

Fishery Data Series No. 01-32

Escapements of Chinook Salmon in Southeast Alaska and Transboundary Rivers in 2000

by

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Alaska Department of Fish and Game

Division of Sport Fish



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Weights and measures (metric)		General		Mathematics, statistics, fisheries	
centimeter	cm	All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis	H_A
deciliter	dL	All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
gram	g	and	&	catch per unit effort	CPUE
hectare	ha	at	@	coefficient of variation	CV
kilogram	kg	Compass directions:		common test statistics	F, t, χ^2 , etc.
kilometer	km	east	E	confidence interval	C.I.
liter	L	north	N	correlation coefficient	R (multiple)
meter	m	south	S	correlation coefficient	r (simple)
metric ton	mt	west	W	covariance	cov
milliliter	ml	Copyright	©	degree (angular or temperature)	°
millimeter	mm	Corporate suffixes:		degrees of freedom	df
Weights and measures (English)		Company	Co.	divided by	÷ or / (in equations)
cubic feet per second	ft ³ /s	Corporation	Corp.	equals	=
foot	ft	Incorporated	Inc.	expected value	E
gallon	gal	Limited	Ltd.	fork length	FL
inch	in	et alii (and other people)	et al.	greater than	>
mile	mi	et cetera (and so forth)	etc.	greater than or equal to	≥
ounce	oz	exempli gratia (for example)	e.g.,	harvest per unit effort	HPUE
pound	lb	id est (that is)	i.e.,	less than	<
quart	qt	latitude or longitude	lat. or long.	less than or equal to	≤
yard	yd	monetary symbols (U.S.)	\$, ¢	logarithm (natural)	ln
Spell out acre and ton.		months (tables and figures): first three letters	Jan, ..., Dec	logarithm (specify base)	log ₂ , etc.
Time and temperature		number (before a number)	# (e.g., #10)	mid-eye-to-tail fork	MEF
day	d	pounds (after a number)	# (e.g., 10#)	minute (angular)	'
degrees Celsius	°C	registered trademark	®	multiplied by	x
degrees Fahrenheit	°F	Trademark	™	not significant	NS
hour (spell out for 24-hour clock)	h	United States (adjective)	U.S.	null hypothesis	H_0
minute	min	United States of America (noun)	USA	percent	%
second	s	U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	probability	P
Spell out year, month, and week.				probability of a type I error (rejection of the null hypothesis when true)	α
Physics and chemistry				probability of a type II error (acceptance of the null hypothesis when false)	β
all atomic symbols				second (angular)	"
alternating current	AC			standard deviation	SD
ampere	A			standard error	SE
calorie	cal			standard length	SL
direct current	DC			total length	TL
hertz	Hz			variance	var
horsepower	hp				
hydrogen ion activity	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

FISHERY DATA SERIES NO. 01-32

**ESCAPEMENTS OF CHINOOK SALMON IN SOUTHEAST ALASKA
AND TRANSBOUNDARY RIVERS IN 2000**

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 2000 was 94,428 large (age .3 and older) chinook, a 31% increase from the escapement of 72,010 fish estimated in 1999. The 2000 estimate was 155% of the 1977–1979 average of 64,296 chinook salmon, 98% of the 1980–1989 average of 96,089 and 77% of the 1990–1999 average of 122,918 fish.

Seven out of eleven escapement indices increased from 1999, however indices were below escapement goal ranges in the Chilkat and Blossom rivers. Estimated age and sex composition and mean length at age of all stocks sampled in 2000 are presented.

Key words: chinook, *Oncorhynchus tshawytscha*, escapement, escapement goals, Taku River, Stikine River, Alsek River, Chilkat River, Unuk River, Chickamin River, Blossom River, Keta River, King Salmon River, Situk River, Andrew Creek, 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, (Kissner 1977). 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) (Figure 1). The program used region-wide, all-gear catch ceilings for chinook salmon, designed to rebuild spawning escapements by 1995 (ADF&G 1981). In 1985, the Alaskan program was incorporated into a comprehensive coast-wide rebuilding program for all wild stocks of chinook salmon, under the auspices of the U.S./Canada Pacific Salmon Treaty (PST).

To track the spawning escapement, the Alaska Department of Fish and Game (ADF&G), the Canadian Department of Fisheries and Oceans (DFO), the Taku River Tlingit First Nation (TRTFN), and the Tahltan First Nation (TFN) count spawning chinook salmon in a designated set of eleven 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 relatively constant proportion of the annual escapement in an index area or watershed.

Programs to estimate total escapement and survey count-to-escapement expansion factors for index counts have been implemented for all 11 index stocks. Long-term annual programs are in place on the Situk, Alsek, Chilkat, Taku, Stikine and Unuk rivers. Short-term (2–3 year) projects were used to estimate expansion factors for the other 5 systems. Estimates of escapement from these mark-recapture and weir studies are generally superior to expanded survey count estimates, and are preferentially employed whenever they are available.

Escapement data are provided annually to the Joint Chinook Technical Committee (CTC) of the Pacific Salmon Commission (PSC), who use them to evaluate the status of the indicator stocks (PSC 1997). Estimates of the total escapement of

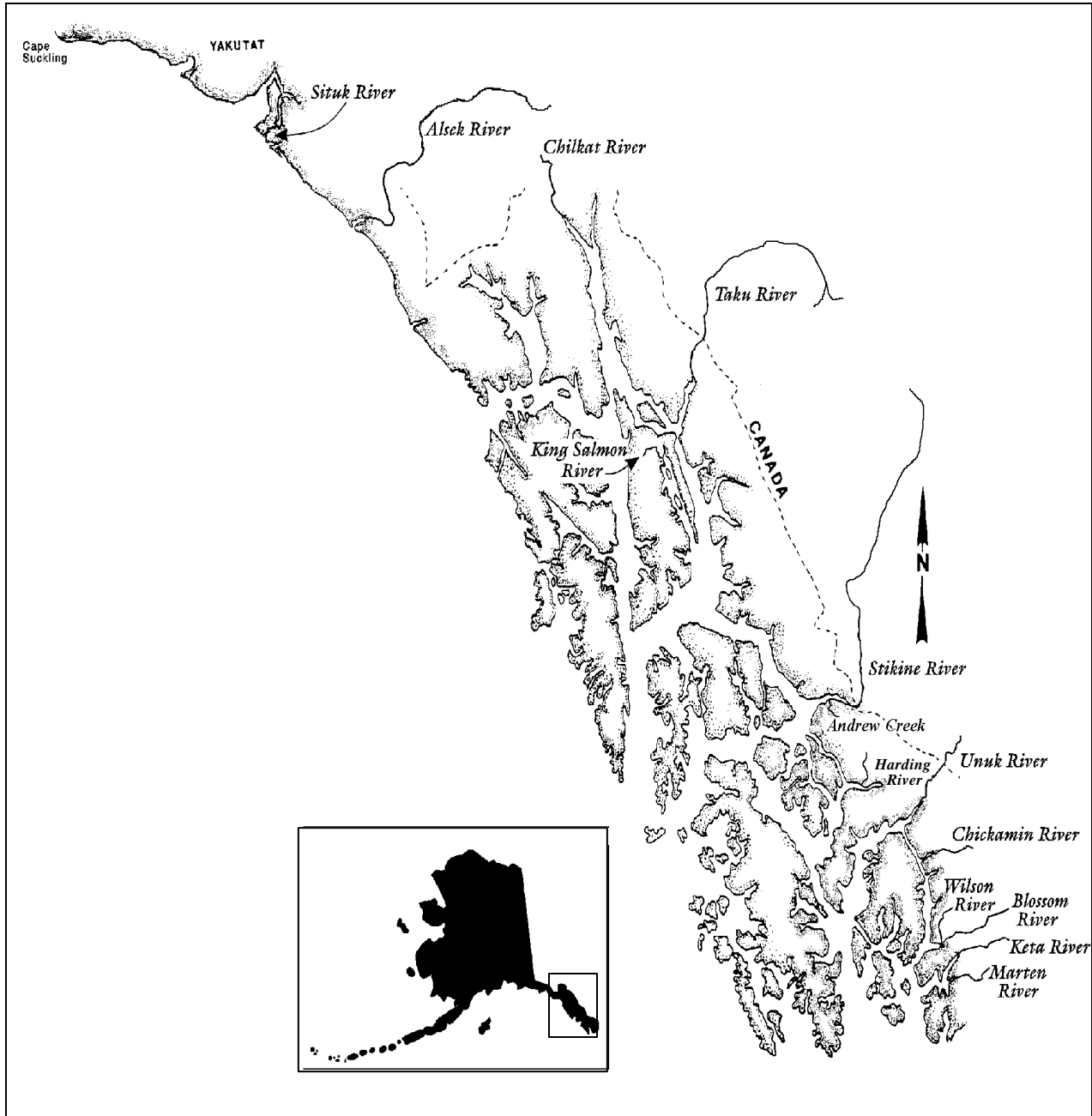


Figure 1.—Location of selected chinook salmon systems in Southeast Alaska, Yakutat, and trans-boundary rivers.

large spawners are provided to the CTC for six stocks (Situk, Chilkat, Taku, Stikine, Andrew and King Salmon rivers) and index counts for the remaining five stocks are used to track trends in escapement.

In addition to these applications, Biological Escapement Goals (BEGs 5AAC 39.222) have

been established for 10 of the systems and fisheries are managed to achieve those escapement goal ranges.

This project obtained indices of spawner abundance for major chinook salmon stocks in Southeast Alaska. Objectives for 2000 were to count large (≥ 660 mm 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 Stikine, Taku, Alsek, Situk, Unuk, Chickamin, Keta, Blossom, King Salmon rivers and in 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 maps 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 km²; average monthly flows range from 60 m³/sec in February to 1,097 m³/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 few 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.

Stock assessment of chinook salmon has been conducted intermittently on the Taku River since the 1950s, and standardized helicopter surveys of the index areas have been conducted annually since 1973. Survey index areas include portions of the Nakina, Nahlin, Dudidontu, Tatsamenie, and Kowatua rivers and Tseta Creek. In addition, since 1973 the DFO, TRTFN, and ADF&G have operated a carcass collection weir below the major spawning area on the Nakina river, which provides an estimate of the age and size composition of the escapement. Mark-recapture experiments are providing annual independent estimates of total

escapement since 1995 (McPherson et al. 1996, 1997, 1998a, 1999).

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 km², much 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 U.S. portion of the lower Stikine River, supports a significant run of chinook salmon. The upper drainage of the Stikine is accessible via the Telegraph Creek Road.

Helicopter surveys of the Little Tahltan River index area have been conducted annually since 1975, and the DFO and TFN have operated a fish counting weir at the mouth of the Little Tahltan River since 1985. Counts from the weir represent the total escapement to that tributary. Since 1996, mark-recapture experiments have provided independent estimates of total escapement to the Stikine River (Pahlke and Etherton 1997; 1999a; 2000).

Andrew Creek flows into the lower Stikine River in Alaska, not far from the limit of tidal influence. From 1976 to 1984, a weir was operated on Andrew Creek to provide brood stock for hatcheries. Foot, aerial and helicopter surveys to count chinook salmon have been conducted annually since 1985. A new weir was operated on Andrew Creek in 1997 and 1998.

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. The Alsek River drainage covers about 28,000 km²

(Bigelow et al. 1995), but much of it, including the mainstem of the Alsek itself, is inaccessible to anadromous salmonids because of velocity barriers. The significant spawning areas for chinook salmon are found mostly 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 *O. nerka*, 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 aboriginal 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, surveys were made 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 the event that funding for the weir is discontinued. The Blanchard and Takhanne Rivers and Goat Creek, three smaller tributaries of the Tatshenshini River, are also surveyed annually, but are not used to index escapements. In 1998, a mark-recapture and radio telemetry study was conducted to estimate the escapement and distribution of spawning chinook salmon in the Alsek River (Pahlke et al. 1999) and the mark-recapture experiment was continued in 1999 and 2000 (Pahlke and Etherton 2001a; 2001b).

The Unuk, Chickamin, Blossom, and Keta river drainages all feed into Behm Canal—a narrow passage of water east of Ketchikan, Alaska. Misty Fjords 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 km². Most (~85%) spawning occurs in tributaries of the Alaska portion of the river (Pahlke et al. 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. Chinook salmon have been periodically counted in Boundary Creek, but survey conditions there are often poor and the counts are not included in the index. Total escapement was estimated by a mark-recapture project in 1994 (Pahlke et al. 1996) and annually since 1997 (Jones et al. 1998; Jones and McPherson 1999, 2000, 2002).

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 chinook spawning areas on the Chickamin River upstream from the Canadian border (Pahlke 1997a). 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. Total escapement was estimated by mark-recapture projects in 1995 and 1996, and spawning distribution was estimated by radio-telemetry in 1996 (Pahlke 1996; Pahlke 1997a).

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 Fjords National Monument in southern Behm Canal but are within an area that has been specifically excluded from Wilderness designation, because of 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 km² and the Blossom about 176 km² (Bigelow et al. 1995) and have been surveyed by helicopter annually since 1975. Chinook salmon escapements to the Wilson and Marten rivers have been monitored on an intermittent basis in recent years. Mark-recapture experiments were conducted in 1998 to estimate the escapement of chinook salmon in the Blossom and Keta rivers (Brownlee et al. 1999) and were repeated on the Keta River in 1999 and 2000 (Freeman et al. 2001).

The King Salmon River drains an area of approximately 100 km² 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 more than 100 spawning chinook salmon. ADF&G operated a weir on the King Salmon River from 1983 through 1992 to count chinook salmon and collect broodstock for Snettisham Hatchery. Helicopter surveys have been conducted annually since 1975 and foot surveys since 1992.

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 and foot surveys are an ineffective index of abundance for this system (Johnson et al. 1992) and were suspended in 1993, in favor of annual estimates of escapement using mark-recapture methods. Total escapement has been estimated annually since 1991 (Ericksen 2000).

The Situk River is located about 16 km east of Yakutat, Alaska. The Situk supports a large run of sockeye salmon which are harvested in commercial and subsistence set gillnet fisheries concentrated at the mouth of the Situk River. Situk River chinook salmon are harvested both incidentally and targeted in the set gillnet fisheries, depending on run strength, 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. Since 1976, a weir has been operated primarily to count chinook and sockeye salmon. The proportion of the recreational harvest above the weir varies from year to year (Howe et al. 1998).

METHODS

There are 34 river systems in the region (Figure 1) with populations of wild chinook salmon. Three transboundary rivers, the Taku, Stikine, and Asek, are classed as major producers—each with potential production (harvest plus escapement) greater than 10,000 fish (Kissner 1974). 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 list 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 A2). Abundance in the Chilkat River is estimated only by a mark-recapture program. These index systems, along with the Chilkat River, are believed to account for about 90% of the total chinook salmon escapement in Southeast Alaska and transboundary rivers.

ESCAPEMENT GOALS

The initial rebuilding program established interim escapement goals in 1981 for nine systems: the Asek, Taku, Stikine, Situk, King Salmon, Unuk, Chickamin, Keta and Blossom/Wilson Rivers. Although the aim was to have escapement goals that provided the optimal level of harvest, little data was available to produce such goals. As a result, escapement goals were originally set based on the highest observed escapement count prior to 1981 (Pahlke 1997b). Goals for the Chilkat River and Andrew Creek were added in 1985, bringing the total number of regularly monitored river systems to eleven. Pahlke (1997b) provides detailed descriptions of the escapement goals and

their origins. Escapement goals have been revised when sufficient new information warrants. Most of the revised escapement goals have been developed with spawner-recruit analysis, as ranges of optimum escapement rather than a single point estimate (Appendix A1). Spawner-recruit analysis requires not only a long series of escapement estimates, but also annual age and sex-specific estimates of escapement (McPherson and Carlile 1997). The United States Section of the CTC developed data standards in 1997 for stock specific assessments of escapement, terminal runs, and forecasts of abundance which are used to evaluate existing stock assessment programs (USCTC 1997). This data has been collected routinely at weirs and during mark-recapture studies and recently specific programs have been implemented to collect age, sex and length data from chinook salmon in the Blossom, Chickamin, and King Salmon rivers and Andrew Creek.

INDICES OF ESCAPEMENT

Spawning chinook salmon are counted at 26 designated index areas in nine of the systems; total escapement in the other two systems are estimated by complete counts of chinook salmon at the Situk River weir and by annual mark-recapture estimates on the Chilkat River. Counts are made during aerial or foot surveys during periods of peak spawning, or at weirs. 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 since 1976 (Kissner 1982; Pahlke 1997b). 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 conditions preclude the second survey. Survey conditions on each index survey are rated as poor, normal or excellent for that particular index area. Factors that affect the rating include water level, clarity, light conditions, and weather.

Only large (typically age-.3, -.4, and -.5) chinook salmon, ≥ 660 mm mid-eye-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. In some systems age- 1.2 fish may be larger than 660 mm MEF and be difficult to avoid counting.

Aerial surveys are conducted from a Bell 206 or Hughes 500D helicopter. 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.

Weather, distances involved, run timing, etc., can make it difficult for a single surveyor to complete all the index surveys annually under normal or excellent conditions. Thus, alternate surveyors are selected to conduct the counts when the primary surveyor is unavailable. Also, new surveyors take on primary responsibilities at infrequent intervals. Since between observer variability and bias can be significant (Jones et al. 1998), new surveyors must be trained and calibrated against the primary surveyor to provide consistency and continuity in the data. Alternate observers accompany the primary observer on regularly scheduled surveys to learn survey methods and counting techniques (training flights). Each alternate observer also accompanies the primary observer on additional regularly scheduled surveys to independently count chinook salmon (calibration flights). Each calibration flight consists of two passes over the index area so the two observers in turn sit in the preferred location in the helicopter during one pass along the river. Counts are not shared during the calibration surveys, but are shared and discussed following the completion of the second pass of each flight. Calibration data will be

collected annually for several years. The relationship between observer escapement counts will be determined from the accumulated data, and applied to counts as needed.

Several index areas are routinely surveyed by more than one method; e.g. Andrew Creek is surveyed from airplanes, helicopters and by foot. The various surveys will be conducted as close as possible to each other to promote comparison and calibration of the different methods.

