Fishery Data Series No. 96-35

Escapements of Chinook Salmon in Southeast Alaska and Transboundary Rivers in 1995

by

Keith A. Pahlke

November 1996

Alaska Department of Fish and Game

Division of Sport Fish

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

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

Spell out acre and ton.

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s

Spell out year, month, and week.

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

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
id est (that is)	i.e.,
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2, etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

FISHERY DATA SERIES NO. 96-35

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by

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ABSTRACT

As part of a continuing stock assessment program in Southeast Alaska, the Division of Sport Fish obtained indices of escapement for chinook salmon *Oncorhynchus tshawytscha* in designated streams and transboundary rivers. The estimated total escapement in 1995 was 67,312 large (age .3+) chinook, an 18% decrease from the 82,057 fish estimated in 1994. The 1995 estimate was nearly twice the 1975–1980 base period average of 35,284 chinook salmon, 119% of the 1981–1985 average of 56,357, and 90% of the 1986–1990 average of 75,219.

Escapement indices continued to exceed management goals in the Situk River (up 244% from 1994), and in the Alsek River, for the first time since the start of the rebuilding program (up 55% from 1994). Indices were below goal in the Stikine River (down 49% from 1994) and the Taku River (down 11% from 1994). The King Salmon River index count decreased from 140 fish in 1994 to 97 in 1995 (down 31%), and Andrew Creek also declined (down 40%). Indices in the Behm Canal systems remained below management goals: Unuk: (up 9% from 1994), Chickamin (down 8%), Blossom (up 35%), and Keta River (down 43%).

Key words: Chinook, *Oncorhynchus tshawytscha*, escapement, Taku River, Stikine River, Alsek River, Chilkat River, Unuk River, Chickamin River, Blossom River, Keta River, Marten River, Wilson River, King Salmon River, Situk River, Andrew Creek, Behm Canal, Southeast Alaska, U.S./Canada Treaty, transboundary rivers.

INTRODUCTION

Chinook salmon *Oncorhynchus tshawytscha* are known to occur in 34 rivers in, or draining into, the Southeast region of Alaska from British Columbia or Yukon Territory, Canada (Figure 1). In the mid-1970s it became apparent that many of the chinook salmon stocks in this region were depressed relative to historical levels of production (Kissner 1974), and a fisheries management program was implemented to rebuild stocks in Southeast Alaska streams and in transboundary rivers (rivers that originate in Canada and flow into Southeast Alaska coastal waters; ADF&G 1981). Initially, this management program closed commercial and recreational fisheries in terminal and near-terminal areas in U.S. waters.

In 1981, this program was formalized and expanded to a 15-year (roughly 3 life-cycles) rebuilding program for the transboundary Taku, Stikine, Alsek, Unuk, Chickamin, and Chilkat rivers and the non-transboundary Blossom, Keta, Situk, and King Salmon rivers (ADF&G 1981). The program used regionwide, all-gear catch ceilings for chinook salmon, designed to rebuild spawning escapements by 1995 (ADF&G 1981). Then, in 1985, the Alaskan program was incorporated into a comprehensive coastwide rebuilding program under the auspices of the U.S./Canada Pacific Salmon Treaty (PST) for all wild stocks of chinook salmon.

To track the rate of rebuilding, the Alaska Department of Fish and Game (ADF&G), the Canadian Department of Fisheries and Oceans (DFO), and the Taku River Tlingit First Nation (TRTFN) count spawning chinook salmon in a designated set of watersheds (Appendix A1). These streams were selected on the basis of their historical importance to fisheries, size of the population, geographic distribution, extent of the historical database, and ease of data collection. Counts from each of these streams are considered to be indicators of relative abundance, based on the assumption that counts are a constant proportion of the escapement in an index area or watershed.

These data are provided annually to the Joint Chinook Technical Committee (CTC) of the Pacific Salmon Commission (PSC), who use them to evaluate rebuilding progress of escapement indicator stocks (PSC 1996). Evaluation focuses on escapements in the last 5 years, with two criteria to compare with a linear trend-line

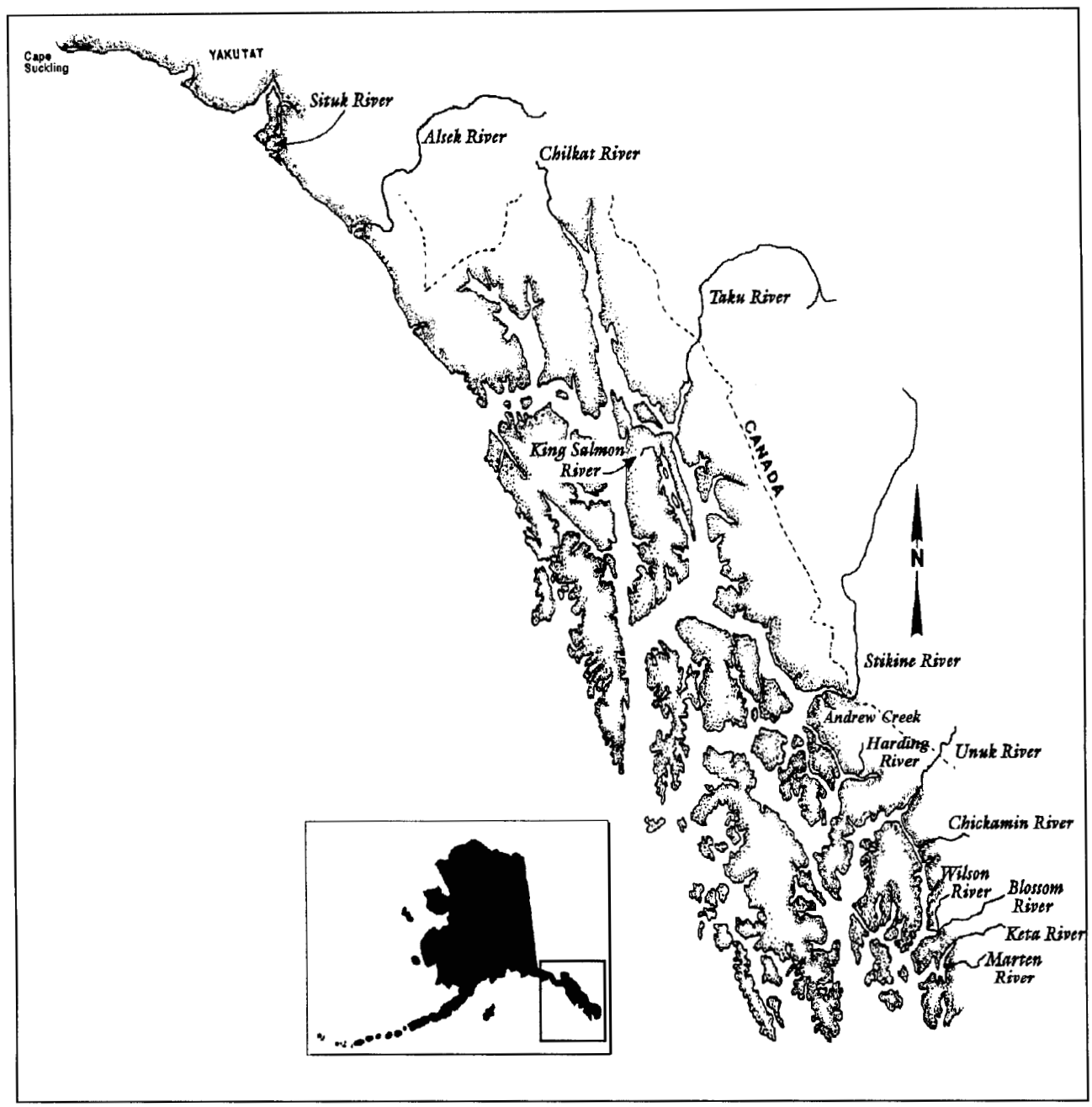

Figure 1.–Location of selected chinook salmon systems in Southeast Alaska.

extending from the base period escapement to the goal at the rebuilding target date, and a third criterion to evaluate increasing or decreasing trends. Judgments as to rebuilding progress provide the basis for regulations to restrict or expand fisheries to achieve rebuilding goals.

As part of a continuing program by the Division of Sport Fish to improve wild chinook stocks, this project obtained indices of spawner abundance for major chinook salmon stocks in Southeast Alaska. Objectives for 1995 were to count large (≥ 660mm mid-eye to fork length, or ocean-age 3 and older) spawning chinook salmon during the time of peak abundance in tributaries and mainstem areas of the Taku, Stikine, Alsek, Situk, Unuk, Chickamin, Blossom, Keta, King Salmon rivers and Andrew Creek and to compile and compare the indices to those from past years.

DESCRIPTION OF STUDY SITES

Many individual spawning areas are surveyed annually in a designated set of watersheds. Detailed descriptions and locations of these areas are found in Mecum and Kissner (1989), and general descriptions of the watersheds are below.

The Taku River originates in northern British Columbia and flows into the ocean 48 km east of Juneau, Alaska. The Taku River drainage covers over 17,000 km^2; average monthly flows range from 60 m^3/sec in February to 1,097 m^3/sec in June (Bigelow et al. 1995). Principal tributaries are the Sloko, Nakina, Sheslay, Inklin, and Nahlin rivers. The clearwater Nakina and Nahlin rivers contribute less than 25% of the total drainage discharge; most is from glacier-fed streams on the eastern slope of the Coast Range of British Columbia. Upstream of the abandoned mining community of Tulsequah, British Columbia, the drainage remains in pristine condition with very little mining, logging, or other development activities. The upper Taku River area is extremely remote, with no road access and few year-round residents. All of the important chinook salmon spawning areas are in tributaries in the upper drainage in British Columbia. These include the Nakina, Nahlin, Dudidontu, Tatsamenie, Hackett, and Kowatua rivers and Tseta Creek.

Stock assessment of chinook salmon has been conducted intermittently on the Taku River since the 1950s, and helicopter surveys of the index areas have been conducted annually since 1973. In addition the DFO, TRTFN, and ADF&G have operated a carcass collection weir below the major spawning area on the Nakina river since 1973. The carcass weir provides an estimate of the age composition of the escapement.

The Stikine River originates in British Columbia and flows to the sea approximately 32 km south of Petersburg, Alaska. Its drainage covers about 52,000 km^2, nearly 90% of which is inaccessible to anadromous fish because of natural barriers and velocity blocks. The Stikine River's principal tributaries include the Tahltan, Chutine, Scud, Iskut, and Tuya rivers. The lower river and most tributaries are glacially occluded (e.g., Chutine, Scud, and Iskut rivers).

Only 2% of the Stikine River drainage is in Alaska (Beak Consultants Limited 1981), and the majority of the chinook salmon spawning areas in the Stikine River are located in British Columbia, Canada, in the mainstem Tahltan and Little Tahltan rivers (including Beatty Creek). However, Andrew Creek, in the lower Stikine River, supports a significant run of chinook salmon. The upper drainage of the Stikine is accessible via the Telegraph Creek Road. Development includes several active mines in the Canadian portion of the Stikine drainage and proposals for major hydroelectric projects.

Helicopter surveys of the Little Tahltan River index area have been conducted annually since 1975, and the DFO has operated a fish counting weir at the mouth of the Little Tahltan River since 1985. Since all fish spawning in the Little Tahltan River spawn above the weir, counts from the weir represent the total escapement to that tributary.

The Alsek River originates in Yukon Territory, Canada, and flows in a southerly direction into the Gulf of Alaska approximately 75 km

Southeast of Yakutat, Alaska. Its largest tributaries are the Dezadeash and Tatshenshini rivers. Its drainage covers about 28,000 km^2 (Bigelow et al. 1995), much of which is inaccessible to anadromous salmonids because of velocity barriers. Most of the significant chinook salmon spawning areas are found in tributaries of the Tatshenshini River, including the Klukshu, Blanchard, and Takhanne rivers and in Village and Goat creeks. The Klukshu and upper Tatshenshini rivers are accessible by road near Dalton Post, Yukon Territory.

Counts of chinook salmon have been collected on the Alsek River since 1962. Beginning in 1976, the DFO has operated a weir at the mouth of the Klukshu to count chinook, sockeye, and coho salmon O. *kisutch*. The count of chinook salmon through the Klukshu River weir is used as the index for the Alsek River. Some harvest takes place above the weir. Aerial surveys to count spawning chinook salmon have been conducted by ADF&G with a helicopter since 1981. Prior to 1981, counts were obtained from fixed-wing aircraft. The escapement to the Klukshu River is difficult to count by aerial, boat or foot surveys because of deep pools and overhanging vegetation. However, surveys of the Klukshu River are conducted annually to provide some continuity in estimates in case the weir is not funded.

The Unuk, Chickamin, Blossom, and Keta rivers drainages all feed into Behm Canal—a narrow passage of water east of Ketchikan, Alaska. Misty Fiords National Monument/ Wilderness Area surrounds the eastern or "back" Behm Canal and includes the Boca de Quadra fjords. Many of the mainland rivers in the area support chinook salmon; the Unuk, Chickamin, Blossom and Keta rivers are designated chinook salmon escapement index systems.

The Unuk River originates in a glaciated area of British Columbia and flows 129 km to Burroughs Bay 85 km northeast of Ketchikan, Alaska; only the lower 39 km of the river are in Alaska . The Unuk is a large braided, glacially occluded river with a drainage of approximately 3,885 km^2. Most spawning occurs in tributaries of the Alaska portion of the river (Pahlke 1996). The escapement index areas are all small clear-water tributaries: Eulachon River and Cripple, Genes Lake, Clear, Lake, and Kerr creeks. Cripple Creek and Genes Lake Creek cannot be surveyed by air because of heavy vegetation, so fish are counted by foot survey. Chinook salmon have been counted annually by foot or helicopter surveys in these areas since 1977.

The Chickamin River is a large, glacial river that originates in British Columbia, and flows into Behm Canal approximately 32 km southeast of Burroughs Bay and 65 km northeast of Ketchikan. Although it is technically a transboundary river, there are no known chinook spawning areas on the Chickamin River upstream from the Canadian border. Important spawning tributaries are the South Fork of the Chickamin and Barrier, Butler, Indian, Leduc, Humpy, King, and Clear Falls creeks. Chinook salmon have been counted by foot or helicopter surveys in index areas of the Chickamin River each year since 1975.

The Blossom, Keta, Wilson, and Marten rivers are non-transboundary rivers that flow into Behm Canal approximately 45 km east of Ketchikan. These rivers lie inside the boundaries of the Misty Fiords National Monument in southern Behm Canal but are within an area that has been specifically excluded from Wilderness designation, due to the potential development of a large-scale molybdenum mine (Quartz Hill) near the divide of the Blossom and Keta rivers. The mine is presently undeveloped, but an access road has been completed; it terminates at salt water near the mouth of the Blossom River.

The Keta River drainage covers about 192 km^2 and the Blossom about 176 km^2 (Bigelow et al. 1995). Chinook salmon escapements to the Wilson and Marten rivers have been monitored on an intermittent basis in recent years. The Marten River, the most southern of the four rivers, flows into Marten Arm near Boca de Quadra.

The King Salmon River drains an area of approximately 100 km^2 on Admiralty Island,

flowing into King Salmon Bay on the eastern side of Stephens Passage about 48 km south of Juneau. The King Salmon River is the only island river system in Southeast Alaska to support a significant population of spawning chinook salmon. The only other island system with a documented run of chinook salmon is Wheeler Creek, also on Admiralty Island. The Alaska Department of Fish and Game (ADF&G) operated an upstream weir on the King Salmon River from 1983 through 1992 to count chinook salmon and collect their eggs for Snettisham Hatchery.

The Chilkat River is a large glacial river which originates in Yukon Territory, Canada, and flows into Chilkat Inlet at the head of northern Lynn Canal near Haines, Alaska. Helicopter surveys were conducted on Big Boulder Creek and Stonehouse Creek, two index areas of the Chilkat River, from 1981 to 1992 (Pahlke 1993). Counts from these streams were shown by Johnson, Marshall and Elliott (1992) to be an ineffective index of abundance, and they greatly underestimated the escapement to Chilkat River. Because all other streams in the Chilkat drainage are glacially occluded or unsuitable for other reasons, the aerial indices were suspended in favor of annual abundance estimates of escapement using mark-recapture experiments.

The Situk River is located about 16 km east of Yakutat, Alaska. The Situk supports a large run of sockeye salmon *O. nerka* which are harvested in commercial and subsistence set gill net fisheries concentrated at the mouth of the Situk River. Situk River chinook salmon have been harvested incidentally in the set gill net fisheries and in a recreational fishery in the river. A weir was operated on the Situk River at the upper limit of the intertidal area from 1928 to 1955 to count all five species of Pacific salmon spawning in the river. From 1976 to 1987, a weir was operated further upstream near the Nine Mile Road bridge, primarily to count chinook and sockeye salmon. In 1988, the weir was returned to a location near tidewater and is operated jointly by the Division of Sport Fish and Commercial Fisheries Management and Development Division (CFMD) of ADF&G. Some recreational harvest occurs above the weir.

METHODS

There are 34 river systems in the region (Figure 1) with populations of wild chinook salmon. Three transboundary rivers, the Taku, Stikine, and Alsek, are classed as major producers—each with potential production (harvest plus escapement) greater than 10,000 fish. Nine rivers are classed as medium producers, each with production of 1,500 to 10,000 fish. The remaining 22 rivers are minor producers, with production less than 1,500 fish. Small numbers of chinook salmon occur in other streams of the region but they are not included in the above because successful spawning has not been documented. Chinook salmon are counted via aerial surveys or at weirs each year in all three major producing systems, in six of the medium producers, and in one minor producer (Appendix A1).

