). A brief history of the evolution of weir projects follows.

Beginning in 1930, the U. S. Fish and Wildlife Service (USFWS) installed a weir on the lower Situk River below the current weir site at river mile 1.2 to count sockeye salmon (Appendix A1). There was little mention of steelhead in the early years of weir operation except to note that they probably preyed on sockeye salmon smolts and eggs. In 1952, however, crews at the weir estimated the emigration at 25,000–30,000 steelhead, 6,000 of which were counted as they passed downstream in a single night (USFWS 1952).

The USFWS terminated their program in 1955, and no weir was operated on the river from 1956 to 1970. In 1971, the ADF&G Commercial Fisheries

Table 2.—Counts of immigrant and emigrant steelhead at weirs across the Situk River, 1947–1996. All counts from 1971 to 1987 were obtained near Nine-Mile Bridge; while those from 1947 to 1953 and after 1988 were obtained from the Lower River site (see Figure 1). Complete counts of emigrants were obtained only in the shaded rows encompassing 1990, 1995, and 1996, and an estimate for immigrant steelhead was obtained only in 1990; nd = no data.

Year	Weir site ^a	Approximate dates of operation		Number of immigrants	Number of emigrants	Source
		Start	End			
1947	Lower	nd	nd	nd	300–500 minimum	USFWS (1947)
1951	Lower	nd	nd	nd	3,000 minimum	USFWS (1951)
1952	Lower	16-Jun	31-Aug	nd	25,000–30,000	USFWS (1952)
1953	Lower	nd	nd	nd	“almost non-existent”	USFWS (1953)
1954	Lower	nd	nd	nd	“very few”	USFWS (1954)
1971	Upper	7-Jun	18-Aug	0	160	Appendix B1
1976	Upper	10-Jun	20-Aug	16	117	Appendix B2
1977	Upper	10-Jun	17-Aug	5	17	Appendix B3
1978	Upper	6-Jun	17-Aug	3	32	Appendix B4
1979	Upper	22-May	16-Aug	60	370	Appendix B5
1980	Upper	29-May	29-Jul	58	340	Appendix B6
1981	Upper	1-Jun	15-Aug	4	6	Appendix B7
1982	Upper	12-May	18-Aug	139 ^b	1,830 ^b	Appendix B8
1983	Upper	17-Jun	16-Aug	7	18	Appendix B9
1984	Upper	5-Jun	18-Aug	13	50	Appendix B10
1985	Upper	17-Jun	16-Aug	1	891	Appendix B11
1986	Upper	4-Jun	17-Aug	38	222	Appendix B12
1987	Upper	11-Jun	18-Aug	0	5	Appendix B13
1988	Lower	7-Jun	8-Aug	60	1,211	Appendix B14
1989	Lower	26-May	16-Aug	128	5,991	Appendix B15
1990	Lower	8-May	27-Jul	741 ^c	3,652	Appendix B16
1991 ^d	Lower	9-May	27-Jul	394	2,526	Appendix B17
1992 ^e	Lower	18-Apr	17-Jul	1,079	2,976	Appendix B18
1993	Lower	14-Jun	24-Jul	nd	338	Appendix B19
1994	Lower	21-May	4-Aug	341	7,854	Appendix B20
1995	Lower	8-May	3-Aug	620	6,680	Appendix B21
1996	Lower	6-May	6-Aug	497	8,510	Appendix B22

^a Lower = near Lower Landing, Upper = near Nine-Mile Bridge.

^b Jones (1983) reported that the total spring immigrant count at the weir was 907 from which 138 were tagged with Peterson disc tags; therefore the immigrant count of 139 presented here may be in error. The 1982 tagging study estimated total emigration at approximately 5,000 fish (Jones 1983).

^c Weir count was supplemented by early-season sonar and visual counts to estimate a total spring immigration of 3,005 steelhead (Johnson 1991).

^d Incomplete count; weir breached 5/28–6/9/91.

^e Incomplete count; weir breached 5/4–5/15/92.

Division (CF) constructed a weir of approximately 2-inch mesh chicken wire near Nine-Mile Bridge at river mile 13.1 (Figure 1) to count sockeye salmon. Crews also counted any steelhead passing upstream or downstream. This weir was also operated in 1976 and 1977. In 1978 and 1979, the

weir was upgraded to aluminum pickets and channel which stood upright between iron pipe driven into the streambed and supported by heavy cable strung across the river. In 1980, the weir was again upgraded to use tripods and metal pickets and then operated annually through 1987.

Steelhead counts at the Nine-Mile Bridge weir site are low because many steelhead spawn in the river downstream of the weir.

In 1988, the weir was moved from Nine-Mile Bridge to its present site in the lower river at river mile 1.2 (Figure 1) and jointly operated by ADF&G CF and SF. Beginning that year, counts of all emigrant steelhead became a planned objective for the first time (and immigrants were also counted). Nevertheless, the weir was installed too late to count most emigrants in 1988 and 1989. In 1990, the weir was installed in early May and provided the first complete count of emigrant steelhead (Johnson 1991). Very few steelhead have been documented to spawn below this weir.

In 1991, the tripod/picket weir was replaced with a stronger aluminum bipod/metal picket design. Despite these improvements, spring freshets undermined and breached the weir (Glynn 1992). In 1992, the weir was installed in mid-April to count both immigrants and emigrants but was again breached by floods (Glynn and Elliott 1993). The early installation of the weir also had the effect of delaying the spring immigration until the flood took the weir out as evidenced by the reluctance and refusal of immigrating steelhead to pass upstream through the weir which resulted in the pooling of steelhead just downstream of the weir. Persistent high water delayed weir installation in both 1993 and 1994 and resulted in incomplete counts for both those years. In 1995, the bipod/picket weir was replaced with a floating/resistance board weir and installed in early May. To date, this design has weathered all freshets and provided continuous counts of emigrant steelhead (Johnson and Jones 2000).

FLOAT COUNTS

Prior to the installation of the floating/resistance board weir, counts of steelhead obtained during float surveys were the primary metric of steelhead abundance in the Situk River (Appendix C). This preference derived from the expense of weir operations and the inability of early weir operations to obtain complete steelhead counts (especially due to high flows). Annually since 1974, ADF&G staff, using a canoe, raft, or outboard-powered riverboat, would launch at the Nine-Mile Bridge and drift or slowly motor the

“Lower River” downstream to the pullout point at the Lower Landing (Figure 1). Two or more observers counted steelhead from one or both sides of the boat and kept a running tally of fish and their locations. Beginning in 1985, the survey area was expanded to include the “Upper River”; i.e., the area from Situk Lake to the Nine-Mile Bridge (Figure 1).

Use of the float counts as an index to run size was dependent both upon their consistency in methods and their relationship to an accurate count of the total run. It was hoped that the sonar experiments conducted in 1989 and 1990 (Johnson 1990, 1991) would resolve the annual steelhead census problem. Benefits of perfecting a sonar system would have included the ability to accurately count both immigrant and emigrant steelhead without affecting run timing. When the sonar project proved problematic, emphasis shifted to looking for a dependable weir design as well as improving the integrity of float counts. Before 1991, staff generally conducted one to four surveys from April through June. Surveys were timed to take advantage of good weather to improve counting conditions and consequently, the dates of surveys varied among years.

In 1991, Glynn (1992) developed and applied more systematic methods, since float surveys to that date tended to lack quantitative rigor. He conducted multiple surveys of both the Upper and Lower River at regular intervals, recorded the methods used in the survey, and recorded data in a consistent manner. In 1994, Johnson (1996) adopted these methods, and in addition, clustered surveys during weeks of expected peak instream abundance, established measured and defined survey sections, and collected weather and visibility data. Methods in Johnson (1996) are currently in use. Thus, in a series of one or more counts, the highest count total was chosen as the “peak float count” and used as an index of abundance (Table 3).

Johnson and Jones (1999) analyzed float count data from 1994 to 1998 and determined that counts conducted under low, clear water conditions from May 8 to 18 produced the most precise indices of abundance. Given good conditions and correct timing, Situk River float surveys are capable of counting nearly every steelhead present within the

Table 3.—Peak counts of adult steelhead obtained from float surveys of the Situk River, 1974–1996. Peak counts highlighted in **bold** were single counts which were taken on dates usually corresponding with peak instream abundance of steelhead; nd = no data.

Year	Upper river ^a		Lower river ^b		Total count	Source
	Date	Count	Date	Count		
1974	nd	nd	4-Oct	9		Appendix C1
1975	nd	nd	18-June	84		Appendix C1
1976	nd	nd	15-June	114		Appendix C1
1977	nd	nd	13-May	245		Appendix C1
1978	nd	nd	14-May	241		Appendix C1
1979	nd	nd	15-May	567		Appendix C1
1980	nd	nd	12-May	694		Appendix C1
1981	nd	nd	14-May	1,503		Appendix C1
1982	nd	nd	5-June	497		Appendix C1
1983	nd	nd	30-May	220		Appendix C1
1984	nd	nd	10-May	2,151		Appendix C1
1985	10-June	736	5-June	1,312	2,048 ^c	Appendix C1
1986	nd	nd	28-May	1,367		Appendix C1
1987	11-May	1,123	12-May	2,083	3,206	Appendix C1
1988	15-May	430	25-May	2,165	2,595 ^c	Appendix C1
1989	20-May	1,016	21-May	1,235	2,251	Appendix C1
1990	16-May	502	17-May	1,138	1,640	Appendix C1
1991	14-May	386	12-May	593	979	Glynn (1992)
1992	16-May	220	16-May	663	883	Glynn and Elliott (1993)
1993	19-May	369	18-May	3,130	3,499	Appendix C2
1994	21-May	319	21-May	4,383	4,702	Johnson (1996)
1995	8-May	1,406	9-May	4,829	6,235	Appendix C3
1996	18-May	677	18-May	5,867	6,544	Appendix C4

^a Upper River = Situk Lake to Nine-Mile Bridge (Figure 1).

^b Lower River = Nine-Mile Bridge to the Lower Landing (Figure 1).

^c Total obtained by summing counts separated by 5 to 10 days, and thus less reliable than counts made within a short period.

area surveyed. However, because some steelhead spawn in locations other than the survey area and pass through the survey area either before or after the survey season, not all fish in the system are counted (Johnson and Jones 1999). Counts from Nine Mile Bridge downstream from 20 May to 27 May have represented 57% to 78% of the total weir emigration; however, weir data have demonstrated that 15% to 25% of the annual emigration may occur prior to this time period (Johnson and Jones 1999).

Though float count procedures are now more rigorous than in the past, fundamentals of float

counts have remained essentially unchanged since 1977. In the absence of other data, counts from 1977 to present are deemed comparable and should provide a rough measure of abundance (though we acknowledge some differences in timing, environmental conditions, or observer experience). These data (Table 3) indicate that steelhead numbers have increased greatly over the last three decades. In the late 1970s, indices were frequently less than 1,000, whereas numbers doubled in the 1980s, and some counts exceeded 2,000. In the 1990s, numbers doubled again, with counts exceeding 4,000, and some counts nearing 6,000 fish.

STEELHEAD HARVEST AND TOTAL CATCH

SPORT FISHERY

The major sport fishery for Situk River steelhead operates on combined spring and fall-run fish from April through June. Before the mid-1970s, the Situk River was fished primarily by local residents; however, it then became more popular with visiting anglers (Jones 1983). The sport bag limit for steelhead (“trout” over 20 inches in total length) was 3 fish from the 1940s until 1975, when it was reduced to 2 fish. In 1980, the steelhead bag limit was reduced to 1 fish (“trout” over 16 inches in total length). No data on steelhead sport harvests are available prior to 1977, but sport harvests from 1977 to 1996 (Table 4) were obtained from the Statewide Harvest Survey (SWHS) (Mills 1979–1994; Howe et al. 1995, 1996, 2001). Harvests slowly increased from 136 in 1977 to 1,086 fish in 1989. Estimated steelhead harvests dropped to near zero after emergency regulations restricted the Situk fishery to catch and release from 1991 to 1993, and then after a suite of regulation changes were imposed throughout Southeast Alaska in 1994. These changes included a 36-inch minimum size limit for steelhead along with a 2-fish annual limit. The use of bait in the Situk River was also eliminated in 1994 and severely restricted or eliminated in most other fresh waters of Southeast Alaska.

A small sport fishery directed on fall-run steelhead occurs in October and November, but catch and harvest of these fish cannot be separated from the spring fishery statistics. Also, because statewide harvest survey questionnaires are first mailed out about November 1, some fall-run steelhead caught late in the year may not be reported. However, because the November fishery effort is small and the number of fish caught and harvested even smaller, the effect of this potential accounting error is considered negligible.

Total catch of steelhead in the sport fishery was first estimated from the SWHS in 1990 (Table 4). In both 1990 and 1996, the estimated total steelhead catch exceeded the total emigrant count. The effects of this large amount of catch-and-release fishing on the steelhead run is unknown;

however, elimination of bait should have reduced hooking mortality rates.

To obtain more detailed fishery estimates, ADF&G SF conducted onsite creel surveys to estimate the fishing effort, harvest, and catch of steelhead from 1985 through 1991 (Table 5). These creel surveys were discontinued after the fishery was restricted to catch-and-release. Because the SWHS estimates are considered more comprehensive, the estimates of total catch and harvest obtained from creel surveys are expected to be smaller than those from the SWHS.

COMMERCIAL FISHERY

Commercial set gillnet fisheries occur in the Situk/Ahrnklin estuary just downstream of the Lower Landing from late June to early October (Figure 1). Immigrating fall-run steelhead are harvested incidentally in the fisheries for sockeye and coho salmon occurring in August and September. Additional harvests of emigrating spring and fall-run fish occur in the spring when they leave the river after spawning (Didier and Marshall 1991).

Prior to 1987, annual commercial harvests of steelhead in the Yakutat area as reported on fish tickets did not exceed 10 fish. From 1987 to 1996, reported incidental harvest of steelhead in commercial set gillnet fisheries on the Situk River ranged from 42 to 235 fish (Table 6). It is important to note that fish reported in any one calendar year may belong to either of two separate runs of steelhead: catches in the spring belong to the spawners of that year while catches in the fall belong to the spawning population of the following spring. Data include only those fish reported on Commercial Fisheries Harvest Tickets, but the total harvest is higher as some harvested fish are retained for personal use. Didier and Marshall (1991) found that 70% of the steelhead caught were retained for personal use or sold and 30% were released. In a fishery with five openings, most of the fish were taken during the first opening and only one fish was seen after the third opening.

SUBSISTENCE FISHERY

Subsistence fishing for salmon in the Yakutat area is permitted in fresh waters from the Doame to the Tsiu River and in the salt waters of Yakutat Bay,

Table 4.—Estimated number of anglers, days fished, sport harvest, and catch of steelhead at the Situk River from the Statewide Harvest Survey, 1977–1996. Data are from Mills (1979–1994) and Howe et al. (1995–1996, 2001). SEs for harvest were first estimated in 1987; total catch was first estimated in 1990 and SE for catch was first estimated in 1992.

Year	Number of anglers ^a	Fishing effort (in angler days) ^a	Harvest	SE	Total catch	SE	Source
1977		3,571	136				Mills (1979)
1978		4,480	145				Mills (1980)
1979		3,458	336				Mills (1981a)
1980		4,313	258				Mills (1981b)
1981		4,270	335				Mills (1982)
1982		4,094	509				Mills (1983)
1983		4,518	818				Mills (1984)
1984	922	4,824	673				Mills (1985)
1985	2,112	7,120	336				Mills (1986)
1986	2,870	7,166	494				Mills (1987)
1987	2,321	6,284	454	179			Mills (1988)
1988	2,475	9,550	833	309			Mills (1989)
1989	2,160	6,744	1,086	381			Mills (1990)
1990	2,520	7,884	591	213	5,679		Mills (1991)
1991	1,948	7,587	530	446	2,793		Mills (1992)
1992	2,057	6,626	8	8	2,887	759	Mills (1993)
1993	2,685	8,938	0	0	4,321	1,088	Mills (1994)
1994	2,932	10,099	42	20	3,228	636	Howe et. al. (1995)
1995	2,895	11,155	48	30	2,772	693	Howe et. al. (1996)
1996	^b	10,616	54	31	14,721	3,681	Howe et. al. (2001)

^a Angler effort applies to the entire season and all species.

^b Estimated 2,461 anglers above weir and 2,389 anglers below weir (total for entire river not calculated).

Table 5.—Estimated harvest and total catch of steelhead during the spring and early summer from on-site creel surveys of the Situk River, 1985–1991.

Year	Dates of survey	Angler effort (hrs)	Number of steelhead		Catch per hour	Source
			Total catch	Harvest		
1985	4/29-7/07	10,434 ^a	3,057 ^a	362 ^a	0.29 ^a	Mecum and Suchanek (1986)
1986	4/14-7/06	12,283	2,381	287	0.19	Mecum and Suchanek (1987)
1987	4/06-6/28 ^b	10,542	4,188	391	0.40	Bingham et al (1988)
1988	3/28-7/03	16,379	5,414	423	0.33	Suchanek and Bingham (1989)
1989	4/04-7/02	12,953 ^a	2,416	361	0.19 ^a	Johnson and Marshall (1990)
1990	4/23-5/27	15,661	1,460	321	0.09	Johnson and Marshall (1991)
1991	4/08-7/31	7,087	1,055	0	0.15	Glynn (1992)

^a Data revised in Johnson and Marshall (1991).

^b No survey between 5/26 and 6/14 in 1987.

Table 6.—Reported harvest of steelhead in the Situk River/Ahrnklin River commercial set net fisheries, 1987–1996. Data from ADF&G Commercial Fisheries Division Integrated Fisheries Database (IFDB). Note that spring and fall fisheries operate on separate spawning populations (i.e., the fall fishery harvests spawners of the following year).

Calendar year	Number of steelhead harvested		Annual total
	Spring fishery (stat. weeks 27–32) ^a	Fall fishery (stat. weeks 33–40) ^b	
1987	11	31	42
1988	16	157	173
1989	168	51	219
1990	26	46	72
1991	94	19	113
1992	18	97	115
1993	12	163	175
1994	50	113	163
1995	53	99	152
1996	57	178	235

^a Approximately late June through early August.

^b Approximately early August through early October.

but most effort takes place in the Situk/Ahrnklin lagoon downstream from the mouth of the Situk River, where the commercial fishery also occurs. The number of permits issued has remained relatively stable since 1990 although the number of permits actively fished has ranged from 24 to 111 (Table 7). Yakutat residents receive about 87% of permits issued and represent about 86% of permits fished. This fishery targets chinook and sockeye salmon but pink, chum and coho salmon are also harvested along with up to 25 incidentally harvested steelhead per year. Subsistence harvests from 1990 to 2000 averaged 690 chinook salmon, 3,800 sockeye salmon, 1,600 coho salmon, and fewer than 100 pink and chum salmon per year.