Counts and other observations from the 2000 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 increased by an expansion factor (Table 1). An expansion factor is an estimate of the proportion of the season's total escapement counted in a river system during the peak spawning period. Expansion factors are based on comparisons with weir counts, mark-recapture estimates, and spawning distribution studies. They vary among rivers according to how complete the coverage of spawning areas is and 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. Expansion factors range from 1.5 for the King Salmon River to 5.2 for the Taku River (Table 1).

Escapement counts are obtained from a fish-counting weir on the Situk River and a mark-recapture program on the Chilkat River. Survey expansions are not necessary for those streams where weirs or other estimation programs are used to count all migrating chinook salmon.

Finally, to estimate total regional escapement, escapement estimates from the 11 index systems are expanded to account for the unsurveyed systems. (Appendix A2). Presently, we believe the total estimated escapement in the index areas represents approximately 90% of the region total. Escapement estimates for the Chilkat

River are not available prior to 1991. From 1991 to 1997 the estimated escapement to the Chilkat River averaged 6% of the estimated regionwide total. Therefore, prior to 1991 the expanded index counts represent approximately 84% of the estimated Southeast Alaska total escapement.

Expansion factors for individual rivers have been revised, based on results from experiments to estimate total escapement and spawning distribution. For example, estimated total escapement and radio-tracking distribution data were used to revise tributary expansion factors for the Taku and Unuk rivers (Pahlke and Bernard 1996; McPherson et al. 1996 and McPherson et al. 1997). Mark-recapture studies to estimate spawning abundance on the Unuk River in 1994 (Pahlke et al. 1996) and on the Chickamin River in 1995 and 1996 (Pahlke 1996, Pahlke 1997a) were used to revise expansion factors for those two rivers in 1996; results were also applied to the nearby Blossom and Keta rivers. On Andrew Creek, a weir was operated over 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 1997, ten years (1983–1992) of matched weir and index counts were used to revise the expansion factor for the King Salmon River (McPherson and Clark 2001). The expansion factors for the Taku River were revised in 1996 and again in 1999 based on the results of mark-recapture studies (Pahlke and Bernard 1996, McPherson et al. 2000).

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 before 1991 on the Chilkat River system were highly inaccurate, because the index areas received less than 5% of the escapement. Consequently, since 1991, escapement to the Chilkat River has been estimated annually by mark-recapture experiments (Ericksen 1997). Studies on the Taku, Stikine, Asek, Unuk, Chickamin, Blossom, Keta 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

Table 1.–Peak survey counts, survey expansion factors, estimated total escapement from expanded survey counts, M-R projects or weir, for chinook salmon returning to Southeast Alaska and transboundary rivers in 2000.

	Survey area	Survey count	Survey expansion factor	Survey expansion estimated escapement ^a	Estimated total escapement (M-R or weir) ^b	Reference ^c
Major producers						
Alsek River	Klukshu	1,365	4.0	5,440 ^d	8,295	Pahlke and Etherton 2001
Taku River	5 tributaries	5,772	5.2	30,014	30,529	McPherson et al. 2002
Stikine River	Little Tahltan	6,640	5.15	34,196	27,531	Derhovanisian et al. 2001
Category subtotal				69,650		
Medium producers						
Situk River	NA	NA	NA	NA	1,888 ^e	
Chilkat River	NA	NA	NA	NA	2,035 ^f	Ericksen 2001
Andrew Cr.	All	690	2.0	1,380	NA	
Unuk River	6 tributaries	1,341	4.0	5,364	5,872	Jones and McPherson 2002
Chickamin River	8 tributaries	801	4.0	3,204	NA	
Blossom River	All	231	2.5	578	NA	
Keta River	All	300	2.5	750	914	Freeman et al. 2001
Category subtotal				15,199		
Minor producers						
King Salmon R.	All	91	1.5	137	NA	
Index system total				84,985		
Region total				^g 94,428		

^a Estimated by multiplying survey count by expansion factor.

^b Estimated from mark-recapture program or weir count. Final numbers used for ADF&G management.

^c Reference document for mark-recapture estimate.

^d Klukshu weir count × 4 minus aboriginal fishery harvest above weir (20).

^e Situk River weir count broke down by age and size composition, minus estimated sport harvest of large fish above weir (825).

^f Mark-recapture estimates used instead of expansion factors.

^g Regional expansion factor (90%) developed in 1998.

1997a). 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, Unuk, Keta, and Alsek rivers. Estimates of escapement from expanded counts are included in this document to provide relative estimates of total spawner abundance over time, with the caveat that expansion factors may produce incorrect estimates, or be revised in the future.

AGE, SEX, AND LENGTH COMPOSITION OF ESCAPEMENTS

I compiled estimates of escapement by age and sex for all 11 systems having chinook salmon stock assessment projects in Southeast Alaska in

2000 (Appendix A4) to provide a basic statistical summary for managers and researchers. Estimates for the Keta, Unuk, Stikine, Taku, Chilkat and Alsek rivers were the results of research projects using mark-recapture experiments (Freeman et al. 2001; Jones and McPherson 2002; DerHovanisian et al 2001; McPherson et al. 2002; Ericksen 2001; Pahlke and Etherton 2001b). Results compiled from each of these projects are the reported unbiased estimates of escapement of medium and large sized chinook salmon, except for the Stikine River where the unbiased estimates include small fish. Estimates for medium and large fish from the Situk River are based on age sampling and a total census of the escapement at a weir.

Age composition estimates for the Chickamin, Blossom and King Salmon rivers and Andrew Creek were calculated by dividing the peak survey count by the best available survey-count-to-escapement expansion factor (Table 1), and multiplying the result by the age composition of the escapement sampled on the spawning grounds of each drainage in 2001. Standard errors have not been estimated for these numbers because of the short series of data upon which the expansion factors are based. Note that the survey index count for these 4 systems is assumed to include many age 1.2 chinook salmon because their large size makes them virtually indistinguishable from the large sized fish targeted for counting. For this reason, all fish sampled on the spawning grounds (most are age 1.2 and older) are used in the calculations reported in Appendix A4. Also note that while there was no way to investigate size or sex selective sampling in these spawning ground samples, the various techniques used have been applied in similar quantitative experiments and are expected to provide unbiased and reliable results when sample sizes are adequate.

Estimates of mean length by sex and age and their estimated variances were also calculated for each system (Appendix A5). These estimates are either the unbiased estimates reported in the publications cited above, or made using the spawning ground samples as noted above.

RESULTS

In 2000, 35 locations, 25 of which were designated index areas, were surveyed specifically for chinook salmon escapement (Appendix A3). Surveys generally progressed as planned.

From 1984 to 1993, the estimated escapement of chinook salmon in Southeast Alaska increased steadily for 10 years, peaking in 1993 (Appendix A2). This was due primarily to strong returns to the Taku, Stikine, and Chilkat rivers, which together make up over 75% of the summed escapement goals in the region. Escapements declined in 1994 and 1995 and then peaked again in 1996 and 1997 as a result of record high escapements in the Taku River. In 1998 and 1999 escapements to the Taku River declined dramatically which contributed to the lowest

estimated escapements to Southeast Alaska since 1984.

The estimated escapement (expanded) of chinook salmon for all Southeast Alaska and trans-boundary rivers in 2000 was 94,428 (Table 1), a 31% increase from the estimated 72,010 fish in 1999. The estimates for 1999 and prior years were revised from previous reports using updated estimates. The estimated total for the region increased, primarily due to increases in estimated escapements to the Taku and Stikine rivers.

TAKU RIVER

The count of 5,772 large chinook salmon in the five index areas of the Taku River was an increase over the low escapement in 1999 (Table 2) however counts in all tributaries remained below average (Table 3). Counts increased steadily from 1983 to 1993, and escapements exceeded the upper limit of the BEG four times in the 90s (Figure 2).

Counts were expanded by a survey expansion factor of 5.2 and the Tseta Creek counts were excluded. The expansion factor was revised in 1999 based on five years of mark-recapture experiments on the Taku River (Table 4) (McPherson et al. 2000). McPherson et al. recommend an escapement goal range of 30,000 to 55,000 large spawners. These changes were adopted by the Transboundary River Technical Committee (TBTC) and the Chinook Technical Committee (CTC) of the PSC. The revised PSC goal uses counts in five index areas expanded by 5.2, which corresponds to an index goal range of 5,800 to 10,600 fish. Expansion of the survey counts of 5,772 by 5.2 results in an escapement estimate of 30,014 large chinook salmon in 2000. The preliminary estimate from a mark-recapture experiment conducted in 2000 is 30,529 (SE = 5,417) large fish (McPherson et al. 2002).

Age, sex and length data were collected from carcasses at the Nakina, Nahlin, and Tatsamenie rivers and also from live fish at Tatsamenie River sampled with angling gear (Appendix A4H; A5H).

Table 2.–Counts of spawning chinook salmon in index areas of the Taku River, 1951–2000.

Year ^a	Nakina River		Nahlin River		Kowatua River		Tatsamenie River		Dudidontu River		5 Trib. total	Tseta Creek ^f	
1951	5,000	(F) ^b	1,000	(F)	—	—	—	—	400	(F)	6,400	100	(F)
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 ^c	(F/W)	—	—	—	—	—	—	—	—	1,500	—	—
1958	2,500 ^c	(F/W)	2,500	(A)	—	—	—	—	4,500	(A)	9,500	—	—
1959	4,000 ^c	(F/W)	—	—	—	—	—	—	—	—	4,000	—	—
1962	—	—	216	(A)	—	—	—	—	25	(A)	241	81	(A)
1965	3,050	(H)	35	(A)	200	P(A)	50	P(A)	110	(A)	3,445	18	(A)
1966	3,700	P(A)	300	(A)	14	P(A)	100	P(A)	252	(A)	4,366	151	(A)
1967	700	(A)	300	P(A)	250	P(A)	—	—	600	(A)	1,850	350	(A)
1968	300	P(A)	450	(A)	1,100	(A)	800	E(A)	590	(A)	3,240	230	(A)
1969	3,500	(A)	—	—	3,300	(A)	800	E(A)	—	—	7,600	—	—
1970	—	—	26	(A)	1,200	P(A)	530	E(A)	10	(A)	1,766	25	(A)
1971	500	(A)	473	(A)	1,400	E(A)	360	E(A)	165	(A)	2,898	—	(A)
1972	1,000	(F)	280	(A)	170	(A)	132	(A)	102	(A)	1,684	80	P(A)
1973	2,000	N(H)	300	E(H)	100	N(H)	200	E(H)	200	E(H)	2,800	4	(A)
1974	1,800	E(H)	900	E(H)	235	(A)	120	(A)	24	(A)	3,079	4	(A)
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)	—	—	3,284	21	E(H)
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)	9,528	258	N(H)
1982	2,533	E(H)	1,246	E(H)	289	N(H)	387	N(H)	130	N(H)	4,585	228	N(H)
1983	968	E(H)	391	N(H)	171	E(H)	236	E(H)	117	E(H)	1,883	179	N(H)
1984 ^d	1,887	(H)	951	(H)	279	E(H)	616	E(H)	—	—	3,733	176	(H)
1985	2,647	N(H)	2,236	E(H)	699	E(H)	848	E(H)	475	(H)	6,905	303	E(H)
1986	3,868	(H)	1,612	E(H)	548	E(H)	886	E(H)	413	E(H)	7,327	193	E(H)
1987	2,906	E(H)	1,122	E(H)	570	E(H)	678	E(H)	287	E(H)	5,563	180	E(H)
1988	4,500	E(H)	1,535	E(H)	1,010	E(H)	1,272	E(H)	243	E(H)	8,560	66	E(H)
1989	5,141	E(H)	1,812	E(H)	601 ^e	(W)	1,228	E(H)	204	E(H)	8,986	494	E(H)
1990	7,917	E(H)	1,658	E(H)	614 ^e	(W)	1,068	N(H)	820	E(H)	12,077	172	N(H)
1991	5,610	E(H)	1,781	E(H)	570	N(H)	1,164	E(H)	804	E(H)	9,929	224	N(H)
1992	5,750	E(H)	1,821	E(H)	782	E(H)	1,624	N(H)	768	N(H)	10,745	313	N(H)
1993	6,490	E(H)	2,128	N(H)	1,584	E(H)	1,491	E(H)	1,020	E(H)	12,713	491	N(H)
1994	4,792	N(H)	2,418	E(H)	410	P(H)	1,106	N(H)	573	N(H)	9,299	614	E(H)
1995	3,943	E(H)	2,069	E(H)	550	N(H)	678	N(H)	731	E(H)	7,971	786	E(H)
1996	7,720	E(H)	5,415	E(H)	1,620	N(H)	2,011	N(H)	1,810	N(H)	18,576	1,201	N(H)
1997	6,095	E(H)	3,655	E(H)	1,360	N(H)	1,148	N(H)	943	N(H)	13,201	648	N(H)
1998	2,720	E(H)	1,294	N(H)	473	N(H)	675	E(H)	807	E(H)	5,969	360	E(H)
1999	1,900	N(H)	532	N(H)	561	E(H)	431	N(H)	527	E(H)	3,951	221	N(H)
2000	2,907	N(H)	728	P(H)	702	N(H)	953	N(H)	482	N(H)	5,772	160	N(H)
90–99	5,294	—	2,277	—	852	—	1,140	—	880	—	10,443	503	—
Average	—	—	—	—	—	—	—	—	—	—	—	—	—

^a Counts before 1975 may not be comparable due to changes in survey dates and methods; foot surveys may include 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 (W) 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, 1989, 1990.

^f Tseta Creek removed from index areas in 1999.

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
1995	3,943	45	2,069	24	550	6	678	8	731	8	786	9	8,757
1996	7,720	39	5,415	27	1,620	8	2,011	10	1,810	9	1,201	6	19,777
1997	6,095	44	3,655	26	1,360	10	1,148	8	943	7	648	5	13,849
1998	2,720	43	1,294	20	473	7	675	11	807	13	360	6	6,329
1999	1,900	46	532	13	561	13	431	10	527	13	221	5	4,172
Average	4,396	49	1,916	21	720	8	985	11	591	7	374	4	8,981
2000	2,907	49	728	12	702	12	953	16	482	8	160	3	5,932

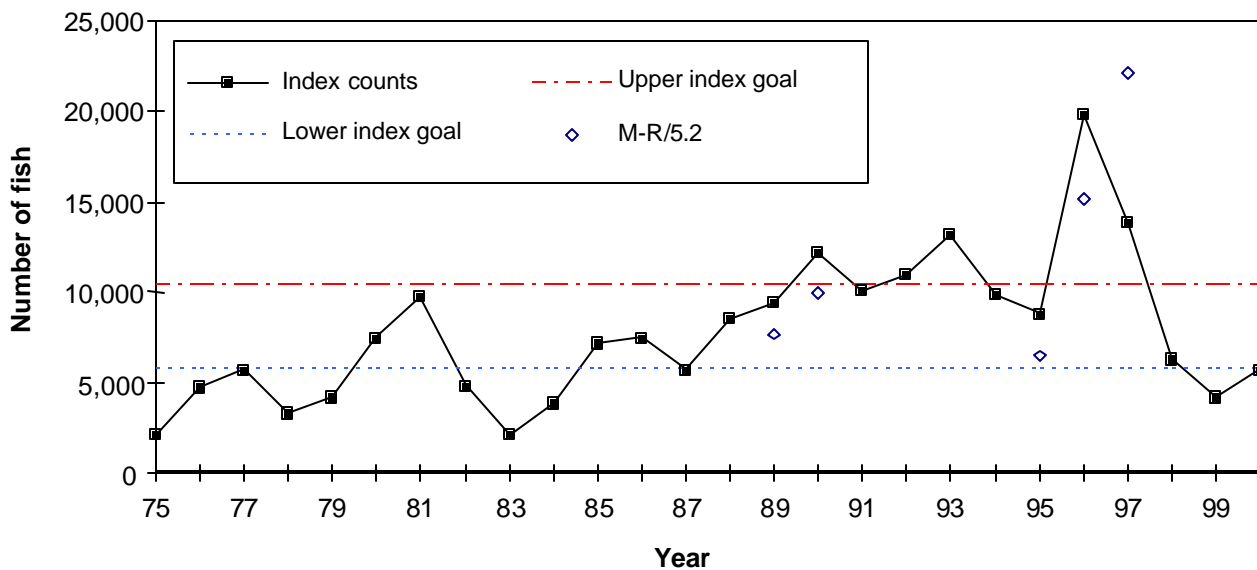


Figure 2.–Counts of chinook salmon in index areas of the Taku River, 1975–2000 and mark-recapture estimates divided by expansion factor of 5.2. Lines show upper and lower limits of index escapement goal range.

Table 4.—Taku River index counts, mark-recapture estimates of escapement, and percent of escapement observed.

Year	Counts ^a	M-R	SE	% Observed
1989	8,986	40,329	5,646	22.3
1990	12,077	52,142	9,326	23.2
1995	7,971	33,805	5,060	23.6
1996	18,576	79,019	9,048	23.5
1997	13,201	114,938	17,888	11.5
Average	12,162	64,047		19.0
1998	6,329	not available		
1999	4,172	not available		
2000	5,772	30,529	5,417	18.9

^a sum of five tributaries, not 6 as prior to 1999.

STIKINE RIVER

At the Little Tahltan River weir 6,640 large chinook salmon were counted in 2000. The weir count was 140% of the count of 4,738 in 1999 and above the 1990–1999 average of 5,639 (Table 5). Aerial surveys of Beatty Creek and the glacially occluded mainstem Tahltan River were discontinued as recommended in Bernard et al., (2000).

The peak aerial survey flown in 2000 obtained a count of 2,720 large chinook salmon above the Little Tahltan River weir. The peak survey count was 41.0% of the total escapement through the weir. From 1985 to 1999, the proportion of the total escapement of chinook salmon counted during peak aerial surveys has ranged from 28.4% to 56.6% and averaged 37.7% (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. In 1998 and 1999, survey conditions were not unusual and no explanation is offered for the lower than average proportion of escapement observed.

Age, sex and length data was collected from 787 live fish sampled at the Little Tahltan River weir and from 432 post-spawning and dead fish sampled at Verrett Creek (Appendix A4E, A5E).