INDICES OF ESCAPEMENT

Spawning chinook salmon are counted at 26 designated index areas in nine of the systems; complete counts of chinook salmon are obtained at the Situk River weir. Counts are made during aerial or foot surveys or at weirs. Aerial surveys are conducted from a Bell 206 or Hughes 500D helicopter during periods of peak spawning. Peak spawning times, defined as the period when the largest number of adult chinook salmon actively spawn in a particular stream or river, are well-documented from surveys of these index areas conducted over the past 21 years (Kissner 1982). The proportion of fish in pre-spawning, spawning and post-spawning condition is used to judge whether the survey timing is correct to encompass peak spawning.

Index areas are surveyed at least twice unless turbid water or unsafe flying conditions preclude the second survey. Pilots are directed to fly the helicopter from 6 to 15 meters above the river bed at a speed of 6–16 km/h. The helicopter door on the side of the observer is removed, and the helicopter is flown sideways

while observations of spawning chinook salmon are made from the open space.

Foot surveys are conducted by at least two people walking in the creek bed or on the riverbank. Only large (typically age-.3, -.4, and -.5) chinook salmon, >660 mm mideye-to-fork length (MEF), are counted during aerial or foot surveys. No attempt is made to accurately count small (typically age-.1 and -.2) chinook salmon <660 mm (MEF) (Mecum 1990). These small chinook salmon, also called jacks, are early maturing, precocious males considered to be surplus to spawning escapement needs. They are easy to separate visually from their older age counterparts under most conditions, because of their short, compact bodies and lighter color. They are, however, difficult to distinguish from other smaller species such as pink *O. gorbuscha* and sockeye salmon.

Counts and other observations from the 1995 surveys (Appendix A3) are entered into the ADF&G CFMD Integrated Fisheries Database (IFDB) in Juneau for archiving and general distribution.

Estimates of total escapement are needed to model total production, exploitation rates and other population parameters. To estimate escapement (since indices are only a partial count of spawning abundance), counts from index areas are expanded by a "survey expansion factor" and/or a "tributary expansion factor" (Appendix A1). A survey expansion factor is a judgment as to the proportion of the total season's escapement counted in the specific area observed during the peak spawning period.

Survey expansion factors are based on professional judgment and comparisons with weir counts and mark-recapture estimates. They vary among index areas according to the difficulties encountered in observing spawners, such as overhanging vegetation, turbid water conditions, presence of other salmon species (i.e., pink and chum *O. keta* salmon), or protraction of run timing. Survey expansion factors range from 1.3333X for the Nakina and Nahlin rivers to 4X for most other index areas (Appendix A1).

Escapement counts are also obtained from fish-counting weirs operated by the DFO on the Little Tahltan (Stikine), Tatsamenie (Taku), and Klukshu (Alsek) rivers, by the TRTN on the Nahlin and Nakina rivers (Taku), and by ADF&G on the Situk River. Survey expansions are not necessary for those streams where weirs or other estimation programs are used to count all migrating chinook salmon.

Peak aerial, foot, or weir counts are also expanded by a "tributary expansion factor," a judgment as to the proportion of spawners observed in index areas relative to the escapement to the entire drainage (i.e., not all tributaries or spawning areas were surveyed). Tributary expansion factors range from 4X for the Stikine River to 1.5625X for the Klukshu River (Appendix A1).

Finally, to estimate total regional escapement, counts are additionally expanded by a "category expansion factor" which weights expanded counts from major, medium, and minor producers by the number of streams in each category in the region. These factors are 3/3 for large systems, 9/7 for medium systems and 22/1 for small systems (Appendix A1).

Expansion factors for individual rivers have been revised, as programs to quantify the relationship between index counts and total escapement have been conducted. From 1989 to 1991, counts from the surveyed watersheds were expanded by the survey and tributary expansion factors, and judgments as to the rebuilding rate of stocks were made on expanded data (Mecum 1990, Pahlke 1991, 1993). At that time limited data were available to estimate the fraction counted in the index areas. Since then, radio-tracking distribution studies have resulted in the revision of tributary expansion factors for the Taku and Unuk rivers (PSC 1991; Pahlke et al. 1996). Mark-recapture studies to estimate spawning abundance on the Unuk River in 1994 (Pahlke et al. 1996) and on the Chickamin River in 1995 (Pahlke *In prep.*) were used to revise expansion factors for those two rivers in 1995; results were also applied to the nearby Blossom and Keta rivers. On Andrew Creek, a weir was

operated in four years (1979, 1981, 1982, and 1984), during which index counts were also made, establishing a new expansion factor for that system in 1995. Also in 1995, ten years (1983–1992) of matched weir and index counts were used to confirm the expansion factor for the King Salmon River.

These studies have helped to estimate total escapement in the region and have shown that, in most cases, the surveyed index areas provide reasonably accurate trends in escapements. However, Johnson et al. (1992) demonstrated that expansion factors used on the Chilkat River system were highly inaccurate, because the index areas received less than 5% of the escapement. Since 1991, escapement to the Chilkat River has been estimated annually by mark-recapture experiments (Ericksen, *In press*).

However, studies on the Taku, Unuk, Chickamin, and King Salmon rivers, as well as on Andrew Creek, have shown that the index expansion factors used on those systems were much more accurate than those used on the Chilkat (PSC 1991, Pahlke 1996, Pahlke *In prep.*). Expansion factors will continue to be revised as additional data become available.

Ongoing research projects should provide more information on the expansion factors for the Taku, Stikine, Chilkat, Unuk, and Chickamin rivers, and Andrew Creek. Estimates of escapement from expanded counts are included in this document to provide gross figures of spawner abundance, with the caveat that expansion factors may produce incorrect estimates in some cases.

RESULTS

From 1984 to 1993, the estimated escapement of chinook salmon in Southeast Alaska increased steadily for 10 years and exceeded the sum of escapement goals for all systems for the first time in 1993 (Figure 2). This was due primarily to strong returns to the Taku, Stikine, and Chilkat rivers, which together make up 69% of the regional escapement goal.

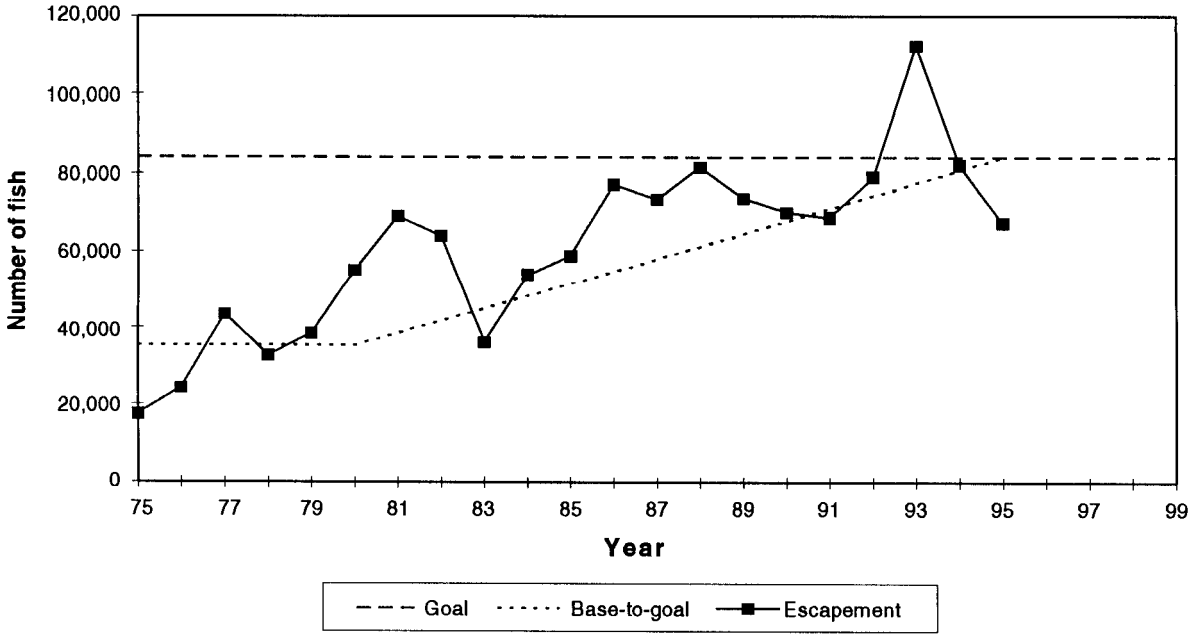

Figure 2.–Estimated total escapement of large chinook salmon to Southeast Alaska and transboundary rivers, 1975–1995. Spawner counts are expanded by survey, tributary, and category expansion factors. Base-to-goal line represents desired rebuilding rate, starting in 1981 at the average escapement during base period (1975–1980) and ending at a management escapement goal of 83,951 large chinook salmon in 1995 (final year of the three-cycle rebuilding program).

Table 1.–Estimated escapement of chinook salmon to Southeast Alaska and transboundary rivers in 1995.

	Survey area	Number counted	Survey expansion factor	Tributary expansion factor	Estimated inriver escapement	Category expansion factor	Final estimated escapement
Major producers							
Alsek River	Klukshu	5,657[a]	1X	1.5625X	8,839		8,579[b]
Taku River	4 tributaries[c]	2,745	1.6X	1.9231X	8,446		
Taku River	Nakina/Nahlin	6,012	1.3333X	1.9231X	15,415		
Taku subtotal		8,757			23,861		23,861
Stikine River	Little Tahltan	3,259	1X	4X	13,036		13,036
Category subtotal					45,737	3/3	45,476
Medium producers							
Situk River	all	4,700	–	1X	4,363[d]		
Chilkat River	all	3,790	–	1X	3,790		
Andrew Cr.	all	343	2X[e]	1X	686		
Unuk River	all	772	4X[e]	1X	3,088		
Chickamin River	all	356	4X[e]	1X	1,424		
Blossom River	all	217	2.5X[e]	1X	543		
Keta River	all	175	2.5X[e]	1X	438		
Category subtotal					14,331	9/7	18,426
Minor producers							
King Salmon R.	all	97	1.6X	1X	155		
Category subtotal					155	22/1	3,410
Total							67,312

[a] Klukshu weir count minus broodstock removal (21).

[b] Estimated escapement reduced by 260 subsistence.

[c] Kowatua, Tatsamenie, and Dudidontu Rivers and Tseta Creek

[d] Situk River weir count minus estimated sport harvest above weir.

[e] Revised in 1995.

In 1995, 44 locations, 26 of which were designated index areas, were surveyed specifically for chinook salmon escapement (Appendix A3). Surveys generally progressed as planned, but poor water conditions prevented a second aerial or foot survey of the King Salmon River. All Alsek River tributaries were surveyed approximately 1 week after the peak spawning period, because of poor weather. However, total counts in the largest Alsek index are obtained at the Klukshu weir, and the surveys are primarily for calibration of survey technique.

The estimated escapement (expanded) of chinook salmon for all Southeast Alaska and transboundary rivers was 67,312 (Table 1), an 18% decrease from the estimated 82,057 fish in 1994. This was due primarily to a large decline in escapement to the Stikine River, one of the two largest stocks in the region. The 1995 escapement is nearly twice the 1975–1980 base period average of 35,284 chinook salmon, 119% of the 1981–1985 average of 56,357, and 90% of the 1986–1990 average of 75,219 fish (Appendix A2).

TAKU RIVER

The count of 8,757 large chinook salmon in the six index areas of the Taku River was the lowest since 1988 (Table 2). The total count was similar to the 1984–1994 average; Tseta Creek and the Dudidontu and Nahlin rivers were above average (Table 3). Counts increased steadily from 1983 to 1993, meeting the revised six-tributary escapement goal (PSC 1991) of 13,210 fish for the first time in 1993 (Figure 3). Counts have been below the goal in 1994 and 1995.

Counts were expanded by survey expansion factors (1.3333X for Nakina/Nahlin and 1.6X for the other four tributaries) and by the tributary expansion factor (1.9231X) to produce an estimated escapement of 23,861 (Appendix A2) large chinook salmon in the Taku River. Ongoing research on Taku River chinook salmon indicates the present expansion factors may underestimate the actual escapement by as much as 30% (Pahlke and Bernard, 1996; McPherson et al. *In prep.*).

Expansion factors for the Taku River were modified in 1991 on the basis of results from a 2-year tagging study which produced new information on the distribution of spawners in the drainage (PSC 1991). However, these changes were not adopted by the Transboundary River Technical Committee (TBTC) of the PSC, who revised the escapement goal to be composed of the sum of counts from all six index tributaries (PSC 1991). The goal uses no expansion factors and refers to chinook actually counted during surveys. Since terminal catches at this time are small relative to the escapement, the TBTC recommends that only escapement counts for the six index tributaries be used in assessing rebuilding status.

STIKINE RIVER

At the Little Tahltan River weir 3,259 chinook salmon were counted in 1995. The 1995 weir count was 49% lower than the count of 6,426 in 1994 and the lowest escapement since 1986 (Table 4). An aerial survey of Beatty Creek counted 152 large chinook salmon, down considerably from the record count of 757 in 1993 (Table 4). The count in the glacially occluded mainstem Tahltan River was 696 fish, also considerably below the 1985–94 average of 2,173.

Two aerial surveys were flown in 1995 with counts of 936 and 1,117 large chinook salmon above the Little Tahltan River weir. The peak survey count was 34.3% of the total escapement through the weir. From 1985 to 1994, the proportion of the total escapement of chinook salmon counted during peak aerial surveys has ranged from 35.0% to 56.6% and averaged 46.1% (Table 5). The proportion of the total escapement observed in a single survey often declined after the peak of spawning as fish died or were removed by predators.

The revised escapement goal (PSC 1991) for the Little Tahltan River weir is 5,300 fish. The 1995 weir count fell below that goal for the first year since 1991, and, for the first time since 1986, fell below the rebuilding schedule (Figure 4). Expansion of the 1995 Little Tahltan weir count of 3,259 large chinook salmon by the tributary expansion factor (4X) produced a total Stikine River escapement estimate of 13,036 large chinook salmon.

Table 2.–Counts of spawning chinook salmon in index areas of the Taku River, 1951–1995.

Year[a]	Nakina River	Nahlin River	Kowatua River	Tatsamenie River	Dudidontu River	Tseta Creek	Total
1951	5,000 (F)[b]	1,000	–	–	400 (F)	100 (F)	6,500
1952	9,000 (F)	–	–	–	–	–	9,000
1953	7,500 (F)	–	–	–	–	–	7,500
1954	6,000 (F)	– (F)	–	–	–	–	6,000
1955	3,000 (F)	–	–	–	–	–	3,000
1956	1,380 (F)	–	–	–	–	–	1,380
1957	1,500 (F/W)	–	–	–	–	–	1,500[c]
1958	2,500 (F/W)	2,500 (A)	–	–	4,500 (A)	–	9,500[c]
1959	4,000 (F/W)	–	–	–	–	–	4,000[c]
1962	–	216 (A)	–	–	25 (A)	81 (A)	322
1965	3,050 (H)	35 (A)	200 P(A)	50 P(A)	110 (A)	18 (A)	3,463
1966	3,700 P(A)	300 (A)	14 P(A)	100 P(A)	252 (A)	150 (A)	4,516
1967	700 (A)	300 P(A)	250 P(A)	–	600 (A)	350 (A)	2,200
1968	300 P(A)	450 (A)	1,100 (A)	800 E(A)	590 (A)	230 (A)	3,470
1969	3,500 (A)	–	3,300 (A)	800 E(A)	–	–	7,600
1970	–	26 (A)	1,200 P(A)	530 E(A)	10 (A)	25 (A)	1,791
1971	500 (A)	473	1,400	360 E(A)	165 (A)	–	2,898
1972	1,000 (F)	280	170	132 E(A)	102 (A)	80	1,764
1971	500 (A)	473 (A)	1,400 E(A)	360 E(A)	165 (A)	– (A)	2,898
1972	1,000 (F)	280 (A)	170 (A)	132 (A)	102 (A)	80 P(A)	1,764
1973	2,000 N(H)	300 E(H)	100 N(H)	200 E(H)	200 E(H)	4 (A)	2,804
1974	1,800 E(H)	900 E(H)	235 (A)	120 (A)	24 (A)	4 (A)	3,083
1975	1,800 E(H)	274 E(H)	–	–	15 N(H)	–	2,089
1976	3,000 E(H)	725 E(H)	341 P(A)	620 E(H)	40 (H)	–	4,726
1977	3,850 E(H)	650 E(H)	580 E(A)	573 E(H)	18 (H)	–	5,671
1978	1,620 E(H)	624 E(H)	490 N(H)	550 E(H)	–	21 E(H)	3,305
1979	2,110 E(H)	857 E(H)	430 N(H)	750 E(H)	9 E(H)	–	4,156
1980	4,500 E(H)	1,531 E(H)	450 N(H)	905 E(H)	158 E(H)	–	7,544
1981	5,110 E(H)	2,945 E(H)	560 N(H)	839 E(H)	74 N(H)	258 N(H)	9,786
1982	2,533 E(H)	1,246 E(H)	289 N(H)	387 N(H)	130 N(H)	228 N(H)	4,813
1983	968 E(H)	391 N(H)	171 E(H)	236 E(H)	117 E(H)	179 N(H)	2,062
1984	1,887 (H)	951 (H)	279 E(H)	616 E(H)	–	176 (H)	3,909[d]
1985	2,647 N(H)	2,236 E(H)	699 E(H)	848 E(H)	475 (H)	303 E(H)	7,208
1986	3,868 (H)	1,612 E(H)	548 E(H)	886 E(H)	413 E(H)	193 E(H)	7,520
1987	2,906 E(H)	1,122 E(H)	570 E(H)	678 E(H)	287 E(H)	180 E(H)	5,743
1988	4,500 E(H)	1,535 E(H)	1,010 E(H)	1,272 E(H)	243 E(H)	66 E(H)	8,626
1989	5,141 E(H)	1,812 E(H)	601 (W)	1,228 E(H)	204 E(H)	494 E(H)	9,480[e]
1990	7,917 E(H)	1,658 E(H)	614 (W)	1,068 N(H)	820 E(H)	172 N(H)	12,249[e]
1991	5,610 E(H)	1,781 E(H)	570 N(H)	1,164 E(H)	804 E(H)	224 N(H)	10,153
1992	5,750 E(H)	1,821 E(H)	782 E(H)	1,624 N(H)	768 N(H)	313 N(H)	11,058
1993	6,490 E(H)	2,128 N(H)	1,584 E(H)	1,491 E(H)	1,020 E(H)	491 N(H)	13,204
1994	4,792 N(H)	2,418 E(H)	410 P(H)	1,106 N(H)	573 N(H)	614 E(H)	9,913
1995	3,943 E(H)	2,069 E(H)	550 N(H)	678 N(H)	731 E(H)	786 E(H)	8,757

[a] Counts before 1975 may not be comparable due to changes in survey dates and methods. Early foot surveys may have included jacks.