A directed subsistence fishery for steelhead has been permitted in the Situk River since 1997 under State of Alaska regulations but there had been no participation until 2001, when one permit was issued but not fished. The directed fishery was to be managed for an annual guideline harvest level of 300 steelhead.

DISCUSSION

This review of Situk River steelhead data was conducted to identify and correct past errors, compile and archive available data in a central location, and address public concerns regarding historical data. The review of historical data included examination of the high estimate (25,000 to 30,000) of steelhead made in 1952. The sheer magnitude of this estimate, when compared to recent counts, had led to questions about its accuracy. Consequently, the author of the 1952 report was contacted and a detailed verbal description of events during 1952 was received which indicates that the run was correctly documented. A run of this magnitude (25,000) appears to be anomalous given that the run in 1953 was “very small,” especially in light of information that indicates 25% to over 50% of the steelhead run is composed of repeat spawners. The weir was not installed until June 18 in 1951, when up to 3,000 steelhead were “estimated in front of the weir at one time.” Compared to recent run timing, approximately 90 to 95% of the run typically would have emigrated by 18 June. It is possible that emigration was delayed in 1952 and that runs were of similar size in 1951 and 1953, but emigrated prior to weir installation.

Interestingly, the years 1950, 1951, and 1954 were record dry years in Yakutat, when approximately one-half of the annual current average precipitation was recorded (National Oceanic and Atmospheric Administration data). This severe reduction of precipitation likely affected rearing steelhead survival. A similar drought during the summer of 1987 may have been at least partially responsible for the reduced numbers of steelhead noted from 1990 through 1992. The question of what happened to all of the “at-sea” age classes will probably never be known. Therefore, it will probably never be known for certain whether average steelhead run size has declined significantly since the 1950s. Float counts taken during the late 1970s suggest that steelhead run sizes during this period were small (Table 2), relative to runs in the mid-1990s. Given that exploitation of Situk River steelhead is now minimal because of fishing restrictions, it will be interesting to note the effect on run sizes.

Table 7.—Participation in the Yakutat subsistence fishery for salmon and incidental harvests of steelhead, 1990–2000.

Year	Permits issued			Permits fished			Incidental steelhead harvest
	Yakutat residents	Non-local Alaska residents	Total	Yakutat residents	Non-local Alaska residents	Total	
1990	105	11	116	63	4	67	na ^a
1991	115	17	132	17	7	24	0
1992	123	16	139	96	13	109	29
1993	115	15	130	95	10	105	1
1994	125	12	137	92	9	101	21
1995	126	12	138	85	9	94	25
1996	105	19	124	77	12	89	22
1997	108	21	129	71	18	89	25
1998	118	23	141	93	18	111	3
1999	102	20	122	76	13	89	na ^a
2000	114	24	138	89	20	109	11

^a Steelhead harvest estimate not available.

The reasons for any declines in steelhead numbers are unknown; however, studies on Pacific salmon suggest that climactic changes influencing both marine and freshwater productivity and or changes in high seas harvests may be factors in temporal trends in abundance. Harvests of Situk River salmon species decreased significantly since the first half of this century and rebounded somewhat in recent years (Figure 2), a trend common to fisheries throughout Southeast Alaska (Marshall 1992), and it is probable that steelhead abundance over the long term is driven by the same factors driving production of other salmon species.

Interception of salmon and steelhead in high seas drift gillnet fisheries has been blamed for reduced escapements throughout the North Pacific, especially those in central and western Alaska. Interception of Southeast Alaska stocks has been inferred from the presence of net scars on salmon at Auke Creek (Taylor 1985), steelhead at Karta River (Harding and Jones 1993), and steelhead at Sitkoh Creek (Yanusz 1997). Similar anecdotal observations of net marked steelhead were made at the Situk River weir during the mid- to late 1980s when up to one-third of the immigrating steelhead carried gillnet markings at times, even though there

were no local set net fisheries operating (Authors R. Johnson and G. Woods, Alaska Department of Fish and Game, Yakutat, Alaska, personal communication). Under international agreement, high seas fisheries were gradually phased out beginning in 1989, and these actions may have reduced the interception of Southeast Alaska steelhead as noted at Sitkoh Creek (Yanusz 1997). The effects of these events on Situk River steelhead are unknown.

Finally, the gradual uplifting of the Yakutat Foreland (Combellick and Long 1983) and other geophysical events are responsible for some naturally ongoing habitat alterations. Since little historical information on production of steelhead smolts from the Situk River is available, effects of these changes in freshwater environments on steelhead stocks cannot be evaluated.

Indeed, although any one, or all, of these events may have periodically contributed to a decline or increase in abundance of Situk River steelhead, none of them can be accurately measured or their impact assessed. The goal of all future projects conducted on the steelhead stock in the Situk River, is to consistently collect and analyze data that may help to sustain this world-class fishery.

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APPENDIX A:
HISTORICAL DATA, 1930–1960

Appendix A1.—Summary of, and excerpts from, historical annual reports from U.S. Fish and Wildlife Service biologists documenting fisheries work in the Situk River, 1930–1960.

- 1930:** Situk River weir operated, but no mention of steelhead.
1931: Situk River weir operated, but no mention of steelhead.
1932: Report missing.
1933: No mention of weir operation.
1934: W.W. Kinsey, Asst. Agent, Situk River weir operated.

STREAM CLEARANCE AND PREDATORY TROUT CONTROL

"FUND AVAILABLE-----Furnished by Libby, McNeill & Libby \$1500.00

April 26, 1934, sent crew of five men up the Situk River twelve miles above weir camp to remove log jamb. April 30 went up to supervise work. Next day made inspection of upper river. Found little work necessary above jamb. Instructed crew as to further work, returned to Yakutat May 2. Crew returned Yakutat May 5 reporting work completed. Labor cost \$250.00; Powder, fuse, etc \$29.64; Total \$279.64"

"May 7 started construction of series of trout traps in connection with weir on Situk River. Labor by stream guards, time charged to this fund. May 17 placed J. H. Huffman, resident white, on payroll.

These trout are migratory. Downstream run of large ones began May 15. Fair number taken with traps and seine. Due to extreme high water traps out of order and no trout taken May 26 to June 4. June 4 run of large trout finished, heavy run of smaller ones followed closely, and continued until July 10. July 10 moderate run of large ones up stream. A few small ones (down run) and a fair number of large ones (up run) taken until late July. August run too light to justify continuing. Warm weather caused heavy flow of moss in the river making it difficult to keep traps and weir clear. Work discontinued, traps dismantled August 9".

"COSTS

Seines & Nets \$55.72; Trap material \$50.04; Inc \$2.55; Total \$108.31

Labor-May \$156.00; June \$208.50; July \$155.00; Aug \$45.00 Total \$564.50

TROUT TAKEN

May- 5,415; June- 104,735; July- 31,372; Aug- 1,025; Total 142,547 Unit cost 48/100 cents".

"Unused explosives turned over to Libby, McNeill & Libby. Two servicable seines and a large amount of usable wire netting stored in weir cabin. Unused fyke net stored with Libby, McNeill & Libby".

- 1935:** W.W. Kinsey, Asst. Agent, Situk River weir operated.

"Trout traps were operated in conjunction with weir, seines also being used in the destruction of Dolly Varden trout during May, June, and July".

"Libby, McNeill & Libby made an appropriation of \$1000.00 to be used by the Bureau of Fisheries on predatory trout control in Situk River during the year 1935".

"Trout traps were operated in conjunction with weir, seines also being used in the destruction of Dolly Varden trout during May, June and July".

-continued-

1935: (continued)

"The down river migration of these Dolly Varden came on about May 1st and continued until June 10th. From May 20th to June 10th this run was heavy but high water made it impossible to use seines or maintain traps during the major portion of this period".

"The later run of smaller trout was not so heavy and the taking of them was hazardous on account of many salmon fry descending the river at this time. Only the large trout could be taken at this time with safety to the fry, making a very limited catch".

"A still later run, mostly large ones, usually follow the Red salmon run, beginning about June 20th. During this season very poor success was had taking this run due to our inability to segregate the trout from the salmon with almost continuous high water in the river".

"31,012 Dolly Varden trout were destroyed at a cost of \$840.42, slightly less per fish than the amount of the bounty of 2 cents per tail paid at Bristol Bay".

"The past season's experiences have demonstrated pretty well that the only practical time to operate at the weir site is during the down river migration of the large trout in May and June. Later operation at this point is too hazard at this point both as to the costs and danger of destroying salmon fry".

1936: Ralph C. Baker, Acting Asst. Agent, Situk River weir operated, but no mention of steelhead.

1937: William B. Berry, Warden, Situk River weir operated, but no mention of steelhead.

1938: William B. Berry, Warden, Situk River weir operated, but no mention of steelhead.

"Situk River – This stream had its best run of reds it has had for some time. This stream seems to be picking up in its production of red salmon also of kings. This may be due to the Dolly Varden trout control program started in 1924. The escapement this year is the best that has occurred in the past several years".

1939: William B. Berry, Warden

" Dolly Varden Trout seem to be just as numerous this season as ever. It is difficult to get the local residents to take an interest in this work. During the salmon fishing season they are all too busy, and from the time salmon fishing season is ended until freeze up, they have all the money they need. In the spring after the ice breakup, they are busy preparing for the fishing season".

"The following is a summary of Dolly Varden trout taken out of the Yakutat District during 1939"

Date	Area Caught	Number of Trout	Value of Bounty
May	Situk River	2,850	\$ 71.25
June	Situk River	7,408	185.20
July	Situk River	11,376	234.40
August	Italio River	1,473	36.95
September	Situk River	7,142	178.55
		30,254	\$756.35

1940: William B. Berry, Warden, Situk River weir operated, but no mention of steelhead.

There were very few Dolly Varden trout tails turned in for the bounty this season. All residents were informed that there were no funds available to pay a bounty.

1941: Culbertson and Myreboe, Situk River weir operated, but no mention of steelhead.

1942: Emil C. Myreboe, Fishery Patrol Agent, No mention of weir operations

1943: Emil C. Myreboe, Fishery Patrol Agent, Situk River weir operated, but no mention of steelhead. Situk River mouth changed.

1944: Emil C. Myreboe, Fishery Patrol Agent, Situk River weir operated, but no mention of steelhead.

1945: Chris C. Mortensen, Fishery Patrol Agent, Situk weir was operated

"Although many trout have been taken out of the river in the past few years, by anglers of the armed forces from over the territory, there is still an abundance of rainbows and Dolly Varden of all sizes in the stream.

On a fifteen mile trip up the river by canoe, it was noticed that the river banks and deeper holes were full of trout. The rainbows were from twenty inches to thirty inches in length, as many have been caught this season and measured. The largest was 35 and ½ inches".

"Several times during the summer fresh salmon eggs were dropped from the weir and in a very short time the water would be alive with small fish; using a long handled 18" dip net and at each try would get from fifty to one hundred small rainbow and Dolly Varden trout".

"Many Humps spawned in front of the weir and due to low, clear water, a very good observation of the damage done by trout could be seen. A very small percentage of the salmon eggs reached the gravel to be covered.

On three occasions while weir was in operation it was noticed that the Dolly Varden run was equal in numbers to that of Sockeye".

"There has been no bounty on trout since 1939 and the increase has become very noticeable and seems that control measures are necessary".

1946: Chris C. Mortensen, Fishery Patrol Agent, Situk River weir operated.

"There has been no bounty on trout since 1939 and the increase has become very noticeable. During the season there were very few anglers that fished the river".

"During the time that weir was in operation it was noticed that the number of Dolly's was equal to the number of sockeye going thru weir. Many large Dolly's were gilled in sockeye gear by outside fishermen and in the Situk/Ahrnklin inlet".

"Using wire trout trap and baiting with salmon eggs, several hundred small rainbow and dolly varden were taken in few hours".

1947: Chris C. Mortensen, Fishery Patrol Agent, Situk River weir operated.

"It would be hard to estimate the number of trout in the Situk River, but this year have gone all out to get as much information as possible. We think that there is much damage being done to Salmon spawn by Dolly's Rainbow, and Steelhead".

"In using a 4-4-4-ft. trap with tunnel and baiting with fresh salmon eggs, could take several hundred small Dolly's and Rainbows during the day. Many of these were eight inches long or as long as the tunnel would take".

"In feeding fresh salmon eggs off of the weir, it was astonishing to note the amount of food consumed by these small trout".

-continued-

1947: (continued)

"The large rainbows and steelhead would gather in front of the weir about flood tide and have been an estimated number of from three to five hundred idling back and forth. These trout were from twenty to thirty inches in length. A few were caught that measured a little over thirty-five inches".

"During our closed period (July 11 to 27) the Natives wanted to cook fish. Using a six fathom net, placed from weir to shore, 32 were entangled in less than one hour. When cleaned, all contained salmon spawn and a few weighing as much as seven pounds".

"This season several Native canoes made trip up river. All were asked to observe closely for trout. On their return they report that they saw many in river and lake. It is their belief, that the trout are increasing to the extent of being very damaging to Salmon spawn".

"...Situk Channel to change course, moving eastward and emptying into the Ahrnklin several thousand yards from the mouth of the Situk/Ahrnklin Inlet".

1948: Chris C. Mortensen, Fishery Patrol Agent

"The Situk is one of the best sportsman stream in Alaska. During the past season there were many that flew in from Anchorage and Juneau, also anglers from Michigan and South Dakota. Of the many small fish that were checked by use of dip net, it was found Dolly Varden in the majority".

1949: No Report on file

1950: No Report on file

1951: Lawrence Knapp, Fishery Aide, Situk River weir operated.

"The weir had the effect of holding back numerous Steelhead on their way back out to sea after spawning. As high as 3000 Steelhead have been estimated in front of the weir at one time. They are able to escape in large numbers, however, during high water when it is practically impossible to keep sections of the weir from washing out".

"Hoads of Dolly Varden started their upstream migration in the middle of July and continued until the end of the salmon season. If they be classed as predators it would appear that they greatly overbalance the number of salmon that spawn in this river".

1952: Lawrence Knapp, Fishery Management Biologist, Situk River weir operated.

"A large migration of steelhead preceded the sockeye salmon, approximately 25,000 – 30,000 in number leading one to believe that this migration has been mistaken on numerous occasions for an early run of sockeye salmon by the natives".

"The weir had the effect of holding back large numbers of steelhead on their way back to the ocean after spawning. We had to stand on the weir at night with open gates and a lantern shining into the water over the gates before the steelhead would attempt going downstream. Very few would go through the gates headfirst but would allow the current to drift them through tail first. Before we hit upon this scheme we had almost reached the conclusion that they would either have to be seined and brailed over to the other side or remove a shore-most section of the weir. In years before large sections of the weir would wash away on frequent occasions, allowing the steelhead plenty of large holes to migrate downstream through. We were up several times all through the night allowing steelhead to escape downstream. Being curious as to how many passed through the gates during an evening, we made one count. Over 6,000 were counted through during one night. Very few Dolly Varden, as compared with the season before, were seen this season".

-continued-

1952: (continued)

"The weir washed out at approximately 03:00 a.m. September 1... and large trees afloat swept about 2/3 of the weir about a mile and half downstream onto the tide flats and into the ocean. Standing on the riverbank, gazing upon a mangled weir is sufficient to cause a seed of inventiveness to germinate in the least inventive brain. We plan to try out a different type of weir construction for the coming season".

1953: Lawrence Knapp, Fishery Management Biologist, Situk River weir operated.

"Steelhead trout were almost non-existent this season".

1954: Lawrence Knapp, Fishery Management Biologist, Situk River weir operated.

"Very few mature steelhead were in the river again during this season".

1955: Lawrence Knapp, Fishery Management Biologist, Situk River weir operated, with no mention of steelhead.

1956: Lawrence Knapp, Fishery Management Biologist, Situk River weir not installed.

1957: George W. Hewitt, District Fishery Management Supervisor, Situk River weir not installed.

1958: George W. Hewitt, District Fishery Management Supervisor, Situk River weir not installed.

"An earthquake at 9:15 pm July 9th caused severe physical damage from Yakutat Bay to Lituya Bay. In the Situk River there were numerous waterspouts of subterranean origin. There were some channel changes which made the entrance difficult to navigate".

1959: George W. Hewitt, District Fishery Management Supervisor, Situk River weir not installed.

1960: C. L. Anderson, Walter Kirkness, Stanley Swanson, E. J. Huizer, Jim Parker, and Jay Bergstrand, Situk River weir not installed.