Based on a stock-recruit model, the BEG was revised in 1999 to a range of 14,000 to 28,000

Table 5.—Counts of spawning chinook salmon in the Little Tahltan River, Stikine River, 1975–2000.

Year	Weir count	Above-weir catch ^b	Escapement	Aerial survey		
				Peak count ^{a, c}	Percent counted	
1975	-			700	E(H)	
1976	-			400	N(H)	
1977	-			800	P(H)	
1978	-			632	E(H)	
1979	-			1,166	E(H)	
1980	-			2,137	N(H)	
1981	-			3,334	E(H)	
1982	-			2,830	N(H)	
1983	-			594	E(H)	
1984	-			1,294	(H)	
1985	3,114	0	3,114	1,598	E(H)	51.3
1986	2,891	0	2,891	1,201	E(H)	41.5
1987	4,783	0	4,783	2,706	E(H)	56.6
1988	7,292	0	7,292	3,796	E(H)	52.1
1989	4,715	0	4,715	2,527	E(H)	53.6
1990	4,392	0	4,392	1,755	E(H)	40.0
1991	4,506	0	4,506	1,768	E(H)	39.2
1992	6,627	0	6,627	3,607	E(H)	54.4
1993	11,449	12	11,437	4,010	P(H)	35.1
1994	6,387	14	6,373	2,422	N(H)	38.0
1995	3,072	0	3,072	1,117	N(H)	36.4
1996	4,821	0	4,821	1,920	N(H)	39.8
1997	5,557	10	5,547	1,907	N(H)	34.4
1998	4,879	6	4,873	1,385	N(H)	28.4
1999	4,738	0	4,738	1,379	N(H)	29.1
90-99 Ave.	5,639	4	5,635	2,127		37.7
2000	6,640	9	6,631	2,720	N(H)	41.0

^a (F) = foot survey; N = normal survey conditions; (H) = helicopter survey; P = survey conditions hampered by glacial or turbid waters; E = excellent survey conditions; — = no survey conducted.

^b Above weir harvest includes broodstock collection and Aboriginal fishery catch.

^c Peak count equals peak survey above weir plus count below weir on that date.

large chinook total in the Stikine River drainage or 2,700 to 5,300 at the Little Tahltan weir (Bernard et al. 2000). The 2000 weir count was above the revised escapement goal range for the Little Tahltan River, which has been met or exceeded every year since the weir was installed in 1985 (Figure 3).

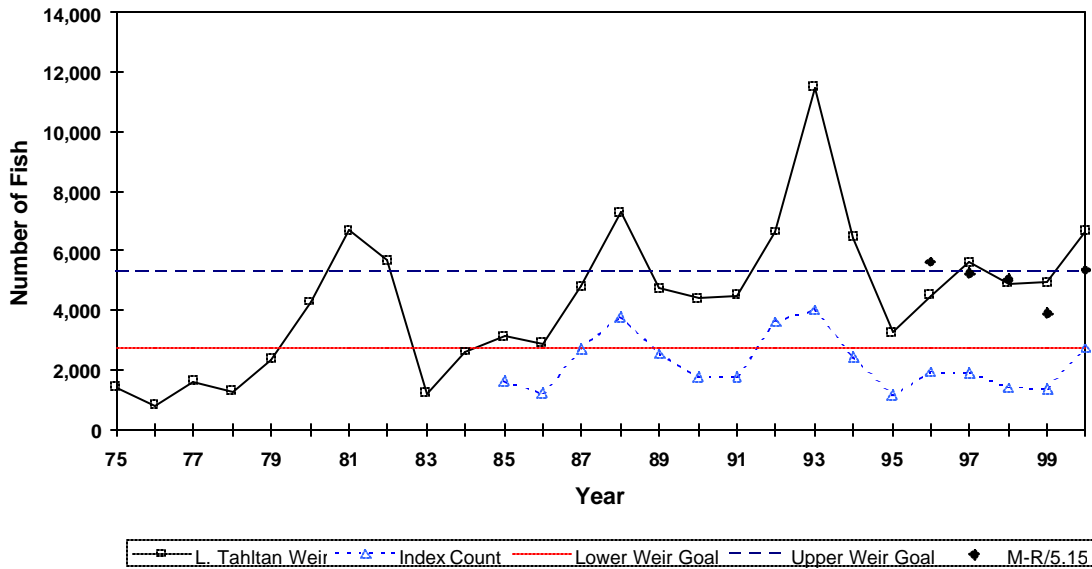


Figure 3.—Counts of chinook salmon at the Little Tahltan River weir, Stikine River, 1975–2000. Mark-recapture estimates divided by expansion factor of 5.15. Data for 1985–2000 from weir counts, 1975–1984 estimated by doubling index count. Lines show upper and lower limits of escapement goal range.

Expansion of the 2000 Little Tahltan weir count of 6,640 large chinook salmon by the survey expansion factor (5.15) produced a total Stikine River escapement estimate of 34,196 large chinook salmon. The estimate of total escapement to the Stikine River from a mark-recapture experiment conducted in 2000 is 27,531 (SE = 3,168, DerHovanisian et al., 2001) which is at the upper end of the escapement goal range for the drainage.

ANDREW CREEK

The 2000 survey count of chinook salmon in Andrew Creek was 690 fish, compared to 605 in 1999 (Table 6). In 1998, a spawner recruit analysis was completed and a biological escapement goal range of 650 to 1,500 total (~325–750 index count) large spawners was adopted (Clark et al. 1998). Since 1985, Andrew Creek escapements have exceeded the lower limit of the goal in all but two years (Figure 4).

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 during 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 2.0 (see Table 1). No survey expansion was necessary for the years when the weir provided total escapement counts (Appendix A2).

Two aerial, one helicopter, and one foot survey were conducted the same week in August, 2000 with 840, 690, 583, and 643 chinook salmon counted respectively (Appendix A3). The aerial count was used as the peak count based on experience from years when the weir was operated and surveys were conducted by the same observer who conducted the aerial survey (Clark et al. 1998).

Age, sex, and length data was collected from 128 pre-spawning fish in Andrew Creek, using angling gear and dip nets (Appendix A4F, A5F).

Table 6.—Counts of spawning chinook salmon in selected rivers in central Southeast Alaska, 1956–2000.
(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 conditions; E = excellent conditions; P = poor conditions; (B) = escapement surveyed from boat.

Year	Andrew Cr. ^a	North Arm	Clear Creek	Harding River	Aaron Creek	Bradfield River	
						N. Fork	E. Fork
1956	4,500 (A)	—	—	—	—	—	—
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	—	—	—	—	—	—	—
1971	305 (A)	—	—	—	—	—	—
1972	—	—	—	—	—	—	—
1973	40 (A)	—	—	10	—	—	—
1974	129 (A)	—	—	35	—	—	—
1975	260 (F)	—	—	—	—	—	P(A)
1976	404 (W/F)	—	—	12 N(A)	24	—	13
1977	456 (W/F)	—	—	410 E(A)	—	—	—
1978	388 (W/F)	24 E(F)	—	12 N(H)	—	—	63 P(A)
1979	327 (W/F)	16 E(F)	—	—	—	—	10 P(A)
1980	282 (W/F)	68 F(N)	—	—	—	30 P(H)	—
1981	536 (W/F)	84 E(F)	4 P(F)	28 P(H)	12	84 P(H)	—
1982	672 (W/F)	138 F(N)	188 N(F)	8 E(A)	—	—	—
1983	366 (W/F)	15 F(N)	—	15 P(A)	—	55 N(H)	—
1984	389 (W/F)	31 F(N)	—	35 N(B)	—	—	—
1985	320 E(F)	44 E(F)	—	243 N(F)	179	58 N(A)	85 N(A)
1986	708 N(F)	73 F(N)	45 E(A)	240 N(B)	178	104 E(A)	215 E(A)
1987	788 E(H)	71 E(F)	122 N(F)	40 E(A)	51	186 P(A)	175 P(A)
1988	564 N(F)	125 F(N)	167 N(F)	70 P(A)	325	680 N(A)	410 N(A)
1989	530 E(F)	150 A(N)	49 N(H)	80 P(A)	135	193 P(A)	132 P(A)
1990	664 E(F)	83 F(N)	33 P(H)	24 P(A)	—	—	—
1991	400 N(A)	38 A(N)	46 N(A)	42 N(F)	—	81 P(A)	320 P(A)
1992	778 E(H)	40 E(F)	31 N(A)	48 P(A)	30 P(A)	—	—
1993	1,060 E(F)	53 E(F)	—	40 N(A)	—	33 P(A)	118 P(A)
1994	572 E(H)	58 E(F)	10 N(A)	87 N(H)	27 P(H)	15 P(H)	—
1995	343 P(A)	28 A(P)	1 E(A)	38 N(H)	65 N(H)	16 P(A)	43 P(A)
1996	335 N(F)	35 F(N)	21 N(A)	75 N(A)	15 N(H)	78 N(A)	48 P(A)
1997	293 N(F)	—	—	—	55 N(H)	—	30 A(P)
1998	487 E(F)	35 N(A)	28 N(A)	75 N(A)	69 P(A)	—	66 P(A)
1999	605 E(A)	22 N(A)	—	—	550 N(A)	—	5 P(A)
90–99	554	44	24	54	116	45	90
2000	690 N(A)	35 N(A)	—	—	16 P(A)	—	33 N(A)

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

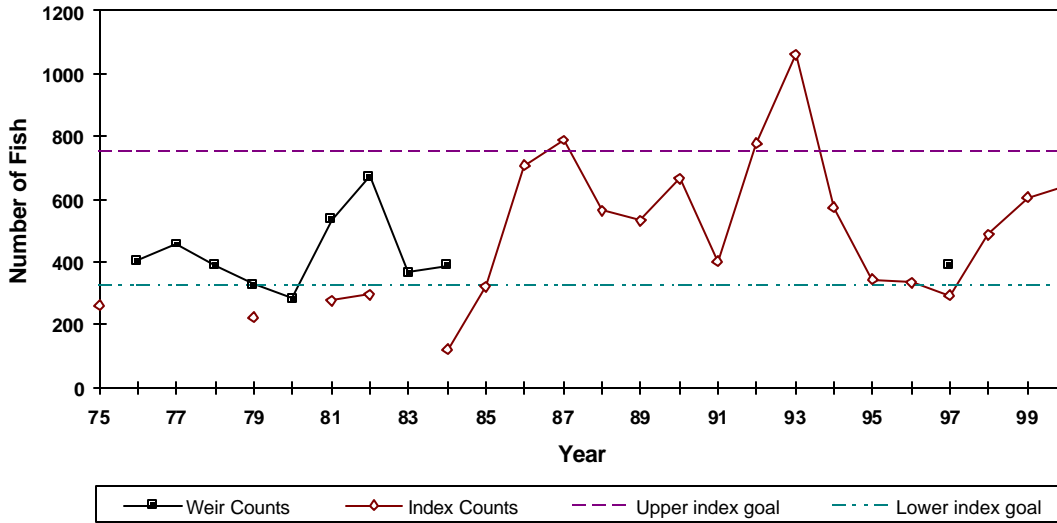


Figure 4.– Counts of chinook salmon at the Andrew Creek Weir, 1976–1984, 1997 and in aerial/foot surveys, 1975, 1985–2000. Lines show upper and lower bounds of index escapement goal range.

ALSEK RIVER

The count of large chinook salmon through the Klukshu River weir in 2000 was 1,365 fish, a 38% decrease from the count of 2,193 in 1999 (Table 7; Figure 5). The escapement to the Klukshu, estimated by subtracting the Aboriginal Fishery (AF) harvest (20) and sport harvest (0) above the weir from the weir count, was 1,343 fish, within the escapement goal range of 1,100 to 2,300, adopted in 1998 (McPherson et al. 1998b). All of the sport and most of the AF harvest was below the weir.

No aerial survey of the Klukshu River was conducted in 2000. However, in helicopter surveys we counted 152 large chinook salmon in the Takhanne River, 163 in the Blanchard River, 33 in Goat Creek and in a foot survey 47 fish were counted in Low Fog Creek.

There is no agreement in the PSC on use of expansion factors for the Alsek River; expansion factors used in the past have ranged from 1.56 to 2.5, based on assumptions that the Klukshu River represented 40 to 64 percent of the escapement to the entire drainage (Pahlke 1997b). Results from the 1998 tagging study to estimate distribution

and escapement of Alsek River chinook salmon indicated that the Klukshu River accounts for about 16–24% of the chinook salmon escapement to the Alsek River drainage (Pahlke et al. 1999). Results from the 1999 study also indicate less than 25% of the escapement to the Alsek drainage is accounted for in the Klukshu River (Pahlke and Etherton 2001b). On the basis of the results of those two studies, the expansion factor was revised to 4.0. The escapement to the entire drainage was then estimated by expanding the weir count by 4.0 and subtracting the above-weir (20) harvest, resulting in an estimated escapement of 5,542 fish. Preliminary results of a mark-recapture experiment indicate a total escapement of 8,295 large chinook salmon (SE = 1,625; Pahlke and Etherton, 2001b).

Age, sex and length data were collected from 765 live fish sampled at the Klukshu River weir, other spawning areas and at a lower river tagging project (Appendix A4J; A5J).

UNUK RIVER

In 2000, 1,341 large chinook salmon were counted in all index areas of the Unuk River (Table 8), a count that was above the recent 10-

Table 7.—Escapement of chinook salmon to the Klukshu River and counts of spawning adults in other tributaries of the Alsek River, 1962–2000. (A) = aerial survey from fixed wing aircraft; (H) = helicopter survey; E = excellent survey conditions; N = normal conditions; P = poor conditions; – = no survey.

Year ^a	Klukshu River						Escapement ^b	Blanchard River	Takhanne River	Goat Creek	Total ^c
	Aerial count	Weir count	Above-weir harvest								
			AF	Sport	Brood						
1962	86	A	–	–	–	86	–	–	–	86	
1963	–	–	–	–	–	–	–	–	–	0	
1964	20	A	–	–	–	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	A	–	–	–	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	1,064	–	–	–	1,064	
1977	–	–	3,144	350	96	2,698	–	–	–	2,698	
1978	–	–	2,976	350	96	2,530	–	–	–	2,530	
1979	–	–	4,404	1,300	0	3,104	–	–	–	3,104	
1980	–	–	2,673	150	0	2,487	–	–	–	2,487	
1981	–	–	2,113	150	0	1,963	35 (H)	11 (H)	–	2,009	
1982	633	N(H)	2,369	400	0	1,969	59 (H)	241 (H)	13 (H)	2,282	
1983	917	N(H)	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	P(H)	2,709	102	0	2,607	556 (H)	358 (H)	142 (H)	3,663	
1987	933	E(H)	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	E(H)	2,456	234	0	2,202	–	158 E(H)	34 E(H)	2,394	
1990	1,381	E(H)	1,915	202	0	1,698	–	325 E(H)	32 E(H)	2,055	
1991	–	–	2,489	241	0	2,223	121 N(H)	86 E(H)	63 E(H)	2,493	
1992	261	P(H)	1,367	88	0	1,243	86 P(H)	77 N(H)	16 N(H)	1,422	
1993	1,058	N(H)	3,303	64	0	3,221	326 N(H)	351 E(H)	50 N(H)	3,948	
1994	1,558	N(H)	3,727	99	0	3,620	349 N(H)	342 E(H)	67 N(H)	4,378	
1995	1,053	E(H)	5,678	260	0	5,397	338 P(H)	260 P(H)	–	5,995	
1996	788	N(H)	3,599	215	0	3,382	132 N(H)	230 N(H)	12 N(H)	3,756	
1997	718	P(H)	2,989	160	0	2,829	109 P(H)	190 P(H)	–	3,128	
1998	–	–	1,364	17	0	1,347	71 P(H)	136 N(H)	39 N(H)	1,593	
1999	500	P(H)	2,193	27	0	2,166	371 N(H)	194 N(H)	51 N(H)	2,782	
89–98 avg.	964	–	2,889	158	0	2,716	192	216	39	3,116	
2000	–	–	1,365	20	0	1,343	168 N(H)	152 N(H)	33 N(H)	1,698	

^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 above weir Aboriginal Fishery (AF) catch and broodstock.

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

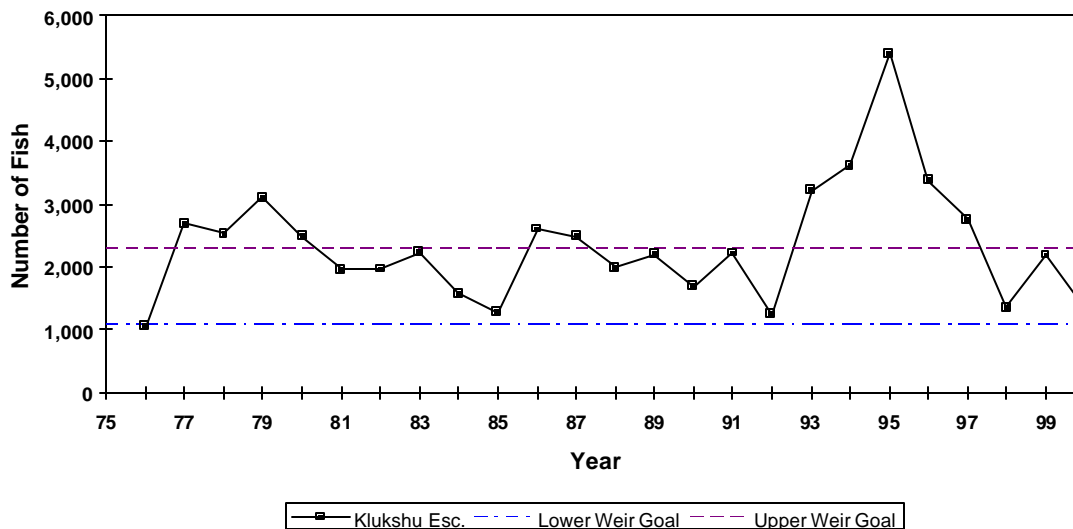


Figure 5. –Weir count of chinook salmon to the Klukshu River tributary of the Alsek River, 1975–2000. Lines show upper and lower limits of revised escapement goal range.

year average in 5 out of 6 index areas (Table 9). The total count was at the upper end of the index goal range of 650 to 1,400 (McPherson and Carlile 1997). Index counts have been below the lower end of the escapement goal range only three times since 1981 (Figure 6).