[b] (F) = foot survey, — = no survey conducted, (A) = fixed-wing aircraft, (H) = helicopter, P = survey conditions hampered by glacial or turbid waters, N = normal water flows and turbidity–average survey conditions, E = survey conditions excellent.

[c] Partial survey of Nakina River in 1957–59; comparisons made from carcass weir counts.

[d] Surveys in 1984 conducted by DFO; partial survey of Tseta Creek and Nahlin.

[e] Carcass weir at Kowatua River used to partially count escapement due to unfavorable water conditions.

Table 3.–Distribution of spawning chinook salmon among index areas of the Taku River during years when all index areas were surveyed.

Year	Nakina River	%	Nahlin River	%	Kowatua River	%	Tatsamenie River	%	Dudidontu River	%	Tseta Creek	%	Total
1981	5,110	52	2,945	30	560	6	839	9	74	1	258	3	9,786
1982	2,533	53	1,246	26	289	6	387	8	130	3	228	5	4,813
1983	968	47	391	19	171	8	236	11	117	6	179	9	2,062
1985	2,647	37	2,236	31	699	10	848	12	475	7	303	4	7,208
1986	3,868	51	1,612	21	548	7	886	12	413	5	193	3	7,520
1987	2,906	51	1,122	20	570	10	678	12	287	5	180	3	5,743
1988	4,500	52	1,535	18	1,010	12	1,272	15	243	3	66	1	8,626
1989	5,141	54	1,812	19	601	6	1,228	13	204	2	494	5	9,480
1990	7,917	65	1,658	14	614	5	1,068	9	820	7	172	1	12,249
1991	5,610	55	1,781	18	570	6	1,164	11	804	8	224	2	10,153
1992	5,750	52	1,821	16	782	7	1,624	15	768	7	313	3	11,058
1993	6,490	49	2,128	16	1,584	12	1,491	11	1,020	8	497	4	13,210
1994	4,792	48	2,418	24	410	4	1,106	11	573	6	614	6	9,913
Avg.	4,479	51	1,747	20	647	8	987	11	456	5	286	4	8,602
1995	3,943	45	2,069	24	550	6	678	8	731	8	786	9	8,757

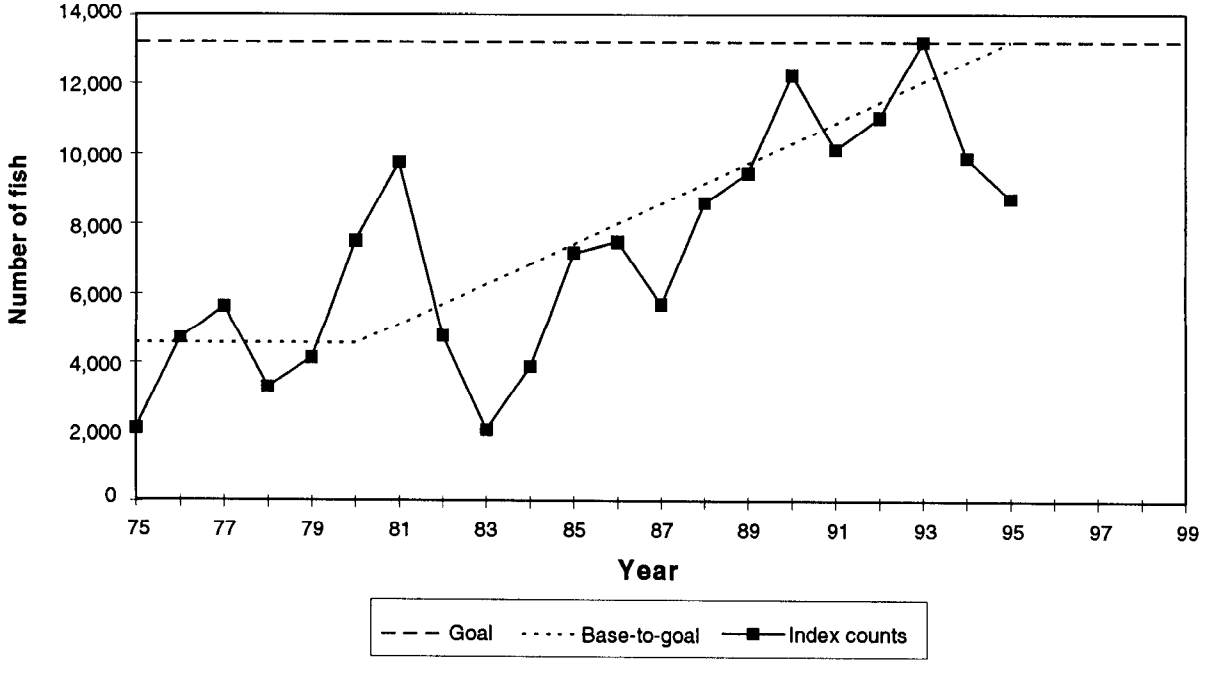

Figure 3.–Counts of chinook salmon in index areas of the Taku River, 1975–1995. Base-to-goal line indicates linear rebuilding schedule, starting in 1981 at average escapement level during the base period (1975–1980) and ending at revised escapement goal of 13,200 large chinook salmon in 1995 (final year of the three-cycle rebuilding program.)

Table 4.–Counts of spawning chinook salmon in index areas of the Stikine River, 1956–1995.

Year[a]	Little Tahltan River: Survey count		Little Tahltan River: Weir count	Mainstem Tahltan River		Beatty Creek		Total	
1956	493	(F)[b]	–	–		–		493	
1957	199	(F)	–	–		–		199	
1958	790	(F)	–	–		–		790	
1959	198	(F)	–	–		–		198	
1960	346	(F)	–	–		–		346	
1961	–		–	–		–		–	
1962	–		–	–		–		–	
1963	–		–	–		–		–	
1964	–		–	–		–		–	
1965	–		–	85		–		85	[c]
1966	–		–	318		–		318	[c]
1967	800	N(H)	–	–		–		800	
1968	–		–	–		–		–	
1969	–		–	–		–		–	
1970	–		–	–		–		–	
1971	–		–	–		–		–	
1972	–		–	–		–		–	
1973	–		–	–		–		–	
1974	–		–	–		–		–	
1975	700	E(H)	–	2,908	E(H)	–		3,608	
1976	400	N(H)	–	120	(H)	–		520	[d]
1977	800	P(H)	–	25	(A)	–		825	
1978	632	E(H)	–	756	P(H)	–		1,388	
1979	1,166	E(H)	–	2,118	N(H)	–		3,284	
1980	2,137	N(H)	–	960	P(H)	122	E(H)	3,219	
1981	3,334	E(H)	–	1,852	P(H)	558	E(H)	5,744	
1982	2,830	N(H)	–	1,690	N(F)	567	E(H)	5,087	
1983	594	E(H)	–	453	N(H)	83	E(H)	1,130	
1984	1,294	(H)	–	–		126	(H)	1,420	[e]
1985	1,598	E(H)	3,114	1,490	N(H)	147	N(H)	4,751	[f]
1986	1,201	E(H)	2,891	1,400	P(H)	183	N(H)	4,474	
1987	2,706	E(H)	4,783	1,390	P(H)	312	E(H)	6,485	
1988	3,796	E(H)	7,292	4,384	N(H)	593	E(H)	12,269	
1989	2,527	E(H)	4,715	–		362	E(H)	5,077	
1990	1,755	E(H)	4,392	2,134	N(H)	271	E(H)	6,797	
1991	1,768	E(H)	4,506	2,445	N(H)	193	N(H)	7,144	
1992	3,607	E(H)	6,627	1,891	N(H)	362	N(H)	8,880	
1993	4,010	P(H)	11,449	2,249	P(H)	757	E(H)	14,455	
1994	2,422	N(H)	6, 450[g]	–		184	N(H)	6,545	
1995	1,117	N(H)	3,259	696	E(H)	152	N(H)	4,395	

[a] Counts prior to 1975 may not be comparable because of differences in survey dates and counting methods.

[b] (F) = survey conducted by walking; N = normal survey conditions; (A) = survey conducted by fixed-wing aircraft; (H) = survey conducted by helicopter; P = survey conditions hampered by glacial or turbid waters; E = excellent survey conditions; — = no survey conducted or data not comparable.

[c] Chinook lifted over barrier on mainstem Tahltan, 1965 and 1966.

[d] Late count on mainstem Tahltan, minimal estimate.

[e] Surveys were done by DFO in 1984.

[f] Total = Little Tahltan weir count plus aerial or weir counts on other systems, 1985-present.

[g] Total count of 6,450 was reduced to 6,426 actual spawners by an egg take of 26 fish.

ANDREW CREEK

The count of chinook salmon in Andrew Creek was 343 fish, a 40% decrease from 572 in 1994 (Table 6). This was the only the second year since 1985 that the Andrew Creek escapement did not exceed the goal of 470 fish (Figure 5). The stream channel changed significantly in 1987, and previous years' counts were revised in 1991 to be consistent with present methods. Changes were small, <40 fish, except in 1987, when 137 fish were added to the count. From 1976 to 1984 a weir was operated on Andrew Creek to provide brood stock for hatcheries. Total spawners removed from the creek ranged from 12 in 1978 to 275 in 1982 (Pahlke 1995). Surveys were also conducted on the system four of those years and, on the basis of those paired counts, the survey expansion factor was revised in 1995 from 1.6 (1/.625) to 2 (see Table 1). However, the expanded goal remains 750 fish. No survey expansion was necessary for years when the weir provided total escapement counts (Appendix A2).

Table 5.–Comparison of peak aerial survey counts of chinook salmon to final counts at the Little Tahltan River weir, 1985–1995.

Year	Weir count[a]	Count from aerial survey[b]	Percent counted in survey
1985	3,114	1,598	51.3%
1986	2,891	1,201	41.5%
1987	4,783	2,706	56.6%
1988	7,292	3,796	52.1%
1989	4,715	2,527	53.6%
1990	4,392	1,755	40.0%
1991	4,506	1,768	39.2%
1992	6,627	3,607	54.4%
1993	11,449	4,010	35.0%
1994	6,426	2,422	37.7%
1995	3,259	1,117	34.3%
Average	5,407	2,410	45.0%

[a] Weir count minus egg takes.

[b] Final count equals peak survey above weir plus count below weir on that date.

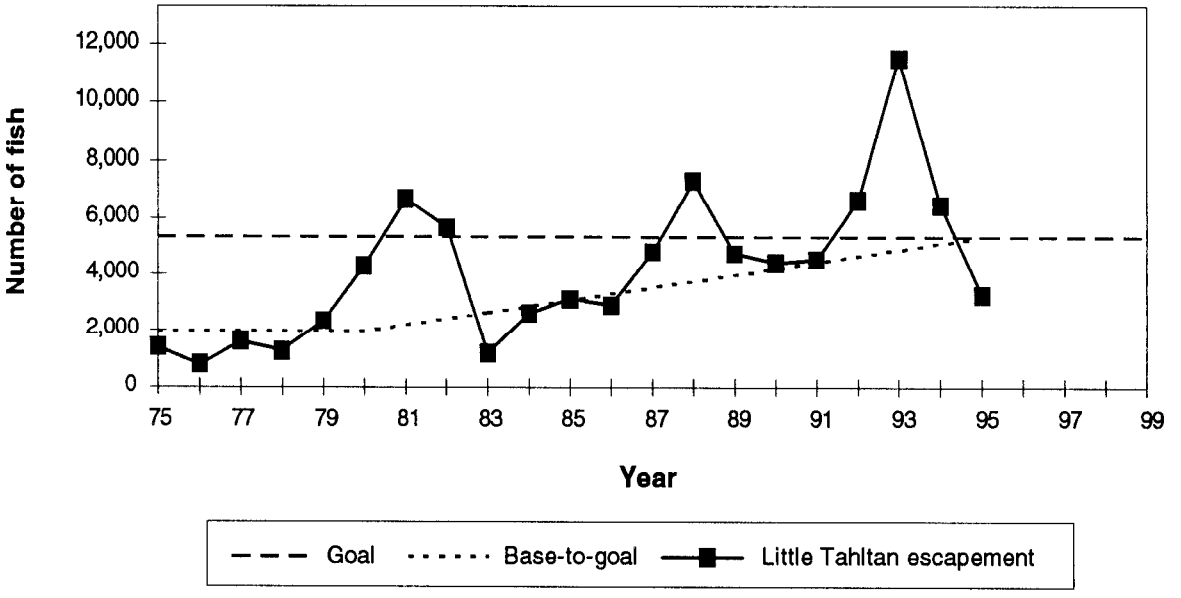

Figure 4.–Counts of chinook salmon at the Little Tahltan River weir, Stikine River, 1975–1995. Base-to-goal line shows linear rebuilding schedule, starting in 1981 at average escapement level during base period (1975–1980) and ending at escapement goal of 5,300 large chinook salmon in 1995 (final year of the three-cycle rebuilding program).

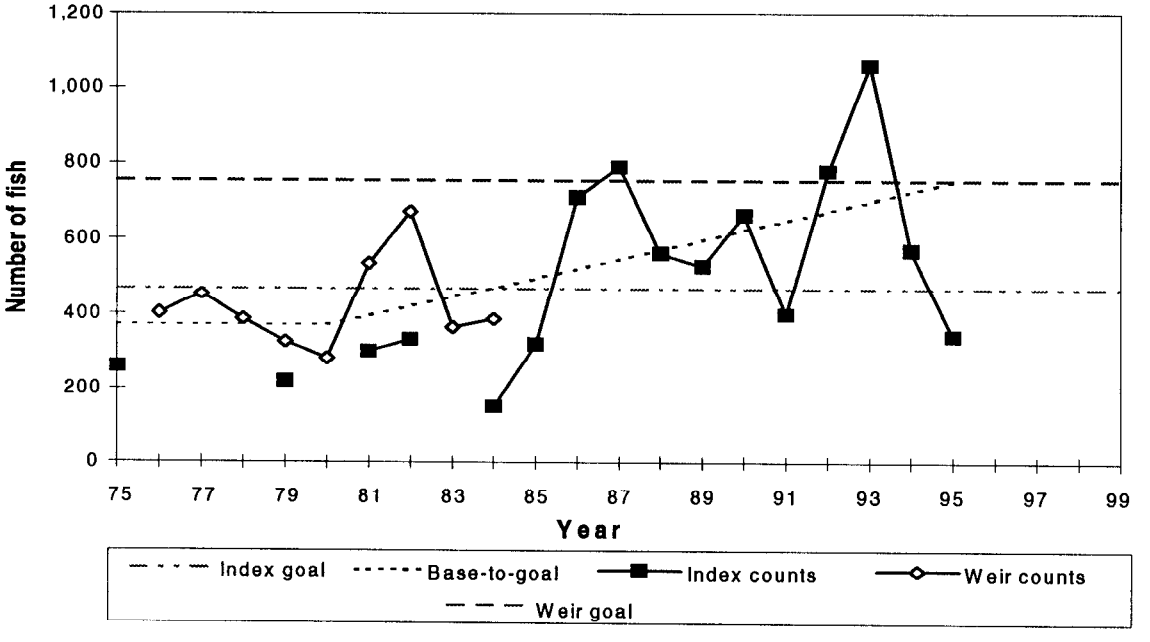

Figure 5.–Counts of chinook salmon at the Andrew Creek weir (1976–1984) and in aerial/foot surveys, 1975, 1985–1995. Base-to-goal line shows linear rebuilding schedule, starting in 1981 at average escapement level during base period (1975–1980) and ending at escapement goal of 750 large chinook salmon in 1995 (final year of the three-cycle rebuilding program).

Table 6.–Counts of spawning chinook salmon in selected rivers in central Southeast Alaska, 1956–1995.