**APPENDIX B: COUNTS OF STEELHEAD AT THE
SITUK RIVER WEIR, 1971–1996**

Appendix B1.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1971.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
15-Jun	0	3	3	0	0	nd	nd	6-Aug	0	0	160	0	0	37.8	nd
16-Jun	3	0	6	0	0	nd	nd	7-Aug	0	0	160	0	0	36.3	nd
17-Jun	nd	nd	nd	nd	nd	nd	nd	8-Aug	0	0	160	0	0	35.6	nd
18-Jun	nd	nd	nd	nd	nd	nd	nd	9-Aug	0	0	160	0	0	33.5	nd
19-Jun	nd	nd	nd	nd	nd	nd	nd	10-Aug	0	0	160	0	0	30.5	nd
20-Jun	nd	nd	nd	nd	nd	nd	nd	11-Aug	0	0	160	0	0	30.5	nd
21-Jun	0	0	6	0	0	nd	nd	12-Aug	0	0	160	0	0	30.5	nd
22-Jun	0	2	8	0	0	40.6	9.4	13-Aug	0	0	160	0	0	33.5	nd
23-Jun	10	0	18	0	0	39.9	nd	14-Aug	0	0	160	0	0	36.8	nd
24-Jun	6	0	24	0	0	38.1	nd	15-Aug	0	0	160	0	0	39.6	nd
25-Jun	4	0	28	0	0	36.8	nd	16-Aug	0	0	160	0	0	40.1	nd
26-Jun	0	0	28	0	0	37.6	nd	17-Aug	0	0	160	0	0	40.6	nd
27-Jun	22	0	50	0	0	36.8	nd	18-Aug	0	0	160	0	0	40.6	nd
28-Jun	0	0	50	0	0	36.6	nd	Totals	155	5	160	0	0		
29-Jun	33	0	83	0	0	37.1	nd								
30-Jun	0	0	83	0	0	36.6	nd								
1-Jul	0	0	83	0	0	37.6	nd								
2-Jul	35	0	118	0	0	51.3	nd								
3-Jul	0	0	118	0	0	52.8	nd								
4-Jul	0	0	118	0	0	44.7	nd								
5-Jul	0	0	118	0	0	41.1	nd								
6-Jul	0	0	118	0	0	39.4	10.0								
7-Jul	0	0	118	0	0	38.6	11.1								
8-Jul	0	0	118	0	0	37.6	nd								
9-Jul	0	0	118	0	0	36.8	nd								
10-Jul	6	0	124	0	0	37.3	nd								
11-Jul	4	0	128	0	0	38.6	nd								
12-Jul	3	0	131	0	0	38.1	nd								
13-Jul	0	0	131	0	0	36.1	12.2								
14-Jul	0	0	131	0	0	35.6	nd								
15-Jul	0	0	131	0	0	45.7	nd								
16-Jul	5	0	136	0	0	56.6	nd								
17-Jul	0	0	136	0	0	48.8	nd								
18-Jul	1	0	137	0	0	45.7	nd								
19-Jul	0	0	137	0	0	43.9	nd								
20-Jul	2	0	139	0	0	47.0	nd								
21-Jul	0	0	139	0	0	44.5	nd								
22-Jul	0	0	139	0	0	43.2	nd								
23-Jul	1	0	140	0	0	40.1	nd								
24-Jul	0	0	140	0	0	36.8	13.3								
25-Jul	7	0	147	0	0	55.9	nd								
26-Jul	13	0	160	0	0	92.7	nd								
27-Jul	0	0	160	0	0	72.4	nd								
28-Jul	0	0	160	0	0	71.1	nd								
29-Jul	0	0	160	0	0	70.6	nd								
30-Jul	0	0	160	0	0	70.1	nd								
31-Jul	0	0	160	0	0	58.9	nd								
1-Aug	0	0	160	0	0	48.8	nd								
2-Aug	0	0	160	0	0	45.0	nd								
3-Aug	0	0	160	0	0	43.2	nd								
4-Aug	0	0	160	0	0	42.7	nd								
5-Aug	0	0	160	0	0	41.1	nd								

Appendix B2.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1976.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
10-Jun	0	0	0	1	1	54.6	10.0	1-Aug	1	0	116	0	16	47.0	13.9
11-Jun	0	0	0	0	1	54.6	10.0	2-Aug	0	0	116	0	16	47.0	15.0
12-Jun	0	0	0	0	1	54.6	8.3	3-Aug	0	0	116	0	16	47.0	14.4
13-Jun	0	0	0	0	1	54.6	8.3	4-Aug	0	0	116	0	16	47.0	15.0
14-Jun	3	0	3	2	3	53.3	8.3	5-Aug	0	0	116	0	16	45.7	14.4
15-Jun	2	0	5	0	3	52.1	8.9	6-Aug	0	0	116	0	16	45.7	14.4
16-Jun	8	0	13	1	4	53.3	9.4	7-Aug	0	0	116	0	16	47.0	13.9
17-Jun	1	3	17	0	4	55.9	9.4	8-Aug	0	0	116	0	16	48.3	13.9
18-Jun	23	0	40	4	8	55.9	9.4	9-Aug	0	0	116	0	16	48.3	13.9
19-Jun	0	0	40	0	8	55.9	10.0	10-Aug	0	0	116	0	16	49.5	13.3
20-Jun	7	0	47	3	11	57.2	10.0	11-Aug	1	0	117	0	16	50.8	13.3
21-Jun	1	0	48	0	11	55.9	8.9	12-Aug	0	0	117	0	16	48.3	13.9
22-Jun	3	1	52	2	13	54.6	10.0	13-Aug	0	0	117	0	16	48.3	13.3
23-Jun	1	0	53	0	13	53.3	11.1	14-Aug	0	0	117	0	16	47.0	12.8
24-Jun	17	0	70	0	13	53.3	11.1	15-Aug	0	0	117	0	16	44.5	12.8
25-Jun	13	0	83	0	13	53.3	11.1	16-Aug	0	0	117	0	16	40.6	12.8
26-Jun	0	0	83	1	14	50.8	11.1	17-Aug	0	0	117	0	16	40.6	12.2
27-Jun	3	0	86	0	14	50.8	11.1	18-Aug	0	0	117	0	16	59.7	12.2
28-Jun	5	0	91	0	14	50.8	11.1	19-Aug	0	0	117	0	16	59.7	12.2
29-Jun	2	0	93	0	14	49.5	11.1	20-Aug	0	0	117	0	16	59.7	12.2
30-Jun	0	0	93	1	15	50.8	11.1	Totals	112	5	117	16	16		
1-Jul	4	0	97	0	15	50.8	11.1								
2-Jul	1	0	98	0	15	50.8	11.1								
3-Jul	3	0	101	0	15	50.8	11.1								
4-Jul	3	0	104	0	15	50.8	11.1								
5-Jul	0	0	104	0	15	48.3	12.2								
6-Jul	1	0	105	0	15	48.3	10.5								
7-Jul	1	1	107	0	15	48.3	11.7								
8-Jul	0	0	107	0	15	48.3	12.8								
9-Jul	1	0	108	0	15	48.3	12.2								
10-Jul	0	0	108	0	15	50.8	11.7								
11-Jul	0	0	108	1	16	50.8	13.3								
12-Jul	0	0	108	0	16	50.8	14.4								
13-Jul	0	0	108	0	16	50.8	16.1								
14-Jul	1	0	109	0	16	50.8	12.2								
15-Jul	1	0	110	0	16	49.5	12.2								
16-Jul	1	0	111	0	16	50.8	12.2								
17-Jul	0	0	111	0	16	50.8	11.7								
18-Jul	0	0	111	0	16	50.8	12.2								
19-Jul	0	0	111	0	16	48.3	12.2								
20-Jul	2	0	113	0	16	47.0	12.2								
21-Jul	1	0	114	0	16	50.8	12.2								
22-Jul	1	0	115	0	16	48.3	12.8								
23-Jul	0	0	115	0	16	48.3	12.2								
24-Jul	0	0	115	0	16	48.3	12.2								
25-Jul	0	0	115	0	16	52.1	12.2								
26-Jul	0	0	115	0	16	48.3	12.2								
27-Jul	0	0	115	0	16	52.1	12.2								
28-Jul	0	0	115	0	16	50.8	12.2								
29-Jul	0	0	115	0	16	50.8	12.2								
30-Jul	0	0	115	0	16	49.5	12.2								
31-Jul	0	0	115	0	16	47.0	12.8								

Appendix B3.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1977.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
10-Jun	0	0	0	0	0	45.7	12.0	1-Aug	0	0	17	0	4	43.2	14.0
11-Jun	0	0	0	1	1	44.5	12.0	2-Aug	0	0	17	0	4	43.2	12.5
12-Jun	1	0	1	0	1	44.5	11.0	3-Aug	0	0	17	0	4	43.2	13.0
13-Jun	0	1	2	0	1	44.5	11.0	4-Aug	0	0	17	0	4	43.2	13.0
14-Jun	0	0	2	0	1	44.5	11.0	5-Aug	0	0	17	1	5	41.9	14.0
15-Jun	0	0	2	0	1	43.2	11.0	6-Aug	0	0	17	0	5	41.9	14.5
16-Jun	0	0	2	1	2	43.2	11.5	7-Aug	0	0	17	0	5	41.9	14.0
17-Jun	2	0	4	1	3	43.2	11.0	8-Aug	0	0	17	0	5	40.6	13.5
18-Jun	0	0	4	0	3	45.7	11.5	9-Aug	0	0	17	0	5	40.6	13.0
19-Jun	0	0	4	0	3	47.0	10.0	10-Aug	0	0	17	0	5	41.9	12.5
20-Jun	0	0	4	0	3	50.8	10.5	11-Aug	0	0	17	0	5	54.6	13.0
21-Jun	2	0	6	0	3	49.5	11.0	12-Aug	0	0	17	0	5	53.3	13.0
22-Jun	0	0	6	0	3	48.3	12.0	13-Aug	0	0	17	0	5	50.8	13.0
23-Jun	0	0	6	0	3	49.5	11.5	14-Aug	0	0	17	0	5	47.0	13.0
24-Jun	2	0	8	1	4	48.3	11.0	15-Aug	0	0	17	0	5	45.7	13.0
25-Jun	1	0	9	0	4	45.7	11.5	16-Aug	0	0	17	0	5	44.5	12.0
26-Jun	1	0	10	0	4	45.7	11.5	17-Aug	0	0	17	0	5	43.2	12.0
27-Jun	0	0	10	0	4	45.7	11.5	Totals	16	1	17	5	5		
28-Jun	4	0	14	0	4	48.3	11.5								
29-Jun	0	0	14	0	4	48.3	11.5								
30-Jun	3	0	17	0	4	53.3	11.5								
1-Jul	0	0	17	0	4	53.3	12.5								
2-Jul	0	0	17	0	4	53.3	13.0								
3-Jul	0	0	17	0	4	63.5	13.0								
4-Jul	0	0	17	0	4	73.7	11.5								
5-Jul	0	0	17	0	4	68.6	12.0								
6-Jul	0	0	17	0	4	64.0	12.0								
7-Jul	0	0	17	0	4	62.2	12.0								
8-Jul	0	0	17	0	4	55.9	13.0								
9-Jul	0	0	17	0	4	53.3	13.0								
10-Jul	0	0	17	0	4	52.1	13.0								
11-Jul	0	0	17	0	4	50.8	13.5								
12-Jul	0	0	17	0	4	50.8	14.5								
13-Jul	0	0	17	0	4	49.5	14.0								
14-Jul	0	0	17	0	4	50.8	14.0								
15-Jul	0	0	17	0	4	53.3	13.0								
16-Jul	0	0	17	0	4	53.3	12.5								
17-Jul	0	0	17	0	4	52.1	14.0								
18-Jul	0	0	17	0	4	50.8	15.0								
19-Jul	0	0	17	0	4	49.5	14.0								
20-Jul	0	0	17	0	4	48.3	13.0								
21-Jul	0	0	17	0	4	48.3	12.5								
22-Jul	0	0	17	0	4	47.0	12.0								
23-Jul	0	0	17	0	4	47.0	13.0								
24-Jul	0	0	17	0	4	45.7	13.0								
25-Jul	0	0	17	0	4	44.5	13.0								
26-Jul	0	0	17	0	4	44.5	12.0								
27-Jul	0	0	17	0	4	44.5	13.0								
28-Jul	0	0	17	0	4	43.2	14.0								
29-Jul	0	0	17	0	4	43.2	14.5								
30-Jul	0	0	17	0	4	43.2	13.5								
31-Jul	0	0	17	0	4	43.2	13.5								

Appendix B4.–Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1978.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
6-Jun	0	0	0	0	0	53.3	nd	28-Jul	0	0	32	0	3	45.7	11.0
7-Jun	0	0	0	0	0	50.8	nd	29-Jul	0	0	32	0	3	41.9	12.0
8-Jun	0	0	0	0	0	48.3	11.0	30-Jul	0	0	32	0	3	38.1	13.0
9-Jun	1	0	1	0	0	47.0	10.0	31-Jul	0	0	32	0	3	36.8	13.5
10-Jun	0	0	1	0	0	45.7	10.0	1-Aug	0	0	32	0	3	35.6	14.0
11-Jun	1	0	2	0	0	43.2	11.0	2-Aug	0	0	32	0	3	33.0	15.0
12-Jun	5	0	7	0	0	40.6	11.0	3-Aug	0	0	32	0	3	33.0	14.5
13-Jun	0	0	7	1	1	40.6	11.0	4-Aug	0	0	32	0	3	33.0	14.5
14-Jun	4	0	11	0	1	38.1	11.0	5-Aug	0	0	32	0	3	36.8	14.0
15-Jun	0	0	11	0	1	39.4	11.0	6-Aug	0	0	32	0	3	39.4	14.0
16-Jun	15	0	26	0	1	40.6	11.0	7-Aug	0	0	32	0	3	35.6	14.0
17-Jun	1	0	27	0	1	57.2	10.0	8-Aug	0	0	32	0	3	48.3	14.0
18-Jun	0	0	27	0	1	52.1	11.0	9-Aug	0	0	32	0	3	43.2	14.0
19-Jun	1	0	28	0	1	54.6	11.0	10-Aug	0	0	32	0	3	43.2	13.5
20-Jun	0	0	28	2	3	59.7	11.0	11-Aug	0	0	32	0	3	38.1	14.0
21-Jun	0	0	28	0	3	59.7	11.0	12-Aug	0	0	32	0	3	35.6	14.0
22-Jun	0	0	28	0	3	53.3	12.0	13-Aug	0	0	32	0	3	34.3	13.0
23-Jun	0	0	28	0	3	50.8	12.0	14-Aug	0	0	32	0	3	34.3	13.0
24-Jun	0	0	28	0	3	47.0	11.5	15-Aug	0	0	32	0	3	35.6	13.0
25-Jun	0	0	28	0	3	49.5	11.0	16-Aug	0	0	32	0	3	35.6	13.0
26-Jun	2	0	30	0	3	69.9	11.0	17-Aug	0	0	32	0	3	34.3	13.0
27-Jun	0	0	30	0	3	83.8	10.0	Totals	32	0	32	3	3		
28-Jun	0	0	30	0	3	76.2	11.5								
29-Jun	2	0	32	0	3	69.9	11.0								
30-Jun	0	0	32	0	3	59.7	12.0								
1-Jul	0	0	32	0	3	55.9	11.5								
2-Jul	0	0	32	0	3	61.0	10.0								
3-Jul	0	0	32	0	3	63.5	10.5								
4-Jul	0	0	32	0	3	63.5	11.0								
5-Jul	0	0	32	0	3	57.2	11.0								
6-Jul	0	0	32	0	3	54.6	11.0								
7-Jul	0	0	32	0	3	52.1	12.0								
8-Jul	0	0	32	0	3	48.3	12.0								
9-Jul	0	0	32	0	3	45.7	12.0								
10-Jul	0	0	32	0	3	43.2	12.0								
11-Jul	0	0	32	0	3	41.9	11.5								
12-Jul	0	0	32	0	3	40.6	12.0								
13-Jul	0	0	32	0	3	40.6	11.5								
14-Jul	0	0	32	0	3	40.6	11.0								
15-Jul	0	0	32	0	3	40.6	12.0								
16-Jul	0	0	32	0	3	40.6	11.0								
17-Jul	0	0	32	0	3	40.6	11.5								
18-Jul	0	0	32	0	3	38.1	11.5								
19-Jul	0	0	32	0	3	36.8	12.0								
20-Jul	0	0	32	0	3	39.4	12.0								
21-Jul	0	0	32	0	3	39.4	12.0								
22-Jul	0	0	32	0	3	43.2	11.0								
23-Jul	0	0	32	0	3	47.0	11.0								
24-Jul	0	0	32	0	3	47.0	11.0								
25-Jul	0	0	32	0	3	53.3	11.5								
26-Jul	0	0	32	0	3	49.5	12.0								
27-Jul	0	0	32	0	3	48.3	11.5								

Appendix B5.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1979.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
22-May	29	0	29	0	0	nd	nd	13-Jul	0	0	370	0	60	38.1	13.0
23-May	nd	nd	nd	nd	nd	nd	nd	14-Jul	0	0	370	0	60	40.6	12.5
24-May	nd	nd	nd	nd	nd	nd	nd	15-Jul	0	0	370	0	60	43.2	13.0
25-May	nd	nd	nd	nd	nd	nd	nd	16-Jul	0	0	370	0	60	38.1	11.0
26-May	nd	nd	nd	nd	nd	nd	nd	17-Jul	0	0	370	0	60	39.4	12.5
27-May	nd	nd	nd	nd	nd	nd	nd	18-Jul	0	0	370	0	60	64.8	12.0
28-May	nd	nd	nd	nd	nd	nd	nd	19-Jul	0	0	370	0	60	71.1	13.0
29-May	nd	nd	nd	nd	nd	nd	nd	20-Jul	0	0	370	0	60	69.9	13.0
30-May	nd	nd	nd	nd	nd	nd	nd	21-Jul	0	0	370	0	60	63.5	13.0
31-May	nd	nd	nd	nd	nd	nd	nd	22-Jul	0	0	370	0	60	58.4	14.0
1-Jun	0	0	29	0	0	36.8	8.0	23-Jul	0	0	370	0	60	55.9	13.0
2-Jun	3	0	32	5	5	41.9	8.0	24-Jul	0	0	370	0	60	50.8	13.0
3-Jun	8	0	40	8	13	43.2	8.0	25-Jul	0	0	370	0	60	44.5	13.0
4-Jun	2	0	42	8	21	41.9	8.0	26-Jul	0	0	370	0	60	40.6	13.5
5-Jun	3	0	45	2	23	40.6	9.0	27-Jul	0	0	370	0	60	38.1	13.5
6-Jun	4	0	49	5	28	40.6	9.0	28-Jul	0	0	370	0	60	35.6	13.0
7-Jun	14	0	63	8	36	43.2	9.0	29-Jul	0	0	370	0	60	33.0	13.0
8-Jun	25	0	88	3	39	40.6	8.5	30-Jul	0	0	370	0	60	30.5	13.0
9-Jun	6	0	94	1	40	38.1	9.0	31-Jul	0	0	370	0	60	30.5	13.0
10-Jun	32	0	126	2	42	36.8	9.0	1-Aug	0	0	370	0	60	29.2	13.0
11-Jun	15	0	141	4	46	36.8	9.0	2-Aug	0	0	370	0	60	29.2	13.0
12-Jun	7	0	148	2	48	34.3	9.5	3-Aug	0	0	370	0	60	27.9	13.0
13-Jun	37	0	185	4	52	33.0	9.5	4-Aug	0	0	370	0	60	27.9	13.0
14-Jun	29	0	214	3	55	33.0	9.5	5-Aug	0	0	370	0	60	27.9	13.0
15-Jun	20	0	234	4	59	31.8	10.0	6-Aug	0	0	370	0	60	25.4	13.0
16-Jun	1	0	235	1	60	30.5	11.0	7-Aug	0	0	370	0	60	25.4	13.0
17-Jun	7	0	242	0	60	30.5	10.0	8-Aug	0	0	370	0	60	26.7	13.0
18-Jun	0	0	242	0	60	30.5	10.0	9-Aug	0	0	370	0	60	27.9	13.0
19-Jun	1	0	243	0	60	30.5	11.0	10-Aug	0	0	370	0	60	27.9	13.0
20-Jun	6	0	249	0	60	30.5	10.5	11-Aug	0	0	370	0	60	27.9	13.0
21-Jun	12	0	261	0	60	29.2	10.5	12-Aug	0	0	370	0	60	26.7	12.0
22-Jun	3	0	264	0	60	29.2	10.5	13-Aug	0	0	370	0	60	25.4	12.0
23-Jun	8	0	272	0	60	27.9	11.5	14-Aug	0	0	370	0	60	25.4	12.0
24-Jun	2	0	274	0	60	27.9	11.0	15-Aug	0	0	370	0	60	25.4	12.0
25-Jun	0	0	274	0	60	27.9	10.5	16-Aug	0	0	370	0	60	30.5	13.0
26-Jun	60	0	334	0	60	30.5	11.0	Totals	370	0	370	60	60		
27-Jun	18	0	352	0	60	38.1	10.0								
28-Jun	18	0	370	0	60	nd	10.0								
29-Jun	0	0	370	0	60	66.0	10.0								
30-Jun	0	0	370	0	60	55.9	11.0								
1-Jul	0	0	370	0	60	49.5	12.0								
2-Jul	0	0	370	0	60	44.5	12.0								
3-Jul	0	0	370	0	60	39.4	13.5								
4-Jul	0	0	370	0	60	38.1	13.0								
5-Jul	0	0	370	0	60	35.6	13.0								
6-Jul	0	0	370	0	60	43.2	12.0								
7-Jul	0	0	370	0	60	59.7	12.0								
8-Jul	0	0	370	0	60	55.9	13.0								
9-Jul	0	0	370	0	60	50.8	13.0								
10-Jul	0	0	370	0	60	47.0	13.0								
11-Jul	0	0	370	0	60	44.5	13.0								
12-Jul	0	0	370	0	60	40.6	13.5								