Nineteen large chinook salmon were counted in Boundary Creek in 2000. A change in the river between 1991 and 1994, which had revealed more spawning area than previously observed in Boundary Creek, has again changed, resulting in lower counts. Boundary Creek is not part of the Unuk River index area and was not included in either the summed counts for the watershed nor in the expanded count.

Based on results of mark-recapture and radio-tracking studies, the expansion factors were revised in 1996 from 1.6 to 4.0 times the summed tributary counts on the Unuk and Chickamin rivers (Pahlke et al. 1996, Pahlke 1997a, Pahlke 1997b). The expansion factor produced an estimated escapement of 5,364 large chinook salmon to the Unuk River in 2000, an increase of 37% from 1999. The ongoing mark-recapture program estimated an escapement of 5,872 large chinook salmon (SE = 644) in 2000 (Jones and McPherson 2002). As part of that project, 867

fish were sampled for age, sex and size data (Appendix A4D, A5D). Live fish were sampled with angling gear and carcasses were collected by spear.

CHICKAMIN RIVER

In 2000, 801 large chinook salmon were counted in index areas on eight tributaries of the Chickamin River, compared to 501 in 1999 (Table 10). Counts in 2000 were above the ten year average in 6 out of 8 Chickamin River tributaries (Table 11). The 2000 count was within the index survey escapement goal range of 450 to 900 fish; McPherson and Carlile 1997) (Figure 7). The summed counts for 2000 were multiplied by a survey expansion factor of 4.0 to produce a total escapement estimate of 3,204 fish to the system.

Angling and spears were used to collect age, sex and size data from 187 fish in 2000 (Appendix A4C, A5C).

BLOSSOM RIVER

Two hundred and thirty-one (231) large chinook salmon were counted in index areas of the Blossom River in 2000, up from 212 fish counted in 1999 (Table 12). The 2000 count was 4% below the lower limit of the index survey goal

Table 8.–Peak escapement counts of chinook salmon to index areas of the Unuk River, 1960–2000.

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 ^d
1993	448 N(F)	330 N(F)	132 E(F)	137 N(F)	8 N(F)	13 P(H)	1,068
1994	161 P(F)	300 N(F)	52 N(H)	128 E(F)	18 N(F)	52 N(F)	711 ^e
1995	211 N(F)	347 N(F)	74 N(H)	66 E(H)	35 E(H)	39 N(H)	772
1996	417 N(F)	400 N(F)	79 N(F)	148 E(F)	25 E(H)	98 E(F)	1,167
1997	244 P(F)	154 N(F/H)	53 N(F)	113 N(F)	13 N(H)	59 E(F)	636 ^f
1998	311 N(F)	283 N(F)	39 N(H)	81 N(F)	22 N(F)	104 N(F)	840 ^g
1999	202 N(F)	307 N(F)	54 N(H)	67 N(F)	9 N(F)	41 N(F)	680 ^h
89–98 Average	277	289	66	101	21	46	799
2000	450 N(F)	565 N(F)	116 N(H)	86 N(H)	56 E(H)	68 N(H)	1,341 ⁱ

^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 Cripple Cr. weir count reduced by /0.625 to be comparable with foot surveys.

^e Mark-recapture estimate of escapement 4,623 (SE 1,266; Pahlke et al. 1996).

^f Mark-recapture estimate of escapement 2,970 (SE 277; Jones et al. 1998b)

^g Mark-recapture estimate of escapement 4,132 (SE 413; Jones and McPherson 1999).

^h Mark-recapture estimate of escapement 3,914 (SE 490; Jones and McPherson 2000).

ⁱ Mark-recapture estimate of escapement 5,872 (SE 644; Jones and McPherson 2002).

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
1995	211	27	347	45	74	10	66	9	35	5	39	5	772
1996	417	36	400	34	79	7	148	13	25	2	98	8	1,167
1997	244	38	154	24	53	8	113	18	13	2	59	9	636
1998	311	37	283	34	39	5	81	10	22	3	104	12	840
1999	202	30	307	45	54	8	67	10	9	1	41	6	680
Avg.	424	39	325	31	180	15	95	9	25	2	37	4	1,087
2000	450	34	565	42	116	9	86	6	56	4	68	5	1,341

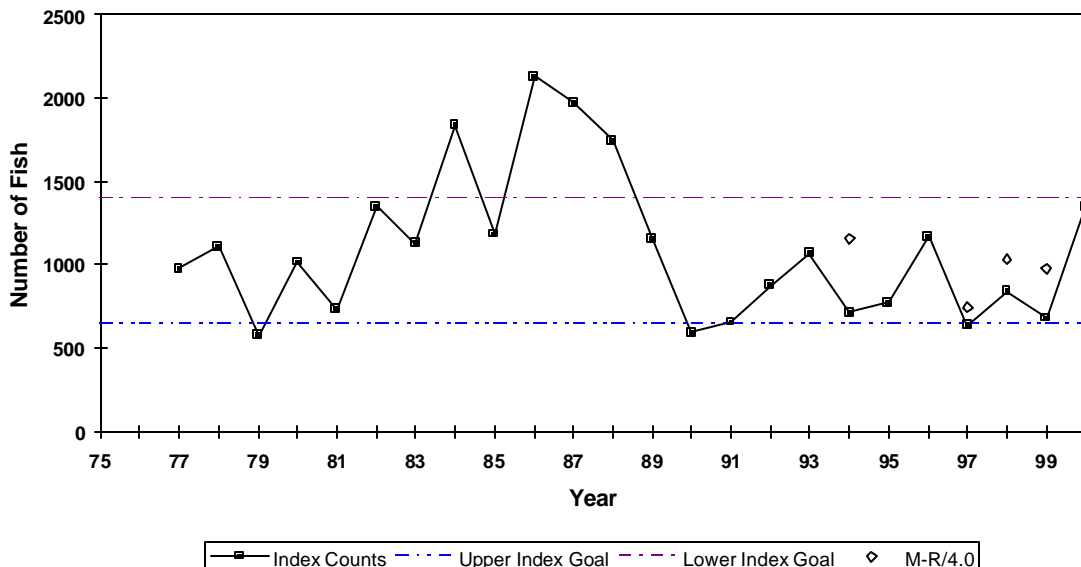


Figure 6.–Counts of large chinook salmon in index areas of the Unuk River, 1975–2000, and mark-recapture estimates divided by expansion factor (4.0). Lines show upper and lower limits of index escapement goal range.

Table 10.–Counts of chinook salmon in index areas of the Chickamin River, 1960–2000

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
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 ^d
1996	72 N(H)	13 N(F)	74 E(H)	23 E(H)	48 N(F)	30 N(F)	106 E(F)	56 E(H)	422 ^d
1997	28 P(H)	10 N(H)	43 N(H)	7 N(H)	24 N(H)	15 N(H)	95 N(H)	50 N(H)	272
1998	46 N(H)	0 N(H)	124 E(H)	16 P(H)	46 N(H)	28 N(H)	123 N(H)	8 P(H)	391
1999	54 N(H)	18 N(H)	106 N(H)	33 N(H)	52 N(F)	16 N(F)	200 N(H)	22 N(H)	501
90-99									
Avg.	73	26	68	21	33	22	127	42	412
2000	109 N(H)	27 N(H)	230 E(H)	61 N(H)	63 N(H)	20 N(H)	251 N(H)	40 P(H)	801

^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.

^d Mark-recapture estimates of escapement: 1995 = 2,309 large fish (SE 723); 1996 = 1,587 (SE 199).

Table 11.–Distribution of spawning chinook salmon among 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
1995	87	24	12	3	59	17	60	17	36	10	13	4	62	17	27	8	356
1996	72	17	13	3	74	18	23	5	48	11	30	7	106	25	56	13	422
1997	28	10	10	4	43	16	7	3	24	9	15	6	95	35	50	18	272
1998	46	12	0	0	124	32	16	4	46	12	28	7	123	31	8	2	391
1999	54	11	18	4	106	21	33	7	52	10	16	3	200	40	22	4	501
Avg.	134	21	73	11	89	14	23	4	53	8	28	4	199	31	41	6	640
2000	109	14	27	3	230	29	61	8	63	8	20	2	251	31	40	5	801

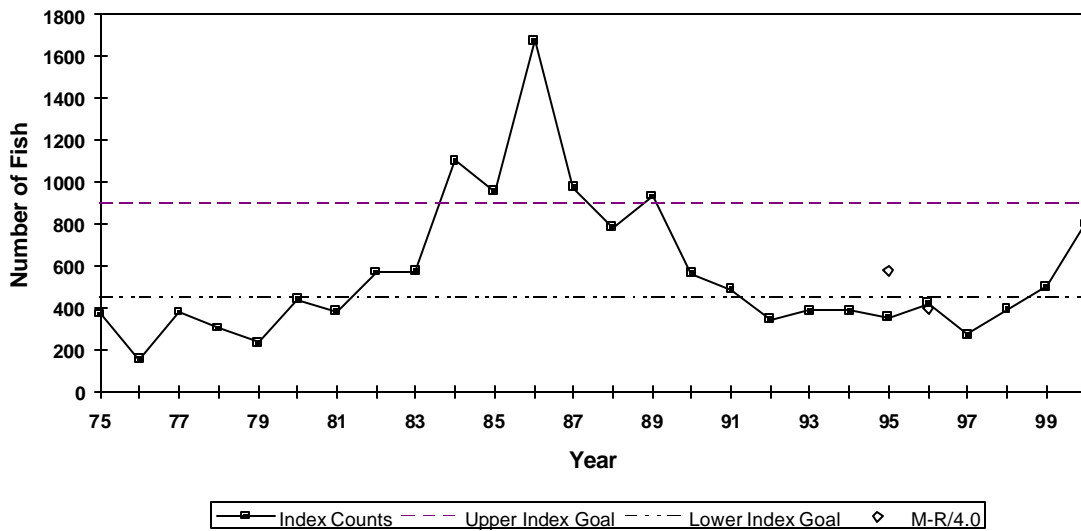


Figure 7.–Counts of chinook salmon in index areas of the Chickamin River, 1975–2000. Lines show upper and lower limits of index escapement goal range.

range of 250 to 500; McPherson and Carlile 1997). Counts had exceeded the goal from 1982–1989, but since 1991 they have frequently been below the escapement goal range (Figure 8). Based on results of mark-recapture and radio-tracking studies, the expansion factors for the Blossom and Keta rivers were revised in 1996 from 1.6 to 2.5 (Pahlke 1997b). The count for 2000 was multiplied by the expansion factor of 2.5 to produce a total escapement estimate of 578 fish.

Angling was used to sample age, sex and size data and 43 samples were collected in 2000 (Appendix A4B, A5B).

KETA RIVER

In 2000, 300 chinook salmon were counted in the Keta River, up from 276 counted in 1999 (Table 12) and within the 1996 revised index goal range of 250 to 500 large fish (McPherson and Carlile 1997). Prior to 1990, counts of chinook salmon in the Keta River increased steadily since implementation of the 1980 rebuilding program, and had exceeded the escapement goal range every year since 1981 (Figure 9). The peak count for 2000 was multiplied by a survey expansion factor of 2.5 to produce a total escapement estimate of 750 fish. A mark-recapture experiment conducted in 2000 estimated an escapement of 914 (SE = 122) large spawners (Freeman et al. *in prep*). In the course of that project 462 age, sex and size samples were collected using angling gear on live fish and spears on dead and dying fish (Appendix A4A, A5A).

KING SALMON RIVER

Two helicopter surveys and a foot survey were conducted on King Salmon River in 2000. The peak count during the helicopter surveys was 71 large chinook salmon while 91 were counted during the foot survey. This was less than half the 200 fish counted in 1999 but similar to the 88 fish counted in 1998. (Table 13; Figure 10). The escapement goal was revised in 1997 to a range of 120 to 240 total large fish, (McPherson and Clark, 2001). The resulting index goal range is 80-160 large fish observed. Counts exceeded the lower bound of the index goal range from 1993-

1998 and the 2000 count exceeded the lower range of the escapement goal.

The peak count of 91 was multiplied by the survey expansion factor of 1.5 to produce a total escapement estimate of 137 large fish to the system. Angling gear was used to collect age, sex and size data from 39 chinook salmon in 2000 (Appendix A4G, A5G).

SITUK RIVER

The count of all chinook salmon through the Situk River weir in 2000 was 3,092 fish. The estimate of sport harvest above the weir is 825 fish. The escapement estimate of large fish (3-5 ocean age) as determined by analysis of length and age samples was 1,888 (Table 14; Scott McPherson, ADFG, personal communication). Escapements have exceeded the escapement goal of 600 large spawners (range of 500–1,000) each year since 1984 (Figure 11). 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 and from the statewide harvest survey (Howe et al. 1998). The escapement counts from the base period all exceeded the revised escapement goal, indicating the Situk chinook salmon stock was not depressed and never needed rebuilding.

Age, sex and size data was collected from 225 live fish sampled at the weir (Appendix A4K, A5K).

CHILKAT RIVER

The 2000 escapement to the Chilkat River was estimated by mark-recapture experiment to be 2,035 large chinook salmon, the lowest estimate since the start of the mark-recapture program in 1991 (Ericksen 2000; Appendix A2). The escapement goal of 2,000 large fish has remained unchanged since Johnson et al. (1992) demonstrated that expansion factors used on the Chilkat River system were inaccurate. The escapement goal will be reviewed soon. The mark-recapture experiment also provided age, sex, and size data from 628 fish sampled with nets and spears on the spawning grounds (Appendix A4I, A5I).

Table 12.—Counts of chinook salmon for selected rivers in Behm Canal, 1961–2000. Survey types: F = foot, A = airplane, H = helicopter, – = no survey. Conditions: P = poor, N = normal, E = excellent.

Year ^a	Keta River	Blossom River	Wilson River	Marten River	Grant River	Klahini River	Total
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 N(H)	239 N(H)	–	135 N(H)	–	–	646
1992	217 N(H)	150 N(H)	109 E(H)	76 (H)	25 N(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
1995	175 E(H)	217 N(H)	58 N(H)	171 E(H)	–	–	621
1996	297 N(H)	220 E(H)	23 P(H)	62 N(H)	–	–	602
1997	246 N(H)	132 N(H)	16 N(H)	56 N(H)	9 N(H)	–	459
1998	180 N(H)	91 N(H)	–	–	–	–	271
1999	276 E(H)	212 N(H)	–	–	–	–	488
1990-99 Avg.	294	198	54	149	17	19	643
2000	300 N(H)	231 N(H)	–	–	–	–	531

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

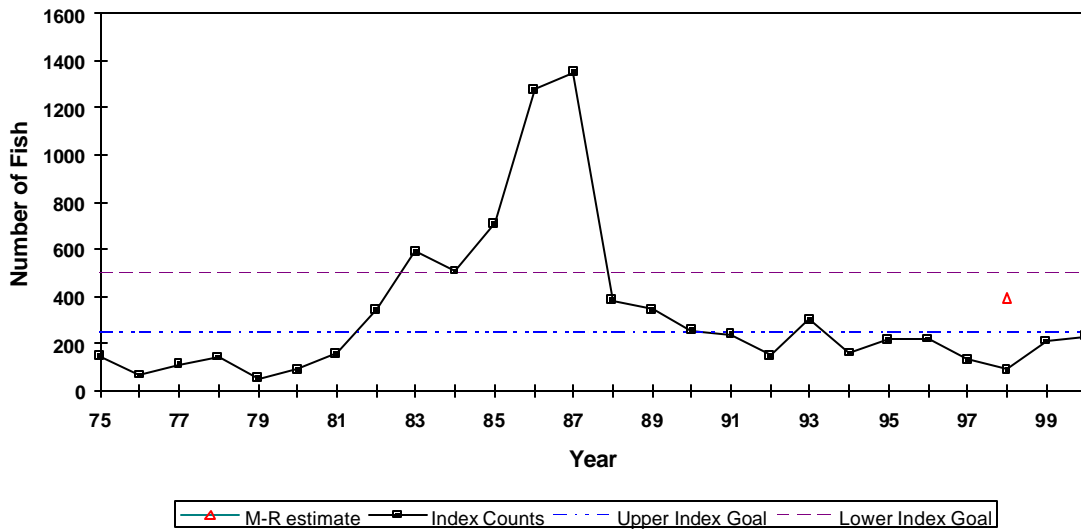


Figure 8.—Counts of chinook salmon into the Blossom River, 1975–2000. Lines show upper and lower limits of index escapement goal range.

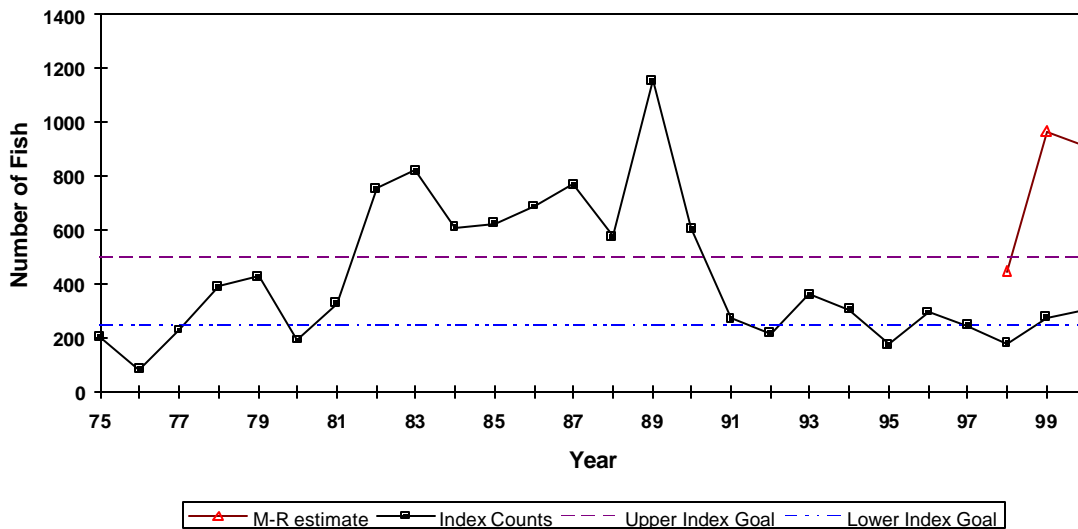


Figure 9.—Counts of chinook salmon to the Keta River, 1975–2000 and mark-recapture estimates for 1998-2000. Lines show upper and lower limits of index escapement goal range.