Year	Andrew Creek[a]		North Arm		Clear Creek		Harding River		Aaron Creek	Bradfield River	
										N. Fork	E. Fork
1956	4,500	(A)[b]	–		–		–		–	–	–
1957	3,000	(F/A)	–		–		–		–	–	–
1958	2,500	(F/A)	–		–		–		–	–	–
1959	150	(F/A)	–		–		–		–	–	–
1960	287	(F)	200	(F)N	–		–		–	–	–
1961	103	(F)	138	(F)	–		–		–	–	–
1962	300	(A)	80	(A)N	–		–		–	–	–
1963	500	(A/H)	187	(F)	–		–		–	–	–
1964	400	(H)	–		–				–	–	–
1965	100	(A)	–		–		25		–	–	–
1966	75	(A)	–		–		–		–	–	–
1967	30	(A)	–		–		–		–	–	–
1968	15	–	–		–		–		–	–	–
1969	12	(A)	–		–		–		–	–	–
1970	0	–	–		–		–		–	–	–
1971	305	(A)	–		–		–		–	–	–
1972	0	–	–		–		–		–	–	–
1973	40	(A)	–		–		10		–	–	–
1974	129	(A)	–		–		35		–	–	–
1975	260	(F)	–		–		–		–	–	–
1976	404	(W/F)	–		–		12	(A)N	24	–	13
1977	456	(W/F)	–		–		410	(A)E		–	
1978	388	(W/F)	24	(F)E	–		12	(H)N	–	–	63
1979	327	(W/F)	16	(F)E	–		–		–	–	10
1980	282	(W/F)	68	(F)N	–		–		–	30	–
1981	536	(W/F)	84	(F)E	4	(F)P	28	(H)P	12	84	–
1982	672	(W/F)	138	(F)N	188	(F)N	8	(A)E	–		–
1983	366	(W/F)	15	(F)N	–		15	(A)P	–	55	–
1984	389	(W/F)	31	(F)N	–		35	(B)N	–	–	–
1985	320	(F)E	44	(F)E	–		243	(F)N	179	58	85
1986	708	(F)N	73	(F)N	45	(A)E	240	(B)N	178	104	215
1987	788	(H)E	71	(F)E	122	(F)N	40	(A)E	51	186	175
1988	564	(F)N	125	(F)N	167	(F)N	70	(A)P	325	680	410
1989	530	(F)E	150	(A)N	49	(H)N	80	(A)P	135	193	132
1990	664	(F)E	83	(F)N	33	(H)P	24	(A)P	–	–	–
1991	400	(A)N	38	(A)N	46	(A)N	42	(F)N	–	81	320
1992	778	(H)E	40	(F)E	31	(A)N	48	(A)P	30	–	–
1993	1,060	(F)E	53	(F)E	–		40	(A)N	–	33	118
1994	572	(H)E	58	(F)E	10	(A)N	87	(H)N	27	15	–
1995	343	(F)N	28	(A)P	1	(A)E	38	(H)N	65	16	43

[a] Andrew Creek total return equals sum of weir count, below weir, and North Fork, minus egg take, 1976–1984.

[b] (A) = survey conducted by fixed -wing aircraft; — = no survey conducted or data not comparable; (F/A) = combined foot and aerial count; (F) = survey conducted by walking; (H) = survey conducted by helicopter; (W/F) = weir and foot count; N = normal survey conditions; E = excellent survey conditions; P = poor survey conditions; (B) = escapement surveyed from boat.

ALSEK RIVER

The count of large chinook salmon through the Klukshu River weir in 1995 was 5,678 fish, the highest count since the installation of the weir in 1976 (Table 7). The escapement to the Klukshu, estimated by subtracting the Indian Food Fishery (IFF) harvest (260) and brood stock removal (21) from the weir count, was 5,397, an increase of 1,777 fish from 1994 and above the escapement goal of 4,700 fish for the first time. All of the sport harvest (601 fish) was below the weir. The aerial surveys were delayed almost a week by poor weather, and because of the late surveys,

Table 7.–Escapement of chinook salmon to the Klukshu River and counts of spawning adults in other tributaries of the Alsek River, 1962–1995.

	Klukshu River												
	Aerial	Weir	Above-weir harvest			Escape-	Blanchard	Takhanne		Goat		
Year[a]	count	count	IFF	Sport	Brood	ment[b]	River	River		Creek		Total[c]
1962	86	–	–	–		86	–[d]	–		–		86
1963	–	–	–	–		–	–	–		–		0
1964	20	–	–	–		20	–	–		–		20
1965	100	–	–	–		100	100	250		–		450
1966	1,000	–	–	–		1,000	100	200		–		1,300
1967	1,500	–	–	–		1,500	200	275		–		1,975
1968	1,700	–	–	–		1,700	425	225		–		2,350
1969	700	–	–	–		700	250	250		–		1,200
1970	500	–	–	–		500	100	100		–		700
1971	300	–	–	–		300	–	–		–		300
1972	1,100	–	–	–		1,100	12	(A)	250		–		1,362
1973	–	–	–	–		–	–		49	(A)	–		49
1974	62	–	–	–		62	52	(A)	132		–		246
1975	58	–	–	–		58	81	(A)	177	(A)	–		316
1976	–	1,278	150	64		1,153	–		–		–		1,153
1977	–	3,144	350	96		2,894	–		–		–		2,894
1978	–	2,976	350	96		2,676	–		–		–		2,676
1979	–	4,404	1,300	0		4,274	–		–		–		4,274
1980	–	2,673	150	0		2,487	–		–		–		2,487
1981	–	2,113	150	0		1,963	35	(H)	11	(H)	–		2,009
1982	633	2,369	400	0		1,969	59	(H)	241	(H)	13	(H)	2,282
1983	917	2,537	300	0		2,237	108	(H)	185	(H)	–		2,530
1984	–	1,672	100	0		1,572	304	(H)	158	(H)	28	(H)	2,062
1985	–	1,458	175	0		1,283	232	(H)	184	(H)	–		1,699
1986	738	2,709	102	0		2,607	556	(H)	358	(H)	142	(H)	3,663
1987	933	2,616	125	0		2,491	624	(H)	395	(H)	85	(H)	3,595
1988	–	2,037	43	0		1,994	437	E(H)	169	E(H)	54	E(H	2,654
1989	893	2,456	234	0	20	2,289	–		158	E(H)	34	E(H	2,481
1990	1,381	1,915	202	0	15	1,742	–		325	E(H)	32	E(H	2,099
1991	–	2,489	241	0	25	2,153	121	N(H)	86	E(H)	63	E(H	2,423
1992	261	1,367	88	0	36	1,283	86	P(H)	77	N(H)	16	N(H	1,462
1993	1,058	3,302	64	0	18	3,125	326	N(H)	351	E(H)	50	N(H	3,852
1994	1,558	3,735	99	0	8	3,628	349	N(H)	342	E(H)	67	N(H	4,386
85–94 average	975	2,408	137	0	20	2,258	341		245		60		2,830
1995	1,053	5,678	260	0	21	5,397	338	P(H)	260	P(H)	–		5,995

[a] Escapement counts prior to 1975 may not be comparable due to differences in survey dates and counting methods.

[b] Klukshu River escapement = weir count minus Indian Food Fishery (IFF) and broodstock.

[c] Total = Klukshu escapement plus aerial counts of other systems.

[d] — = no survey; (A) = aerial survey from fixed wing aircraft; (H) = helicopter survey; E = excellent survey conditions; N = normal conditions; P = poor conditions;.

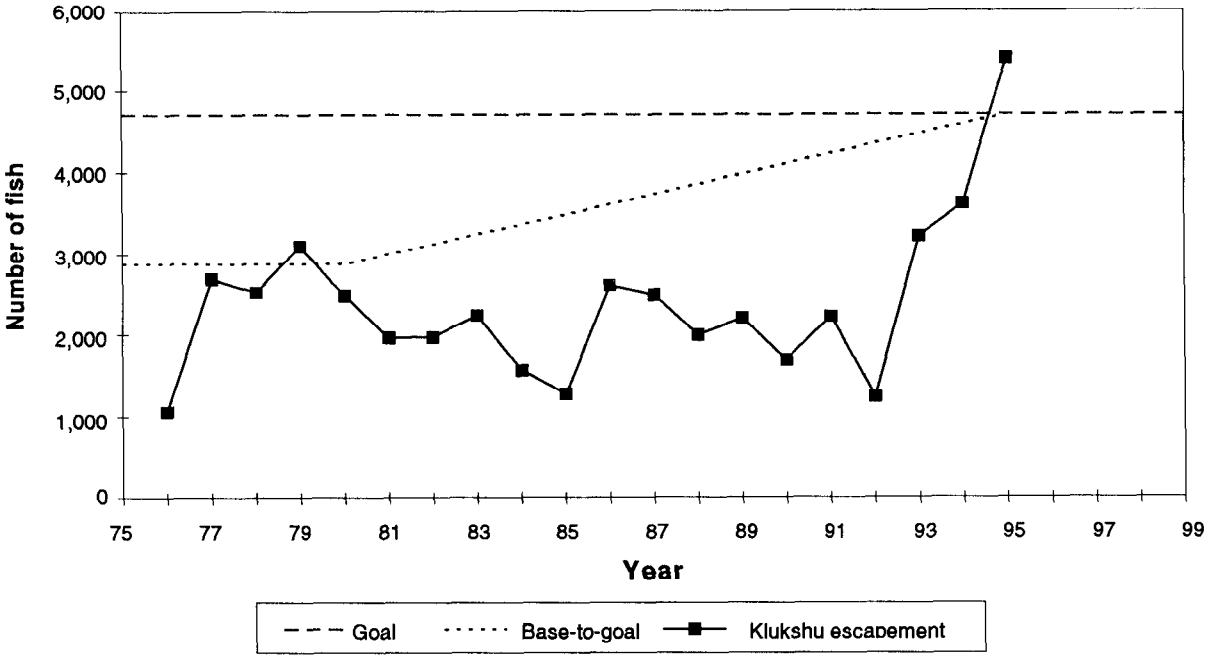

Figure 6.–Escapement of chinook salmon to the Klukshu River tributary of the Alsek River, 1975–1995. Base-to-goal line indicates linear rebuilding trend, starting in 1981 at average escapement level during base period (1975–1980) and ending at the escapement goal of 4,700 large chinook salmon in 1995 (final year of three-cycle rebuilding program).

Takhanne River and 338 in the Blanchard River are believed to be poor indicators of actual escapement in 1995. The aerial count of chinook the peak aerial counts of 260 large chinook salmon in the salmon escapement to Goat Creek in 1995 was canceled because of weather delays.

The estimated escapement for the entire Alsek River drainage, obtained by expanding the count from the Klukshu River weir minus broodstock removal by 1.5625X (tributary expansion factor) and subtracting sport harvest (0) and IFF harvest (260), was 8,579 large chinook salmon. Average escapements of chinook salmon to the Alsek River during the first two cycles of the rebuilding program (1981–1985 and 1986–1990) actually declined, relative to the 1975–1980 base period (Figure 6). In 1991, the TBTC revised the Alsek River chinook escapement goal to 4,700 fish through the Klukshu River weir (PSC 1991). There is no agreement on use of new expansion factors; therefore the total escapement was estimated using the above methods.

UNUK RIVER

In 1995, 772 large chinook salmon were counted in index areas of the Unuk River (Table 8)—a count that was below average in 3 out of 6 index areas (Table 9). The total count was 12% below the survey goal (revised in 1994) of 875 fish (McPherson and Carlile, *In prep.*).

Boundary Creek was again surveyed in 1995, but a change in the river between 1991 and 1994, which had revealed more spawning than previously observed area in that tributary, has again changed, resulting in low counts. Boundary Creek was not included in summed counts for the watershed nor in the expanded count.

Based on results of mark-recapture and radio-tracking studies (Pahlke et al. 1996, Pahlke *In prep.*), the survey expansion factors for the Unuk, Chickamin, Blossom and Keta rivers were revised in 1995. Expansion of the summed counts for 1995 by a revised survey expansion factor of 4X produced an estimated escapement

Table 8.–Peak escapement counts of chinook salmon to index areas of the Unuk River, 1960–1995.

Year[a]	Cripple Creek	Genes Lake Creek	Eulachon Creek	Clear Creek	Lake Creek	Kerr Creek	Total
1960	–[b]	–	250 (A)	–	–	–	250
1961	3 (F)	200 (F)	270 (F)	65 (F)	–	53 (F)	591
1962	–	150 (A)	145 (A)	100 (A)	30 (A)	–	425
1963	100 (A)	750 (A)	150 (A)	25 (A)	–	–	1,025
1964	–	–	25 (A)	–	–	–	25
1965	–	–	–	–	–	–	0
1966	–	–	–	–	–	–	0
1967	–	–	60 (H)	–	–	–	60
1968	–	–	75 (H)	–	–	–	75
1969	–	–	150 (H)	–	–	–	150
1970	–	–	–	–	–	–	0
1971	–	–	30 (A)	–	–	–	30
1972	95 (A)	35 (A)	450 (A)	90 (A)	55 (A)	–	725
1973	–	–	64 (H)	–	–	–	64
1974	–	–	68 (H)	–	–	–	68
1975	–	–	17 (H)	–	–	–	17
1976	–[c]	–	3 (A)	–	–	–	3
1977	529[c] (F)	339 (F)	57 (H)	34 (H)		15 (H)	974
1978	394[c] (F)	374 (F)	218 (H)	85 (H)	20 (H)	15 (H)	1,106
1979	363 (F)	101 (F)	48 (H)	14 (H)	30 (H)	20 (H)	576
1980	748 (F)	122 (F)	95 (H)	28 (H)	5 (H)	18 (H)	1,016
1981	324 (F)	112 (F)	196 (H)	54 (H)	20 (H)	25 (H)	731
1982	538 (F)	329 (F)	384 (H)	24 (H)	48 (H)	28 (H)	1,351
1983	459 (F)	338 (F)	288 (H)	24 (H)	12 (H)	4 (H)	1,125
1984	644 (F)	647 (F)	350 (H)	113 (H)	32 (H)	51 (H)	1,837
1985	284 (F)	553 (F)	275 (H)	37 (H)	22 (H)	13 (H)	1,184
1986	532 (F)	838 (F)	486 (H)	183 (F)	25 (H)	62 (H)	2,126
1987	860 (F)	398 (F)	520 (H)	107 (H)	37 (H)	51 (H)	1,973
1988	1,068 (F)	154 (F)	146 (F)	292 (H)	60 (H)	26 (H)	1,746
1989	351 (F)	302 (F)	298 (H)	128 (H)	27 (F)	43 (H)	1,149
1990	86 (F)	284 (F)	81 (H)	103 (F)	26 (F)	11 (H)	591
1991	358 (W/F)	123 (F)	43 (H)	96 (F)	23 (F)	12 (H)	655[d]
1992	327 (W/F)	360 (F)	57 (F)	69 (F)	31 (H)	30 (H)	874[e]
1993	448 N(F)	330 N(F)	132 E(F)	137 N(F)	8 N(F)	13 P(H)	1,068[f]
1994	161 P(F)	300 N(F)	52 N(H)	128 E(F)	18 N(F)	52 N(F)	711[g]
85–94 Average	448	364 N(F)	209	128	28	31	1,208
1995	211 N(F)	347 N(F)	74 N(H)	66 E(H)	35 E(H)	39 N(H)	772

[a] Counts prior to 1975 may not be comparable due to differences in survey dates and counting methods.

[b] — = no survey conducted or data not comparable; (F) = escapement survey conducted by walking river; (A) = escapement survey conducted from fixed-wing aircraft; (H) = escapement survey conducted from helicopter; (W/F) = weir and foot count; N = survey conditions normal; E = excellent; P = poor.

[c] Not including 35 fish for egg take in 1976; 132 in 1977; 85 in 1978.

[d] Total does not include 108 from Boundary Creek, Cripple Creek weir count reduced by /0.625 to be comparable with foot surveys.

[e] Total does not include 123 from Boundary Creek, Cripple Creek weir count reduced by /0.625 to be comparable with foot surveys.

[f] Total does not include 143 from Boundary Creek.

[g] Total does not include 42 fish from Boundary Creek.

Table 9.–Distribution of spawning chinook salmon among index areas of the Unuk River for years when all index areas were surveyed.

Year	Cripple Creek	%	Genes Lake Creek	%	Eulachon Creek	%	Clear Creek	%	Lake Creek	%	Kerr Creek	%	Total
1978	394	36	374	34	218	20	85	8	20	2	15	1	1,106
1979	363	63	101	18	48	8	14	2	30	5	20	3	576
1980	748	74	122	12	95	9	28	3	5	0	18	2	1,016
1981	324	44	112	15	196	27	54	7	20	3	25	3	731
1982	538	40	329	24	384	28	24	2	48	4	28	2	1,351
1983	459	41	338	30	288	26	24	2	12	1	4	0	1,125
1984	644	35	647	35	350	19	113	6	32	2	51	3	1,837
1985	284	24	553	47	275	23	37	3	22	2	13	1	1,184
1986	532	25	838	39	486	23	183	9	25	1	62	3	2,126
1987	860	44	398	20	520	26	107	5	37	2	51	3	1,973
1988	1,068	61	154	9	146	8	292	17	60	3	26	1	1,746
1989	351	31	302	26	298	26	128	11	27	2	43	4	1,149
1990	86	15	284	48	81	14	103	17	26	4	11	2	591
1991	358	55	123	19	43	7	96	15	23	4	12	2	655
1992	327	37	360	41	57	7	69	8	31	4	30	3	874
1993	448	42	330	31	132	12	137	13	8	0	13	1	1,068
1994	161	23	300	42	52	7	128	18	18	3	52	7	711
Avg.	467	40	333	28	216	18	95	8	26	2	28	2	1,166
1995	211	27	347	45	74	10	66	9	35	5	39	5	772

of 3,088 large chinook salmon to the Unuk River, an 8% decrease from 2,844 fish in 1994. Escapements of chinook salmon to the Unuk River have been below the escapement goal during 4 of the last 6 years (Figure 7). The average escapement over the base period of 1976–1980 is above the revised escapement goal for the Unuk River; therefore, no base-to-goal rebuilding line is needed.