Appendix B6.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1980.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
29-May	5	0	5	0	0	27.9	nd	20-Jul	0	0	340	0	58	22.9	12.0
30-May	0	0	5	0	0	34.3	nd	21-Jul	0	0	340	0	58	22.9	12.0
31-May	1	0	6	4	4	34.3	nd	22-Jul	0	0	340	0	58	22.9	13.0
1-Jun	0	0	6	0	4	34.3	nd	23-Jul	0	0	340	0	58	22.9	13.5
2-Jun	3	0	9	4	8	33.0	nd	24-Jul	0	0	340	0	58	20.3	12.5
3-Jun	4	0	13	11	19	31.8	nd	25-Jul	0	0	340	0	58	20.3	12.5
4-Jun	18	0	31	7	26	30.5	nd	26-Jul	0	0	340	0	58	22.9	13.0
5-Jun	8	0	39	2	28	30.5	nd	27-Jul	0	0	340	0	58	22.9	12.5
6-Jun	6	0	45	0	28	30.5	12.5	28-Jul	0	0	340	0	58	33.0	12.5
7-Jun	46	0	91	12	40	30.5	13.0	29-Jul	0	0	340	0	58	57.2	12.0
8-Jun	38	0	129	4	44	30.5	13.5	Totals	333	7	340	58	58		
9-Jun	14	0	143	1	45	30.5	13.0								
10-Jun	8	1	152	2	47	30.5	12.0								
11-Jun	4	2	158	0	47	33.0	12.0								
12-Jun	7	2	167	0	47	33.0	12.0								
13-Jun	88	0	255	5	52	36.8	10.5								
14-Jun	1	0	256	0	52	36.8	11.0								
15-Jun	1	0	257	0	52	36.8	12.0								
16-Jun	0	0	257	0	52	33.0	11.5								
17-Jun	0	0	257	0	52	34.3	11.0								
18-Jun	4	0	261	0	52	33.0	10.0								
19-Jun	3	0	264	0	52	33.0	9.0								
20-Jun	1	0	265	3	55	30.5	10.0								
21-Jun	11	0	276	1	56	31.8	10.0								
22-Jun	3	0	279	0	56	27.9	10.0								
23-Jun	8	2	289	0	56	27.9	11.0								
24-Jun	21	0	310	1	57	27.9	10.0								
25-Jun	3	0	313	1	58	25.4	11.0								
26-Jun	0	0	313	0	58	25.4	11.5								
27-Jun	4	0	317	0	58	25.4	11.0								
28-Jun	1	0	318	0	58	25.4	11.5								
29-Jun	0	0	318	0	58	25.4	11.5								
30-Jun	0	0	318	0	58	25.4	11.0								
1-Jul	3	0	321	0	58	25.4	11.0								
2-Jul	1	0	322	0	58	25.4	11.0								
3-Jul	0	0	322	0	58	25.4	10.0								
4-Jul	0	0	322	0	58	25.4	11.0								
5-Jul	0	0	322	0	58	22.9	11.5								
6-Jul	8	0	330	0	58	22.9	11.5								
7-Jul	0	0	330	0	58	22.9	13.0								
8-Jul	0	0	330	0	58	20.3	12.0								
9-Jul	0	0	330	0	58	22.9	12.0								
10-Jul	3	0	333	0	58	22.9	12.0								
11-Jul	0	0	333	0	58	22.9	12.0								
12-Jul	3	0	336	0	58	22.9	12.0								
13-Jul	4	0	340	0	58	25.4	12.0								
14-Jul	0	0	340	0	58	26.7	13.0								
15-Jul	0	0	340	0	58	26.7	13.0								
16-Jul	0	0	340	0	58	25.4	13.0								
17-Jul	0	0	340	0	58	25.4	12.0								
18-Jul	0	0	340	0	58	25.4	12.0								
19-Jul	0	0	340	0	58	25.4	11.0								

Appendix B7.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1981.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
1-Jun	0	0	0	0	0	50.8	10.0	23-Jul	0	0	6	0	4	nd	nd
2-Jun	0	0	0	0	0	50.8	10.0	24-Jul	0	0	6	0	4	nd	nd
3-Jun	0	0	0	0	0	49.5	nd	25-Jul	0	0	6	0	4	nd	nd
4-Jun	0	0	0	0	0	48.3	11.0	26-Jul	0	0	6	0	4	nd	nd
5-Jun	0	0	0	0	0	48.3	11.0	27-Jul	0	0	6	0	4	nd	nd
6-Jun	0	0	0	1	1	48.3	11.0	28-Jul	0	0	6	0	4	nd	nd
7-Jun	0	0	0	0	1	49.5	12.0	29-Jul	0	0	6	0	4	nd	nd
8-Jun	0	0	0	0	1	47.2	11.5	30-Jul	0	0	6	0	4	nd	nd
9-Jun	0	0	0	1	2	47.0	11.0	31-Jul	0	0	6	0	4	nd	nd
10-Jun	0	0	0	1	3	45.7	12.0	1-Aug	0	0	6	0	4	55.9	12.0
11-Jun	0	0	0	0	3	45.7	11.5	2-Aug	0	0	6	0	4	57.2	12.0
12-Jun	0	0	0	0	3	45.7	12.0	3-Aug	0	0	6	0	4	59.7	12.5
13-Jun	0	0	0	0	3	45.7	12.0	4-Aug	0	0	6	0	4	59.7	10.5
14-Jun	0	0	0	0	3	47.0	11.0	5-Aug	0	0	6	0	4	62.2	11.0
15-Jun	0	0	0	0	3	47.0	11.0	6-Aug	0	0	6	0	4	62.2	11.0
16-Jun	0	0	0	0	3	47.0	11.0	7-Aug	0	0	6	0	4	Flood	11.0
17-Jun	0	0	0	0	3	45.7	11.0	8-Aug	0	0	6	0	4	nd	11.0
18-Jun	0	0	0	0	3	45.7	11.5	9-Aug	0	0	6	0	4	nd	13.0
19-Jun	1	0	1	0	3	45.7	11.5	10-Aug	0	0	6	0	4	nd	13.0
20-Jun	5	0	6	0	3	58.4	11.0	11-Aug	0	0	6	0	4	nd	13.0
21-Jun	0	0	6	0	3	101.6	12.0	12-Aug	0	0	6	0	4	nd	13.0
22-Jun	0	0	6	0	3	nd	nd	13-Aug	0	0	6	0	4	nd	13.0
23-Jun	0	0	6	0	3	nd	nd	14-Aug	0	0	6	0	4	nd	13.0
24-Jun	0	0	6	0	3	flood	nd	15-Aug	0	0	6	0	4	nd	13.0
25-Jun	0	0	6	0	3	nd	nd	Totals	6	0	6	4	4		
26-Jun	0	0	6	0	3	114.3	12.0								
27-Jun	0	0	6	0	3	106.7	11.5								
28-Jun	0	0	6	0	3	114.3	11.5								
29-Jun	0	0	6	0	3	94.0	11.5								
30-Jun	0	0	6	0	3	83.8	11.5								
1-Jul	0	0	6	0	3	76.2	12.0								
2-Jul	0	0	6	0	3	74.9	12.0								
3-Jul	0	0	6	0	3	72.4	13.0								
4-Jul	0	0	6	0	3	68.6	13.0								
5-Jul	0	0	6	0	3	63.5	12.5								
6-Jul	0	0	6	0	3	61.0	12.5								
7-Jul	0	0	6	0	3	61.0	12.5								
8-Jul	0	0	6	0	3	59.7	12.5								
9-Jul	0	0	6	0	3	59.7	12.5								
10-Jul	0	0	6	0	3	58.4	13.0								
11-Jul	0	0	6	0	3	55.9	12.5								
12-Jul	0	0	6	0	3	54.6	13.0								
13-Jul	0	0	6	0	3	53.3	13.0								
14-Jul	0	0	6	0	3	52.1	12.5								
15-Jul	0	0	6	0	3	55.9	12.0								
16-Jul	0	0	6	0	3	61.0	12.5								
17-Jul	0	0	6	0	3	68.6	12.0								
18-Jul	0	0	6	0	3	66.0	13.0								
19-Jul	0	0	6	0	3	63.5	12.5								
20-Jul	0	0	6	0	3	62.2	12.5								
21-Jul	0	0	6	1	4	58.4	12.0								
22-Jul	0	0	6	0	4	nd	nd								

Appendix B8.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1982. Jones (1983) reports that the 1982 upstream migrant count at the weir was 907 of which 138 were tagged with red Peterson disc tags; therefore the 138 fish upstream migrant count presented here may be in error.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
12-May	0	0	0	0	0	nd	nd	3-Jul	0	0	1,815	0	138	44.5	11.0
13-May	0	0	0	8	8	nd	nd	4-Jul	0	0	1,815	0	138	43.2	11.0
14-May	0	0	0	5	13	nd	nd	5-Jul	4	0	1,819	0	138	43.2	11.5
15-May	0	0	0	12	25	nd	2.0	6-Jul	0	0	1,819	1	139	40.6	11.5
16-May	0	0	0	16	41	nd	2.0	7-Jul	0	0	1,819	0	139	40.6	12.0
17-May	0	0	0	10	51	48.3	3.5	8-Jul	0	0	1,819	0	139	39.4	12.0
18-May	0	0	0	21	72	49.5	3.5	9-Jul	0	0	1,819	0	139	38.1	12.0
19-May	0	0	0	14	86	52.1	3.5	10-Jul	0	0	1,819	0	139	38.1	12.0
20-May	1	0	1	5	91	54.6	4.0	11-Jul	0	0	1,819	0	139	38.1	12.0
21-May	11	0	12	10	101	55.9	4.0	12-Jul	5	0	1,824	0	139	38.1	12.0
22-May	0	0	12	12	113	52.1	4.0	13-Jul	0	0	1,824	0	139	36.8	11.0
23-May	17	0	29	10	123	50.8	4.0	14-Jul	0	0	1,824	0	139	36.8	11.0
24-May	8	0	37	7	130	64.8	4.0	15-Jul	1	0	1,825	0	139	35.6	12.0
25-May	1	0	38	0	130	58.4	4.0	16-Jul	0	0	1,825	0	139	35.6	11.0
26-May	1	0	39	7	137	53.3	4.0	17-Jul	0	0	1,825	0	139	38.1	11.0
27-May	0	0	39	1	138	50.8	5.0	18-Jul	0	0	1,825	0	139	39.4	11.0
28-May	21	0	60	0	138	49.5	5.0	19-Jul	1	0	1,826	0	139	40.6	11.0
29-May	12	0	72	0	138	45.7	6.0	20-Jul	0	0	1,826	0	139	40.6	11.0
30-May	12	0	84	0	138	43.2	8.0	21-Jul	0	0	1,826	0	139	39.4	12.0
31-May	30	0	114	0	138	40.6	12.0	22-Jul	0	0	1,826	0	139	36.8	12.0
1-Jun	20	0	134	0	138	40.6	11.0	23-Jul	0	0	1,826	0	139	36.8	12.0
2-Jun	27	2	163	0	138	43.2	10.0	24-Jul	0	0	1,826	0	139	35.6	12.0
3-Jun	61	1	225	0	138	43.2	10.0	25-Jul	1	0	1,827	0	139	35.6	12.0
4-Jun	31	0	256	0	138	43.2	9.0	26-Jul	0	0	1,827	0	139	35.6	12.0
5-Jun	91	0	347	0	138	41.9	9.0	27-Jul	0	0	1,827	0	139	34.3	12.0
6-Jun	321	0	668	0	138	40.6	8.5	28-Jul	0	0	1,827	0	139	34.3	12.0
7-Jun	7	0	675	0	138	40.6	8.5	29-Jul	0	0	1,827	0	139	33.0	12.0
8-Jun	201	0	876	0	138	39.4	9.0	30-Jul	1	0	1,828	0	139	35.6	12.0
9-Jun	97	1	974	0	138	39.4	10.0	31-Jul	0	0	1,828	0	139	36.8	12.0
10-Jun	49	0	1,023	0	138	39.4	9.5	1-Aug	0	0	1,828	0	139	35.6	12.0
11-Jun	518	6	1,547	0	138	40.6	9.0	2-Aug	0	0	1,828	0	139	35.6	12.0
12-Jun	8	0	1,555	0	138	50.8	9.0	3-Aug	0	0	1,828	0	139	34.3	11.0
13-Jun	26	0	1,581	0	138	50.8	9.0	4-Aug	0	0	1,828	0	139	34.3	12.0
14-Jun	10	0	1,591	0	138	50.8	9.5	5-Aug	0	0	1,828	0	139	33.0	12.0
15-Jun	130	0	1,721	0	138	52.1	9.5	6-Aug	0	0	1,828	0	139	35.6	12.0
16-Jun	2	1	1,724	0	138	50.8	9.5	7-Aug	0	0	1,828	0	139	35.6	12.0
17-Jun	0	0	1,724	0	138	49.5	9.0	8-Aug	2	0	1,830	0	139	38.1	12.0
18-Jun	17	0	1,741	0	138	50.8	9.0	9-Aug	0	0	1,830	0	139	44.5	12.0
19-Jun	30	0	1,771	0	138	69.9	10.0	10-Aug	0	0	1,830	0	139	41.9	11.0
20-Jun	0	0	1,771	0	138	68.6	10.0	11-Aug	0	0	1,830	0	139	39.4	11.0
21-Jun	0	0	1,771	0	138	66.0	10.0	12-Aug	0	0	1,830	0	139	39.4	11.0
22-Jun	3	0	1,774	0	138	62.2	10.0	13-Aug	0	0	1,830	0	139	38.1	12.0
23-Jun	7	0	1,781	0	138	57.2	10.0	14-Aug	0	0	1,830	0	139	36.8	12.0
24-Jun	24	0	1,805	0	138	53.3	11.0	15-Aug	0	0	1,830	0	139	36.8	12.0
25-Jun	1	0	1,806	0	138	53.3	12.0	16-Aug	0	0	1,830	0	139	36.8	12.0
26-Jun	1	1	1,808	0	138	50.8	12.0	17-Aug	0	0	1,830	0	139	35.6	12.0
27-Jun	5	0	1,813	0	138	50.8	13.0	18-Aug	0	0	1,830	0	139	34.3	11.0
28-Jun	0	0	1,813	0	138	49.5	12.0	Totals	1,818	12	1,830	139	139		
29-Jun	2	0	1,815	0	138	48.3	12.0								
30-Jun	0	0	1,815	0	138	45.7	12.0								
1-Jul	0	0	1,815	0	138	47.0	11.5								
2-Jul	0	0	1,815	0	138	45.7	10.0								

Appendix B9.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1983.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
17-Jun	0	0	0	1	1	41.9	13.0	8-Aug	0	0	18	0	7	38.1	12.0
18-Jun	0	0	0	1	2	41.9	11.0	9-Aug	0	0	18	0	7	43.2	12.0
19-Jun	1	0	1	0	2	40.6	12.0	10-Aug	0	0	18	0	7	43.2	12.0
20-Jun	0	0	1	0	2	40.6	12.0	11-Aug	0	0	18	0	7	45.7	12.0
21-Jun	0	0	1	1	3	39.4	11.5	12-Aug	0	0	18	0	7	50.8	12.5
22-Jun	1	0	2	1	4	39.4	11.0	13-Aug	0	0	18	0	7	45.7	12.0
23-Jun	1	0	3	1	5	38.1	11.0	14-Aug	0	0	18	0	7	50.8	12.0
24-Jun	1	0	4	2	7	38.1	11.5	15-Aug	0	0	18	0	7	61.0	11.0
25-Jun	0	0	4	0	7	36.8	12.0	16-Aug	0	0	18	0	7	58.4	11.0
26-Jun	0	0	4	0	7	36.8	12.5	Totals	18	0	18	7	7		
27-Jun	0	0	4	0	7	35.6	12.0								
28-Jun	0	0	4	0	7	36.8	12.0								
29-Jun	0	0	4	0	7	35.6	12.5								
30-Jun	0	0	4	0	7	35.6	12.0								
1-Jul	1	0	5	0	7	36.8	12.0								
2-Jul	0	0	5	0	7	36.8	12.0								
3-Jul	1	0	6	0	7	35.6	13.0								
4-Jul	0	0	6	0	7	36.8	13.0								
5-Jul	7	0	13	0	7	35.6	13.0								
6-Jul	1	0	14	0	7	38.1	12.5								
7-Jul	0	0	14	0	7	38.1	11.5								
8-Jul	0	0	14	0	7	38.1	13.0								
9-Jul	0	0	14	0	7	38.1	11.5								
10-Jul	0	0	14	0	7	38.1	12.0								
11-Jul	2	0	16	0	7	38.1	11.5								
12-Jul	1	0	17	0	7	38.1	11.5								
13-Jul	0	0	17	0	7	38.1	12.0								
14-Jul	0	0	17	0	7	38.1	12.0								
15-Jul	0	0	17	0	7	36.8	11.0								
16-Jul	0	0	17	0	7	35.6	13.0								
17-Jul	0	0	17	0	7	34.3	13.0								
18-Jul	0	0	17	0	7	35.6	12.5								
19-Jul	0	0	17	0	7	35.6	12.5								
20-Jul	0	0	17	0	7	35.6	12.5								
21-Jul	0	0	17	0	7	35.6	12.0								
22-Jul	1	0	18	0	7	36.8	12.5								
23-Jul	0	0	18	0	7	40.6	12.0								
24-Jul	0	0	18	0	7	38.1	12.0								
25-Jul	0	0	18	0	7	38.1	13.0								
26-Jul	0	0	18	0	7	36.8	12.5								
27-Jul	0	0	18	0	7	35.6	12.5								
28-Jul	0	0	18	0	7	34.3	13.0								
29-Jul	0	0	18	0	7	33.0	13.0								
30-Jul	0	0	18	0	7	33.0	12.5								
31-Jul	0	0	18	0	7	33.0	12.5								
1-Aug	0	0	18	0	7	33.0	12.0								
2-Aug	0	0	18	0	7	30.5	12.5								
3-Aug	0	0	18	0	7	30.5	13.0								
4-Aug	0	0	18	0	7	29.2	12.5								
5-Aug	0	0	18	0	7	30.5	12.5								
6-Aug	0	0	18	0	7	40.6	11.5								
7-Aug	0	0	18	0	7	39.4	12.0								