Table 13.—Peak escapement counts and weir counts of spawning chinook salmon in the King Salmon River, 1957–2000.

Year	Survey count		Survey as percent of weir count	Total egg take (adults)	Total weir count (adults)	Total weir count (jacks) ^b	Adults below weir (foot ct)	Total inriver (adults)	Total natural spawning
	Below weir	Above weir							
	A	B	B/(D-C)	C	D	E	F	D+F	D+F-C
1957	— ^a	200 (F)	—	—	—	—	—	—	—
1960	—	20 (F)	—	—	—	—	—	—	—
1961	—	117 (F)	—	—	—	—	—	—	—
1971	—	94 (F)	—	—	—	—	—	—	—
1972	—	90 (F)	—	—	—	—	—	—	—
1973	—	211 (F)	—	—	—	—	—	—	—
1974	—	104 (F)	—	—	—	—	—	—	—
1975	—	42 (H)	—	—	—	—	—	—	—
1976	—	65 (H)	—	—	—	—	—	—	—
1977	—	134 (H)	—	—	—	—	—	—	—
1978	—	57 (H)	—	—	—	—	—	—	—
1979	—	88 (H)	—	17	—	—	—	—	—
1980	—	70 (H)	—	—	—	—	—	—	—
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-----	-----	-----	-----	-----	-----
1994	—	140 N(F)	-----	no weir or egg take-----	-----	-----	-----	-----	-----
1995	—	97 P(H)	-----	no weir or egg take-----	-----	-----	-----	-----	-----
1996	—	192 E(F)	-----	no weir or egg take-----	-----	-----	-----	-----	-----
1997	—	238 N(F)	-----	no weir or egg take-----	-----	-----	-----	-----	-----
1998	—	88 E(F)	-----	no weir or egg take-----	-----	-----	-----	-----	-----
1999	—	200 E(F)	-----	no weir or egg take-----	-----	-----	-----	-----	-----
1983–92 Avg.	17	126	67%	31	209	56	22	231	188
2000	—	91 N(F)	-----	no weir or egg take-----	-----	-----	-----	-----	-----

^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%.

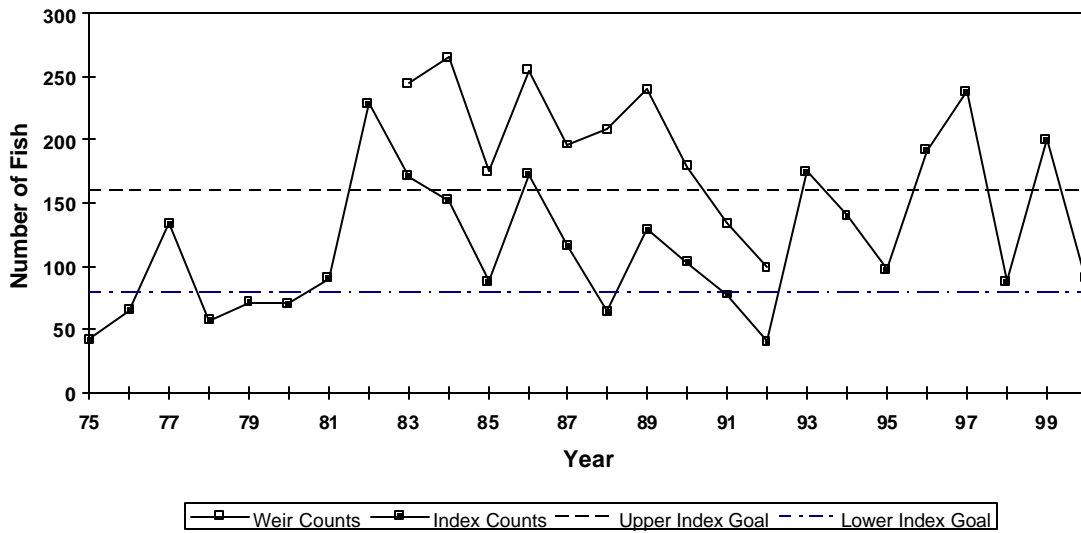


Figure 10.—Counts of chinook salmon at a weir and in survey counts in the index area of the King Salmon River, 1975-2000. Lines show upper and lower limits of index escapement goal range.

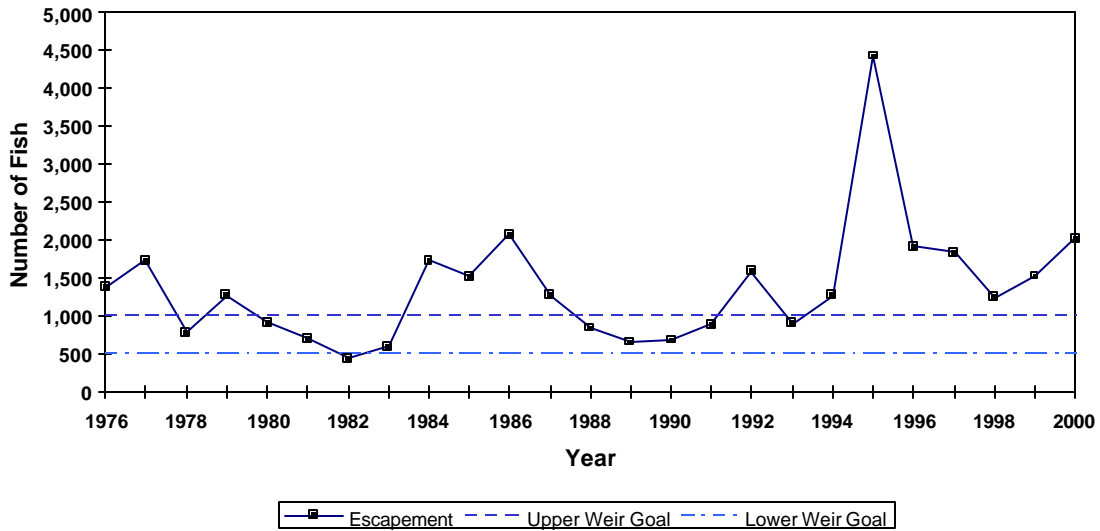


Figure 11.—Counts of large chinook salmon at the Situk River weir, 1975–2000. Lines show upper and lower limits of escapement goal range.

Table 14.–Harvest, escapement, and minimum total run of Situk River chinook salmon, 1976–2000.

Year	Harvests below weir				Abundance above weir					Estimated total run inriver ^a				
	182-70 gillnet	Subsis- tence	Sport	Total	Total weir count	Harvest above weir	Estimated escapement ^d							
							Large	Medium	Small ^c	Total				
1976	1,002	41	200	1,243	1,941	0	1,365	576		1,941				3,184
1977	833	24	244	1,101	1,880	0	1,732	148		1,880				2,981
1978	382	50	210	642	1,103	0	776	327		1,103				1,745
1979	1,028	25	282	1,335	1,800	0	1,266	534		1,800				3,135
1980	969	57	233	1,259	1,125	0	905	220		1,125				2,384
1981	858	62	130	1,050	807	0	702	105		807	1,270	543	44	1,857
1982	248	27	63	338	611	0	434	177		611	672	261	16	949
1983	349	50	52	451	849	0	592	257		849	866	406	28	1,300
1984	512	89	151	752	2,201	0	1,726	475		2,201	2,427	521	5	2,953
1985	484	156	511	1,151	1,982	0	1,521	461		1,982	2,233	683	217	3,133
1986	202	99	37	338	2,572	0	2,067	505		2,572	2,290	583	37	2,910
1987	891	24	395	1,310	1,799	0	1,265	534		1,799	2,215	575	319	3,109
1988	299	90	132	521	1,078	56	837	185		1,022	1,337	259	3	1,599
1989	1	496 ^b	0	497	1,871	0	653	122	1,096	1,871	1,073	198	1,096	2,367
1990	0	516 ^b	0	516	1,363	0	676	532	155	1,363	969	755	155	1,879
1991	786	220 ^b	67	1,073	1,613	29	878	125	582	1,585	1,678	413	595	2,686
1992	1,504	341	127	1,972	1,985	54	1,579	224	128	1,931	3,103	699	155	3,957
1993	790	202	50	1,042	4,200	202	899	461	2,638	3,998	1,718	753	2,772	5,243
1994	2,656	367	397	3,420	4,416	170	1,263	1,399	1,584	4,246	3,040	3,161	1,764	7,965
1995	8,106	528	1,180	9,814	8,231	506	4,398	497	2,830	7,725	13,439	1,608	3,131	18,177
1996	3,717	478	1,270	5,465	4,151	795	1,803	522	1,031	3,356	6,521	1,509	1,678	9,708
1997	2,339	352	802	3,493	5,001	1,168	1,950	382	1,501	3,834	5,424	1,266	1,923	8,612
1998	2,101	594	494	3,189	5,329	857	1,072	716	2,683	4,472	3,340	1,924	3,308	8,572
1999	3,810	510	605	4,925	2,786	740	1,523	227	296	2,046	5,453	1,614	644	7,711
90-99	2,581	411	499	3,491	3,908	452	1,624	488	1,343	3,456	4,450	1,337	1,612	7,399
2000	1,318	594	352	2,237	3,092	825	1,888	87	293	2,267	4,481	392	455	5,328

^a Total run inriver = chinook escapement + Situk commercial, sport, and subsistence harvests. An unknown portion of the Yakutat Bay catch is Situk fish. Large chinook are 3 to 5-ocean-age and small are 1 and 2-ocean age. Commercial and subsistence catches include some small chinook (Scott McPherson, unpublished report).

^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 1- and 2-ocean jacks from 1990 to 1996; 1-ocean fish not counted before 1990.

^d Escapement from Scott McPherson, Alaska Department of Fish and Game, Douglas, personal communication, based on age composition.

OTHER SYSTEMS

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 2000, efforts were concentrated on the Blossom and Keta

Rivers and no chinook salmon surveys were conducted on the Marten or Wilson rivers.

Grant and Klahini rivers, small chinook systems in Behm Canal which have been surveyed sporadically, were not surveyed in 2000 (Table 12). Since 1995 surveys occasional surveys have been flown on the Harding River and Aaron Creek to determine the feasibility of adding these medium and small systems to the

program (Table 6). The remaining systems are too remote, and funds are not currently available for these surveys.

OBSERVER TRAINING

An alternate observer accompanied the primary observer on training flights to eleven index areas in 2000 (Table 15). The same alternate observer also conducted two calibration surveys in 2000. The median proportion of the alternates' counts versus the primary observer's counts on the training flights was 80.8% (average 90%) and 83.5% on the calibration surveys.

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 is assumed to cause a proportional change in the index count. Consequently, if this assumption holds, even though index counts are not estimates of total escapement, multi-year trends in escapement are correct. Two types of error affect the accuracy of the survey counts.

First, factors intrinsic to each area interfere with the ability to count fish. Examples include heavily shaded areas or topography that prevent close approach with a helicopter, presence of other species that could be confused with chinook salmon, and overhanging brush, or deep or occluded water. Also, not all spawning areas in a tributary or drainage are surveyed. These factors are accounted for by survey expansion factors.

Second, factors that affect counting efficiency may vary greatly from year to year and survey to survey. These include annual changes in migratory timing; large changes in abundance that may cause reduced counts relative to the number of fish in the index area; changes in the distribution of spawners among the tributaries of a watershed among years; and inclement

weather, turbidity events, or changes in pilot and/or observer experience.

Weather, logistics, run timing, etc., can make it difficult for a single surveyor to complete all the index surveys annually under good or excellent conditions. Thus, alternate surveyors are selected to conduct the counts when the primary surveyor can not. Also, new surveyors take on primary responsibilities at infrequent intervals. Since between observer variability and bias can be significant (Jones et al. 1998), new surveyors must be trained and calibrated against the primary surveyor to provide consistency and continuity in the data.

Estimates of total escapement (direct estimates or expanded counts) are needed when comparing escapements 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 (Appendix B *in* Pahlke 1997b), and error associated with these expansions can be large. Johnson et al. (1992) showed that expansion factors for the Chilkat River, for example, greatly underestimated escapement to that watershed. ADF&G recognized the need to develop better expansions throughout the region, and has independently estimated distribution and escapement for chinook salmon in the Unuk (Pahlke et al. 1996; Jones and McPherson 1999; 2000), Chickamin (Pahlke 1996; 1997a), Stikine (Pahlke and Etherton 1999a; Bernard et al. 2000), Taku (Pahlke and Bernard 1996, McPherson et al. 1997, 2001), Keta (Brownlee et al. 1999) and Alsek rivers (Pahlke et al. 1999). Total escapement projects are continuing on many of those 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.

Table 15.–Observer training and calibration flights conducted in 2000.

Index area	Date	Visibility	Primary ^a observer	Alternate ^a observer	P - A	A/P percent	Comments
Nahlin IA1	7/30	poor	46	39	7	84.8	frontseat training flight ^b
Nahlin IA2	7/30	poor	315	307	8	97.5	frontseat training flight
Nahlin IA3	7/30	normal	367	283	84	77.1	frontseat training flight
Nakina IA1	7/30	normal	1,207	890	317	73.7	backseat training flight
Nakina IA2	7/30	normal	420	310	110	73.8	backseat training flight
Nakina IA3	7/30	normal	730	590	140	80.8	backseat training flight
Nakina IA4	7/30	poor	77	130	-53	168.8	backseat training flight
Little Tahltan	7/30	poor	2,557	2,270	287	88.8	backseat training flight
Dudidontu R.	7/31	normal	433	344	89	79.4	backseat training flight
Blanchard	8/1	normal	163	168	-5	103.1	backseat training flight
Takhanne	8/1	normal	152	102	50	67.1	backseat training flight
						Average	90.4
						Median	80.8
Tseta Creek	7/30	normal	130	113	17	86.9	calibration survey
Tatsamenie	8/21	normal	953				
Tatsamenie	8/25	normal		763	190	80.1	calibration survey, 4 days later
						Average and median	83.5

^a P: primary observer, KAP, A: alternate, JAD.

^b FSTF = alternate observer sits in front (preferred) seat; BSTF = alternate observer sits in back seat

The expansion factor for the Taku River was revised in 1999 after 5 years of mark-recapture data (McPherson et al. 2000). The expansion factor for the Alsek River was revised in 2000 based on 2 years of mark-recapture studies.

Changing the escapement goals, however, requires a formal review by ADF&G and the Chinook Technical Committee of the PSC, as was done for the Situk River in 1991, the Behm Canal systems in 1994, and King Salmon River in 1997. The Andrew Creek escapement goal was also revised in 1998 to a range of 650 to 1,500 total large spawners (Clark et al. 1998). The Canadian Department of Fisheries and Oceans and the Transboundary Technical Committee are included in any review of Taku, Stikine or Alsek River goals. In 1998, a revised stock-recruitment analysis by ADF&G and DFO staff estimated

that the escapement goal for the Klukshu River should range between 1,100 and 2,300 spawners (McPherson et al. 1998b). Escapement goals for the Taku and Stikine rivers were approved in 1999 (McPherson et al. 2000; Bernard et al. 2000).

Expansion factors and escapement goals will continue to be revised as we complete more studies which include both index counts and estimates of total escapement. Any change in survey methods or observers 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 (seven

with Chilkat) producing watersheds are included in the index survey program. Prior to 1997, counts from these streams were expanded to represent the escapement of all streams in minor and medium producing categories. The King Salmon River is unique among Southeast Alaska chinook populations as the only island system, and using it to represent the other 21 small systems most likely produced inaccurate estimates of total escapement. However, because escapement to small and medium systems are a small proportion of the total region escapement, errors in those estimates would have little effect on estimates of regional escapement. In 1997, the method used to expand the index counts to a total region escapement estimate was revised based on over 20 years of systematic escapement surveys in Southeast Alaska and the transboundary rivers. The revised method assumes the sum of the expanded indices accounts for approximately 90% of the total escapement and that number is expanded to account for the remaining 10%. We think this method more accurately reflects the geographic distribution of the unsurveyed systems.

Observer training and calibration flights conducted in 2000 indicated a fairly consistent undercounting by the alternate observer when compared with the primary observers counts. These flights will be continued in the future and reanalyzed as more calibration surveys are completed.

Escapement goal revisions based on spawner-recruit analysis require a long time series of age and sex composition data along with total escapement estimates. Age, sex, and length composition estimates for all sampled chinook stocks in Southeast Alaska and transboundary rivers are presented in Appendix tables A4-A5. An interesting trend was apparent in 1999, with the largest fish occurring in the southern systems and average size decreasing towards the north. In 2000, the largest fish were again seen in the southern systems, but the fish in the northern systems: Chilkat, Alsek and Situk rivers were larger than chinook salmon in the central systems. Many (up to 75%) of the 2 ocean fish sampled on the Blossom, Keta and Chickamin rivers were of legal size (28" total

length), which is uncommon in other systems. When mean lengths at age were tested for differences, lengths from the Keta, Blossom and Chickamin rivers were not different from each other but were statistically larger than those of other systems in almost every case (Appendix A6).

The age-.2 (2-ocean-age jack) component was relatively strong which indicates high survival rates for the 1996 brood year. The 3-ocean-age (1995 brood) class was dominant in all systems in 2000, while age-.4 fish comprised a lower percentage in most systems, compared to 1999. We therefore expect to see an increase in abundance in 2001 for many stocks, compared to 2000.

Sampling strategies were designed to make the estimated age and sex distributions relatively unbiased for age-.2 to age-.5 fish. A weir was used to sample the Situk River; stratified mark-recapture studies were used on the Alsek, Chilkat, Taku, Stikine, Unuk and Keta Rivers; and non-selective rod and reel and/or carcass sampling was used on the Blossom, Chickamin, Andrew Creek and King Salmon systems. Therefore, comparisons of length or age compositions between stocks within the age-.2. to age-.5 should be relatively unbiased for stocks with adequate sample sizes. The Situk River is the only chinook system in Southeast Alaska where the escapement of age-.1 jacks are estimated annually. The mean length at age data is unbiased for all stocks.