Chickamin River

In 1995, 356 large chinook salmon were counted in index areas on eight tributaries of the Chickamin River, compared to 388 in 1994 (Table 10). Counts in 1995 were below average in all but one Chickamin River tributary (Table 11). The 1995 count was 32% below the survey escapement goal (revised in 1994 to 525 fish) (McPherson and Carlile *In prep.*).

The summed counts for 1995 were expanded by a survey expansion factor of 4X to produce a total escapement estimate of 1,424 fish to the watershed. The 1995 total escapement was similar to 1992–1994, but lower than average 1981–1985 and 1986–1990 escapements. The 1995 escapement was again below both the escapement goal and the rebuilding schedule. Total escapements had been above the linear rebuilding schedule from 1980 to 1991 and below the schedule since 1992 (Figure 8).

Blossom River

Two hundred seventeen (217) large chinook salmon were counted in index areas of the Blossom River in 1995, an increase of about 34% from the 161 fish counted in 1994 (Table 12). The 1995 count was approximately 38% below the revised escapement goal of 300 observed fish. Counts were above the escapement goal of 300 from 1982–1989, but since 1991, with the exception of 1993, they have fallen below the linear rebuilding schedule (Figure 9).

Keta River

In 1995, 175 chinook salmon were counted in the Keta River, down from 306 counted in 1994

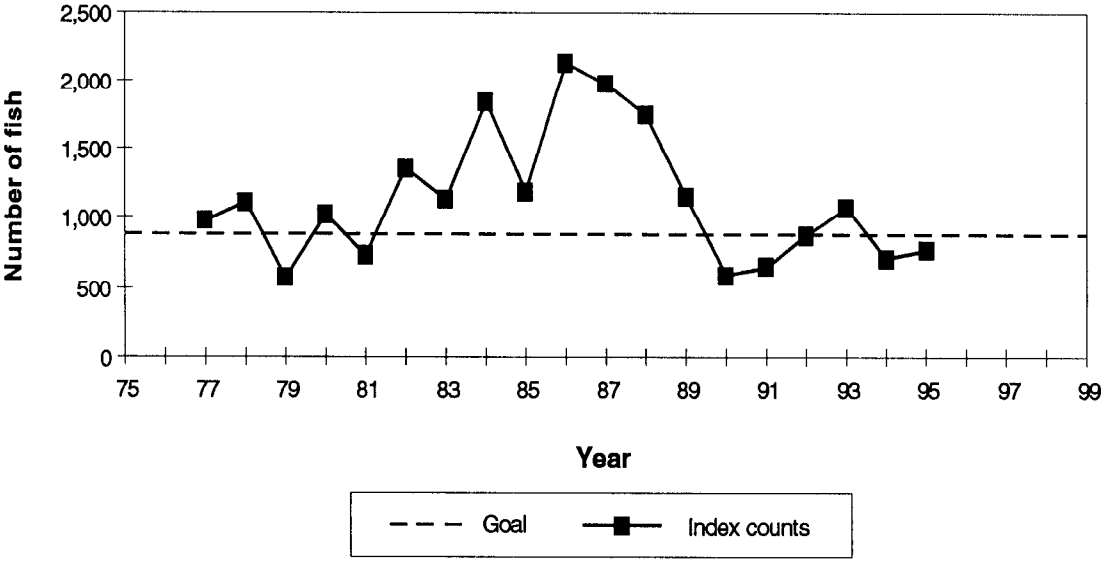

Figure 7.–Counts of large chinook salmon in index areas of the Unuk River, 1975–1995.

(Table 11) and below the 1994 revised goal of 300. Prior to 1990, counts of chinook salmon in the Keta River increased steadily since implementation of the 1980 rebuilding program, and had exceeded the rebuilding schedule every year since 1981 (Figure 10). The base period average count of 255 fish is close enough to the revised goal that a base-to-rebuilding line is not necessary.

Marten and Wilson Rivers

Counts of chinook salmon in the Marten and Wilson Rivers are not included in the regional index program, and no official escapement goals have been set for these systems. However, regular counts have been made in the Marten River since 1982 because of its proximity to other surveyed systems.

In 1995, 171 large chinook salmon were counted during aerial surveys of the Marten River, similar to the count of 178 in 1994. In 1988, the U.S. Forest Service modified a barrier on Dicks Creek, a major tributary of the Marten River, with the objective of opening access to new spawning areas. Since then, aerial surveys have documented chinook salmon above the barrier site indicating some success.

Fifty-eight (58) large chinook salmon were counted in the Wilson River in 1995, which was not surveyed in 1994. The Grant and Klahini Rivers, small chinook systems in Behm Canal which have been surveyed sporadically, were not surveyed in 1995.

King Salmon River

One helicopter survey was conducted on King Salmon River in 1995. A second scheduled helicopter survey and foot survey were canceled due to poor survey conditions, consequently a lower than average proportion of total escapement may have been counted in 1995. Ninety-seven (97) large chinook salmon were counted during the aerial survey. Survey counts, with fish removed for hatchery egg takes subtracted from the total, have been slightly below the goal of 140 fish since 1983, with the exceptions of 1993 and 1994 (Table 13). Counts have been below the linear rebuilding schedule four out of six years since 1990 (Figure 11).

Table 10.–Counts of chinook salmon in index areas of the Chickamin River, 1960–1995.

Year[a]	South Fork Creek	Barrier Creek	Butler Creek	Leduc Creek	Indian Creek	Humpy Creek	King Creek	Clear Falls Creek	Total[c]
1960	–[b]	–	–	–	–	3 (A)	–	–	3
1961	–	36 (A)	77 (A)	42 (A)	5 (A)	120 (A)	48 (A)	–	328
1962	400 (A)	35 (A)	–	–	–	150 (A)	–	–	585
1963	350 (A)	115 (A)	–	–	–	3 (A)	200 (A)	–	668
1964	–	–	–	–	–	–	–	–	–
1965	–	–	–	–	–	–	75 (A)	–	75
1966	–	–	–	–	–	50 (F)	–	–	50
1967	–	–	–	–	–	-	45 (H)	–	45
1968	–	–	–	–	–	30 (H)	20 (H)	–	50
1969	–	–	–	–	–	10 (H)	45 (H)	–	55
1970	–	–	–	–	–	–	–	–	–
1971	–	–	–	–	–	–	–	–	–
1972	350 (A)	25 (A)	–	85 (A)	–	65 (A)	510 (A)	–	1,035
1973	–	–	–	–	–	14 (A)	65 (A)	–	79
1974	144 (H)	–	–	–	–	–	11 (H)	–	155
1975	141 (H)	9 (H)	66 (H)	6 (H)	90 (H)	7 (H)	30 (H)	–	370
1976	46 (H)	10 (H)	15 (H)	12 (H)	9 (H)	–	–	–	157
1977	52 (H)	66 (H)	30 (H)	26 (H)	53 (H)	0 (H)	–	–	363
1978	21 (H)	94 (H)	4 (H)	42 (H)	20 (H)	–	–	–	308
1979	63 (H)	17 (H)	29 (H)	0 (H)	31 (H)	–	–	–	239
1980	56 (H)	62 (H)	104 (H)	17 (H)	22 (H)	–	–	–	445
1981	51 (H)	105 (H)	51 (H)	25 (H)	12 (H)	4 (F)	105 (F)	31 (H)	384
1982	84 (H)	149 (H)	37 (H)	36 (H)	30 (F)	37 (F)	165 (F)	33 (H)	571
1983	28 (H)	138 (H)	91 (H)	30 (H)	47 (H)	–	212 (F)	30 (H)	599
1984	185 (H)	171 (H)	124 (H)	15 (H)	103 (H)	88 (F)	388 (F)	28 (H)	1,102
1985	163 (H)	129 (H)	92 (H)	8 (H)	125 (H)	50 (H)	377 (H)	12 (H)	956
1986	562 (H)	168 (H)	203 (H)	20 (H)	120 (H)	–	564 (H)	40 (H)	1,745
1987	261 (H)	76 (H)	120 (H)	19 (H)	115 (H)	26 (H)	310 (H)	48 (H)	975
1988	280 (H/F)	82 (H/F)	159 (H)	25 (H/F)	32 (H)	19 (H/F)	164 (H)	25 (H/F)	786
1989	226 (H/F)	90 (H)	137 (H)	57 (H)	84 (H)	22 (H/F)	224 (H)	94 (H)	934
1990	135 (F)	107 (H)	27 (H)	20 (H)	24 (H)	35 (H)	163 (H)	53 (H)	564
1991	125 (H)	18 (H)	49 (H)	14 (H)	38 (H)	13 (H)	185 (H)	45 (H)	487
1992	87 (H)	4 (H)	68 (H)	4 (H)	20 (H)	8 (H)	131 (H)	24 (H)	346
1993	67 N(H)	46 E(H)	68 N(H)	11 N(H)	29 N(H)	13 N(H)	80 N(H)	75 N(H)	389
1994	31 N(H)	29 E(H)	64 E(H)	18 E(H)	16 N(H)	44 N(H)	129 E(H)	57 E(H)	388
1985-1994 Avg.	194	75	99	20	60	26	233	47	750
1995	87 E(H)	12 E(F)	59 E(F)	60 E(H)	36 N(F)	13 N(F)	62 N(H)	27 E(H)	356

[a] Escapement counts conducted prior to 1975 may not be comparable due to differences in survey dates and counting methods.

[b] — = no survey conducted or data not comparable; (A) = escapement surveyed by fixed-wing aircraft; (F) = escapement surveyed by walking stream; (H) = escapement surveyed by helicopter; (H/F) = escapement surveyed by combination of walking and helicopter; N = survey conditions normal; E = excellent.

[c] Totals for 1975–1980, 1983 and 1986 expanded for unsurveyed index areas by 1981–1992 average % observed to those indices.

Table 11.–Distribution of spawning chinook salmon into index areas of the Chickamin River for years when all index areas were surveyed.

Year	South Fork Creek	%	Barrier Creek	%	Butler Creek	%	Leduc Creek	%	Indian Creek	%	Humpy Creek	%	King Creek	%	Clear Falls Creek	%	Total
1981	51	13	105	27	51	13	25	7	12	3	4	1	105	27	31	8	384
1982	84	15	149	26	37	6	36	6	30	5	37	6	165	29	33	6	571
1984	185	17	171	16	124	11	15	1	103	9	88	8	388	35	28	3	1,102
1985	136	14	156	16	93	10	8	0	125	13	50	5	377	39	12	1	957
1987	261	27	76	8	120	12	19	2	115	12	26	3	310	32	48	5	975
1988	280	36	82	10	159	20	25	3	32	4	19	2	164	21	25	3	786
1989	226	24	90	10	137	15	57	6	84	9	22	2	224	24	94	10	934
1990	135	24	107	19	27	5	20	4	24	4	35	6	163	29	53	9	564
1991	125	26	18	4	49	10	14	3	38	8	13	3	185	38	45	9	487
1992	87	25	4	1	68	20	4	1	20	6	8	2	131	38	24	7	346
1993	67	17	46	12	68	17	11	3	29	7	13	3	80	21	75	19	389
1994	31	8	29	7	64	16	18	5	16	4	44	11	129	33	57	15	388
Avg.	161	22	96	13	92	13	22	3	57	8	30	4	228	31	43	6	728
1995	87	24	12	3	59	17	60	17	36	10	13	4	62	17	27	8	356

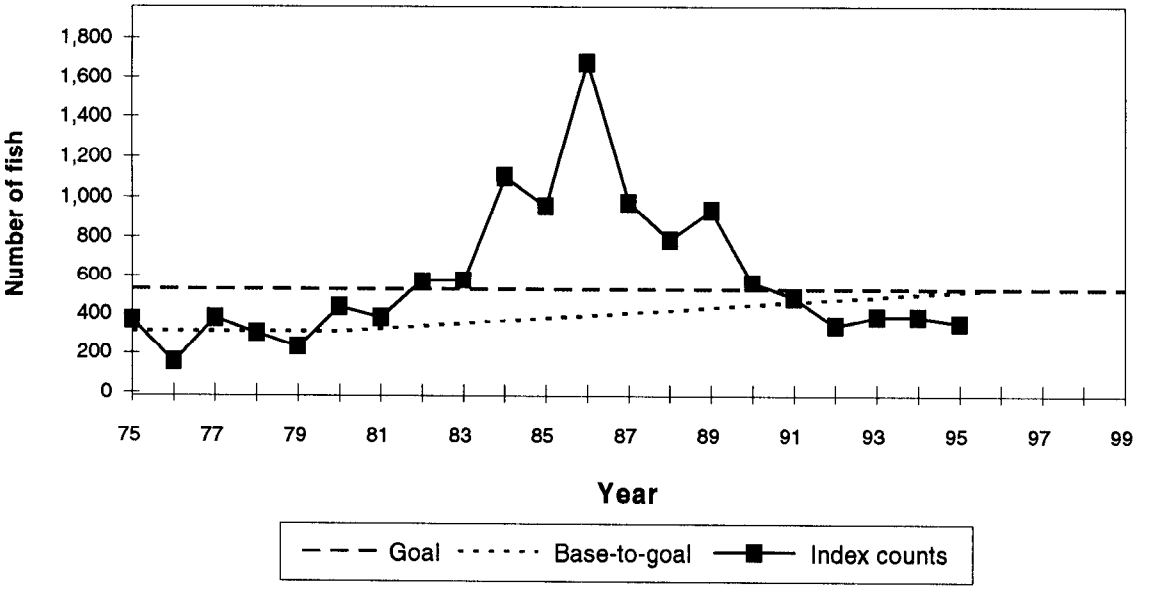

Figure 8.–Counts of chinook salmon in index areas of the Chickamin River, 1975–1995. Base-to-goal line indicates linear rebuilding schedule, starting in 1981 at average escapement level during the base period (1975–1980) and ending at escapement goal of 525 large chinook salmon in 1995 (final year of the three-cycle rebuilding program).

Table 12.–Counts of chinook salmon for selected rivers in Behm Canal, 1948–1995.

Year[a]	Keta River	Blossom River	Wilson River	Marten River	Grant River	Klahini River	Total
1948	500 (F)[b]	–	–	–	–	–	500
1949	–	–	–	–	–	–	–
1950	210 (F)	–	–	–	–	–	210
1951	120 (F)	–	–	–	–	–	120
1952	462 (F)	–	–	–	–	–	462
1953	156 (F)	–	–	–	–	–	156
1954	300 (A)	–	–	–	–	–	300
1955	1,000 (A)	–	–	–	–	–	1,000
1956	1,500 (A)	–	–	–	–	–	1,500
1957	500 (A)	–	–	–	–	–	500
1958	–	–	–	–	–	–	–
1959	–	–	–	–	–	–	–
1960	–	–	–	–	–	–	–
1961	44 (F)	68 (F)	–	22 (F)	40 (A)	-	174
1962	–	–	–	–	6 (A)	100 (A)	106
1963	–	450 (A)	375 (A)	–	15 (A)	–	840
1964	–	–	–	–	–	–	–
1965	–	–	50 (A)	43 (H)	–	–	93
1966	75 (A)	200 (A)	60 (A)	10 (A)	100 (A)	3 (A)	448
1967	86 (H)	–	8 (H)	7 (H)	15 (H)	–	116
1968	–	–	–	–	4 (H)	–	4
1969	200 (A)	–	10 (A)	10 (A)	69 (H)	3 (H)	292
1970	–	100 (H)	–	–	–	–	100
1971	–		–	–	–	–	–
1972	255 (A)	225 (A)	275 (A)	–	25 (A)	150 (A)	930
1973	–	–	30 (A)	–	38 (A)	7 (H)	75
1974	25 (H)	166 (H)	–	–	–	–	191
1975	203 (H)	146 (H)	7 (H)	15 (H)	–	–	371
1976	84 (H)	68 (H)	–	–	–	–	152
1977	230 (H)	112 (H)	–	–	–	–	342
1978	392 (H)	143 (H)	–	2 (A)	–	–	537
1979	426 (H)	54 (H)	36 (H)	–	–	–	516
1980	192 (H)	89 (H)	–	–	–	–	281
1981	329 (H)	159 (H)	76 (F)	–	25 (H)	42 (F)	631
1982	754 (H)	345 (H)	300 (B)	75 (F)	33 (F)	79 (F)	1,586
1983	822 (H)	589 (H)	178 (B)	138 (B)	8 (A)	10 (H)	1,745
1984	610 (H)	508 (H)	133 (F)	12 (B)	124 (F)	54 (F)	1,441
1985	624 (H)	709 (H)	420 (H)	69 (F)	55 (F)	20 (F)	1,897
1986	690 (H)	1,278 (H)	–	–	–	–	1,968
1987	768 (H)	1,349 (H)	–	270 (H)	33 (A)		2,420
1988	575 (H)	384 (H)	–	543 (H)	–	40 (H)	1,542
1989	1,155 (H)	344 (H)	–	133 (H)	–	–	1,632
1990	606 (H)	257 (H)	–	283 (H)	–	–	1,146
1991	272 (H)	239 (H)	–	135 (H)	–	–	646
1992	217 (H)	150 (H)	109 (H)	76 (H)	25 (H)	19 (H)	596
1993	362 E(H)	303 N(H)	63 P(H)	229 E(H)	–	–	957
1994	306 E(H)	161 N(H)	–	178 E(H)	–	–	645
1985–94 Avg.	558	517	197	213	38	26	1,345
1995	175 E(H)	217 N(H)	58 N(H)	171 E(H)	–	–	621

[a] Escapement counts prior to 1975 may not be comparable due to differences in survey dates or methods.