Appendix B10.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1984.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
5-Jun	19	0	19	11	11	nd	nd	27-Jul	0	0	46	0	13	nd	11.0
6-Jun	nd	nd	nd	nd	nd	nd	nd	28-Jul	0	0	46	0	13	nd	11.0
7-Jun	nd	nd	nd	nd	nd	nd	nd	29-Jul	0	0	46	0	13	nd	11.5
8-Jun	0	0	19	0	11	nd	nd	30-Jul	0	0	46	0	13	nd	11.0
9-Jun	nd	nd	nd	nd	nd	nd	nd	31-Jul	0	0	46	0	13	nd	11.0
10-Jun	nd	nd	nd	nd	nd	nd	nd	1-Aug	0	0	46	0	13	nd	12.0
11-Jun	nd	nd	nd	nd	nd	nd	nd	2-Aug	0	0	46	0	13	nd	11.0
12-Jun	nd	nd	nd	nd	nd	nd	nd	3-Aug	0	0	46	0	13	nd	11.5
13-Jun	nd	nd	nd	nd	nd	nd	nd	4-Aug	0	0	46	0	13	nd	12.0
14-Jun	nd	nd	nd	nd	nd	nd	nd	5-Aug	0	0	46	0	13	nd	12.0
15-Jun	nd	nd	nd	nd	nd	nd	nd	6-Aug	0	0	46	0	13	nd	12.0
16-Jun	nd	nd	nd	nd	nd	nd	nd	7-Aug	1	0	47	0	13	nd	12.0
17-Jun	nd	nd	nd	nd	nd	nd	nd	8-Aug	0	0	47	0	13	nd	11.0
18-Jun	nd	nd	nd	nd	nd	nd	nd	9-Aug	1	0	48	0	13	nd	12.0
19-Jun	nd	nd	nd	nd	nd	nd	nd	10-Aug	0	0	48	0	13	nd	12.0
20-Jun	13	0	32	0	11	nd	11.0	11-Aug	0	0	48	0	13	nd	12.0
21-Jun	1	0	33	0	11	nd	12.5	12-Aug	1	0	49	0	13	nd	13.0
22-Jun	2	0	35	0	11	nd	12.0	13-Aug	0	0	49	0	13	nd	12.0
23-Jun	0	0	35	1	12	nd	12.0	14-Aug	0	0	49	0	13	nd	12.0
24-Jun	0	0	35	0	12	nd	12.0	15-Aug	0	0	49	0	13	nd	12.0
25-Jun	1	0	36	0	12	nd	12.0	16-Aug	0	0	49	0	13	nd	12.0
26-Jun	0	0	36	0	12	nd	12.0	17-Aug	1	0	50	0	13	nd	12.0
27-Jun	0	0	36	1	13	nd	11.0	18-Aug	0	0	50	0	13	nd	12.0
28-Jun	3	0	39	0	13	nd	11.0	Totals	50	0	50	13	13		
29-Jun	0	0	39	0	13	nd	11.0								
30-Jun	0	0	39	0	13	nd	11.0								
1-Jul	0	0	39	0	13	nd	11.0								
2-Jul	0	0	39	0	13	nd	11.0								
3-Jul	0	0	39	0	13	nd	11.0								
4-Jul	0	0	39	0	13	nd	11.0								
5-Jul	0	0	39	0	13	nd	11.0								
6-Jul	0	0	39	0	13	nd	11.0								
7-Jul	0	0	39	0	13	nd	12.0								
8-Jul	0	0	39	0	13	nd	12.0								
9-Jul	6	0	45	0	13	nd	12.0								
10-Jul	0	0	45	0	13	nd	12.0								
11-Jul	1	0	46	0	13	nd	12.5								
12-Jul	0	0	46	0	13	nd	12.5								
13-Jul	0	0	46	0	13	nd	12.5								
14-Jul	0	0	46	0	13	nd	13.0								
15-Jul	0	0	46	0	13	nd	13.0								
16-Jul	0	0	46	0	13	nd	13.0								
17-Jul	0	0	46	0	13	nd	11.0								
18-Jul	0	0	46	0	13	nd	11.0								
19-Jul	0	0	46	0	13	nd	11.0								
20-Jul	0	0	46	0	13	nd	12.0								
21-Jul	0	0	46	0	13	nd	12.0								
22-Jul	0	0	46	0	13	nd	12.0								
23-Jul	0	0	46	0	13	nd	12.0								
24-Jul	0	0	46	0	13	nd	11.5								
25-Jul	0	0	46	0	13	nd	11.0								
26-Jul	0	0	46	0	13	nd	11.0								

Appendix B11.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1985.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
17-Jun	21	0	21	1	1	nd	nd	8-Aug	0	0	891	0	1	nd	12.0
18-Jun	0	0	21	0	1	nd	nd	9-Aug	0	0	891	0	1	nd	12.0
19-Jun	69	0	90	0	1	nd	nd	10-Aug	0	0	891	0	1	nd	12.0
20-Jun	38	0	128	0	1	nd	nd	11-Aug	0	0	891	0	1	nd	12.0
21-Jun	31	0	159	0	1	nd	nd	12-Aug	0	0	891	0	1	nd	12.0
22-Jun	25	0	184	0	1	nd	nd	13-Aug	0	0	891	0	1	nd	12.0
23-Jun	29	0	213	0	1	nd	nd	14-Aug	0	0	891	0	1	nd	12.0
24-Jun	198	0	411	0	1	nd	nd	15-Aug	0	0	891	0	1	nd	12.0
25-Jun	109	0	520	0	1	nd	nd	16-Aug	0	0	891	0	1	nd	12.0
26-Jun	51	0	571	0	1	nd	8.0	Totals	891	0	891	1	1		
27-Jun	0	0	571	0	1	nd	8.0								
28-Jun	0	0	571	0	1	nd	8.0								
29-Jun	0	0	571	0	1	nd	8.0								
30-Jun	13	0	584	0	1	nd	10.0								
1-Jul	0	0	584	0	1	nd	10.0								
2-Jul	0	0	584	0	1	nd	10.0								
3-Jul	5	0	589	0	1	nd	10.0								
4-Jul	1	0	590	0	1	nd	10.0								
5-Jul	38	0	628	0	1	nd	10.0								
6-Jul	6	0	634	0	1	nd	10.0								
7-Jul	17	0	651	0	1	nd	10.0								
8-Jul	2	0	653	0	1	nd	10.0								
9-Jul	6	0	659	0	1	nd	10.5								
10-Jul	0	0	659	0	1	nd	10.5								
11-Jul	26	0	685	0	1	nd	11.0								
12-Jul	2	0	687	0	1	nd	11.0								
13-Jul	0	0	687	0	1	nd	11.0								
14-Jul	1	0	688	0	1	nd	11.0								
15-Jul	2	0	690	0	1	nd	11.0								
16-Jul	0	0	690	0	1	nd	12.0								
17-Jul	0	0	690	0	1	nd	12.0								
18-Jul	43	0	733	0	1	nd	12.0								
19-Jul	1	0	734	0	1	nd	12.0								
20-Jul	153	0	887	0	1	nd	12.0								
21-Jul	0	0	887	0	1	nd	12.0								
22-Jul	1	0	888	0	1	nd	12.0								
23-Jul	3	0	891	0	1	nd	12.0								
24-Jul	0	0	891	0	1	nd	12.0								
25-Jul	0	0	891	0	1	nd	12.0								
26-Jul	0	0	891	0	1	nd	12.0								
27-Jul	0	0	891	0	1	nd	12.0								
28-Jul	0	0	891	0	1	nd	12.0								
29-Jul	0	0	891	0	1	nd	12.0								
30-Jul	0	0	891	0	1	nd	12.0								
31-Jul	0	0	891	0	1	nd	12.0								
1-Aug	0	0	891	0	1	nd	12.0								
2-Aug	0	0	891	0	1	nd	12.0								
3-Aug	0	0	891	0	1	nd	12.0								
4-Aug	0	0	891	0	1	nd	12.0								
5-Aug	0	0	891	0	1	nd	11.5								
6-Aug	0	0	891	0	1	nd	11.5								
7-Aug	0	0	891	0	1	nd	11.5								

Appendix B12.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1986.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
4-Jun	0	0	0	0	0	nd	nd	26-Jul	15	0	221	0	38	4.9	12.0
5-Jun	0	0	0	0	0	15.2	10.0	27-Jul	0	0	221	0	38	14.0	10.5
6-Jun	0	0	0	0	0	13.4	8.5	28-Jul	0	0	221	0	38	12.2	11.5
7-Jun	0	0	0	0	0	12.2	9.0	29-Jul	0	0	221	0	38	9.1	13.0
8-Jun	0	0	0	0	0	20.1	8.0	30-Jul	0	0	221	0	38	6.4	12.5
9-Jun	35	0	35	0	0	37.2	8.0	31-Jul	0	0	221	0	38	3.7	12.0
10-Jun	7	0	42	0	0	41.1	8.0	1-Aug	0	0	221	0	38	1.5	12.0
11-Jun	17	0	59	6	6	41.8	8.0	2-Aug	0	0	221	0	38	0.9	12.0
12-Jun	8	0	67	2	8	36.6	8.0	3-Aug	0	0	221	0	38	1.5	12.0
13-Jun	5	0	72	0	8	29.9	9.0	4-Aug	0	0	221	0	38	18.9	12.0
14-Jun	7	0	79	5	13	24.4	11.5	5-Aug	0	0	221	0	38	17.4	12.0
15-Jun	5	0	84	4	17	21.3	9.5	6-Aug	0	0	221	0	38	20.7	11.5
16-Jun	19	0	103	3	20	19.5	10.0	7-Aug	0	0	221	0	38	24.4	11.5
17-Jun	3	0	106	0	20	17.7	10.5	8-Aug	0	0	221	0	38	21.6	12.0
18-Jun	0	0	106	4	24	16.2	10.0	9-Aug	0	0	221	0	38	65.5	11.5
19-Jun	13	0	119	3	27	14.0	10.0	10-Aug	0	0	221	0	38	58.2	12.0
20-Jun	8	0	127	0	27	12.8	10.0	11-Aug	0	0	221	0	38	62.5	12.0
21-Jun	3	0	130	0	27	11.6	9.5	12-Aug	0	0	221	0	38	53.0	12.0
22-Jun	0	0	130	1	28	12.2	9.0	13-Aug	0	0	221	0	38	50.3	12.0
23-Jun	53	0	183	1	29	20.1	9.0	14-Aug	0	0	221	0	38	43.3	11.5
24-Jun	1	0	184	0	29	21.3	9.0	15-Aug	0	0	221	0	38	35.7	11.0
25-Jun	1	0	185	0	29	20.4	9.0	16-Aug	0	0	221	0	38	31.4	10.5
26-Jun	0	0	185	1	30	17.1	9.5	17-Aug	1	0	222	0	38	25.3	10.0
27-Jun	2	0	187	0	30	14.0	10.0	Totals	222	0	222	38	38		
28-Jun	0	0	187	0	30	11.6	11.5								
29-Jun	0	0	187	1	31	10.1	11.5								
30-Jun	0	0	187	2	33	8.8	11.5								
1-Jul	1	0	188	0	33	7.3	11.5								
2-Jul	1	0	189	0	33	8.5	11.0								
3-Jul	1	0	190	0	33	8.2	11.5								
4-Jul	0	0	190	2	35	6.4	12.0								
5-Jul	3	0	193	0	35	5.5	11.5								
6-Jul	0	0	193	0	35	4.3	11.5								
7-Jul	6	0	199	1	36	3.0	11.5								
8-Jul	0	0	199	0	36	2.7	11.0								
9-Jul	0	0	199	0	36	1.8	11.5								
10-Jul	2	0	201	2	38	0.9	11.5								
11-Jul	0	0	201	0	38	0.3	13.0								
12-Jul	0	0	201	0	38	3.0	12.0								
13-Jul	0	0	201	0	38	3.0	11.5								
14-Jul	0	0	201	0	38	4.6	11.5								
15-Jul	0	0	201	0	38	3.7	11.0								
16-Jul	0	0	201	0	38	2.4	12.0								
17-Jul	0	0	201	0	38	1.2	11.0								
18-Jul	1	0	202	0	38	0.3	11.5								
19-Jul	0	0	202	0	38	-0.6	11.5								
20-Jul	1	0	203	0	38	-1.2	11.5								
21-Jul	1	0	204	0	38	-1.5	11.5								
22-Jul	0	0	204	0	38	-1.8	11.5								
23-Jul	1	0	205	0	38	-0.6	11.5								
24-Jul	1	0	206	0	38	0.3	11.5								
25-Jul	0	0	206	0	38	4.0	12.0								

Appendix B13.—Daily counts of steelhead at a weir near the Nine Mile Bridge, Situk River, Alaska, 1987.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
11-Jun	0	0	0	0	0	nd	nd	2-Aug	0	0	5	0	0	38.0	13.0
12-Jun	0	0	0	0	0	nd	nd	3-Aug	0	0	5	0	0	36.0	12.0
13-Jun	0	0	0	0	0	nd	nd	4-Aug	0	0	5	0	0	32.0	11.0
14-Jun	0	0	0	0	0	nd	nd	5-Aug	0	0	5	0	0	30.0	12.0
15-Jun	0	0	0	0	0	nd	nd	6-Aug	0	0	5	0	0	32.0	11.0
16-Jun	0	0	0	0	0	nd	nd	7-Aug	0	0	5	0	0	40.0	12.0
17-Jun	0	0	0	0	0	nd	nd	8-Aug	0	0	5	0	0	40.0	12.0
18-Jun	0	0	0	0	0	nd	8.0	9-Aug	0	0	5	0	0	46.0	10.0
19-Jun	0	0	0	0	0	nd	8.0	10-Aug	0	0	5	0	0	42.0	12.0
20-Jun	0	0	0	0	0	nd	10.0	11-Aug	0	0	5	0	0	38.0	13.0
21-Jun	0	0	0	0	0	nd	10.0	12-Aug	0	0	5	0	0	34.0	11.0
22-Jun	0	0	0	0	0	23.0	9.0	13-Aug	0	0	5	0	0	30.0	12.0
23-Jun	1	0	1	0	0	24.0	9.0	14-Aug	0	0	5	0	0	28.0	12.0
24-Jun	1	0	2	0	0	18.0	9.0	15-Aug	0	0	5	0	0	28.0	11.0
25-Jun	0	0	2	0	0	17.0	9.0	16-Aug	0	0	5	0	0	36.0	11.0
26-Jun	0	0	2	0	0	15.0	9.0	17-Aug	0	0	5	0	0	38.0	11.0
27-Jun	0	0	2	0	0	13.0	9.0	18-Aug	0	0	5	0	0	38.0	11.0
28-Jun	1	0	3	0	0	12.0	10.0	Totals	5	0	5	0	0		
29-Jun	0	0	3	0	0	12.0	10.0								
30-Jun	1	0	4	0	0	18.0	11.0								
1-Jul	0	0	4	0	0	18.0	11.0								
2-Jul	0	0	4	0	0	108.0	11.0								
3-Jul	0	0	4	0	0	100.0	10.0								
4-Jul	0	0	4	0	0	90.0	14.0								
5-Jul	0	0	4	0	0	86.0	10.0								
6-Jul	0	0	4	0	0	82.0	10.0								
7-Jul	1	0	5	0	0	78.0	10.0								
8-Jul	0	0	5	0	0	74.0	11.0								
9-Jul	0	0	5	0	0	70.0	12.0								
10-Jul	0	0	5	0	0	74.0	11.0								
11-Jul	0	0	5	0	0	76.0	11.0								
12-Jul	0	0	5	0	0	80.0	11.0								
13-Jul	0	0	5	0	0	76.0	11.0								
14-Jul	0	0	5	0	0	74.0	9.0								
15-Jul	0	0	5	0	0	70.0	11.0								
16-Jul	0	0	5	0	0	66.0	11.0								
17-Jul	0	0	5	0	0	60.0	11.0								
18-Jul	0	0	5	0	0	58.0	11.0								
19-Jul	0	0	5	0	0	54.0	11.0								
20-Jul	0	0	5	0	0	52.0	11.0								
21-Jul	0	0	5	0	0	50.0	12.0								
22-Jul	0	0	5	0	0	50.0	12.0								
23-Jul	0	0	5	0	0	50.0	12.0								
24-Jul	0	0	5	0	0	48.0	12.0								
25-Jul	0	0	5	0	0	46.0	11.0								
26-Jul	0	0	5	0	0	42.0	11.0								
27-Jul	0	0	5	0	0	40.0	12.0								
28-Jul	0	0	5	0	0	38.0	13.0								
29-Jul	0	0	5	0	0	40.0	12.0								
30-Jul	0	0	5	0	0	40.0	12.0								
31-Jul	0	0	5	0	0	40.0	12.0								
1-Aug	0	0	5	0	0	40.0	13.0								

Appendix B14.–Daily counts of steelhead at the lower Situk River weir, Alaska, 1988. Corrected from Glynn and Elliott (1993).