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APPENDIX A

Appendix A1.–Survey escapement goals and system goals for large chinook salmon, Southeast Alaska and transboundary rivers, as accepted by ADF&G, DFO, CTC and TTC, 2000.

River	Index areas	Index survey goal ^a			System goal ^b		
		Point est.	Range		Point est.	Range	
			Lower	Upper		Lower	Upper
Alsek^c	Klukshu		1,100	2,300			
Taku^d	5 tributaries	7,000	5,800	10,600	36,000	30,000	55,000
Stikine^e	Little Tahltan	3,300	2,700	5,300	17,368	14,000	28,000
Situk^f	All				600	500	1,000
Chilkat	All				2,000 under review		
Andrew Cr.^g	All	425	325	750	850	650	1,500
Unuk^h	6 tributaries	800	650	1,400			
Chickamin^h	8 tributaries	525	450	900			
Blossom^h	All	300	250	500			
Keta^h	All	300	250	500			
King Salmon R.ⁱ	All	100	80	160	150	120	240

^a Index survey goal corresponds to the peak or highest single day count of large spawners in annual survey counts.

^b System goal corresponds to the estimated total escapement of large spawners in the river system, estimated from mark-recapture studies, weir counts or expanded survey counts.

^c McPherson et al. 1998.

^d McPherson et al. 2000.

^e Bernard et al. 2000.

^f McPherson 1991.

^g Clark et al. 1998.

^h McPherson and Carlile, 1997.

ⁱ McPherson and Clark, 2001.

Appendix A2.–Estimated total escapements of chinook salmon to escapement indicator systems and to Southeast Alaska and transboundary rivers, 1975–2000. Numbers may be revised annually as data are collected. Index escapements are expanded for survey counting rates and unsurveyed tributaries, numbers in **bold type** are weir counts or mark-recapture estimates and are not expanded, [region total expanded for 84% w/o Chilkat River, 90% with Chilkat escapement included].

Year	MAJOR SYSTEMS				MEDIUM SYSTEMS								Total all systems	Expanded region total	
	Alsek	Taku	Stikine	Major subt.	Situk	Chilkat	Andrew	Unuk	Chick-amin	Blos-som	Keta	Med subt.			King Salmon
1975		12,920	7,571				520		1,481	365	508		62		
1976	4,898	24,582	5,723	35,203	1,365		404		627	170	210		96		
1977	12,130	29,496	11,445	53,071	1,732		456	3,896	1,450	280	575	8,389	199	61,659	73,404
1978	11,458	17,124	6,835	35,417	776		388	4,424	1,234	358	980	8,159	84	43,660	51,976
1979	16,316	21,617	12,610	50,543	1,266		327	2,304	954	135	1,065	6,051	113	56,707	67,508
77-79 Ave.	13,301	22,746	10,297	46,344	1,258		390	3,541	1,213	258	873	7,533	132	54,009	64,296
1980	10,398	39,239	30,573	80,210	905		282	4,064	1,779	223	480	7,732	104	88,046	104,817
1981	8,302	49,559	36,057	93,918	702		536	2,924	1,536	398	823	6,918	139	100,975	120,208
1982	9,076	23,847	40,488	73,411	434		672	5,404	2,284	863	1,885	11,542	354	85,307	101,555
1983	9,848	9,795	6,424	26,067	592		366	4,500	2,398	1,473	2,055	11,383	245	37,695	44,875
1984	6,588	20,778	13,995	41,361	1,726		389	7,348	4,408	1,270	1,525	16,666	265	58,292	69,395
1985	5,657	35,916	16,037	57,610	1,521		640	4,736	3,824	1,773	1,560	14,054	175	71,839	85,522
1986	10,734	38,110	14,889	63,733	2,067		1,414	8,504	6,980	3,195	1,725	23,885	255	87,873	104,611
1987	10,339	28,935	24,632	63,906	1,265		1,576	7,892	3,900	3,373	1,920	19,926	196	84,028	100,033
1988	8,105	44,524	37,554	90,183	837		1,128	6,984	3,144	960	1,438	14,491	208	104,882	124,859
1989	9,570	40,329	24,282	74,181	653		1,060	4,596	3,736	860	2,888	13,793	240	88,214	105,016
Avg.	8,862	33,103	24,493	66,458	1,070		806	5,695	3,399	1,439	1,630	14,039	218	80,715	96,089
1990	7,443	52,142	22,619	82,204	676		1,328	2,364	2,256	643	1,515	8,781	179	91,164	108,529
1991	9,690	51,645	23,206	84,541	878	5,897	800	2,620	1,948	598	680	13,421	134	98,096	108,995
1992	5,344	55,889	34,129	95,362	1,579	5,284	1,556	3,496	1,384	375	543	14,217	99	109,678	121,864
1993	13,130	66,125	58,962	138,217	899	4,472	2,120	4,272	1,556	758	905	14,982	259	153,458	170,508
1994	14,801	48,368	33,094	96,263	1,263	6,795	1,144	4,623	1,552	403	765	16,545	207	113,015	125,572
1995	22,431	33,805	16,784	73,020	4,398	3,790	686	3,088	2,309	543	438	15,251	144	88,415	98,239
1996	14,179	79,019	28,949	122,147	1,803	4,920	670	4,668	1,587	550	743	14,941	288	137,376	152,640
1997	11,796	114,938	26,996	153,730	1,950	8,100	586	2,970	1,088	330	615	15,639	357	169,726	188,584
1998	4,621	31,039	25,968	61,628	1,072	3,675	974	4,132	1,564	393	446	12,256	132	74,016	82,240
1999	11,597	20,545	19,947	52,089	1,523	2,271	1,210	3,914	2,004	530	968	12,420	300	64,809	72,010
Avg.	11,503	55,352	29,065	95,920	1,604	5,023	1,107	3,615	1,725	512	762	13,845	210	109,772	122,918
2000	5,440	30,014	34,196	69,650	1,888	2,035	1,380	5,364	3,204	578	750	15,199	137	84,986	94,429
CHANGE FROM 1999 to 2000															
Number	(3,305)	9,469	14,249	20,413	365	(349)	76	1,450	1,200	48	(218)	2,610	(163)	23,029	25,588
Percent	-53	46	71	41	24	-15	6	37	60	9	-23	21	-54	37	31
Under review															
Goals															
Lower	4,400	30,000	14,000	49,400	500		650	2,600	1,800	625	625	8,800	120	57,320	64,800
Point	6,800	36,000	17,500	60,300	600	2,000	850	3,500	2,100	750	750	10,450	150	71,000	78,889
Upper	9,200	55,000	28,000	92,200	1000		1,500	5,600	3,600	1,250	1,250	16,200	240	108,640	120,711
Average percent of goal															
77-79	196	63	59	77	210		52	101	58	34	116	72	88	76	
80-89	130	92	140	110	178		108	163	162	192	217	134	145	114	
90-98	170	164	172	167	267	264	146	102	81	68	99	133	133	155	

Appendix A3.—Detailed 2000 Southeast Alaska chinook salmon escapement surveys as entered into Commercial Fisheries Division Integrated Fisheries Database (IFDB/ALEX). Includes all surveys where chinook salmon were observed, many are not used to estimate escapement.

Stream no.	Stream	Date	Tidal	Mouth	Live	Dead	Total	Survey	Obs ^a	Use ^b	Comment
10115090	Marx Creek-Hyder	8/14/00	0	0	1	0	1	F	TPZ	2	Timothy P. Zadina
10130030	Keta River	8/14/00	0	0	232	0	232	H	KAP	3	40 above chute
10130030	Keta River	8/18/00	0	0	121	0	121	H	KAP	2	Poor visibility
10130030	Keta River	8/28/00	0	0	300	0	300	H	KAP	3	55 below camp
10145007	Herring Cove	6/26/00	1000	0	0	0	1000	A	PSD	2	
10155040	Blossom River	8/14/00	0	0	94	0	94	H	KAP	2	
10155040	Blossom River	8/28/00	0	0	231	0	231	H	KAP	3	
10171004	Chickamin River	8/19/00	0	0	801	0	801	H	KAP	3	Peak total
1017104A	Barrier Creek	8/7/00	0	0	15	0	15	H	KAP	2	
1017104A	Barrier Creek	8/13/00	0	0	27	0	27	H	KAP	3	
1017104A	Barrier Creek	8/19/00	0	0	9	0	9	H	KAP	2	
1017104A	Barrier Creek	10/10/00	0	0	2	0	2	H	GMF	2	2 post king salmon
1017104B	Butler Creek	8/7/00	0	0	230	0	230	H	KAP	3	Excellent survey
1017104B	Butler Creek	8/19/00	0	0	125	0	125	H	KAP	2	
1017104C	Clear Creek	8/7/00	0	0	40	0	40	H	KAP	2	
1017104C	Clear Creek	8/19/00	0	0	38	0	38	H	KAP	2	
1017104H	Humpy Creek	8/13/00	0	0	15	0	15	H	KAP	2	
1017104H	Humpy Creek	8/19/00	0	0	20	0	20	H	KAP	3	
1017104I	Indian Creek	8/7/00	0	0	63	0	63	H	KAP	2	
1017104I	Indian Creek	8/19/00	0	0	9	0	9	H	KAP	1	
1017104K	King Creek	8/7/00	0	0	130	0	130	H	KAP	2	Partial survey
1017104K	King Creek	8/19/00	0	0	251	0	251	H	KAP	3	Schooled-up
1017104L	Leduc River	8/7/00	0	0	47	0	47	H	KAP	2	Clear at bottom
1017104L	Leduc River	8/19/00	0	0	61	0	61	H	KAP	3	
1017104S	South Fork Chickamin	8/7/00	0	0	52	0	52	H	KAP	2	
1017104S	South Fork Chickamin	8/13/00	0	0	102	0	102	H	KAP	3	
1017104S	South Fork Chickamin	8/19/00	0	0	109	0	109	H	KAP	2	
10175015	Eulachon River	8/19/00	0	0	116	0	116	H	KAP	3	Only 5 fish in left fork
10175030	Unuk River	8/18/00	0	0	1341	0	1341	H	KAP	3	Peak total
1017503B	Boundary Cr Unik R	8/14/00	0	0	19	0	19	H	KAP	2	
1017530C	Clear Creek-Unuk R	8/13/00	0	0	86	0	86	H	KAP	2	
1017530C	Clear Creek-Unuk R	8/19/00	0	0	80	0	80	H	KAP	3	
1017530G	Genes Lake CreekUnuk	8/13/00	0	300	0	0	300	H	KAP	2	In lake
1017530G	Genes Lake CreekUnuk	8/14/00	0	0	265	0	265	F	KAP	3	Foot survey by Casey

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Stream no.	Stream	Date	Tidal	Mouth	Live	Dead	Total	Survey	Obs ^a	Use ^b	Comment
1017530G	Genes Lake CreekUnuk	8/19/00	0	300	0	0	300	H	KAP	3	In lake; lots of sockeye
1017530K	Kerr Creek-Unuk R	8/13/00	0	0	65	0	65	H	KAP	3	murky at bottom
1017530K	Kerr Creek-Unuk R	8/19/00	0	0	68	0	68	H	KAP	3	Lots of whitetails
1017530L	Lake Creek-Unuk R	8/13/00	0	0	56	0	56	H	KAP	3	51 at riffles
1017530L	Lake Creek-Unuk R	8/19/00	0	0	51	0	51	H	KAP	3	Lots of whitetails
1017530Q	Cripple Ck-Unuk R	8/14/00	0	0	450	0	450	F	KAP	3	Foot survey by Ed Jones
10180070	Hatchery Ck-Yes Bay	8/31/00	0	0	38	8	46	F	TPZ	2	
10180070	Hatchery Ck-Yes Bay	9/12/00	0	0	0	4	4	F	SCH	2	
10180070	Hatchery Ck-Yes Bay	9/20/00	0	0	0	1	1	F	TPZ	2	
10190029	Traitors Cove Creek	8/9/00	0	0	2	0	2	F	AWP	2	
10190029	Traitors Cove Creek	8/11/00	0	0	4	0	4	F	AWP	2	
10190029	Traitors Cove Creek	8/18/00	0	0	7	0	7	F	AWP	2	
10190029	Traitors Cove Creek	8/30/00	0	0	5	0	5	F	AWP	2	poor visibility
10644031	Crystal Creek	6/22/00	0	50	0	0	50	A	BLL	2	NO FISH ABV RAPIDS
10644031	Crystal Creek	6/28/00	50	0	50	0	100	A	BLL	2	12.8 TIDE,50 JUST OVER RAPIDS
10644031	Crystal Creek	6/30/00	400	0	0	0	400	A	WRB	2	230 ABV RAPIDS,170 BELOW
10644031	Crystal Creek	7/2/00	330	0	0	0	330	A	WRB	1	80 ABV RAPIDS 25 BLW
10644031	Crystal Creek	7/7/00	380	400	5	0	785	A	WRB	2	130 ABV RAPIDS 250 BLW
10644031	Crystal Creek	7/10/00	700	550	0	2	1252	A	WRB	2	470 ABV RAPIDS 230 BLW
10644031	Crystal Creek	7/11/00	1090	200	0	0	1290	A	WRB	2	840 ABV RAPIDS 250 BLW
10644031	Crystal Creek	7/12/00	1380	120	0	0	1500	A	WRB	2	1210 ABV RPDS 170 BLW 4PM
10644031	Crystal Creek	7/14/00	1160	360	0	0	1520	A	WRB	1	870 ABV RPDS 650 BLW 4PM
10644031	Crystal Creek	7/14/00	1340	520	0	0	1860	A	WRB	2	1120 ABV RAPIDS 220 BLW
10644031	Crystal Creek	7/16/00	940	400	0	1	1341	A	WRB	1	FEWER ABV RAPIDS 10:30AM
10644031	Crystal Creek	7/21/00	590	0	0	0	590	A	WRB	1	550 ABV RAPIDS, 40 BLW
10740024	Aaron Creek	8/9/00	0	0	16	0	16	A	WRB	1	TO GLACIAL FOR GOOD COUNT
10740053	Bradfield River E Fk	8/9/00	0	0	33	0	33	A	WRB	1	WATER TO HIGH FOR A GOOD COUNT
10840020	Andrews Creek	8/3/00	0	60	780	0	840	A	WRB	2	INC 40 IN E. ARM
10840020	Andrews Creek	8/7/00	0	0	639	4	643	F	TWR	2	15 ADULT IN N FORK
10840020	Andrews Creek	8/7/00	0	0	583	0	583	H	KAP	3	
10840020	Andrews Creek	8/9/00	0	30	650	10	690	A	WRB	2	
10840020	Andrews Creek	8/18/00	0	0	367	0	367	A	BLL	2	
10841007	Stikine N Arm Mouth	8/3/00	0	0	30	0	30	A	WRB	2	LG ENOUGH FISH TO BE KINGS
10841010	North Arm Creek	8/3/00	0	0	35	0	35	A	WRB	2	TOO MANY DOGS FOR ACCURATE COUNT
10841010	North Arm Creek	8/9/00	0	0	25	5	30	A	WRB	2	TOO MANY DOGS FOR ACCURATE COUNT

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Stream no.	Stream	Date	Tidal	Mouth	Live	Dead	Total	Survey	Obs ^a	Use ^b	Comment
10880120	Little Talhtan River	7/30/00	0	0	2270	0	2270	H	JAD	2	Backseat training survey
10880120	Little Talhtan River	7/30/00	0	0	2517	40	2557	H	KAP	2	Poor visibility
10880120	Little Talhtan River	8/6/00	0	0	1904	816	2720	H	KAP	3	
10880120	Little Talhtan River	8/19/00	0	0	6883	0	6883	W	DFO	3	Weir count
10910006	Sashin Ck P Walter N	8/10/00	0	200	0	0	200	A	WMD	1	
11014007	Farragut River	8/3/00	0	0	15	0	15	A	WRB	1	80% GLACIAL
11032009	Chuck R Windham Bay	7/2/00	0	0	4	0	4	A	WRB	2	BELOW GORGE
11032009	Chuck R Windham Bay	8/7/00	0	0	18	0	18	A	WRB	2	SHADOW 8:30 AM
11034003	Rusty River	8/3/00	0	0	4	0	4	A	WRB	2	PARTIALY GLACIAL
11117010	King Salmon River	7/26/00	0	0	64	0	64	H	KAP	1	Poor visibility
11117010	King Salmon River	7/28/00	0	0	91	0	91	F	KAP	3	Plus 7 jacks
11117010	King Salmon River	7/28/00	0	0	71	0	71	H	KAP	3	
11132220	Nakina River	7/30/00	0	0	77	0	77	H	KAP	3	Index area IV
11132220	Nakina River	7/30/00	0	0	730	0	730	H	KAP	3	Index area III
11132220	Nakina River	7/30/00	0	0	420	0	420	H	KAP	3	Index area II
11132220	Nakina River	7/30/00	0	0	1207	0	1207	H	KAP	3	Index area I
11132220	Nakina River	8/6/00	0	0	815	0	815	H	KAP	3	Index area I
11132220	Nakina River	8/6/00	0	0	2885	22	2907	H	KAP	3	Peak total
11132220	Nakina River	8/6/00	0	0	390	10	400	H	KAP	3	Index area IV
11132220	Nakina River	8/6/00	0	0	1460	10	1470	H	KAP	3	Index area III
11132220	Nakina River	8/6/00	0	0	220	0	220	H	KAP	3	Index area II
11132240	Kowatua Creek	8/13/00	0	0	628	0	628	H	KAP	3	
11132240	Kowatua Creek	8/21/00	0	0	692	10	702	H	KAP	3	
11132240	Kowatua Creek	8/25/00	0	0	241	0	241	H	JAD	2	
11132255	Tatsamenie River	8/21/00	0	0	953	0	953	H	KAP	3	750 below Little Tats
11132255	Tatsamenie River	8/25/00	0	0	763	0	763	H	JAD	2	Index areas I and II combined
11132270	Nahlin River	7/19/00	0	0	162	0	162	H	KAP	2	Index area II
11132270	Nahlin River	7/19/00	0	0	447	0	447	H	KAP	3	Index area III
11132270	Nahlin River	7/30/00	0	0	722	6	728	H	KAP	3	Peak total
11132270	Nahlin River	7/30/00	0	0	46	0	46	H	KAP	3	Index area I
11132270	Nahlin River	7/30/00	0	0	39	0	39	H	JAD	2	Index area I; replicate survey
11132270	Nahlin River	7/30/00	0	0	310	5	315	H	KAP	3	Index area II
11132270	Nahlin River	7/30/00	0	0	366	1	367	H	KAP	2	Index area III
11132270	Nahlin River	7/30/00	0	0	307	0	307	H	JAD	2	Index area II; replicate survey
11132270	Nahlin River	7/30/00	0	0	283	0	283	H	JAD	2	Index area III; backseat replicate survey

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Stream no.	Stream	Date	Tidal	Mouth	Live	Dead	Total	Survey	Obs ^a	Use ^b	Comment
11132275	Tseta Creek	7/30/00	0	0	113	0	113	H	JAD	2	Replicate survey
11132275	Tseta Creek	7/30/00	0	0	130	0	130	H	KAP	2	118 up top; lots of whitetails
11132275	Tseta Creek	8/6/00	0	0	159	1	160	H	KAP	3	All whitetails
11132280	Dudidontu River	7/31/00	0	0	344	0	344	H	JAD	1	Backseat training survey
11132280	Dudidontu River	7/31/00	0	0	431	2	433	H	KAP	3	
11132280	Dudidontu River	8/6/00	0	0	477	5	482	H	KAP	3	
11150069	Fish Creek-Douglas I	8/24/00	35	0	69	4	108	F	LED	2	
11341019	Indian River Sitka	8/26/00	30	0	20	0	50	F	EVP	1	Kings all very rotten, Saw kings in higher holes earlier wee
11341021	Sawmill Creek-Sitka	7/29/00	0	2	0	0	2	B	EVP	1	
11532054	Big Boulder Creek	8/7/00	0	0	77	0	77	F	RPE	3	+5 jacks, more fish were present later but no survey due t
18230020	Kluckshu River (CAN)	9/5/00	0	0	1363	0	1363	W	DFO	3	Weir count
18230042	Tatshenshine R (CAN)	8/1/00	0	0	46	1	47	F	KAP	2	Low Fog Creek
18230043	Takhanni River (CAN)	8/1/00	0	0	102	0	102	H	JAD	2	Backseat training flight
18230043	Takhanni River (CAN)	8/1/00	0	0	152	0	152	H	KAP	3	
18230045	Goat Creek	8/1/00	0	0	33	0	33	H	KAP	2	
18230050	Blanchard Ck (CAN)	8/1/00	0	0	168	0	168	H	JAD	2	Training flight
18230050	Blanchard Ck (CAN)	8/1/00	0	0	163	0	163	H	KAP	3	Plus 30-40 above lake

^a Observer initials on file in Commercial Fisheries IFDB/ALEX database.