[b] (F) = escapement surveyed by walking stream; — = no survey conducted or data not comparable; (A) = escapement surveyed from fixed-wing aircraft; (H) = escapement surveyed from helicopter; (B) = escapement surveyed from boat; N = survey conditions normal; E = excellent.

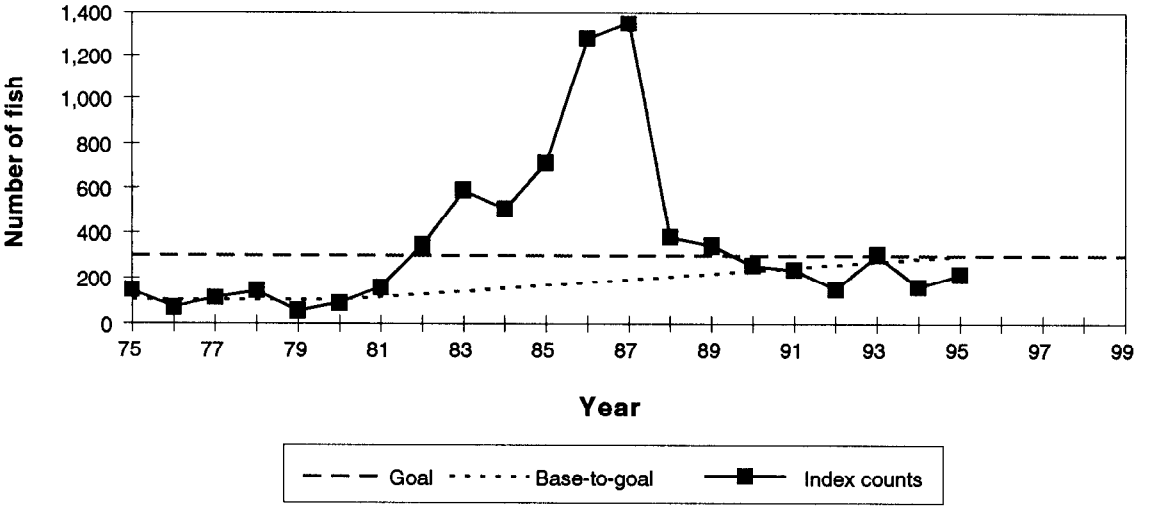

Figure 9.–Counts of chinook salmon into the Blossom River, 1975–1995. Base-to-goal line shows linear rebuilding schedule, starting in 1981 at average escapement level during base period (1975–1980) and ending at escapement goal of 300 large chinook salmon in 1995 (final year of the three-cycle rebuilding program).

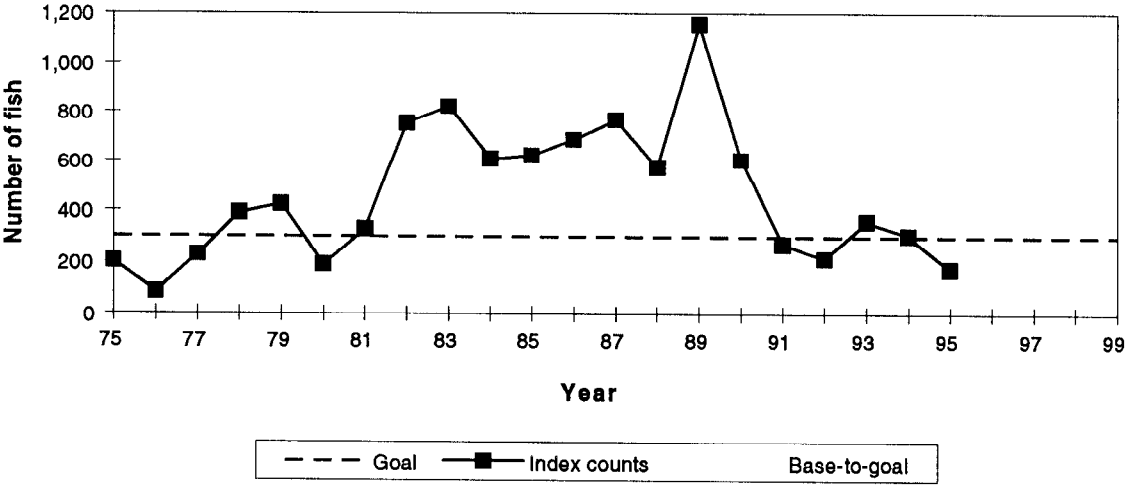

Figure 10.–Counts of chinook salmon to the Keta River, 1975–1995.

Table 13.–Peak escapement counts and weir counts of spawning chinook salmon in the King Salmon River, 1957–1995.

	Survey count			Survey as percent	Total	Total weir	Total weir	Adults below	Total	Total
	Below weir	Above weir		of weir count	egg take (adults)	count (adults)	count (jacks)[b]	weir (foot ct)	inriver (adults)	natural spawning
Year	A	B		B/(D-C)	C	D	E	F	D+F	D+F-C
1957	–[a]	200	(F)	–	–	–	–	–	–	200
1960	–	20	(F)	–	–	–	–	–	–	20
1961	–	117	(F)	–	–	–	–	–	–	117
1971	–	94	(F)	–	–	–	–	–	–	94
1972	–	90	(F)	–	–	–	–	–	–	90
1973	–	211	(F)	–	–	–	–	–	–	211
1974	–	104	(F)	–	–	–	–	–	–	104
1975	–	42	(H)	–	–	–	–	–	–	42
1976	–	65	(H)	–	–	–	–	–	–	65
1977	–	134	(H)	–	–	–	–	–	–	134
1978	–	57	(H)	–	–	–	–	–	–	57
1979	–	88	(H)	–	17	–	–	–	–	71
1980	–	70	(H)	–	–	–	–	–	–	70
1981	–	101	(H)	–	11	–	–	–	101	90
1982	–	259	(H)	–	30	–	–	–	259	229
1983	25	183	(H)	85%	37	252	20	30	282	245[c]
1984	14	184	(H)	71%	46	299	82	12	311	265[c]
1985	12	105	(H)	64%	29	194	45	10	204	175[c]
1986	9	190	(H)	80%	26	264	72	17	281	255[c]
1987	19	128	(H)	73%	31	207	62	20	227	196[c]
1988	5	94	(H)	50%[d]	35	231	54	12	243	208[c]
1989	34	133	(H)	63%	38[e]	249	71	29	278	240[c]
1990	34	98	(H)	57%	29	190	32	8	198	179[c]
1991	6	91	(H)	72%	20	146	89	8	154	134[c]
1992	–	58	(H)	59%[f]	18	47	16	70	117	99[c]
1993	–	175	E(H)	----------no weir or egg take----------						175
1994	–	140	N(F)	----------no weir or egg take----------						140
1983–92 Avg.	17	126		67%	31	209	56	22	231	188
1995	–	97	P(H)	----------no weir or egg take----------						97

[a] — = no survey conducted or data not comparable; (F) = escapement surveyed by walking stream; (H) = escapement surveyed from helicopter; N = survey conditions normal; E = excellent; P = poor.

[b] Minimum count as jacks could pass through weir.

[c] Natural spawning (adults) = (total inriver - egg take; 1983-1992).

[d] Four females and two males were held but not spawned for egg take; % = 94/(231-37-6) = 50%.

[e] Includes holding mortality of 4 males and 6 females for egg take.

[f] Peak survey was after weir was removed 58/99 = 59%.

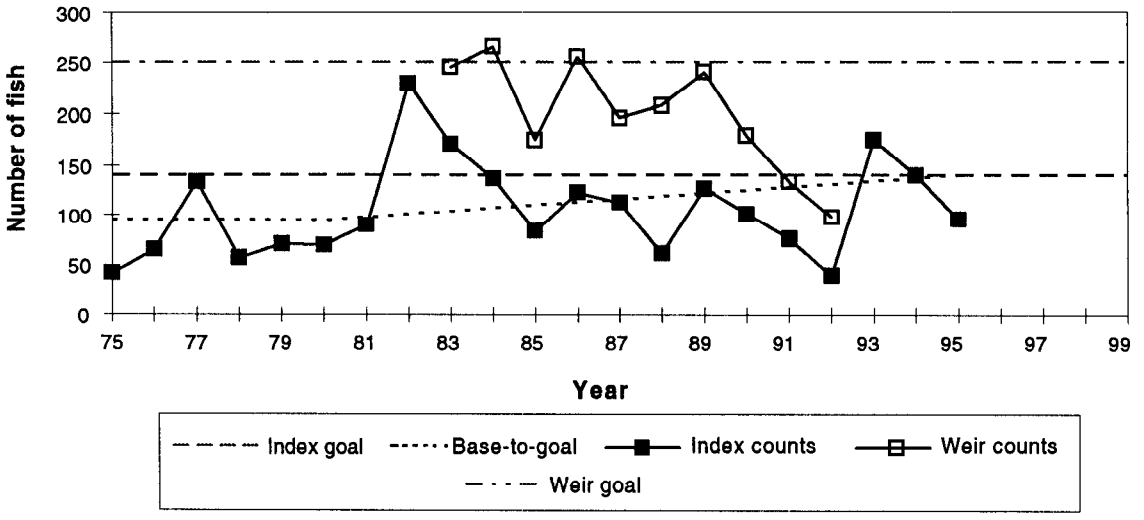

Figure 11.–Counts of chinook salmon at a weir and in the index area of the King Salmon River, 1975-1995. Base-to-goal line shows linear rebuilding schedule, starting in 1981 at average escapement level during base period (1975–1980) and ending at index escapement goal of 140 large chinook salmon in 1995 (final year of the three-cycle rebuilding program. Fish removed for broodstock are subtracted from counts.

SITUK RIVER

Escapement of large chinook salmon to the Situk River in 1995 was 4,363 fish, a 243% increase over the 1994 escapement of 1,252 fish, and the highest escapement since 1947 (Table 14). On the basis of spawner-recruit analysis, ADF&G in 1991 revised the management escapement goal from 2,000 chinook salmon in the Situk River to 600 large fish, with a range of 450–750 (ADF&G 1991). This revised goal has been adopted by the PSC and the Alaska Board of Fisheries as part of a management plan for the Situk River.

Escapements have exceeded the revised escapement goal since 1984 (Figure 12). The 1995 commercial harvest of 8,106 (Table 14) is more than 5,000 fish above the previous record catch of 2,656 set in 1994. The commercial harvest and escapement combined constitute the largest total run since records began in 1915. The proportion of the recreational harvest that is caught above the weir varies from year to year and is estimated by the local management biologists. The escapement counts from the base period all exceed the revised escapement goal, indicating the Situk chinook salmon stock was not depressed and never needed rebuilding.

CHILKAT RIVER

The 1995 escapement to the Chilkat River was estimated by mark-recapture experiment to be 3,790 large chinook salmon (Ericksen *In prep.*). Since Johnson et al. (1992) demonstrated that expansion factors used on the Chilkat River system were inaccurate, the management escapement goal of 2,000 large fish needs to be assessed. A new index method and management escapement goal will be developed when a sufficient number of abundance estimates have been conducted (Johnson et al. 1993, Johnson 1994, Ericksen 1995).

Table 14.–Harvest, escapement, and minimum total run of Situk River chinook salmon, 1915–1995.

	Commercial chinook harvests			Recreational harvests		Escapement			Total run size[a]	
	Yakutat	Situk River				Large	Small		Large	All
Year	Bay	Commercial	Subsistence	Large	Small	chinook	chinook	Total	only	chinook
1915	–	836	–	–	–	–	–	–	–	836
1916	–	931	–	–	–	–	–	–	–	931
1917	–	2,499	–	–	–	–	–	–	–	2,499
1918	–	1,036	–	–	–	–	–	–	–	1,036
1919	–	316	–	–	–	–	–	–	–	316
1920	–	782	–	–	–	–	–	–	–	782
1921	–	1,952	–	–	–	–	–	–	–	1,952
1922	–	2,118	–	–	–	–	–	–	–	2,118
1923	–	1,716	–	–	–	–	–	–	–	1,761
1924	–	1,351	–	–	–	–	–	–	–	1,351
1925	–	1,087	–	–	–	–	–	–	–	1,087
1926	–	1,851	–	–	–	–	–	–	–	1,851
1927	–	1,687	–	–	–	–	–	–	–	1,687
1928	–	–	–	–	–	–	–	1,224	–	1,224
1929	–	–	–	–	–	–	–	3,559	–	3,559
1930	–	–	–	–	–	–	–	1,455	–	1,455
1931	–	–	–	–	–	–	–	2,967	–	2,967
1932	–	–	–	–	–	–	–	1,978	–	1,978
1933	–	267	–	–	–	–	–	–	–	267
1934	–	450	–	–	–	–	–	1,486	1,936	1,936
1935	–	558	–	–	–	–	–	638	1,196	1,196
1936	–	–	–	–	–	–	–	816	–	816
1937	–	–	–	–	–	–	–	1,290	–	1,290
1938	–	1,220	–	–	–	–	–	2,668	3,888	3,888
1939	–	495	–	–	–	–	–	2,117	2,612	2,612
1940	–	164	–	–	–	–	–	903	1,067	1,067
1941	–	390	–	–	–	–	–	2,594	2,984	2,984
1942	–	430	–	–	–	–	–	2,543	2,973	2,973
1943	–	947	–	–	–	–	–	3,546	4,493	4,493
1944	–	844	–	–	–	–	–	2,906	3,750	3,750
1945	–	692	–	–	–	–	–	1,458	2,150	2,150
1946	–	1,468	–	–	–	–	–	4,284	5,752	5,752
1947	–	885	–	–	–	–	–	5,077	5,962	5,962
1948	–	694	–	–	–	–	–	3,744	4,438	4,438
1949	–	410	–	–	–	–	–	1,978	2,388	2,388
1950	–	378	–	–	–	–	–	2,011	2,389	2,389
1951	–	948	–	–	–	–	–	2,780	3,728	3,728
1952	–	225	–	–	–	–	–	1,459	1,684	1,684
1953	–	378	–	–	–	–	–	1,040	1,418	1,418
1954	–	314	–	–	–	–	–	2,101	2,415	2,415
1955	–	740	–	–	–	–	–	1,571	2,311	2,311
1956	–	1,867	–	–	–	–	–	–	–	1,867
1957	–	1,796	–	–	–	–	–	1,500	–	3,296
1958	–	187	–	–	–	–	–	300	–	487
1959	–	426	–	–	–	–	–	–	–	426
1960	24	312	–	–	–	–	–	500	–	812
1961	28	367	–	–	–	–	–	400	–	767
1962	99	337	–	–	–	–	–	1,000	–	1,337
1963	141	466	–	–	–	–	–	-	–	466
1964	115	706	–	–	–	–	–	725	–	1,431
1965	86	442	–	–	–	–	–	1,500	–	1,942
1966	43	411	–	–	–	–	–	800	–	1,211

-continued-

Table 14.–Page 2 of 2.

Year	Commercial chinook harvests: Yakutat Bay	Commercial chinook harvests: Situk River Commercial	Commercial chinook harvests: Situk River Subsistence	Recreational harvests: Large	Recreational harvests: Small	Escapement: Large chinook	Escapement: Small chinook	Total	Total run size[a]: Large only	Total run size[a]: All chinook
1967	241	203	–	–	–	–	–	200	–	403
1968	31	312	–	–	–	–	–	700	–	1,012
1969	29	1,089	–	–	–	–	–	2,500	–	3,589
1970	119	927	–	–	–	–	–	1,100	–	2,027
1971	106	473	–	–	–	–	–	964	–	1,437
1972	115	303	–	–	–	–	–	400	–	703
1973	79	752	–	–	–	–	–	510	–	1,262
1974	64	791	–	–	–	–	–	702	–	1,493
1975	41	562	27	–	–	–	–	1,180	–	1,769
1976	69	1,002	41	200	–	1,433	509	1,942	2,676	3,185
1977	53	833	24	244	–	1,732	148	1,880	2,833	2,981
1978	108	382	50	210	–	814	289	1,103	1,456	1,745
1979	51	1,028	25	282	–	1,400	367	1,767	2,735	3,102
1980	164	969	57	233	120	905	220	1,125	2,164	2,504
1981	151	858	62	86	44	687	81	768	1,693	1,818
1982	419	248	27	47	16	424	169	593	746	931
1983	371	349	50	42	10	588	246	834	1,029	1,285
1984	145	512	89	146	5	1,685	471	2,156	2,432	2,908
1985	240	484	156	294	217	1,454	375	1,829	2,388	2,980
1986	211	202	99	0	37	2,067	494	2,561	2,368	2,899
1987	329	891	24	76	319	1,368	397	1,765	2,359	3,075
1988	196	299	90	185	3	837	185	1,022	1,411	1,599
1989	297	1	96	0	0	652	1,217	1,869	749	1,966
1990	304	0[b]	101	0	0	676	687[c]	1,363	777	1,464
1991	392	786	111	88	8	879	707[c]	1,586	1,864	2,579
1992	147	1,504	341	172	9	1,580	351[c]	1,931	3,597	3,957
1993	148	790	202	137	115	899	3,099	3,998	2,028	5,242
1994	258	2,656	367	400	167	1,252	2,910	4,162	4,675	7,752
1985–94 Avg.	252	761	159	135	88	1,166	1,042	2,209	2,222	3,351
1995	264	8,106	528	1,407[d]	279	4,363	3,353	7,716	14,404	18,036

[a] Total run = chinook escapement + Situk commercial, sport, and subsistence harvests. An unknown portion of the Yakutat Bay catch is Situk fish. Size composition of harvests varies from year to year.