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
7-Jun	6	nd	6	5	5	9.0	20.1	29-Jul	0	nd	1,210	0	60	11.0	27.4
8-Jun	13	nd	19	1	6	10.0	20.7	30-Jul	0	nd	1,210	0	60	10.0	29.9
9-Jun	3	nd	22	8	14	10.0	18.3	31-Jul	0	nd	1,210	0	60	9.5	27.4
10-Jun	79	nd	101	7	21	10.0	18.9	1-Aug	0	nd	1,210	0	60	11.0	24.4
11-Jun	8	nd	109	5	26	10.0	18.9	2-Aug	0	nd	1,210	0	60	10.0	26.2
12-Jun	58	nd	167	3	29	9.0	19.5	3-Aug	0	nd	1,210	0	60	10.5	24.4
13-Jun	56	nd	223	5	34	10.0	19.5	4-Aug	0	nd	1,210	0	60	10.0	26.8
14-Jun	24	nd	247	1	35	10.0	17.7	5-Aug	0	nd	1,210	0	60	10.5	28.0
15-Jun	185	nd	432	4	39	11.0	18.9	6-Aug	0	nd	1,210	0	60	10.0	24.4
16-Jun	130	nd	562	2	41	10.0	20.1	7-Aug	0	nd	1,210	0	60	10.0	24.4
17-Jun	42	nd	604	2	43	10.0	23.8	8-Aug	1	nd	1,211	0	60	10.0	26.2
18-Jun	84	nd	688	0	43	10.0	20.1	Total	1,211	nd	1,211	60	60		
19-Jun	281	nd	969	1	44	9.0	24.4								
20-Jun	0	nd	969	0	44	10.0	22.6								
21-Jun	7	nd	976	0	44	9.0	22.6								
22-Jun	1	nd	977	6	50	11.0	20.7								
23-Jun	0	nd	977	0	50	10.0	19.5								
24-Jun	19	nd	996	0	50	9.0	20.1								
25-Jun	21	nd	1,017	0	50	10.0	20.7								
26-Jun	0	nd	1,017	0	50	10.0	18.3								
27-Jun	12	nd	1,029	4	54	9.0	19.5								
28-Jun	0	nd	1,029	3	57	11.0	17.1								
29-Jun	4	nd	1,033	1	58	10.0	18.9								
30-Jun	8	nd	1,041	1	59	9.0	19.5								
1-Jul	11	nd	1,052	0	59	10.0	21.3								
2-Jul	40	nd	1,092	1	60	9.0	24.4								
3-Jul	3	nd	1,095	0	60	11.0	21.3								
4-Jul	0	nd	1,095	0	60	11.0	19.5								
5-Jul	0	nd	1,095	0	60	10.0	18.9								
6-Jul	0	nd	1,095	0	60	10.0	18.9								
7-Jul	3	nd	1,098	0	60	10.0	18.9								
8-Jul	0	nd	1,098	0	60	10.0	18.3								
9-Jul	0	nd	1,098	0	60	10.0	17.7								
10-Jul	0	nd	1,098	0	60	10.0	20.1								
11-Jul	0	nd	1,098	0	60	11.0	18.3								
12-Jul	1	nd	1,099	0	60	12.0	17.7								
13-Jul	30	nd	1,129	0	60	10.0	21.3								
14-Jul	0	nd	1,129	0	60	10.0	22.6								
15-Jul	0	nd	1,129	0	60	11.0	21.3								
16-Jul	28	nd	1,157	0	60	11.0	26.8								
17-Jul	0	nd	1,157	0	60	11.0	26.2								
18-Jul	0	nd	1,157	0	60	11.0	25.6								
19-Jul	5	nd	1,162	0	60	12.0	23.2								
20-Jul	8	nd	1,170	0	60	12.0	21.9								
21-Jul	8	nd	1,178	0	60	11.0	26.8								
22-Jul	0	nd	1,178	0	60	11.0	25.6								
23-Jul	3	nd	1,181	0	60	10.0	27.4								
24-Jul	2	nd	1,183	0	60	11.0	23.8								
25-Jul	27	nd	1,210	0	60	11.0	25.0								
26-Jul	0	nd	1,210	0	60	10.0	41.5								
27-Jul	0	nd	1,210	0	60	11.0	33.5								
28-Jul	0	nd	1,210	0	60	10.0	30.5								

Appendix B15.–Daily counts of steelhead at the lower Situk River weir, Alaska, 1989. Corrected from Glynn and Elliott (1993).

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
26-May	17	0	17	13	13	nd	nd	17-Jul	0	0	5,649	0	128	24.4	13.0
27-May	49	1	67	14	27	nd	nd	18-Jul	4	0	5,653	0	128	23.8	13.0
28-May	35	0	102	7	34	nd	nd	19-Jul	140	0	5,793	0	128	22.9	13.0
29-May	275	0	377	20	54	nd	nd	20-Jul	17	0	5,810	0	128	22.3	13.0
30-May	577	0	954	22	76	nd	nd	21-Jul	1	0	5,811	0	128	22.3	12.0
31-May	422	0	1,376	8	84	nd	nd	22-Jul	0	1	5,812	0	128	21.9	12.0
1-Jun	185	0	1,561	4	88	nd	nd	23-Jul	0	0	5,812	0	128	21.3	13.0
2-Jun	40	2	1,603	4	92	nd	9.0	24-Jul	0	2	5,814	0	128	23.2	2.0
3-Jun	1013	8	2,624	13	105	73.2	9.0	25-Jul	22	0	5,836	0	128	26.2	11.0
4-Jun	47	9	2,680	6	111	73.2	10.0	26-Jul	8	0	5,844	0	128	24.4	11.0
5-Jun	113	3	2,796	0	111	67.1	9.0	27-Jul	6	0	5,850	0	128	23.2	12.0
6-Jun	83	3	2,882	1	112	61.0	9.0	28-Jul	11	0	5,861	0	128	21.9	13.0
7-Jun	4	4	2,890	0	112	56.4	9.0	29-Jul	0	0	5,861	0	128	21.3	13.0
8-Jun	80	5	2,975	2	114	51.2	9.0	30-Jul	113	0	5,974	0	128	23.8	12.0
9-Jun	52	7	3,034	0	114	46.9	8.0	31-Jul	1	0	5,975	0	128	43.3	12.0
10-Jun	107	9	3,150	5	119	44.5	8.0	1-Aug	0	0	5,975	0	128	35.7	12.0
11-Jun	113	13	3,276	0	119	60.4	8.0	2-Aug	0	0	5,975	0	128	33.5	12.0
12-Jun	317	8	3,601	1	120	51.8	10.0	3-Aug	6	0	5,981	0	128	36.0	11.0
13-Jun	39	6	3,646	3	123	50.0	10.0	4-Aug	1	0	5,982	0	128	44.5	11.0
14-Jun	6	4	3,656	0	123	45.7	10.0	5-Aug	0	0	5,982	0	128	37.2	12.0
15-Jun	52	6	3,714	0	123	45.7	9.0	6-Aug	1	0	5,983	0	128	36.6	12.0
16-Jun	3	3	3,720	0	123	43.9	9.0	7-Aug	0	0	5,983	0	128	39.6	12.0
17-Jun	218	2	3,940	0	123	42.1	9.0	8-Aug	0	0	5,983	0	128	37.8	11.0
18-Jun	87	1	4,028	0	123	39.0	10.0	9-Aug	0	3	5,986	0	128	34.7	11.0
19-Jun	4	1	4,033	0	123	37.8	10.0	10-Aug	2	0	5,988	0	128	33.2	11.0
20-Jun	0	2	4,035	0	123	36.6	10.0	11-Aug	0	1	5,989	0	128	30.5	13.0
21-Jun	5	0	4,040	0	123	35.4	10.0	12-Aug	0	0	5,989	0	128	29.0	13.0
22-Jun	146	1	4,187	0	123	33.5	10.0	13-Aug	0	0	5,989	0	128	28.0	13.0
23-Jun	104	1	4,292	0	123	34.7	10.0	14-Aug	0	0	5,989	0	128	27.1	13.0
24-Jun	276	2	4,570	0	123	37.2	10.0	15-Aug	0	0	5,989	0	128	26.2	12.0
25-Jun	296	3	4,869	3	126	45.1	9.0	16-Aug	2	0	5,991	0	128	24.4	12.0
26-Jun	0	2	4,871	0	126	43.3	10.0	Total	5,867	124	5,991	128	128		
27-Jun	127	2	5,000	2	128	40.5	10.0								
28-Jun	56	1	5,057	0	128	38.4	11.0								
29-Jun	76	0	5,133	0	128	36.6	12.0								
30-Jun	2	1	5,136	0	128	35.1	11.0								
1-Jul	0	1	5,137	0	128	33.5	12.0								
2-Jul	279	0	5,416	0	128	33.5	13.0								
3-Jul	16	2	5,434	0	128	36.6	11.0								
4-Jul	22	1	5,457	0	128	35.1	12.0								
5-Jul	20	0	5,477	0	128	33.5	12.0								
6-Jul	2	0	5,479	0	128	31.7	12.0								
7-Jul	28	1	5,508	0	128	30.5	11.0								
8-Jul	0	0	5,508	0	128	29.9	12.0								
9-Jul	41	0	5,549	0	128	28.3	12.0								
10-Jul	76	0	5,625	0	128	27.4	12.0								
11-Jul	0	1	5,626	0	128	25.9	12.0								
12-Jul	1	0	5,627	0	128	25.9	13.0								
13-Jul	8	1	5,636	0	128	25.9	13.0								
14-Jul	3	0	5,639	0	128	25.3	13.0								
15-Jul	0	0	5,639	0	128	25.6	12.0								
16-Jul	10	0	5,649	0	128	26.2	12.0								

Appendix B16.–Daily counts of steelhead at the lower Situk River weir, Alaska, 1990. Corrected from Glynn and Elliott (1993). A sonar project was used to count 2,264 upstream migrants prior to weir installation on 8 May (Johnson 1991).

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
8-May	1	0	1	5	5	nd	nd	29-Jun	0	0	3,633	0	741	57.3	11.0
9-May	3	0	4	48	53	nd	nd	30-Jun	0	0	3,633	0	741	56.7	13.0
10-May	8	0	12	59	112	nd	nd	1-Jul	0	0	3,633	0	741	53.6	13.0
11-May	1	0	13	57	169	nd	nd	2-Jul	0	0	3,633	0	741	52.4	12.0
12-May	3	0	16	33	202	nd	nd	3-Jul	0	0	3,633	0	741	51.2	13.0
13-May	7	0	23	22	224	nd	nd	4-Jul	0	0	3,633	0	741	49.4	14.0
14-May	11	0	34	42	266	nd	nd	5-Jul	0	0	3,633	0	741	48.8	13.0
15-May	4	1	39	24	290	nd	nd	6-Jul	1	0	3,634	0	741	48.2	13.5
16-May	11	0	50	52	342	nd	nd	7-Jul	0	0	3,634	0	741	48.2	12.5
17-May	9	0	59	27	369	nd	nd	8-Jul	0	0	3,634	0	741	48.8	12.0
18-May	22	0	81	16	385	nd	nd	9-Jul	9	0	3,643	0	741	49.4	12.0
19-May	52	0	133	45	430	nd	nd	10-Jul	4	0	3,647	0	741	62.8	10.0
20-May	62	0	195	39	469	nd	nd	11-Jul	0	0	3,647	0	741	86.6	10.0
21-May	22	0	217	16	485	nd	nd	12-Jul	0	0	3,647	0	741	85.3	10.0
22-May	336	0	553	15	500	nd	nd	13-Jul	1	0	3,648	0	741	85.3	10.5
23-May	139	0	692	19	519	nd	nd	14-Jul	0	0	3,648	0	741	71.9	10.0
24-May	76	0	768	18	537	nd	nd	15-Jul	0	0	3,648	0	741	68.9	10.0
25-May	44	0	812	13	550	nd	nd	16-Jul	0	0	3,648	0	741	64.6	10.0
26-May	158	0	970	15	565	nd	nd	17-Jul	0	0	3,648	0	741	61.0	11.5
27-May	240	1	1,211	38	603	nd	nd	18-Jul	0	0	3,648	0	741	57.9	12.0
28-May	310	0	1,521	39	642	nd	nd	19-Jul	0	0	3,648	0	741	55.5	13.0
29-May	266	2	1,789	26	668	nd	nd	20-Jul	1	0	3,649	0	741	53.6	13.0
30-May	315	4	2,108	30	698	nd	nd	21-Jul	0	0	3,649	0	741	51.2	14.0
31-May	223	2	2,333	9	707	nd	nd	22-Jul	1	0	3,650	0	741	50.6	14.0
1-Jun	120	2	2,455	12	719	nd	nd	23-Jul	0	0	3,650	0	741	49.4	13.5
2-Jun	195	0	2,650	10	729	50.6	11.5	24-Jul	0	0	3,650	0	741	48.8	12.0
3-Jun	113	0	2,763	1	730	49.7	11.0	25-Jul	2	0	3,652	0	741	48.8	11.0
4-Jun	107	0	2,870	4	734	48.8	11.0	26-Jul	0	0	3,652	0	741	48.8	11.0
5-Jun	200	0	3,070	1	735	48.8	11.0	27-Jul	0	0	3,652	0	741	50.6	10.0
6-Jun	119	3	3,192	1	736	49.4	10.0	Total	3,633	19	3,652	741	741		
7-Jun	31	3	3,226	0	736	48.8	10.0								
8-Jun	54	0	3,280	1	737	48.8	10.0								
9-Jun	102	0	3,382	0	737	48.8	10.0								
10-Jun	0	0	3,382	0	737	51.2	9.0								
11-Jun	0	0	3,382	0	737	51.8	10.0								
12-Jun	9	1	3,392	0	737	50.6	11.0								
13-Jun	71	0	3,463	0	737	49.7	12.0								
14-Jun	24	0	3,487	0	737	49.4	11.0								
15-Jun	38	0	3,525	0	737	50.6	10.0								
16-Jun	16	0	3,541	0	737	51.2	10.0								
17-Jun	24	0	3,565	0	737	55.5	10.0								
18-Jun	23	0	3,588	2	739	62.8	10.0								
19-Jun	10	0	3,598	0	739	62.2	10.0								
20-Jun	6	0	3,604	0	739	62.5	10.0								
21-Jun	0	0	3,604	0	739	84.7	10.0								
22-Jun	0	0	3,604	1	740	75.6	10.0								
23-Jun	26	0	3,630	0	740	87.2	9.0								
24-Jun	0	0	3,630	1	741	79.2	9.0								
25-Jun	1	0	3,631	0	741	71.3	9.0								
26-Jun	2	0	3,633	0	741	67.1	9.0								
27-Jun	0	0	3,633	0	741	62.8	10.0								
28-Jun	0	0	3,633	0	741	59.7	10.0								

Appendix B17.—Daily counts of steelhead at the lower Situk River weir, Alaska, 1991. Corrected from Glynn and Elliott (1993). Weir out on 28 May.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
9-May	0	0	0	0	0	nd	nd	30-Jun	8	0	2,411	0	394	53.3	11.0
10-May	0	0	0	0	0	nd	3.0	1-Jul	10	1	2,422	0	394	55.8	10.5
11-May	0	0	0	0	0	85.3	3.0	2-Jul	4	1	2,427	0	394	51.8	12.5
12-May	1	0	1	52	52	77.7	3.0	3-Jul	26	0	2,453	0	394	51.8	11.5
13-May	0	0	1	46	98	73.2	3.5	4-Jul	7	0	2,460	0	394	48.8	12.5
14-May	6	0	7	24	122	72.5	4.0	5-Jul	0	6	2,466	0	394	48.8	11.0
15-May	4	0	11	19	141	75.0	4.5	6-Jul	13	0	2,479	0	394	45.7	10.5
16-May	2	0	13	23	164	88.4	3.5	7-Jul	6	0	2,485	0	394	45.7	11.5
17-May	3	0	16	44	208	78.0	4.5	8-Jul	1	0	2,486	0	394	44.2	12.0
18-May	0	0	16	8	216	72.5	5.0	9-Jul	18	0	2,504	0	394	45.7	11.5
19-May	6	0	22	20	236	70.7	5.0	10-Jul	13	0	2,517	0	394	50.3	11.0
20-May	4	0	26	24	260	74.4	4.5	11-Jul	3	0	2,520	0	394	88.4	11.0
21-May	1	0	27	21	281	68.3	5.5	12-Jul	1	0	2,521	0	394	70.1	12.0
22-May	5	1	33	61	342	64.6	5.0	13-Jul	0	0	2,521	0	394	70.1	12.5
23-May	3	0	36	15	357	62.8	6.0	14-Jul	0	0	2,521	0	394	68.6	12.0
24-May	15	1	52	8	365	62.8	7.0	15-Jul	0	0	2,521	0	394	61.0	11.0
25-May	7	1	60	5	370	61.0	7.0	16-Jul	0	0	2,521	0	394	57.3	11.0
26-May	8	0	68	13	383	59.7	5.0	17-Jul	5	0	2,526	0	394	57.9	11.5
27-May	6	0	74	4	387	57.9	5.5	18-Jul	0	0	2,526	0	394	65.5	11.0
28-May	nd	nd	77	nd	387	115.8	6.0	19-Jul	1	0	2,527	0	394	64.0	11.0
29-May	nd	nd	77	nd	387	198.1	5.0	20-Jul	0	0	2,527	0	394	59.4	11.0
30-May	nd	nd	77	nd	387	0.0	nd	21-Jul	2	0	2,529	0	394	54.9	12.5
31-May	nd	nd	77	nd	387	91.4	nd	22-Jul	0	0	2,529	0	394	51.8	12.0
1-Jun	nd	nd	77	nd	387	0.0	nd	23-Jul	0	0	2,529	0	394	50.3	11.0
2-Jun	nd	nd	77	nd	387	0.0	nd	24-Jul	0	0	2,529	0	394	85.3	11.5
3-Jun	nd	nd	77	nd	387	70.1	6.8	25-Jul	0	0	2,529	0	394	59.4	11.5
4-Jun	nd	nd	77	nd	387	64.0	7.0	26-Jul	0	0	2,529	0	394	56.4	10.0
5-Jun	nd	nd	77	nd	387	0.0	nd	27-Jul	0	0	2,529	0	394	57.9	10.0
6-Jun	nd	nd	77	nd	387	0.0	nd	Total	2,490	36	2,526	394	394		
7-Jun	nd	nd	77	nd	387	0.0	nd								
8-Jun	nd	nd	77	nd	387	0.0	nd								
9-Jun	nd	nd	77	nd	387	0.0	nd								
10-Jun	0	0	77	0	387	86.9	7.0								
11-Jun	2	1	80	0	387	80.8	7.0								
12-Jun	5	3	88	1	388	74.7	8.5								
13-Jun	231	2	321	4	392	67.1	9.0								
14-Jun	1	1	323	0	392	64.0	9.0								
15-Jun	260	2	585	1	393	61.0	9.5								
16-Jun	83	2	670	0	393	59.4	9.0								
17-Jun	0	2	672	0	393	56.4	9.0								
18-Jun	0	3	675	0	393	54.9	9.0								
19-Jun	582	1	1,258	1	394	53.6	9.0								
20-Jun	59	0	1,317	0	394	53.3	11.0								
21-Jun	35	3	1,355	0	394	50.3	12.5								
22-Jun	533	0	1,888	0	394	50.3	14.0								
23-Jun	2	3	1,893	0	394	50.3	13.0								
24-Jun	3	0	1,896	0	394	48.8	11.0								
25-Jun	21	1	1,918	0	394	47.2	11.5								
26-Jun	137	0	2,055	0	394	47.2	12.0								
27-Jun	130	1	2,186	0	394	47.2	11.5								
28-Jun	68	0	2,254	0	394	45.7	12.0								
29-Jun	149	0	2,403	0	394	48.8	11.5								