^b IFDB Standard Usage Codes: 1= not useful for indexing or estimating escapement; 2= potentially useful for indexing or estimating escapement; 3= Potentially useful as the “peak” survey count for this species.

Appendix A4.–Estimated abundance and composition by age and sex of the escapement of chinook salmon to select systems in Southeast Alaska and transboundary rivers, 2000.

PANEL A. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN THE KETA RIVER IN 2000^A																
		BROOD YEAR AND AGE CLASS														
		1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993	
		0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5	Total
Males	n				16	205		8	58		3	25				315
	%				3.9	47.6		1.6	11.7		0.6	5.0				70.4
	SE of %				1.1	4.7		0.6	1.8		0.4	1.1				3.5
	Escapement				50	614		21	151		8	65				907
	SE of Esc.				16	114		8	27		5	15				138
Females	n					4		5	93		8	37				147
	%					0.8		1.0	18.7		1.6	7.5				29.6
	SE of %					0.4		0.5	2.5		0.6	1.4				3.5
	Escapement					10		13	241		21	96				382
	SE of Esc.					5		6	39		8	20				56
Combined	n				16	209		13	151		11	62				462
	%				3.9	48.4		2.6	30.4		2.2	12.5				100.0
	SE of %				1.1	4.6		0.8	3.5		0.7	1.9				
	Escapement				50	624		34	392		29	161				1,289
	SE of Esc.				16	115		10	58		9	28				168

^a From: Freeman et al. 2001.

PANEL B. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN THE BLOSSOM RIVER IN 2000																
Males	n					15		1	12		1	1				30
	%					34.9		2.3	27.9		2.3	2.3				69.8
	SE of %					7.4		2.3	6.9		2.3	2.3				7.1
	Escapement					334		22	267		22	22				668
	SE of Esc.															
Females	n							1	4		1	7				13
	%							2.3	9.3		2.3	16.3				30.2
	SE of %							2.3	4.5		2.3	5.7				7.1
	Escapement							22	89		22	156				289
	SE of Esc.															
Combined	n					15		2	16		2	8				43
	%					34.9		4.7	37.2		4.7	18.6				100.0
	SE of %					7.4		3.2	7.5		3.2	6.0				
	Escapement					334		45	356		45	178				957
	SE of Esc.															

PANEL C. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN THE CHICKAMIN RIVER IN 2000																
Males	n					43			46			17				106
	%					23.0			24.6			9.1				56.7
	SE of %					3.1			3.2			2.1				3.6
	Escapement					957			1,024			378				2,359
	SE of Esc.															
Females	n								51			30				81
	%								27.3			16.0				43.3
	SE of %								3.3			2.7				3.6
	Escapement								1,135			668				1,802
	SE of Esc.															
Combined	n					43			97			47				187
	%					23.0			51.9			25.1				100.0
	SE of %					3.1			3.7			3.2				
	Escapement					957			2,158			1,046				4,161
	SE of Esc.															

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PANEL D. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN THE UNUK RIVER IN 2000^b																
		BROOD YEAR AND AGE CLASS														
		1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993	
		0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5	Total
Males	n		1			260			246			55			2	564
	%		0.2			38.0			25.3			5.6			0.2	69.3
	SE of %		0.2			7.3			3.1			1.0			0.1	4.0
	Escapement		15			3,099			2,060			455			17	5,644
	SE of Esc.		15			946			246			77			12	1,042
Females	n					5			174			120			4	303
	%					0.5			17.7			12.2			0.4	30.7
	SE of %					0.2			2.5			1.8			0.2	4.0
	Escapement					41			1,439			992			33	2,506
	SE of Esc.					19			184			136			17	296
Combined	n		1			265			420			175			6	867
	%		0.2			38.5			42.9			17.8			0.6	100.0
	SE of %		0.2			7.2			5.1			2.5			0.3	
	Escapement		15			3,140			3,499			1,447			50	8,150
	SE of Esc.		15			946			394			185			21	1,163

^b From: Jones and McPherson 2002.

PANEL E. AGE COMPOSITION OF SMALL, MEDIUM AND LARGE CHINOOK SALMON IN THE STIKINE RIVER IN 2000^c																
Males	n		1			172	2		250			174	1		8	608
	%		0.			26.9	0.1		18.2			11.4	0.1		0.5	57.4
	SE of %		0.2			3.7	0.1		1.3			1.1	0.1		0.2	2.5
	Escapement		76			10,743	52		7,263			4,532	26		208	22,900
	SE of Esc.		76			1,925	37		863			608	26		77	2,585
Females	n					26			296	1		280	2		6	611
	%					4.1			19.6	0.1		18.3	0.1		0.4	42.6
	SE of %					1.0			1.6	0.1		1.6	0.1		0.2	2.5
	Escapement					1,629			7,810	26		7,293	52		156	16,966
	SE of Esc.					424			965	26		918	37		66	1,840
Combined	n		1			198	2		546	1		454	3		14	1,219
	%		0.2			31.0	0.1		37.8	0.1		29.7	0.2		0.9	100.0
	SE of %		0.2			4.2	0.1		2.3	0.1		2.3	0.1		0.3	0.0
	Escapement		76			12,372	52		15,073	26		11,825	78		364	39,868
	SE of Esc.		76			2,188	37		1,685	26		1,423	46		105	3,988

^c From: DerHovanisian et al. 2001.

PANEL F. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN ANDREW CREEK IN 2000																
Males	n					13			36			10				59
	%					10.2			28.1			7.8				46.1
	SE of %					2.7			4.0			2.4				4.4
	Escapement					148			410			114				671
	SE of Esc.															
Females	n					2			38			28			1	69
	%					1.6			29.7			21.9			0.8	53.9
	SE of %					1.1			4.1			3.7			0.8	4.4
	Escapement					23			432			319			11	785
	SE of Esc.															
Combined	n					15			74			38			1	128
	%					11.7			57.8			29.7			0.8	100.0
	SE of %					2.9			4.4			4.1			0.8	0.0
	Escapement					171			842			432			11	1,456
	SE of Esc.															

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PANEL G. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN THE KING SALMON RIVER IN 2000																
		BROOD YEAR AND AGE CLASS														
		1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993	Total
		0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5	
Males	n				8			9			2				19	
	%				20.5			23.1			5.1				48.7	
	SE of %				6.6			6.8			3.6				8.1	
	Escapement				35			40			9				84	
	SE of Esc.															
Females	n							7			12	1			20	
	%							17.9			30.8	2.6			51.3	
	SE of %							6.2			7.5	2.6			8.1	
	Escapement							31			53	4			88	
	SE of Esc.															
Combined	n				8			16			14	1			39	
	%				20.5			41.0			35.9	2.6			100.0	
	SE of %				6.6			8.0			7.8	2.6				
	Escapement				35			71			62	4			172	
	SE of Esc.															
PANEL H. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN THE TAKU RIVER IN 2000^d																
Males	n	4			277	1		269	2		77				630	
	%	0.3			23.5	0.1		25.4	0.2		7.4				56.8	
	SE of %	0.2			3.8	0.1		1.7	0.1		0.9				2.7	
	Escapement	130			9,228	33		9,997	75		2,891				22,354	
	SE of Esc.	68			1,493	33		1,733	54		599				2,970	
Females	n				6	1		312	1		131	1		1	453	
	%				0.5	0.1		29.7	0.1		12.5	0.1		0.1	43.2	
	SE of %				0.2	0.1		2.1	0.1		1.2	0.1		0.1	2.7	
	Escapement				210	38		11,696	38		4,919	38		38	16,977	
	SE of Esc.				89	38		2,116	38		955	38		38	3,019	
Combined	n	4			283	2		581	3		208	1		1	1,083	
	%	0.3			24.0	0.2		55.2	0.3		19.9	0.1		0.1	100.0	
	SE of %	0.3			3.8	0.1		3.0	0.2		1.6	0.1		0.1		
	Escapement	130			9,438	71		21,693	113		7,811	38		38	39,331	
	SE of Esc.	68			1,515	50		3,743	67		1,460	38		38	5,660	
^d From: McPherson et al. 2002.																
PANEL I. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN THE CHILKAT RIVER IN 2000^e																
Males	n				209			168			47			2	426	
	%				23.2			26.5			9.0			0.6	59.4	
	SE of %				1.7			1.8			1.1			0.3		
	Escapement				619			707			241			16	1,583	
	SE of Esc.				120			128			54			11	184	
Females	n				3			123			74			2	202	
	%				0.4			24.1			15.5			0.6	40.6	
	SE of %				0.2			1.7			1.4			0.3		
	Escapement				10			643			412			16	1,081	
	SE of Esc.				6			118			81			11	144	
Combined	n				212			291			121			4	628	
	%				23.6			50.7			24.5			1.2	100.0	
	SE of %				1.7			2.0			1.7			0.4		
	Escapement				629			1,350			653			32	2,664	
	SE of Esc.				122			227			118			12	355	

^e From: Ericksen 2001.

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PANEL J. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN THE ALSEK RIVER IN 2000[†]																
		BROOD YEAR AND AGE CLASS														
		1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993	
		0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5	Total
Males	n		3	2		51	4		211			76				347
	%		0.4	0.3		6.7	0.5		27.6			9.9				45.3
	SE of %		0.2	0.2		0.9	0.3		1.6			1.1				1.8
	Escapement		36	24		613	48		2,538			914				4,173
	SE of Esc.		21	17		137	25		477			191				764
Females	n					9			349	2		58				418
	%					1.2			45.6	0.3		7.6				54.6
	SE of %					0.4			1.8	0.2		1.0				1.8
	Escapement					108			4,198	24		698				5,028
	SE of Esc.					40			768	17		152				914
Combined	n		3	2		60	4		560	2		134				765
	%		0.4	0.3		7.8	0.5		73.2	0.3		17.5				100.0
	SE of %		0.2	0.3		1.0	0.3		1.6	0.2		1.4				0.0
	Escapement		36	24		721	48		6,736	24		1,612				9,202
	SE of Esc.		21	17		156	25		1,213	17		314				1,645

[†]From: Pahlke and Etherton 2001.

PANEL K. AGE COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON IN THE SITUK RIVER IN 2000																
Males	n	4	2		4	3		59	7	1	3					83
	%	8.6	4.3		1.0	0.4		24.0	3.3	0.5	1.1					43.2
	SE of %	1.9	1.4		0.7	0.4		2.9	1.2	0.5	0.7					3.3
	Escapement	195	98		22	10		545	75	12	24					980
	SE of Esc.															
Females	n				3			111	8		19	1				142
	%				0.7			45.2	3.8		6.7					56.4
	SE of %				0.6			3.3	1.3		1.7					3.3
	Escapement				16			1,025	85		151					1,278
	SE of Esc.															
Combined	n	4	2		7	3		170	15	1	22	1				225
	%	8.6	4.3		1.7	0.4		69.3	7.1	0.5	7.7	0.4				100.0
	SE of %	1.9	1.4		0.9	0.4		3.1	1.7	0.5	1.8	0.4				
	Escapement	195	98		38	10		1,570	160	12	175	9				2,267
	SE of Esc.															

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SUMMARY. PERCENTAGE AGE COMPOSITION ESTIMATED FROM CHINOOK SALMON SAMPLED IN 11 SOUTHEAST ALASKA RIVERS IN 2000

	BROOD YEAR AND AGE CLASS													
	1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993
	0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5
1. Keta	NE	NE		4%	48%		3%	30%		2%	13%			
2. Blossom	NE	NE			35%		5%	37%		5%	19%			
3. Chickamin	NE	NE			23%			52%			25%			
4. Unuk	NE	<1%			40%			42%			17%			
5. Stikine	NE	<1%			31%	<1%		38%	<1%		30%	<1%		1%
6. Andrew Cr	NE	NE			12%			58%			30%			1%
7. King Salmon	NE	NE			21%			41%			36%	3%		
8. Taku	NE	<1%			24%	<1%		55%	<1%		20%	<1%		<1%
9. Chilkat	NE	NE			24%			51%			25%			1%
10. Alsek	NE	<1%	<1%		8%	<1%		73%	<1%		18%			
11. Situk	9%	4%		2%	<1%		69%	7%		8%	<1%			

SUMMARY. ESTIMATED NUMBERS OF CHINOOK SALMON BY AGE CLASS IN ESCAPEMENTS TO 11 SOUTHEAST ALASKA RIVERS IN 2000

	BROOD YEAR AND AGE CLASS														Total
	1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993	
	0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5	
1. Keta	0	0	0	50	624	0	34	392	0	29	161	0	0	0	1,290
2. Blossom	0	0	0	0	334	0	45	356	0	45	178	0	0	0	957
3. Chickamin	0	0	0	0	957	0	0	2,158	0	0	1,046	0	0	0	4,161
4. Unuk	0	16	0	0	3,317	0	0	3,503	0	0	1,447	0	0	50	8,333
5. Stikine	0	76	0	0	12,372	52	0	15,073	26		11,825	78	0	364	39,866
6. Andrew Cr	0	0	0	0	171	0	0	842	0	0	432	0	0	11	1,456
7. King Salmon	0	0	0	0	35	0	0	71	0	0	62	4	0	0	172
8. Taku	0	130	0	0	9,438	71	0	21,693	113	0	7,811	38	0	38	39,332
9. Chilkat	0	0	0	0	629	0	0	1,350	0	0	653	0	0	32	2,664
10. Alsek	0	36	24	0	721	48	0	6,736	24	0	1,612	0	0	0	9,201
11. Situk	195	98	0	38	10	0	1,570	160	12	175	9	0	0	0	2,267

SUMMARY. PERCENTAGE SEX COMPOSITION THAT WERE MALES BY AGE CLASS ESTIMATED FROM CHINOOK SALMON SAMPLED IN 11 SOUTHEAST ALASKA RIVERS IN 2000

	BROOD YEAR AND AGE CLASS													
	1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993
	0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5
1. Keta				100%	98%		62%	39%		28%	40%			
2. Blossom					100%			75%			13%			
3. Chickamin					100%			47%			36%			
4. Unuk		100%			99%			59%			31%			34%
5. Stikine		100%			87%			48%			38%			57%
6. Andrew Cr					87%			49%			26%			
7. King Salmon					100%			56%			14%			
8. Taku		100%			98%			46%			37%			
9. Chilkat					98%			52%			37%			50%
10. Alsek		100%			85%	100%		38%			57%			
11. Situk	100%	100%		57%			35%	47%		14%				

Appendix A5.—Average length (MEF), by age, of chinook salmon in selected systems in Southeast Alaska and transboundary rivers, 2000.

PANEL A. AVERAGE LENGTH OF CHNOOK SALMON IN THE KETA RIVER IN 2000^a															
		BROOD YEAR AND AGE CLASS													
		1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993
		0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5
Males	n	1	19		16	207		8	53		3	22			
	Average length	450	412		648	650		844	833		908	931			
	SD		19		52	62		82	87		90	80			
	SE		4		13	4		29	12		52	17			
Females	n					3		5	80		7	35			1
	Average length					728		852	844		907	914			960
	SD					18		32	48		52	50			
	SE					10		14	5		20	8			
Combined	n	1	19		16	210		13	133		10	57			1
	Average length	450	412		648	651		847	839		908	921			960
	SD		19		52	62		65	66		60	63			
	SE		4		13	4		18	6		19	8			

^a From: Freeman et al 2001.