[b] Non-retention regulation in effect for commercial fisheries in 1989 and 1990; estimated personal use harvest of 400 large chinook in 1990, 415 in 1990, and 109 in 1991.

[c] Small chinook escapement includes 532 medium fish in 1990 (>450mm<660mm MEF) 126 in 1991, 223 in 1992, 461 in 1993, 1,403 in 1994, and 457 in 1995.

[d] Preliminary estimate of recreational harvest, small for recreational harvest <16 inches.

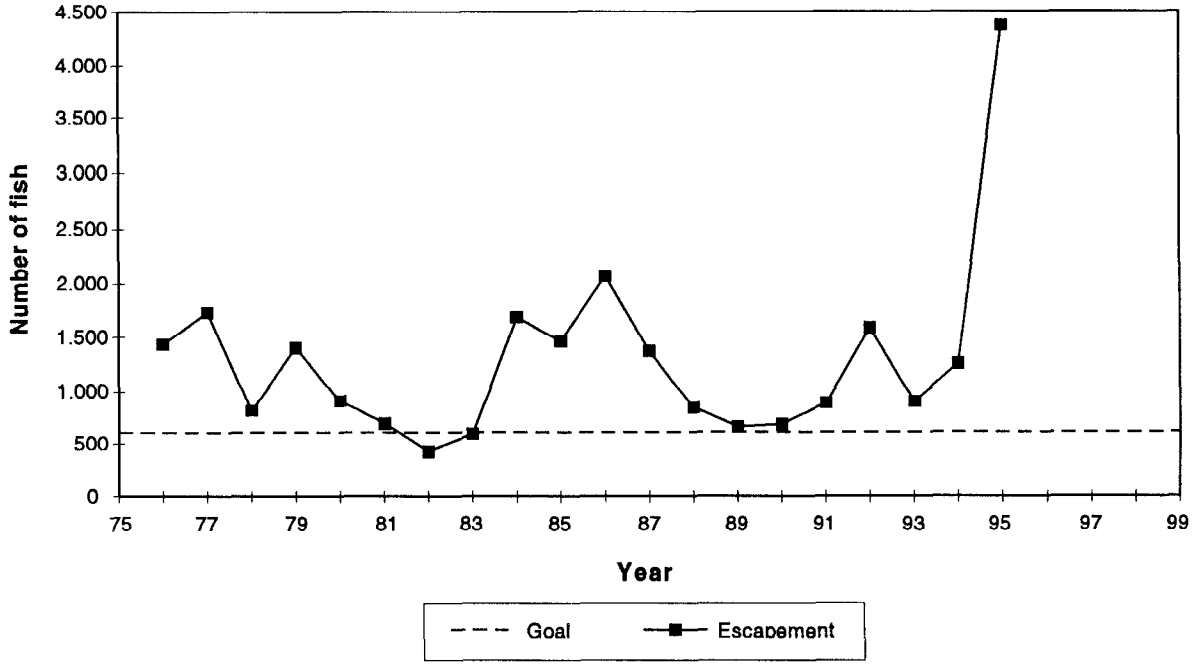

Figure 12.–Counts of chinook salmon at the Situk River weir, 1975–1995.

DISCUSSION

The utility of the index method as a measure of escapement is based on the assumption that the number of fish counted in an index area is a constant proportion of the escapement in the index area or watershed. Therefore, a change in the escapement causes a proportional change in the index count. Implicit in this method are sources of error that fall into two categories:

Factors that are constant sources of error: (1) interference with the ability to count fish; conditions such as heavily shaded areas or topography that prevents close approach with a helicopter, presence of other species that could be confused with chinook salmon, overhanging brush, or deep or normally occluded water (accounted for by a survey expansion factor); and (2) estimates of distribution among tributaries (accounted for by tributary expansion factors).

Factors that are not constants: (1) changes in migratory timing will produce a reduced count; (2) a very large number of spawners may cause reduced counts relative to the number of fish in the index area; (3) changes in the distribution of spawners among the tributaries of a watershed among years; and (4) inclement weather, turbidity events, or changes in pilot and/or observer experience.

Consequently, even though estimates of escapement may be incorrect, multi-year trends in escapement are correct.

To judge rebuilding progress, the Pacific Salmon Commission focuses on whether trends in counts are above or below a linear rebuilding schedule (see Figures 2-11). This method will correctly reflect the rate of rebuilding, provided the ratio of the count to escapement and the effect of "constant factors" do not change among years and that "non-constant factors" are infrequent events.

Expanded counts are needed when comparing indices among watersheds or for estimating exploitation rates and spawner/recruit relationships. Though survey and tributary expansion

factors have been endorsed by the Pacific Salmon Commission (PSC) since 1981, the original expansion factors were developed on the basis of judgment rather than on empirical data, and error associated with these expansions could be large. Johnson et al. (1992) showed that expansion factors for the Chilkat River greatly underestimated escapement to that watershed. ADF&G recognized the need to develop better expansions in other watersheds, and has estimated distribution and escapement for chinook salmon in the Unuk (Pahlke 1995) and Taku rivers. Projects are continuing on those two rivers, along with the Stikine and Chickamin rivers. On the basis of information collected on the Unuk and Chickamin rivers, expansion factors for the four Behm Canal systems were revised in 1996. The expansion factor for the King Salmon River was based on 10 years of weir counts compared with aerial surveys, and the expansion factor for Andrew Creek was based on 4 years of paired weir and survey counts. Changing the escapement goals, however, requires a formal review by ADF&G, the Canadian Department of Fisheries and Oceans, and the CTC or Transboundary Technical Committees of the PSC, as was done for the Situk River in 1991 and the Behm Canal systems in 1994.

Expansion factors and escapement goals will continue to be revised as we learn more about the actual relationships between index counts and total escapement. Any change in survey methods must take into account the comparability of historical data with new data. Year-to-year consistency and repeatability of index counts may be more important than their absolute accuracy to agencies that compare escapement estimates between years.

Currently, only one of the 22 minor producers in the region and six of nine medium producing watersheds are included in the index survey program. Expansion of counts from these streams to represent the escapement of all streams in minor and medium producing categories most likely produces inaccurate estimates of total escapement. In 1995, surveys were flown on the Harding River and Aaron Creek to determine the feasibility of adding these medium and small systems to the program. The remaining systems are too remote, and funds are not currently available for these surveys. It may be more reasonable to expand the small systems by some proportion of the nearest surveyed systems, rather than using only the King Salmon River.

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APPENDIX A

Appendix A1.–Management escapement goals and survey and tributary expansion factors for Southeast Alaska and transboundary rivers. Category escapement goal equals sum of the survey escapement goal times survey and tributary expansion factors times the category expansion factor.

River system	Index tributaries surveyed	Survey escapement goal [a]	Survey expansion factor	Tributary expansion factor [b]	System escapement goal	Category expansion factor	Category escapement goal
Major Production Systems (Total = 3)							
Alsek	Klukshu	4,700 (W)	1	1.5625	7,344		
Taku	4 tributaries	5,155 (H)	1.6	1.9231	15,862		
Taku	Nakina/Nahlin	8,055 (H)	1.3333	1.9231	20,654		
Stikine	Little Tahltan	5,300 (W)	1	4	21,200		
Major category subtotal		23,210			65,059	3/3	65,059
Medium Production Systems (Total = 9)							
Situk	All	600 (W)		1/1	600		
Chilkat	All	2,000 (M)		1/1	2,000		
Andrew Cr.	All	470 (A)	2	1/1	750 [c]		
Unuk	All	875 (A)	4	1/1	3,500		
Chickamin	All	525 (A)	4	1/1	2,100		
Blossom	All	300 (A)	2.5	1/1	750		
Keta	All	300 (A)	2.5	1/1	750		
Medium category subtotal		5,070			10,450	9/7	13,436
Minor Production Systems (Total = 22)							
King Salmon	All	156 (F/H)	1.6	1/1	250		
Minor category subtotal		156			250	22/1	5,491
All systems total		28,436			75,637		83,951

[a] (W) = weir count; (A) = aerial survey peak escapement estimate; (M) = mark/recapture estimate. Survey escapement goal = number of fish actually counted on survey, or through weir.

[b] Expansion factors revised in 1995.

[c] Expansion factor revised but goal remains 750.

Appendix A2.–Estimated total escapements of chinook salmon to escapement indicator systems and to Southeast Alaska and transboundary (T) rivers, 1975–1995. Index escapements are expanded for survey counting rates and unsurveyed tributaries, using 1995 expansions and escapement goals.

	MAJOR SYSTEMS				MEDIUM SYSTEMS										MINOR SYSTEMS			
Year	Alsek[a] (T)	Taku (T)	Stikine[b] (T)	Major subtotal	Situk	Chilkat	Andrew[c]	Unuk (T)	Chicka-min (T)	Blossom	Keta	Behm subtotal	Medium unsurv.	Medium subtotal	King Salmon	Minor unsurv.	Minor subtotal	ALL SYSTEMS
1975		5,854	5,800	11,654			520		1,481	365	508	2353	1,437	4,310	67	1,411	1,478	17,442
1976	1,672	12,729	3,300	17,701	1,433		404		627	170	210	1,007	1,422	4,266	104	2,184	2,288	24,255
1977	4,363	15,259	6,600	26,222	1,732		456	3,896	1,450	280	575	6,201	4,195	12,584	214	4,502	4,717	43,523
1978	4,050	9,168	5,200	18,418	814		388	4,424	1,234	358	980	6,995	4,099	12,296	91	1,915	2,006	32,720
1979	6,101	11,353	9,328	26,782	1,400		327	2,304	954	135	1,065	4,458	3,093	9,278	114	2,386	2,499	38,559
1980	3,770	20,275	17,096	41,141	905		282	4,064	1,779	223	480	6,545	3,866	11,,598	112	2,352	2,464	55,203
Average	3,991	12,440	7,887	23,653	1,257		396	3,672	1,254	255	636	4,593	3,018	9,055	117	2,458	2,575	35,284
1981	2,837	25,856	26,672	55,365	702		536	2,924	1,536	398	823	5,680	3,459	10,377	144	3,024	3,168	68,910
1982	3,078	12,810	22,640	38,528	434		672	5,404	2,284	863	1,885	10,436	5,771	17,312	366	7,694	8,061	63,901
1983	3,352	5,621	4,752	13,725	592		366	4,500	2,398	1,473	2,055	10,425	5,692	17,075	245	5,145	5,390	36,190
1984	2,038	10,748	10,352	23,138	1,726		389	7,348	4,408	1,270	1,525	14,551	8,333	24,999	265	5,565	5,830	53,967
1985	1,853	19,580	12,456	33,889	1,521		640	4,736	3,824	1,773	1,560	11,893	7,027	21,080	175	3,675	3,850	58,819
Average	2,632	14,923	15,374	32,929	995		521	4,982	2,890	1,155	1,570	10,597	6,056	18,169	239	5,021	5,260	56,357
1986	3,966	20,231	11,564	35,761	2,067		1,414	8,504	6,980	3,195	1,725	20,404	11,942	35,827	255	5,355	5,610	77,198
1987	3,598	15,530	19,132	38,260	1,884		1,576	7,892	3,900	3,373	1,920	17,085	10,272	30,817	196	4,116	4,312	73,389
1988	2,891	23,334	29,168	55,393	885		1,128	6,984	3,144	960	1,438	12,526	7,269	21,808	208	4,368	4,576	81,777
1989	3,399	25,481[d]	18,860	47,740	652		1,060	4,596	3,736	860	2,888	12,080	6,896	20,687	240	5,040	5,280	73,707
1990	2,722	32,622[d]	17,568	52,912	676		1,328	2,364	2,256	643	1,515	6,778	4,391	13,172	179	3,759	3,938	70,022
Average	3,315	23,440	19,258	46,013	1,233		1,301	6,068	4,003	1,806	1,897	13,774	8,154	24,462	216	4,528	4,743	75,219
1991	3,165	27,318	18,024	48,507	878	5,897	800	2,620	1,948	598	680	5,846	3,834	17,255	134	2,814	2,948	68,710
1992	1,950	30,142	26,508	58,600	1,580	5,287	1,556	3,496	1,384	375	543	5,798	4,062	18,280	99	2,079	2,178	79,058
1993	4,811	36,208	45,796	86,815	899	4,472	2,120	4,272	1,556	758	905	7,491	4,280	19,262	280	5,880	6,160	112,237
1994	5,532	26,804	25,774	58,136	1,270	6,795	1,144	2,844	1,552	403	765	5,564	4,221	18,993	224	4,704	4,928	82,057
1995	8,579	23,861[d]	13,036	45,436	4,363	3,790	686	3,088	1,424	543	438	5,492	4,095	18,426	155	3,259	3,410	67,312
Average	4,807	28,867	25,833	59,507	1,798	5,248	1,261	3,364	1,573	535	666	6,038	4,098	18,443	178	3,747	3,926	81,875
1995 CHANGE FROM 1994																		
Number	3,047	(2,943)	(12,764)	(12,660)	3,093	(3005)	(458)	244	(128)	140	(328)	(72)	(108)	(487)	(69)	(1,445)	(1,514)	(14,781)
Percent	55	-11	-49	-22	244	-44	-40	9	-8	35	-43	- 1	-3	-3	-31	-31	-31	-18
Goals	7,344	36,515	21,200	65,059	600	2,000[e]	750	3,500	2,100	750	750	7,100	2,986	13,436	250	5,250	5,500	83,951
AVERAGE PERCENT OF GOAL																		
1975–80	55	34	37	37	209		53	105	60	34	85	65	101	67	47	47	47	41
1981–85	36	41	73	51	166		69	142	138	154	209	149	203	135	96	96	96	67
1986–90	45	64	91	71	206		173	173	191	241	253	198	273	182	86	86	86	89
1991–95	65	79	122	96	300	262	168	93	74	40	89	85	137	137	71	71	71	97

[a] Prior to Little Tahltan weir in 1985, Stikine estimate is 8 times aerial survey.

[b] Using CTC calculations of Alsek escapement: Escapement = (weir count/0.64)-sport and IFF harvest.

[c] Andrew Creek revised to include North Fork counts; egg takes excluded; weir counts not expanded.

[d] Mark-recapture estimates for Taku River 1989–(40,329), 1990–(52,142), and 1995–(33,805) large fish. Expansion will be revised in 1996.

[e] Chilkat escapements based on mark recapture estimates; goal under revision.

Appendix A3.–Detailed 1995 Southeast Alaska chinook salmon escapement surveys as entered into Commercial Fisheries Division Integrated Fisheries Database (IFDB).

Detailed Escapement Surveys, 1995

IFDB-SET-01 on 7/5/96

Number	Stream name	Date	Survey type	Dist	Species	Mouth	Tidal	Live	Dead	Total	Obs.	Vis	Depth	Tide	Remarks
101-30-030	Keta River	7/6/95	A	L	chinook	0	0	2	0	2	EDH	N	N	I	
101-30-030	Keta River	8/18/95	H	L	chinook	0	0	162	0	162	KAP	E	N		30 fish way up top
101-30-030	Keta River	8/28/95	H	L	chinook	0	0	165	10	175	KAP	E	L		10 up top
101-30-060	Marten River	8/18/95	H	L	chinook	0	0	171	0	171	KAP	E	L		54 in Dicks Cr.
101-45-078	Carroll Creek	8/13/95	F	L	chinook	0	0	151	1	152	SBW	E	N	H	counted only to intertidal
101-45-081	Falls Creek	8/7/95	A	I	chinook	0	0	180	0	180	PSD	N	N	H	outside pen
101-47-025	Ketchikan Creek	9/6/95	F	L	chinook	0	0	0	7	7	SBW	N	L	H	
101-55-020	Wilson River	8/24/95	H	L	chinook	0	0	58	0	58	KAP	N	N		
101-55-040	Blossom River	8/18/95	H	L	chinook	0	0	216	1	217	KAP	N	L		
101-55-040	Blossom River	8/24/95	H	L	chinook	0	0	59	0	59	KAP	P	N		poor conditions
101-71-04A	Barrier Creek	8/7/95	H	L	chinook	0	0	8	0	8	KAP	N	N		
101-71-04A	Barrier Creek	8/17/95	F	L	chinook	0	0	11	1	12	KAP	E	L		
101-71-04A	Barrier Creek	8/28/95	H	L	chinook	0	0	0	0	0	KAP	E	L		
101-71-04B	Butler Creek	8/7/95	H	L	chinook	0	0	30	0	30	KAP	N	N		
101-71-04B	Butler Creek	8/7/95	F	L	chinook	0	0	38	1	39	JEF	N	N		
101-71-04B	Butler Creek	8/16/95	F	L	chinook	0	0	57	2	59	DLM	E	L		
101-71-04C	Clear Creek	8/7/95	H	L	chinook	0	0	14	0	14	KAP	E	L		
101-71-04C	Clear Creek	8/18/95	H	L	chinook	0	0	26	1	27	KAP	E	N		
101-71-04C	Clear Creek	8/28/95	H	L	chinook	0	0	24	0	24	KAP	E	L		
101-71-04H	Humpy Creek	8/18/95	H	L	chinook	0	0	2	0	2	KAP	N	L		
101-71-04H	Humpy Creek	8/28/95	H	L	chinook	0	0	4	2	6	KAP	N	L		
101-71-04H	Humpy Creek	8/29/95	F	0.5	chinook	0	0	8	5	13	DLM	N	N		
101-71-04I	Indian Creek	8/7/95	H	L	chinook	0	0	15	0	15	KAP	N	N		
101-71-04I	Indian Creek	8/9/95	F	L	chinook	0	0	36	0	36	DLM	N	N		
101-71-04I	Indian Creek	8/28/95	H	L	chinook	0	0	1	0	1	KAP	N	N		
101-71-04K	King Creek	7/13/95	A	L	chinook	0	0	10	0	10	EDH	N	N	I	
101-71-04K	King Creek	7/18/95	A	L	chinook	0	0	40	0	40	EDH	E	N	I	
101-71-04K	King Creek	8/18/95	H	L	chinook	0	0	46	0	46	KAP	N	L		
101-71-04K	King Creek	8/23/95	H	L	chinook	0	0	33	0	33	KAP	N	L		
101-71-04K	King Creek	8/28/95	H	L	chinook	0	0	61	1	62	KAP	N	L		
101-71-04L	Leduc River	8/7/95	H	L	chinook	0	0	60	0	60	KAP	E	L		clear to bottom
101-71-04L	Leduc River	8/16/95	F	0.5	chinook	0	0	25	0	25	KAP	N	N		
101-71-04L	Leduc River	8/18/95	H	L	chinook	0	0	43	0	43	KAP	N	N		
101-71-04L	Leduc River	8/28/95	H	L	chinook	0	0	20	1	21	KAP	N	N		
101-71-04S	South Fork Chickamin	8/7/95	H	L	chinook	0	0	8	0	8	KAP	N	N		
101-71-04S	South Fork Chickamin	8/16/95	H	L	chinook	0	0	70	1	71	KAP	N	L		
101-71-04S	South Fork Chickamin	8/28/95	H	L	chinook	0	0	87	0	87	KAP	E	L		