Appendix B18.—Daily counts of steelhead at the lower Situk River weir, Alaska, 1992. Corrected from Glynn and Elliott (1993). Weir out on 4 May.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
18-Apr	0	0	0	7	7	39.6	5.0	9-Jun	73	0	2,155	3	1,048	33.5	9.0
19-Apr	0	0	0	36	43	33.5	5.0	10-Jun	101	0	2,256	11	1,059	33.5	12.0
20-Apr	0	0	0	77	120	30.5	6.0	11-Jun	139	0	2,395	10	1,069	33.5	12.0
21-Apr	0	0	0	34	154	27.4	6.0	12-Jun	104	0	2,499	1	1,070	30.5	12.0
22-Apr	0	0	0	44	198	24.4	7.0	13-Jun	91	1	2,591	0	1,070	27.4	12.0
23-Apr	0	0	0	2	200	24.4	7.0	14-Jun	11	0	2,602	1	1,071	27.4	12.0
24-Apr	0	0	0	73	273	21.3	8.0	15-Jun	5	0	2,607	0	1,071	27.4	12.0
25-Apr	0	0	0	39	312	18.3	7.0	16-Jun	0	0	2,607	0	1,071	36.6	10.0
26-Apr	1	0	1	45	357	18.3	5.0	17-Jun	120	0	2,727	5	1,076	39.6	10.0
27-Apr	0	0	1	36	393	15.2	5.0	18-Jun	43	0	2,770	0	1,076	36.6	10.0
28-Apr	4	0	5	75	468	36.6	5.0	19-Jun	34	0	2,804	0	1,076	33.5	10.0
29-Apr	0	0	5	97	565	27.4	5.0	20-Jun	15	0	2,819	0	1,076	30.5	10.0
30-Apr	0	0	5	4	569	21.3	5.0	21-Jun	3	0	2,822	0	1,076	79.2	10.0
1-May	7	0	12	54	623	21.3	5.0	22-Jun	0	0	2,822	0	1,076	54.9	10.0
2-May	10	0	22	75	698	21.3	5.0	23-Jun	0	0	2,822	0	1,076	42.7	10.0
3-May	5	0	27	131	829	27.4	5.0	24-Jun	0	0	2,822	0	1,076	48.8	10.0
4-May	nd	nd	27	nd	829	nd	4.0	25-Jun	24	0	2,846	0	1,076	45.7	11.0
5-May	nd	nd	27	nd	829	nd	nd	26-Jun	8	0	2,854	0	1,076	39.6	13.0
6-May	nd	nd	27	nd	829	nd	nd	27-Jun	7	0	2,861	1	1,077	36.6	13.0
7-May	nd	nd	27	nd	829	nd	nd	28-Jun	13	0	2,874	0	1,077	33.5	12.0
8-May	nd	nd	27	nd	829	nd	nd	29-Jun	2	0	2,876	0	1,077	33.5	12.0
9-May	nd	nd	27	nd	829	nd	nd	30-Jun	3	0	2,879	0	1,077	30.5	11.0
10-May	nd	nd	27	nd	829	nd	nd	1-Jul	6	0	2,885	0	1,077	30.5	12.0
11-May	nd	nd	27	nd	829	nd	nd	2-Jul	0	0	2,885	0	1,077	24.4	13.0
12-May	nd	nd	27	nd	829	nd	nd	3-Jul	0	0	2,885	0	1,077	24.4	13.0
13-May	nd	nd	27	nd	829	nd	nd	4-Jul	0	0	2,885	0	1,077	24.4	12.0
14-May	nd	nd	27	nd	829	nd	nd	5-Jul	0	0	2,885	0	1,077	24.4	12.0
15-May	nd	nd	27	nd	829	nd	nd	6-Jul	11	0	2,896	1	1,078	24.4	12.0
16-May	4	0	31	0	829	nd	8.0	7-Jul	2	0	2,898	0	1,078	24.4	12.0
17-May	6	0	37	2	831	nd	6.0	8-Jul	4	0	2,902	1	1,079	24.4	12.0
18-May	41	0	78	25	856	nd	6.0	9-Jul	1	0	2,903	0	1,079	30.5	12.0
19-May	18	0	96	4	860	30.5	7.0	10-Jul	8	0	2,911	0	1,079	30.5	12.0
20-May	59	0	155	13	873	nd	7.0	11-Jul	0	0	2,911	0	1,079	30.5	12.0
21-May	53	0	208	16	889	27.4	8.0	12-Jul	15	0	2,926	0	1,079	39.6	12.0
22-May	82	0	290	16	905	27.4	8.0	13-Jul	14	0	2,940	0	1,079	45.7	12.0
23-May	37	0	327	11	916	27.4	8.0	14-Jul	16	0	2,956	0	1,079	42.7	12.0
24-May	133	0	460	30	946	27.4	8.0	15-Jul	18	0	2,974	0	1,079	42.7	12.0
25-May	37	0	497	11	957	27.4	9.0	16-Jul	1	0	2,975	0	1,079	nd	nd
26-May	240	0	737	8	965	36.6	9.0	17-Jul	1	0	2,976	0	1,079	nd	nd
27-May	97	0	834	9	974	33.5	9.0	Total	2,973	3	2,976	1,079	1,079		
28-May	79	0	913	20	994	33.5	9.0								
29-May	174	0	1,087	14	1,008	33.5	9.0								
30-May	262	0	1,349	9	1,017	36.6	9.0								
31-May	40	0	1,389	7	1,024	33.5	9.0								
1-Jun	155	0	1,544	0	1,024	nd	9.0								
2-Jun	106	0	1,650	0	1,024	nd	9.0								
3-Jun	104	0	1,754	0	1,024	73.2	9.0								
4-Jun	100	0	1,854	10	1,034	54.9	9.0								
5-Jun	55	0	1,909	5	1,039	48.8	9.0								
6-Jun	56	0	1,965	3	1,042	45.7	9.0								
7-Jun	48	0	2,013	3	1,045	45.7	9.0								
8-Jun	67	2	2,082	0	1,045	45.7	9.0								

Appendix B19.—Daily counts of steelhead at the lower Situk River weir, Alaska, 1993.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
14-Jun	28		28	nd	nd	nd	nd								
15-Jun	57		85	nd	nd	nd	nd								
16-Jun	8		93	nd	nd	nd	nd								
17-Jun	59		152	nd	nd	nd	nd								
18-Jun	56		208	nd	nd	nd	nd								
19-Jun	10		218	nd	nd	nd	nd								
20-Jun	25		243	nd	nd	nd	nd								
21-Jun	0		243	nd	nd	nd	nd								
22-Jun	0		243	nd	nd	nd	nd								
23-Jun	2		245	nd	nd	nd	nd								
24-Jun	5		250	nd	nd	nd	nd								
25-Jun	2		252	nd	nd	nd	nd								
26-Jun	0		252	nd	nd	nd	nd								
27-Jun	18		270	nd	nd	nd	nd								
28-Jun	1		271	nd	nd	nd	nd								
29-Jun	0		271	nd	nd	nd	nd								
30-Jun	23		294	nd	nd	nd	nd								
1-Jul	32		326	nd	nd	nd	nd								
2-Jul	0		326	nd	nd	nd	nd								
3-Jul	7		333	nd	nd	nd	nd								
4-Jul	0		333	nd	nd	nd	nd								
5-Jul	0		333	nd	nd	nd	nd								
6-Jul	0		333	nd	nd	nd	nd								
7-Jul	4		337	nd	nd	nd	nd								
8-Jul	0		337	nd	nd	nd	nd								
9-Jul	0		337	nd	nd	nd	nd								
10-Jul	0		337	nd	nd	nd	nd								
11-Jul	0		337	nd	nd	nd	nd								
12-Jul	0		337	nd	nd	nd	nd								
13-Jul	0		337	nd	nd	nd	nd								
14-Jul	0		337	nd	nd	nd	nd								
15-Jul	0		337	nd	nd	nd	nd								
16-Jul	0		337	nd	nd	nd	nd								
17-Jul	0		337	nd	nd	nd	nd								
18-Jul	0		337	nd	nd	nd	nd								
19-Jul	0		337	nd	nd	nd	nd								
20-Jul	0		337	nd	nd	nd	nd								
21-Jul	0		337	nd	nd	nd	nd								
22-Jul	0		337	nd	nd	nd	nd								
23-Jul	0		337	nd	nd	nd	nd								
24-Jul	1		338	nd	nd	nd	nd								
Total	338		338	nd	nd	nd	nd								

Appendix B20.–Daily counts of steelhead at the lower Situk River weir, Alaska, 1994 (Johnson 1996).

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
21-May	2	0	2	16	16	60.0	8.5	12-Jul	0	0	7,807	0	341	47.0	12.0
22-May	79	0	81	31	47	75.0	8.0	13-Jul	0	0	7,807	0	341	45.0	12.0
23-May	470	0	551	41	88	105.0	8.0	14-Jul	0	0	7,807	0	341	43.0	14.0
24-May	510	0	1,061	10	98	77.0	8.5	15-Jul	0	0	7,807	0	341	41.0	13.0
25-May	178	0	1,239	22	120	81.0	8.0	16-Jul	5	0	7,812	0	341	40.0	12.0
26-May	327	3	1,569	28	148	77.0	9.0	17-Jul	0	0	7,812	0	341	40.0	12.0
27-May	254	2	1,825	14	162	71.0	9.0	18-Jul	1	0	7,813	0	341	46.0	12.0
28-May	73	2	1,900	0	162	66.0	9.0	19-Jul	15	0	7,828	0	341	60.0	11.5
29-May	203	3	2,106	11	173	62.0	9.0	20-Jul	23	0	7,851	0	341	86.0	11.0
30-May	297	3	2,406	27	200	58.0	10.0	21-Jul	2	0	7,853	0	341	85.0	11.0
31-May	299	1	2,706	17	217	54.0	8.5	22-Jul	0	0	7,853	0	341	71.0	11.0
1-Jun	124	4	2,834	7	224	61.0	11.0	23-Jul	0	0	7,853	0	341	62.0	11.0
2-Jun	856	6	3,696	21	245	68.0	9.0	24-Jul	0	0	7,853	0	341	57.0	12.0
3-Jun	451	4	4,151	15	260	61.0	9.5	25-Jul	0	0	7,853	0	341	53.0	12.0
4-Jun	254	2	4,407	7	267	59.0	9.5	26-Jul	0	0	7,853	0	341	49.0	12.0
5-Jun	523	3	4,933	12	279	59.0	10.0	27-Jul	0	0	7,853	0	341	47.0	12.0
6-Jun	297	4	5,234	5	284	58.0	10.0	28-Jul	0	0	7,853	0	341	45.0	13.0
7-Jun	508	3	5,745	14	298	54.0	9.8	29-Jul	1	0	7,854	0	341	44.0	13.0
8-Jun	168	3	5,916	11	309	52.0	10.1	30-Jul	0	0	7,854	0	341	44.0	12.0
9-Jun	127	1	6,044	3	312	52.0	10.5	31-Jul	0	0	7,854	0	341	42.0	12.0
10-Jun	172	0	6,216	1	313	52.0	11.5	1-Aug	0	0	7,854	0	341	41.0	13.0
11-Jun	95	4	6,315	0	313	54.0	12.0	2-Aug	0	0	7,854	0	341	39.0	12.0
12-Jun	351	7	6,673	4	317	53.0	12.0	3-Aug	0	0	7,854	0	341	38.0	11.0
13-Jun	143	2	6,818	2	319	52.0	11.0	4-Aug	0	0	7,854	0	341	37.0	12.0
14-Jun	104	0	6,922	0	319	49.0	12.0	Total	7,794	60	7,854	341	341		
15-Jun	52	0	6,974	6	325	46.0	14.0								
16-Jun	136	2	7,112	0	325	46.0	13.5								
17-Jun	173	0	7,285	9	334	46.0	11.0								
18-Jun	101	0	7,386	0	334	46.0	11.0								
19-Jun	152	1	7,539	0	334	47.0	11.0								
20-Jun	0	0	7,539	3	337	47.0	11.0								
21-Jun	0	0	7,539	4	341	49.0	11.0								
22-Jun	0	0	7,539	0	341	51.0	12.0								
23-Jun	0	0	7,539	0	341	49.0	12.0								
24-Jun	58	0	7,597	0	341	56.0	13.0								
25-Jun	78	0	7,675	0	341	62.0	12.0								
26-Jun	54	0	7,729	0	341	62.0	12.0								
27-Jun	0	0	7,729	0	341	59.0	11.0								
28-Jun	0	0	7,729	0	341	54.0	11.0								
29-Jun	0	0	7,729	0	341	52.0	12.0								
30-Jun	8	0	7,737	0	341	48.0	12.0								
1-Jul	2	0	7,739	0	341	46.0	12.0								
2-Jul	6	0	7,745	0	341	49.0	14.0								
3-Jul	0	0	7,745	0	341	49.0	12.0								
4-Jul	0	0	7,745	0	341	48.0	12.0								
5-Jul	9	0	7,754	0	341	56.0	12.0								
6-Jul	0	0	7,754	0	341	80.0	11.0								
7-Jul	29	0	7,783	0	341	74.0	11.0								
8-Jul	24	0	7,807	0	341	63.0	13.0								
9-Jul	0	0	7,807	0	341	58.0	13.0								
10-Jul	0	0	7,807	0	341	55.0	12.0								
11-Jul	0	0	7,807	0	341	50.0	11.0								

Appendix B21.—Daily counts of steelhead at the lower Situk River weir, Alaska, 1995.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
8-May	3	0	3	0	0	nd	nd	29-Jun	1	0	6,607	1	619	46.0	11.1
9-May	5	1	9	0	0	45.0	nd	30-Jun	0	0	6,607	0	619	45.0	12.4
10-May	4	1	14	34	34	45.0	9.2	1-Jul	22	0	6,629	0	619	44.0	11.1
11-May	4	0	18	25	59	45.0	9.0	2-Jul	0	0	6,629	0	619	42.0	12.1
12-May	2	0	20	21	80	45.0	9.0	3-Jul	0	0	6,629	1	620	43.0	11.1
13-May	2	0	22	14	94	45.0	10.0	4-Jul	2	0	6,631	0	620	41.0	11.5
14-May	1	3	26	44	138	45.0	10.0	5-Jul	0	0	6,631	0	620	40.0	13.1
15-May	4	0	30	79	217	47.0	9.0	6-Jul	0	0	6,631	0	620	39.0	11.6
16-May	12	4	46	28	245	50.0	7.8	7-Jul	1	0	6,632	0	620	38.0	12.1
17-May	34	3	83	107	352	53.0	7.6	8-Jul	0	0	6,632	0	620	38.0	11.5
18-May	41	3	127	9	361	51.0	7.1	9-Jul	5	0	6,637	0	620	38.0	10.6
19-May	67	4	198	38	399	48.0	8.4	10-Jul	0	0	6,637	0	620	37.0	12.8
20-May	145	3	346	18	417	47.0	8.4	11-Jul	0	0	6,637	0	620	37.0	12.0
21-May	248	11	605	39	456	46.0	8.4	12-Jul	34	0	6,671	0	620	38.0	11.6
22-May	393	10	1,008	33	489	44.0	8.4	13-Jul	0	0	6,671	0	620	38.0	11.6
23-May	398	11	1,417	31	520	41.0	9.5	14-Jul	0	0	6,671	0	620	40.0	11.5
24-May	378	8	1,803	13	533	40.0	9.5	15-Jul	0	0	6,671	0	620	43.0	11.1
25-May	573	0	2,376	6	539	45.0	8.9	16-Jul	0	0	6,671	0	620	41.0	11.6
26-May	875	0	3,251	10	549	52.0	9.0	17-Jul	0	0	6,671	0	620	43.0	11.6
27-May	1,361	1	4,613	49	598	70.0	8.5	18-Jul	1	0	6,672	0	620	42.0	12.2
28-May	130	0	4,743	0	598	78.0	8.5	19-Jul	0	0	6,672	0	620	41.0	11.7
29-May	23	0	4,766	4	602	90.0	8.5	20-Jul	0	0	6,672	0	620	41.0	11.9
30-May	0	0	4,766	0	602	103.0	8.4	21-Jul	0	0	6,672	0	620	40.0	12.1
31-May	75	0	4,841	4	606	93.0	7.9	22-Jul	0	0	6,672	0	620	39.0	11.9
1-Jun	66	0	4,907	1	607	75.0	8.0	23-Jul	0	0	6,672	0	620	39.0	11.3
2-Jun	34	0	4,941	0	607	75.0	8.5	24-Jul	0	0	6,672	0	620	39.0	10.9
3-Jun	14	3	4,958	2	609	64.0	8.7	25-Jul	3	0	6,675	0	620	46.0	10.9
4-Jun	74	4	5,036	2	611	64.0	8.7	26-Jul	0	0	6,675	0	620	53.0	11.2
5-Jun	131	0	5,167	0	611	61.0	8.5	27-Jul	0	0	6,675	0	620	54.0	11.5
6-Jun	553	0	5,720	0	611	58.0	8.5	28-Jul	0	0	6,675	0	620	49.0	11.5
7-Jun	137	0	5,857	0	611	84.0	8.2	29-Jul	0	0	6,675	0	620	46.0	11.6
8-Jun	51	0	5,908	0	611	110.0	8.0	30-Jul	1	0	6,676	0	620	54.0	11.5
9-Jun	98	0	6,006	0	611	84.0	8.0	31-Jul	0	0	6,676	0	620	59.0	11.5
10-Jun	37	0	6,043	0	611	78.0	8.0	1-Aug	0	0	6,676	0	620	59.0	11.6
11-Jun	247	0	6,290	0	611	64.0	12.2	2-Aug	0	0	6,676	0	620	57.0	11.5
12-Jun	18	0	6,308	0	611	64.0	12.5	3-Aug	4	0	6,680	0	620	97.0	nd
13-Jun	0	0	6,308	0	611	62.0	10.1	Total	6,608	72	6,680	620	620		
14-Jun	4	0	6,312	0	611	60.0	9.8								
15-Jun	96	0	6,408	1	612	65.0	9.7								
16-Jun	0	0	6,408	2	614	54.0	9.8								
17-Jun	0	0	6,408	1	615	52.0	9.8								
18-Jun	4	0	6,412	1	616	50.0	9.2								
19-Jun	7	1	6,420	0	616	49.0	10.1								
20-Jun	2	0	6,422	0	616	48.0	9.8								
21-Jun	29	0	6,451	0	616	46.0	10.5								
22-Jun	14	0	6,465	0	616	45.0	11.0								
23-Jun	11	1	6,477	0	616	47.0	10.1								
24-Jun	129	0	6,606	0	616	58.0	9.4								
25-Jun	0	0	6,606	1	617	60.0	10.1								
26-Jun	0	0	6,606	0	617	53.0	10.5								
27-Jun	0	0	6,606	0	617	50.0	10.1								
28-Jun	0	0	6,606	1	618	48.0	11.1								

Appendix B22.—Daily counts of steelhead at the lower Situk River weir, Alaska, 1996.

Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)	Date	Downstream migrants			Upstream migrants		Water level (cm)	Water temp (C)
	Live	Morts	Cum	No.	Cum				Live	Morts	Cum	No.	Cum		
6-May	8	0	8	42	42	46.0	8.0	27-Jun	9	0	8,418	0	484	44.0	10.5
7-May	11	0	19	17	59	46.0	8.0	28-Jun	66	0	8,484	0	484	48.0	10.0
8-May	13	0	32	48	107	46.0	8.0	29-Jun	15	0	8,499	2	486	60.0	10.0
9-May	1	0	33	4	111	46.0	8.0	30-Jun	0	0	8,499	0	486	54.0	10.5
10-May	19	2	54	20	131	46.0	8.0	1-Jul	0	0	8,499	0	486	60.0	10.5
11-May	5	0	59	37	168	46.0	9.0	2-Jul	0	0	8,499	2	488	56.0	9.5
12-May	10	0	69	4	172	45.0	9.0	3-Jul	0	0	8,499	1	489	52.0	10.5
13-May	4	0	73	4	176	44.0	10.0	4-Jul	0	0	8,499	0	489	48.0	10.5
14-May	11	4	88	2	178	51.0	9.0	5-Jul	0	0	8,499	0	489	47.0	10.5
15-May	14	0	102	0	178	50.0	9.0	6-Jul	0	0	8,499	0	489	47.0	10.5
16-May	53	2	157	0	178	50.0	9.0	7-Jul	0	0	8,499	0	489	44.0	10.5
17-May	52	8	217	11	189	48.0	11.0	8-Jul	5	0	8,504	0	489	42.0	10.5
18-May	61	1	279	8	197	47.0	11.0	9-Jul	0	0	8,504	0	489	42.0	10.0
19-May	136	0	415	18	215	46.0	10.0	10-Jul	0	0	8,504	0	489	43.0	10.0
20-May	413	5	833	23	238	47.0	10.0	11-Jul	0	0	8,504	0	489	42.0	10.5
21-May	231	5	1,069	13	251	45.0	10.0	12-Jul	0	0	8,504	0	489	42.0	10.5
22-May	190	11	1,270	14	265	47.0	10.0	13-Jul	0	0	8,504	0	489	42.0	10.5
23-May	299	0	1,569	23	288	49.0	10.0	14-Jul	0	0	8,504	0	489	44.0	10.5
24-May	967	0	2,536	67	355	49.0	10.0	15-Jul	0	0	8,504	0	489	44.0	10.5
25-May	497	15	3,048	41	396	51.0	10.0	16-Jul	0	0	8,504	0	489	44.0	11.0
26-May	327	7	3,382	16	412	49.0	10.0	17-Jul	4	0	8,508	0	489	44.0	13.5
27-May	304	9	3,695	9	421	51.0	10.0	18-Jul	0	0	8,508	0	489	43.0	13.0
28-May	386	0	4,081	18	439	50.0	10.0	19-Jul	0	0	8,508	0	489	42.0	13.0
29-May	301	0	4,382	6	445	48.0	10.0	20-Jul	0	0	8,508	0	489	42.0	12.0
30-May	656	7	5,045	12	457	47.0	10.0	21-Jul	0	0	8,508	0	489	41.0	12.0
31-May	664	14	5,723	5	462	47.0	10.0	22-Jul	0	0	8,508	0	489	41.0	12.0
1-Jun	448	5	6,176	6	468	47.0	12.0	23-Jul	0	0	8,508	0	489	40.0	12.0
2-Jun	392	6	6,574	11	479	46.0	11.5	24-Jul	0	0	8,508	0	489	39.0	12.0
3-Jun	439	2	7,015	2	481	44.0	11.5	25-Jul	0	0	8,508	0	489	38.0	12.0
4-Jun	140	0	7,155	0	481	46.0	10.0	26-Jul	0	0	8,508	0	489	38.0	12.0
5-Jun	252	0	7,407	0	481	45.0	10.0	27-Jul	0	0	8,508	0	489	37.0	12.5
6-Jun	31	0	7,438	0	481	45.0	12.0	28-Jul	0	0	8,508	0	489	36.0	12.0
7-Jun	65	0	7,503	0	481	44.0	13.0	29-Jul	0	0	8,508	0	489	36.0	12.0
8-Jun	253	0	7,756	2	483	48.0	11.0	30-Jul	0	0	8,508	0	489	35.0	12.0
9-Jun	55	0	7,811	0	483	48.0	11.0	31-Jul	0	0	8,508	0	489	40.0	11.5
10-Jun	125	0	7,936	0	483	48.0	11.0	1-Aug	0	0	8,508	0	489	40.0	11.5
11-Jun	104	0	8,040	0	483	58.0	11.0	2-Aug	0	0	8,508	0	489	40.0	12.0
12-Jun	95	0	8,135	0	483	58.0	11.0	3-Aug	0	0	8,508	0	489	40.0	12.0
13-Jun	3	0	8,138	0	483	60.0	8.5	4-Aug	0	0	8,508	0	489	40.0	12.0
14-Jun	7	0	8,145	0	483	57.0	8.0	5-Aug	0	0	8,508	0	489	39.0	12.0
15-Jun	2	0	8,147	0	483	53.0	10.0	6-Aug	2	0	8,510	8	497	38.0	11.5
16-Jun	5	0	8,152	1	484	52.0	10.5	Total	8,407	103	8,510	497	497		
17-Jun	30	0	8,182	0	484	47.0	12.0								
18-Jun	10	0	8,192	0	484	46.0	11.0								
19-Jun	27	0	8,219	0	484	45.0	10.0								
20-Jun	17	0	8,236	0	484	45.0	11.0								
21-Jun	46	0	8,282	0	484	44.0	11.5								
22-Jun	33	0	8,315	0	484	43.0	12.0								
23-Jun	20	0	8,335	0	484	42.0	11.5								
24-Jun	4	0	8,339	0	484	41.0	12.0								
25-Jun	50	0	8,389	0	484	40.0	11.5								
26-Jun	20	0	8,409	0	484	44.0	11.5								

**APPENDIX C: FLOAT COUNTS OF
SITUK RIVER STEELHEAD, 1971–1996**

Appendix C1.–Float counts of Situk River steelhead, 1971–1996. All counts through 1983 believed to pertain to Lower River, unless otherwise noted.

Year	Date	Count	Observer	Reach/conditions
1971	18-Aug	155	Unknown	Downstream count from Nine-Mile bridge weir site
1974	04-Oct	9	Brogle	ND ^a
1975	18-June	84	Brogle	ND
	23-June	60	Brogle	ND
	04-July	12	Brogle	Lower River, High water
	07-July	8	Unknown	
1976	15-June	114	Brogle	ND
	27-June	70	Brogle	ND
1977	13-May	245	Brogle	ND
	04-June	84	Brogle	ND
	11-June	29	Brogle	ND
1978	14-May	241	Brogle	ND
1979	15-May	567	Marriott/Brogle	ND
	09-June	86	ND ^a	Lower River, Excellent conditions
	16-June	26	ND	Lower River, pure drift (?)
	23-June	18	Woods	ND
1980	12-May	694	Marriott/Brogle	ND
	07-June	75	ND	ND
	19-June	40	Woods	Lower River, Poor
1981	14-May	1,503	Schwan/Brogle	ND
1982	05-June	497	Brogle	Lower River, Poor
	17-June	41	Brogle	Lower River, Excellent conditions
1983	30-May	220	Brogle	Lower River, poor, high water
	08-June	100	Woods	Lower River, excellent
	18-June	20	Brogle	Lower River, excellent, light
1984	19-Apr	1,500	Bethers/Schwan	Lower River, Good
	10-May	2,151	Johnson	Lower River
	15-May	738	Johnson	Upper River
	22-May	1,116	Johnson	Lower River, Excellent
	08-June	89	Woods	Lower River, Excellent, windy
	21-June	116	Woods	Lower River
	1985	15-Apr	126	Johnson
05-June	1,312	Iverson/Johnson	Lower River, Fair, high water	
10-June	1,200	Woods/Iverson	Lower River, Very good, high water	
	10-June	736	Johnson	Upper River

-continued-

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Year	Date	Count	Observer	Reach/conditions
1986	19-March	222	Johnson	Lower River
	23-Apr	237	Johnson	Lower River
	1-May	596	Johnson	Lower River
	28-May	1,367	Johnson	Lower River, Excellent
	05-June	796	Ingledue/GT	Lower River, Excellent
	14-June	135	Johnson	Lower River, Normal
	20-June	100	Iverson/CS	Lower River, Normal
	07-July	2	GT/Iverson	Lower River, Excellent
	27-Oct	16	Johnson	Lower River, Poor
1987	26-Apr	1,162	Johnson	Lower River, Poor water conditions
	11-May	1,123	Johnson	Upper River, Poor water conditions
	12-May	2,083	Johnson	Lower River, Exc. water conditions
	09-June	150	Johnson	Lower River, Poor water conditions
1988	02-May	1,077	Johnson	Lower River, Poor water conditions
	15-May	430	Johnson	Upper River, Normal water conditions
	25-May	2,165	Johnson	Lower River, Poor water conditions
	07-June	520	Johnson	Lower River, Overcast, fair visibility
1989	26-Apr	577	Johnson	Lower River, Exc. visibility
	20-May	1,016	Johnson	Upper River, Visibility exc. 1st 3/4, poor 2nd 1/4
	21-May	1,235	Woods	Lower River Sunny, warm, exc. visibility
1990	16-May	502	Johnson	Upper River, Visibility good 1st 1/2, poor 2nd 1/4
	17-May	1,138	Johnson	Lower River, Visibility fair
1991	-	-	Glynn (1992)	Lower River - 7 counts, Upper River - 3 counts
1992	-	-	Glynn and Elliott (1993)	Lower River - 7 counts, Upper River - 3 counts
1993	-	-	Appendix C2.	Lower River - 11 counts, Upper River - 4 counts
1994	-	-	Johnson (1996)	Lower River - 7 counts, Upper River - 4 counts
1995	-	-	Appendix C3	Lower River - 6 counts, Upper River - 2 counts
1996			Appendix C4	Lower River - 9 counts, Upper River - 4 counts

^a ND = no data.

Appendix C2.–Float counts of Situk River steelhead, 1993.

Upper River^a													
Date	22 Apr							11 May		15 May		19 May	
Conditions	Good							Good		Exc ^b		Exc	
Rock to island	1							nd ^c		nd ^c		nd ^c	
Upper chute	17							119		100		45	
Lower chute	18							144		76		41	
Cut log	102							308		256		136	
Lower closure	31							69		48		56	
West fork	43							160		99		42	
Nine-mile	56							69		94		49	
Subtotal	268							869		673		369	
Lower River^d													
Date	14 Apr	20 Apr	23 Apr	26 Apr	3 May	7 May	10 May			12 May	14 May	18 May	25 May
Conditions	Good	Exc	Good	Good	Fair	Fair	Good			Exc	Good	Exc	Exc
Old Situk	174	249	318	319	238	405	500			634	587	525	231
Middle Cabin	48	149	121	126	116	187	175			246	228	278	171
Fannings	53	79	106	142	163	128	121			207	235	250	189
Falls	36	88	128	159	166	112	224			300	269	397	184
Milk Creek	89	196	193	339	327	371	407			416	494	619	598
Colorado Road	67	147	218	309	355	329	269			393	382	574	536
Nymphs	2	13	59	114	147	162	215			227	162	303	445
ADFG weir	8	8	6	18	81	69	62			83	61	93	90
Lower Landing	0	19	27	7	33	22	44			32	37	91	175
Subtotal	477	948	1,176	1,533	1,626	1,785	2,017			2,538	2,455	3,130	2,619

^a Observers on all Upper River surveys were Brian Glynn and Gordon Woods

^b Exc = excellent

^c nd = no data, count for next section includes count for this reach

^d Observers on Lower River surveys were Brian Glynn and Gordon Woods except for 25 May when observers were Brian Glynn and Randy Ericksen.

Appendix C3.–Float counts of Situk River steelhead in 1995. See Johnson (1996) for location and description of stream survey sections.

Survey section	River mile	Date of survey					
		6-Apr	20-Apr	27-Apr	8-May	16-May	23-May
Upper Situk River:							
Situk Lake	19.4	NS ^a	NS	NS	NS	NS	NS
Island	18.6	NS	NS	NS	142	123	NS
Loop	17.6	NS	NS	NS	226	74	NS
Chute	16.8	NS	NS	NS	157	116	NS
Pool	15.9	NS	NS	NS	223	129	NS
Split	15.4	NS	NS	NS	57	86	NS
End of flats	14.8	NS	NS	NS	242	115	NS
Below logjam	14.4	NS	NS	NS	48	89	NS
West fork	13.6	NS	NS	NS	256	152	NS
9 mile bridge	13.1	NS	NS	NS	55	109	NS
Subtotal					1,406	993	
Lower Situk River:							
Eagle Nest	12.0	251	378	311	563	492	315
Old Situk	10.9	234	248	288	475	338	199
Airstrip	10.1	40	28	65	365	177	186
Cathedral	9.3	33	117	107	462	385	366
Camp	8.8	62	47	36	105	12	62
Finger	8.3	48	183	157	327	334	503
Danny's	6.6	65	263	78	656	704	1,025
#2 Observation	5.2	20	204	129	754	265	251
Chainsaw	4.4	17	284	191	402	382	483
Colorado	3.6	3	341	209	300	268	752
Clay bank	2.4	1	256	152	289	283	598
Weir	1.2	0	61	19	87	98	369
Lower Landing	0	3	53	12	44	158	80
Subtotal		777	2,463	1,754	4,829	3,896	5,189
TOTAL		777	2,463	1,754	6,235	4,889	5,189

^aNS = no survey.

Appendix C4.–Float counts of Situk River steelhead in 1996. See Johnson (1996) for location and description of stream survey sections.

Survey section	River mile	Date of survey								
		29-Mar	17-Apr	23-Apr	8-May	16-May	18-May	21-May	25-May	28-May
Upper Situk River:										
Situk Lake	19.4									
Island	18.6	NS ^a	NS	NS	41	NS	45	38	1	NS
Loop	17.6	NS	NS	NS	92	NS	28	43	3	NS
Chute	16.8	NS	NS	NS	39	NS	23	22	2	NS
Pool	15.9	NS	NS	NS	371	NS	132	85	32	NS
Split	15.4	NS	NS	NS	122	NS	54	45	16	NS
End of flats	14.8	NS	NS	NS	218	NS	142	69	18	NS
Below logjam	14.4	NS	NS	NS	104	NS	51	59	37	NS
West fork	13.6	NS	NS	NS	259	NS	132	109	51	NS
9 mile bridge	13.1	NS	NS	NS	105	NS	70	96	47	NS
Subtotal					1,351		677	566	207	
Lower Situk River:										
Eagle Nest	12.0	89	120	156	424	395	583	389	153	110
Old Situk	10.9	111	158	132	528	467	456	238	109	89
Airstrip	10.1	11	67	33	235	273	444	239	112	143
Cathedral	9.3	5	80	81	369	419	479	361	199	86
Camp	8.8	103	57	48	68	57	69	77	26	133
Finger	8.3	138	171	286	285	411	365	437	282	157
Danny's	6.6	152	250	314	722	647	841	559	784	253
#2 Observation	5.2	36	215	124	657	893	786	771	156	520
Chainsaw	4.4	50	112	307	308	429	315	340	307	182
Colorado	3.6	62	99	164	316	355	511	550	444	526
Clay bank	2.4	0	8	46	309	450	642	848	813	823
Weir	1.2	1	23	21	80	183	183	455	631	528
Lower Landing	0.0	0	49	3	188	189	193	104	170	179
Subtotal		758	1,409	1,715	4,489	5,168	5,867	5,368	4,186	3,729
TOTAL		758	1,409	1,715	5,840	5,168	6,544	5,934	4,393	3,729

^aNS = no survey.

APPENDIX D: DATA ARCHIVE

Appendix D1.–Computer data files containing weir and float count data summarized in this report. The following computer data files used in the preparation of this report are archived at: Alaska Department of Fish and Game, Division of Sport Fish, Research and Technical Services, 333 Raspberry Road, Anchorage, 99518-1599.

File name	Description and contents
71-87 Weir Counts.xls	Microsoft Excel Worksheet; Excel 97. Contains daily weir count, temperature, and depth data for migrant Situk River steelhead 1971 through 1987.
88-96 Weir Counts.xls	Microsoft Excel Worksheet; Excel 97. Contains daily weir count, temperature, and depth data for migrant Situk River steelhead 1988 through 1996.
71-96 Float Counts.xls	Microsoft Excel Worksheet; Excel 97. Contains summary data for float counts of steelhead on the Situk River from 1971 to 1993 and detailed counts by stream reach for 1994 through 1996.