PANEL B. AVERAGE LENGTH OF CHINOOK SALMON IN THE BLOSSOM RIVER IN 2000															
Males	n					15		1	12		1	1			
	Average length					673		695	835		980	950			
	SD					49			63						
	SE					13			18						
Females	n							1	4		1	7			
	Average length							810	871		835	896			
	SD								61			53			
	SE								31			20			
Combined	n					15		2	16		2	8			
	Average length					673		753	844		908	903			
	SD					49		81	63		103	52			
	SE					13		57	16		73	18			

PANEL C. AVERAGE LENGTH OF CHNOOK SALMON IN THE CHICKAMIN RIVER IN 2000															
Males	n					43			46			17			
	Average length					667			793			930			
	SD					50			65			61			
	SE					8			10			15			
Females	n								51			30			
	Average length								844			905			
	SD								45			46			
	SE								6			8			
Combined	n					43			97			47			
	Average length					667			820			914			
	SD					50			61			53			
	SE					8			6			8			

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PANEL D. AVERAGE LENGTH OF CHINOOK SALMON IN THE UNUK RIVER IN 2000^b															
		BROOD YEAR AND AGE CLASS													
		1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993
		0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5
Males	n		10			260			246			55			2
	Average length		370			642			789			910			938
	SD		30			50			64			60			124
	SE		10			3			4			8			88
Females	n					5			174			120			4
	Average length					726			816			884			975
	SD					38			42			46			36
	SE					17			3			4			18
Combined	n		10			265			420			175			6
	Average length		370			644			800			892			963
	SD		30			51			57			52			65
	SE		10			3			3			4			27

^b From: Jones and McPherson 2001.

PANEL E. AVERAGE LENGTH OF CHINOOK SALMON IN THE STIKINE RIVER IN 2000^c															
Males	n		1			100	2		117			142	1		8
	Average length		500			628	712		778			889	928		912
	SD					60	64		76			48			42
	SE					6	45		7			4			15
Females	n					23			155	1		230	2		5
	Average length					635			784	814		839	824		870
	SD					67			50			45	24		40
	SE					14			4			3	17		18
Combined	n		1			123	2		272	1		372	3		13
	Average length		500			629	712		781	814		858	858		896
	SD					67	64		66			39	62		47
	SE					6	45		4			2	36		13

^c From: DerHovanisian et al. 2001.

PANEL F. AVERAGE LENGTH OF CHINOOK SALMON IN ANDREW CREEK IN 2000															
Males	n					13			36			10			
	Average length					590			739			846			
	SD					79			72			41			
	SE					22			12			13			
Females	n					2			38			28			1
	Average length					713			779			829			935
	SD					25			43			37			
	SE					18			7			7			
Combined	n					15			74			38			1
	Average length					606			760			833			935
	SD					85			60			37			
	SE					22			7			6			

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PANEL G. AVERAGE LENGTH OF CHINOOK SALMON IN THE KING SALMON RIVER IN 2000															
		BROOD YEAR AND AGE CLASS													
		1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993
		0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5
Males	n					8			9			2			
Average length						650			754			880			
	SD					30			25			49			
	SE					11			8			35			
Females	n								7			12	1		
Average length									787			817	890		
	SD								30			52			
	SE								11			15			
Combined	n					8			16			14	1		
Average length						650			769			826	890		
	SD					30			31			55			
	SE					11			8			15			

PANEL H. AVERAGE LENGTH OF CHINOOK SALMON IN THE TAKU RIVER IN 2000^d										
Males	n	56		278	1	269	2	77		
Average length		349		584	615	754	833	876		
	SD	85		72		66	4	56		
	SE	11		4		4	3	6		
Females	n			6	1	312	1	131	1	1
Average length				657	680	773	800	826	875	895
	SD			70		46		42		
	SE			29		3		4		
Combined	n	56		284	2	581	3	208	1	1
Average length		349		586	648	764	822	845	875	895
	SD	85		72	46	57	19	54		
	SE	11		4	33	2	11	4		

^d From: McPherson et al. 2002.

PANEL I. AVERAGE LENGTH OF CHINOOK SALMON IN THE CHILKAT RIVER IN 2000^e										
Males	n	65		209		168		47		2
Average length		379		574		762		892		858
	SD	27		73		80		69		4
	SE	3		5		6		10		3
Females	n			3		123		74		2
Average length				732		795		858		875
	SD			14		41		41		35
	SE			8		4		5		25
Combined	n	65		212		291		121		4
Average length		379		576		776		871		866
	SD	27		75		68		56		23
	SE	3		5		4		5		11

^e From: Ericksen 2001.

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PANEL J. AVERAGE LENGTH OF CHNOOK SALMON IN THE ALSEK RIVER IN 2000[†]															
		BROOD YEAR AND AGE CLASS													
		1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993
		0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5
Males	n		3	2		14	4		66				11		
Average length			428	434		616	679		806				934		
	SD		15	141		124	170		80				67		
	SE		9	100		33	85		10				20		
Females	n					4			62	2			11		
Average length						567			775	828			834		
	SD					58			51	47			46		
	SE					29			6	33			14		
Combined	n		3	2		18	4		128	2			22		
Average length			428	434		605	679		783	828			883		
	SD		15	141		113	170		87	47			75		
	SE		9	100		27	85		8	33			16		

[†]From: Pahlke and Etherton 2001.

PANEL K. AVERAGE LENGTH OF CHINOOK SALMON IN THE SITUK RIVER IN 2000															
Males	n	4	2		4	3		59	7	1	3				
Average length		351	373		573	678		769	805	810	862				
	SD	12	11		68	53		49	21		33				
	SE	6	8		34	31		6	8		19				
Females	n				3			110	8		19		1		
Average length					612			780	806		844		850		
	SD				28			30	44		44				
	SE				16			3	16		10				
Combined	n	4	2		7	3		169	15	1	22		1		
Average length		351	373		589	678		776	805	810	847		850		
	SD	12	11		55	53		38	34		43				
	SE	6	8		21	31		3	9		9				

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Appendix A5.–Page 5 of 5.

SUMMARY. AVERAGE LENGTH OF MALE CHINOOK SALMON SAMPLED IN 11 SOUTHEAST ALASKA RIVERS IN 2000														
	BROOD YEAR AND AGE CLASS													
	1998	1997	1996	1997	1996	1995	1996	1995	1994	1995	1994	1993	1994	1993
	0.1	1.1	2.1	0.2	1.2	2.2	0.3	1.3	2.3	0.4	1.4	2.4	0.5	1.5
1. Keta		412		648	650		844	833			931			
2. Blossom					673			835						
3. Chickamin					667			793			930			
4. Unuk		370			642			789			910			
5. Stikine					628			778			889			912
6. Andrew Cr					590			739			846			
7. King Salmon					650			754						
8. Taku		349			584			754			876			
9. Chilkat		379			574			762			892			
10. Alsek					616	679		806			934			
11. Situk	351			573			769	805						

SUMMARY. AVERAGE LENGTH OF FEMALE CHINOOK SALMONS SAMPLED IN 11 SOUTHEAST ALASKA RIVERS IN 2000														
1. Keta					728		852	844		907	914			960
2. Blossom								871			896			
3. Chickamin								844			905			
4. Unuk					726			816			884			975
5. Stikine					635			784			839			870
6. Andrew Cr								779			829			935
7. King Salmon								787			817			
8. Taku					657			773			826			895
9. Chilkat								795			858			
10. Alsek					567			775			834			
11. Situk				612			780	806		844				

SUMMARY. AVERAGE LENGTH OF CHINOOK SALMON SAMPLED IN SOUTHEAST ALASKA IN 2000, SEXES COMBINED														
1. Keta		412		648	651		847	839		908	921			
2. Blossom					673			844			903			
3. Chickamin					667			820			914			
4. Unuk		370			644			800			892			963
5. Stikine					629			781			858	858		896
6. Andrew Cr					606			760			833			
7. King Salmon					650			769			826			
8. Taku		349			586			764			845			
9. Chilkat		379			576			776			871			866
10. Alsek					605	679		783			883			
11. Situk	351			589			776	805		847				
Averages		378			629			795			875			908

Note: age classes with fewer than four fish sampled were not reported in summary panels.

Appendix A6.–Differences in mean lengths (Panel A) and test results (Z, Panel B) for statistical differences in mean lengths between age-1.2 chinook salmon (sexes combined) sampled in 11 rivers in Southeast Alaska in 2000.

Panel A

System	Age class	Average length	SE	Difference in mean length										
				Keta	Blossom	Chickamin	Unuk	Stikine	Andrew	King Sal.	Taku	Chilkat	Alsek	Situk
1. Keta	1.2	651	4	0	22	16	-7	-22	-45	-1	-65	-75	-46	
2. Blossom	1.2	673	13	-22	0	-6	-29	-44	-67	-23	-87	-97	-68	
3. Chickamin	1.2	667	8	-16	6	0	-23	-38	-61	-17	-81	-91	-62	
4. Unuk	1.2	644	3	7	29	23	0	-15	-38	6	-58	-68	-39	
5. Stikine	1.2	629	6	22	44	38	15	0	-23	21	-43	-53	-24	
6. Andrew Cr	1.2	606	22	45	67	61	38	23	0	44	-20	-30	-1	
7. King Salm.	1.2	650	11	1	23	17	-6	-21	-44	0	-64	-74	-45	
8. Taku	1.2	586	4	65	87	81	58	43	20	64	0	-10	19	
9. Chilkat	1.2	576	5	75	97	91	68	53	30	74	10	0	29	
10. Alsek	1.2	605	27	46	68	62	39	24	1	45	-19	-29	0	
11. Situk	1.2													

Panel B.

System	Age class	Average length	SE	Test statistics (Z) for differences in mean length										
				Keta	Blossom	Chickamin	Unuk	Stikine	Andrew	King Sal.	Taku	Chilkat	Alsek	Situk
1. Keta	1.2	651	4	0.00	1.65	1.83	-1.32	-2.99	-2.01	-0.09	-10.75	-11.17	-1.71	
2. Blossom	1.2	673	13	-1.65	0.00	-0.41	-2.22	-3.14	-2.64	-1.39	-6.52	-7.08	-2.31	
3. Chickamin	1.2	667	8	-1.83	0.41	0.00	-2.79	-3.92	-2.62	-1.30	-9.27	-9.86	-2.24	
4. Unuk	1.2	644	3	1.32	2.22	2.79	0.00	-2.22	-1.71	0.54	-10.95	-11.24	-1.45	
5. Stikine	1.2	629	6	2.99	3.14	3.92	2.22	0.00	-1.01	1.72	-5.84	-6.67	-0.88	
6. Andrew Cr	1.2	606	22	2.01	2.64	2.62	1.71	1.01	0.00	1.80	-0.89	-1.32	-0.03	
7. King Salm.	1.2	650	11	0.09	1.39	1.30	-0.54	-1.72	-1.80	0.00	-5.60	-6.26	-1.57	
8. Taku	1.2	586	4	10.75	6.52	9.27	10.95	5.84	0.89	5.60	0.00	-1.46	0.70	
9. Chilkat	1.2	576	5	11.17	7.08	9.86	11.24	6.67	1.32	6.26	1.46	0.00	1.06	
10. Alsek	1.2	605	27	1.71	2.31	2.24	1.45	0.88	0.03	1.57	-0.70	-1.06	0.00	
11. Situk	1.2													

Appendix A7.–Differences in mean lengths (Panel A) and test results (Z, Panel B) for statistical differences in mean lengths between age-1.3 chinook salmon (sexes combined) sampled in 11 rivers in Southeast Alaska in 2000.

Panel A

System	Age class	Average length	SE	Difference in mean length										
				Keta	Blossom	Chickamin	Unuk	Stikine	Andrew	King Sal.	Taku	Chilkat	Alsek	Situk
1. Keta	1.3	839	6	0	5	-19	-39	-58	-79	-70	-75	-63	-56	3
2. Blossom	1.3	844	16	-5	0	-24	-44	-63	-84	-75	-80	-68	-61	-7
3. Chickamin	1.3	820	6	19	24	0	-20	-39	-60	-51	-56	-44	-37	3
4. Unuk	1.3	800	3	39	44	20	0	-19	-40	-31	-36	-24	-17	6
5. Stikine	1.3	781	4	58	63	39	19	0	-21	-12	-17	-5	2	5
6. Andrew	1.3	760	7	79	84	60	40	21	0	9	4	16	23	2
7. King Sal.	1.3	769	8	70	75	51	31	12	-9	0	-5	7	14	1
8. Taku	1.3	764	2	75	80	56	36	17	-4	5	0	12	19	6
9. Chilkat	1.3	776	4	63	68	44	24	5	-16	-7	-12	0	7	5
10. Alsek	1.3	783	8	56	61	37	17	-2	-23	-14	-19	-7	0	1
11. Situk	1.3	805	9	34	39	15	-5	-24	-45	-36	-41	-29	-22	0

Panel B

System	Age class	Average length	SE	Test statistics (Z) for differences in mean length										
				Keta	Blossom	Chickamin	Unuk	Stikine	Andrew	King Sal.	Taku	Chilkat	Alsek	Situk
1. Keta	1.3	839	6	0.00	0.30	-2.25	-6.13	-8.31	-8.74	-7.27	-12.11	-9.03	-5.84	0.09
2. Blossom	1.3	844	16	-0.30	0.00	-1.42	-2.75	-3.88	-4.87	-4.27	-5.02	-4.19	-3.48	-0.20
3. Chickamin	1.3	820	6	2.25	1.42	0.00	-2.95	-5.29	-6.42	-5.14	-8.45	-5.97	-3.75	0.07
4. Unuk	1.3	800	3	6.13	2.75	2.95	0.00	-3.90	-5.31	-3.76	-9.86	-4.94	-2.08	0.12
5. Stikine	1.3	781	4	8.31	3.88	5.29	3.90	0.00	-2.60	-1.38	-3.66	-0.89	0.23	0.07
6. Andrew	1.3	760	7	8.74	4.87	6.42	5.31	2.60	0.00	0.86	0.54	1.99	2.21	0.02
7. King Sal.	1.3	769	8	7.27	4.27	5.14	3.76	1.38	-0.86	0.00	-0.62	0.80	1.28	0.01
8. Taku	1.3	764	2	12.11	5.02	8.45	9.86	3.66	-0.54	0.62	0.00	2.59	2.36	0.08
9. Chilkat	1.3	776	4	9.03	4.19	5.97	4.94	0.89	-1.99	-0.80	-2.59	0.00	0.81	0.07
10. Alsek	1.3	783	8	5.84	3.48	3.75	2.08	-0.23	-2.21	-1.28	-2.36	-0.81	0.00	0.02
11. Situk	1.3	805	9	3.24	2.16	1.39	-0.54	-2.48	-4.00	-3.07	-4.50	-3.00	-1.88	0.00

Appendix A8.–Differences in mean lengths (Panel A) and test results (Z, Panel B) for statistical differences in mean lengths between age-1.4 chinook salmon (sexes combined) sampled in 11 rivers in Southeast Alaska in 2000.

Panel A

System	Age class	Average		Difference in mean length											
		length	SE	Keta	Blossom	Chickamin	Unuk	Stikine	Andrew	King Sal	Taku	Chilkat	Alsek	Situk	
1. Keta	1.4	921	8	0	-18	-7	-29	-63	-88	-95	-76	-50	-38		
2. Blossom	1.4	903	18	18	0	11	-11	-45	-70	-77	-58	-32	-20		
3. Chickamin	1.4	914	8	7	-11	0	-22	-56	-81	-88	-69	-43	-31		
4. Unuk	1.4	892	4	29	11	22	0	-34	-59	-66	-47	-21	-9		
5. Stikine	1.4	858	2	63	45	56	34	0	-25	-32	-13	13	25		
6. Andrew Cr	1.4	833	6	88	70	81	59	25	0	-7	12	38	50		
7. King Sal.	1.4	826	15	95	77	88	66	32	7	0	19	45	57		
8. Taku	1.4	845	4	76	58	69	47	13	-12	-19	0	26	38		
9. Chilkat	1.4	871	5	50	32	43	21	-13	-38	-45	-26	0	12		
10. Alsek	1.4	883	16	38	20	31	9	-25	-50	-57	-38	-12	0		
11. Situk	1.4														

Panel B

System	Age class	Average		Test statistics for differences in mean length											
		length	SE	Keta	Blossom	Chickamin	Unuk	Stikine	Andrew	King Sal	Taku	Chilkat	Alsek	Situk	
1. Keta	1.4	921	8	0.00	-0.89	-0.62	-3.14	-7.34	-8.56	-5.62	-8.31	-5.12	-2.11		
2. Blossom	1.4	903	18	0.89	0.00	0.55	-0.59	-2.43	-3.62	-3.27	-3.09	-1.68	-0.82		
3. Chickamin	1.4	914	8	0.62	-0.55	0.00	-2.54	-7.01	-8.28	-5.30	-8.03	-4.65	-1.75		
4. Unuk	1.4	892	4	3.14	0.59	2.54	0.00	-7.71	-8.23	-4.34	-8.66	-3.26	-0.55		
5. Stikine	1.4	858	2	7.34	2.43	7.01	7.71	0.00	-3.95	-2.16	-3.06	2.38	1.55		
6. Andrew Cr	1.4	833	6	8.56	3.62	8.28	8.23	3.95	0.00	-0.44	1.70	4.83	2.93		
7. King Sal.	1.4	826	15	5.62	3.27	5.30	4.34	2.16	0.44	0.00	1.25	2.89	2.62		
8. Taku	1.4	845	4	8.31	3.09	8.03	8.66	3.06	-1.70	-1.25	0.00	4.11	2.31		
9. Chilkat	1.4	871	5	5.12	1.68	4.65	3.26	-2.38	-4.83	-2.89	-4.11	0.00	0.72		
10. Alsek	1.4	883	16	2.11	0.82	1.75	0.55	-1.55	-2.93	-2.62	-2.31	-0.72	0.00		
11. Situk	1.4														

Appendix A9.–Computer files used to complete this report.

File Name	Description
TOTALCHTS.XLW	Excel workbook with tables and charts with annual counts for each index area.
SUMVER00.XLS	Appendix table A2, with expanded escapement totals for Southeast Alaska
ESC00.XLS	Table 1. Estimated chinook escapement in 2000.
GOALS.XLS	Appendix Table A1. Expanded goals for Southeast Alaska.
AGELENGTHSEAK2000.XLS	Appendix Table A4-A7. Length and age summaries for 2000.