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Number	Stream name	Date	Survey type	Dist	Species	Mouth	Tidal	Live	Dead	Total	Obs.	Vis	Depth	Tide	Remarks
101-75-015	Eulachon River	7/13/95	A	L	chinook	0	0	10	0	10	EDH	N	N	I	
101-75-015	Eulachon River	7/18/95	A	L	chinook	0	0	200	0	200	EDH	E	N	I	
101-75-015	Eulachon River	8/16/95	H	L	chinook	0	0	73	1	74	KAP	N	N		
101-75-015	Eulachon River	8/23/95	H	L	chinook	0	0	58	1	59	KAP	N	N		
101-75-03B	Boundary Cr Unuk R	8/16/95	H	L	chinook	0	0	9	0	9	KAP	N	N		murky at bottom
101-75-30C	Clear Creek-Unuk R	8/7/95	H	L	chinook	0	0	21	0	21	KAP	N	N		
101-75-30C	Clear Creek-Unuk R	8/16/95	H	L	chinook	0	0	66	0	66	KAP	E	N		foot surveyed grotto
101-75-30C	Clear Creek-Unuk R	8/23/95	F	L	chinook	0	0	54	2	56	KAP	E	L		
101-75-30G	Genes Lake Ck-Unuk	8/16/95	F	L	chinook	0	0	340	7	347	JEF	N	N		
101-75-30K	Kerr Creek-Unuk R	8/16/95	H	L	chinook	0	0	37	2	39	KAP	N	L		clear water to mainstem
101-75-30K	Kerr Creek-Unuk R	8/23/95	H	L	chinook	0	0	23	4	27	KAP	E	N		
101-75-30L	Lake Creek-Unuk R	8/7/95	H	L	chinook	0	0	7	0	7	KAP	N	N		
101-75-30L	Lake Creek-Unuk R	8/16/95	H	L	chinook	0	0	25	0	25	KAP	E	L		24 on riffles
101-75-30L	Lake Creek-Unuk R	8/23/95	H	L	chinook	0	0	35	0	35	KAP	E	L		33 on riffles
101-75-30Q	Cripple Ck-Unuk R	8/7/95	F	L	chinook	0	0	190	21	211	DLM	N	N		
101-80-070	Hatchery Ck-Yes Bay	8/1/95	F	0.3	chinook	0	0	2	0	2	MAC	N	N		meg cartwright
101-80-070	Hatchery Ck-Yes Bay	9/1/95	F	L	chinook	0	0	2	0	2	TPZ	E	L		Water extremely low-tim zadina
106-44-031	Crystal Creek	6/6/95	F	1	chinook	2	10	0	0	12	RGZ	N	N	L	2 anglers @ rapids, 1 boat @ M
106-44-031	Crystal Creek	6/9/95	B	M	chinook	0	0	0	0	0	RGZ	N		H	3 boats @ M
106-44-031	Crystal Creek	6/12/95	F	1	chinook	0	0	0	0	0	RGZ	N	H	L	3 anglers, 3 boats @ M
106-44-031	Crystal Creek	6/14/95	F	1	chinook	1	5	0	0	6	RGZ	N	H	L	1 angler, 3 boats @ M, H20 12C
106-44-031	Crystal Creek	6/16/95	F	0.5	chinook	0	25	0	0	25	RGZ	N	N	I	10 anglers 1 adult, H2O temp 13C
106-44-031	Crystal Creek	6/18/95	F	0.5	chinook	0	150	0	0	150	RGZ	N	L	I	16 anglers w/ 3 adults
106-44-031	Crystal Creek	6/19/95	A	I	chinook	30	100	0	0	130	WRB	N	N	L	50 blw rapids, 50 abv
106-44-031	Crystal Creek	6/20/95	F	0.5	chinook	0	250	0	0	250	RGZ	N	L	I	16 anglers 3 adults, H2O 18C
106-44-031	Crystal Creek	6/21/95	F	1	chinook	7	540	0	0	547	RGZ	N	L	L	13 anglers 2 adults, H20 20.5C
106-44-031	Crystal Creek	6/21/95	F	1	chinook	0	0	0	0	0	RGZ	N	L	L	19 boats @ M
106-44-031	Crystal Creek	6/23/95	F	1	chinook	200	0	0	0	200	RGZ	N	N	I	11 anglers 2 adults, H20 16C
106-44-031	Crystal Creek	6/26/95	F	1	chinook	0	0	0	0	0	RGZ	N	N	L	14 anglers w/ 8 adults, H2O temp 11C
106-44-031	Crystal Creek	6/27/95	A	L	chinook	160	100	0	0	260	WRB	N	N	L	80 big rk, 20 floating rks
106-44-031	Crystal Creek	7/2/95	A	L	chinook	11	250	70	0	331	BLL	N	L	L	200 abv rapids, 50 @ big rk
106-44-031	Crystal Creek	7/7/95	F	1	chinook	0	1500	0	0	1500	RGZ	N	L	L	fewer fish @ M than last survey
106-44-031	Crystal Creek	7/10/95	A	L	chinook	100	730	10	550	1390	WRB	E	L	L	no new dead, more just abv rapids
106-44-031	Crystal Creek	7/11/95	A	L	chinook	0	130	50	560	740	BLL	N	L	H	130 abv rapids, 560 dead abv rapids
106-44-031	Crystal Creek	7/16/95	A	L	chinook	0	12	160	0	172	BLL	N	N		
106-44-031	Crystal Creek	7/17/95	A	L	chinook	0	210	20	0	230	WRB	P	N	I	no new die off, 120 right abv rapids
106-44-031	Crystal Creek	7/18/95	B	1	chinook	0	58	22	5	85	RGZ	N	N		58 K in slough, 6 hold pond, 22 cr.
106-44-031	Crystal Creek	7/18/95	F	1	chinook	0	170	0	0	170	RGZ	N	L	L	from pool abv rapids to below big rock
106-44-031	Crystal Creek	8/1/95	B	1	chinook	0	0	720	0	720	RGZ	N	N		150 pond, 70 cr, 500+ slough
106-44-031	Crystal Creek	8/7/95	A	L	chinook	0	500	150	0	650	WRB	N	N	L	+ holding pond is full
107-40-024	Aaron Creek	8/16/95	H	L	chinook	0	0	65	0	65	KAP	N	N		36 in clear trib

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Number	Stream name	Date	Survey type	Dist	Species	Mouth	Tidal	Live	Dead	Total	Obs.	Vis	Depth	Tide	Remarks
107-40-049	Harding River	7/17/95	A	L	chinook	0	0	25	0	25	WRB	N	H	I	
107-40-049	Harding River	8/7/95	A	L	chinook	0	0	29	0	29	WRB	P	N	I	PARTIALLY GLACIAL
107-40-049	Harding River	8/16/95	H	L	chinook	0	0	38	0	38	KAP	N	N		1 wolf
107-40-052	Bradfield River N Fk	8/7/95	A	L	chinook	0	0	16	0	16	WRB	P	N	H	11 NEAR HD IN CLR LEFT FK
107-40-053	Bradfield River E Fk	8/7/95	A	L	chinook	0	0	43	0	43	WRB	P	N	H	
107-40-055	Eagle R Bradfield	8/7/95	A	L	chinook	0	0	5	0	5	WRB	N	N	H	
107-45-082	Channel Island Creek	8/12/95	F	1.5	chinook	0	0	21	0	21	RLT	N	N		walk from lower bridge- most fish abv bridge
108-40-017	Goat Ck Stikine R	8/17/95	A	L	chinook	0	0	7	0	7	WRB	N	N		
108-40-020	Andrews Creek	7/26/95	A	L	chinook	140	0	75	0	215	WRB	P	N		INC 20 N. ARM, 55 RT FORK
108-40-020	Andrews Creek	8/7/95	A	L	chinook	50	0	190	0	240	WRB	P	N		INC 30 N. ARM, 8:30AM SHADOWS
108-40-020	Andrews Creek	8/16/95	H	L	chinook	0	0	287	1	288	KAP	N	N		122 in north fork
108-40-020	Andrews Creek	8/17/95	F	4.5	chinook	0	0	338	17	355	RLT	N	L		Inc 12 jack, 96 E Fk, 18 blw fks, found tag
108-40-13A	W of Hot Springs	8/17/95	A	L	chinook	0	0	1	0	1	WRB	E	N		
108-41-010	North Arm Creek	7/26/95	A	0.2	chinook	0	0	23	0	23	WRB	P	N		FOGGY
108-41-010	North Arm Creek	8/7/95	A	L	chinook	0	0	28	0	28	WRB	P	N		8:20 AM SHADOWS
108-41-010	North Arm Creek	8/17/95	F	L	chinook	0	0	3	3	6	WRB	E	N		WAY PAST PEAK, NO TAGS
108-80-100	Tahltan River	8/1/95	H	L	chinook	0	0	696	0	696	KAP	E	L		
108-80-115	Beatty Ck-Tahltan R	8/1/95	H	L	chinook	0	0	152	0	152	KAP	N	L		
108-80-115	Beatty Ck-Tahltan R	8/6/95	H	L	chinook	0	0	132	1	133	KAP	N	L		
108-80-120	Little Tahltan River	8/1/95	H	L	chinook	0	0	936	0	936	KAP	E	L		52 below weir included
108-80-120	Little Tahltan River	8/6/95	H	L	chinook	0	0	1112	5	1117	KAP	N	L		
108-80-120	Little Tahltan River	8/20/95	W	L	chinook	0	0	3259	0	3259	DFO				prelim weir
110-32-009	Chuck R Windham Bay	7/18/95	A	L	chinook	0	0	8	0	8	WRB	E	N	I	
111-17-010	King Salmon River	7/28/95	H	L	chinook	0	0	97	0	97	KAP	P	H		poor visibility
111-32-220	Nakina River	7/30/95	H	L	chinook	0	0	1130	0	1130	KAP	E	L		IAI
111-32-220	Nakina River	7/30/95	H	L	chinook	0	0	530	0	530	KAP	E	L		IAII
111-32-220	Nakina River	7/30/95	H	L	chinook	0	0	1540	0	1540	KAP	E	L		IAIII
111-32-220	Nakina River	7/30/95	H	L	chinook	0	0	743	0	743	KAP	E	L		IAIV
111-32-220	Nakina River	7/30/95	H	L	chinook	0	0	3943	0	3943	KAP	E	L		Peak Total
111-32-220	Nakina River	8/5/95	H	L	chinook	0	0	1390	0	1390	KAP	N	L		IAI, lots jacks
111-32-220	Nakina River	8/5/95	H	L	chinook	0	0	510	0	510	KAP	N	L		IAII
111-32-220	Nakina River	8/5/95	H	L	chinook	0	0	1700	0	1700	KAP	N	L		IAIII
111-32-220	Nakina River	8/5/95	H	L	chinook	0	0	310	0	310	KAP	N	L		IA IV
111-32-240	Kowatua Creek	8/11/95	H	L	chinook	0	0	295	0	295	KAP	N	L		
111-32-240	Kowatua Creek	8/21/95	H	L	chinook	0	0	550	0	550	KAP	N	L		
111-32-255	Tatsamenie River	8/21/95	H	L	chinook	0	0	576	0	576	KAP	N	L		includes 67 at IAII, Big lake outlet
111-32-255	Tatsamenie River	8/25/95	H	L	chinook	0	0	678	0	678	KAP	N	N		90 at IAII
111-32-270	Nahlin River	7/21/95	H	L	chinook	0	0	467	0	467	KAP	E	L		IAIII
111-32-270	Nahlin River	7/21/95	H	L	chinook	0	0	116	0	116	KAP	E	L		IAII
111-32-270	Nahlin River	7/21/95	H	L	chinook	0	0	1486	0	1486	KAP	E	L		IAI, below weir
111-32-270	Nahlin River	7/21/95	H	L	chinook	0	0	2069	0	2069	KAP	E	L		Peak Total

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Number	Stream name	Date	Survey type	Dist	Species	Mouth	Tidal	Live	Dead	Total	Obs.	Vis	Depth	Tide	Remarks
111-32-270	Nahlin River	7/30/95	H	L	chinook	0	0	915	0	915	KAP	E	L		IAIII
111-32-270	Nahlin River	7/30/95	H	L	chinook	0	0	27	0	27	KAP	E	L		IAII
111-32-270	Nahlin River	7/30/95	H	L	chinook	0	0	697	0	697	KAP	E	L		IAI
111-32-270	Nahlin River	8/10/95	W	L	chinook	0	0	3330	0	3330	DFO				weir count
111-32-275	Tseta Creek	7/30/95	H	L	chinook	0	0	786	0	786	KAP	E	L		
111-32-275	Tseta Creek	8/5/95	H	L	chinook	0	0	557	18	575	KAP	N	L		
111-32-280	Dudidontu River	7/30/95	H	L	chinook	0	0	470	0	470	KAP	N	L		water very low
111-32-280	Dudidontu River	8/5/95	H	L	chinook	0	0	728	3	731	KAP	E	L		lots in Matsatu trib
111-50-069	Fish Creek-Douglas I	8/1/95	F	L	chinook	0	0	1	2	3	LED	N	N	L	
111-50-069	Fish Creek-Douglas I	8/19/95	F	L	chinook	0	5	32	19	56	DPL				
111-50-069	Fish Creek-Douglas I	8/27/95	F	L	chinook	0	5	13	57	75	DPL				DPL = DIPAC
111-50-069	Fish Creek-Douglas I	8/30/95	F	1	chinook	0	5	39	0	44	WSL	N		L	did not count pond
112-17-050	Thayer Creek	8/25/95	F	L	chinook	0	3	11	0	14	LED	P		L	
112-67-040	Jims Creek	9/7/95	F	L	chinook	0	0	1	0	1	JJM				spawning in lower creek
112-72-011	Weir Ck N Arm Hood B	8/24/95	F	1.5	chinook	0	0	2	0	2	LED	P		L	
112-73-020	Hood Bay S Arm Head	8/24/95	F	L	chinook	0	0	6	0	6	WSL	N		L	
113-41-043	Redoubt Lake Outlet	8/31/95	W	L	chinook	0	0	6	0	6	REC				
182-20-010	East Alsek River	6/19/95	A	3M	chinook	0	200	0	0	200	GFW	N	N	I	
182-20-010	East Alsek River	7/10/95	A	L	chinook	0	0	6	0	6	GFW	N	L	H	
182-20-010	East Alsek River	7/17/95	A	L	chinook	0	0	15	0	15	MST	N	L	I	
182-30-020	Klukshu River (CAN)	8/9/95	H	L	chinook	0	0	737	316	1053	KAP	E	L		late
182-30-020	Klukshu River (CAN)	8/10/95	W	L	chinook	0	0	5661	0	5661	DFO				prelim weir
182-30-043	Takhanni River (CAN)	8/9/95	H	L	chinook	0	0	130	130	260	KAP	E	L		late
182-30-045	Goat Creek	8/9/95	H	L	chinook	0	0	2	3	5	KAP	N	N		late
182-30-051	Blanchard Lake (CAN)	8/9/95	H	L	chinook	0	0	268	70	338	KAP	N	N		late
182-40-010	Akwe River	6/19/95	A	10M	chinook	0	15	0	0	15	GFW	N	N	I	
182-40-010	Akwe River	7/1/95	A	10M	chinook	0	0	35	0	35	GFW	P	N	L	
182-70-010	Situk River	6/19/95	A	1.5	chinook	0	700	0	0	700	GFW	N	N	I	Weir to landing
182-70-010	Situk River	6/26/95	A	1.5	chinook	0	125	0	0	125	GFW	N	N	I	Weir to landing
182-70-010	Situk River	7/1/95	A	1.5	chinook	0	125	0	0	125	GFW	P	N	H	
182-70-010	Situk River	7/17/95	A	1.5	chinook	0	0	30	0	30	MST	P	L	I	weir to landing

Restrictions selected:
year = 1995 AND species_code in ('410,' '411')