Fishery Data Series No. 12-02

Abundance, Age, Sex, and Size Statistics for Pacific Salmon in Bristol Bay, 2005

by

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Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

FISHERY DATA REPORT NO. 12-02

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ADF&G Fishery Data Series was established in 1987 for the publication of Division of Sport Fish technically oriented results for a single project or group of closely related projects, and in 2004 became a joint divisional series with the Division of Commercial Fisheries. Fishery Data Series reports are intended for fishery and other technical professionals and are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/ This publication has undergone editorial and peer review.

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ABSTRACT

Abundance, age, sex, and size data were summarized for commercial catches and spawning escapements of Pacific salmon *Oncorhynchus* spp. in Bristol Bay during 2005 as part of an ongoing project to collect baseline biological information. These data have been used to determine spawner-recruit relationships, establish spawning escapement goals, and forecast the abundance of future returns. Age, sex, and size of sockeye salmon (*O. nerka)* in the commercial catch and escapement were estimated with stratified random sampling programs. Sockeye salmon harvests were assigned to river of origin based on catch location and/or with the use of catch and escapement age composition data combined with escapement abundance and run timing. Total runs to each river were estimated by combining river-specific harvests and escapements. Sampling efforts for other salmon species were limited. Chinook (*O. tshawytscha*) and chum (*O. keta*) escapements were sampled for age, sex, and size composition in the Nushagak River. Similarly, catches of Chinook and chum salmon were sampled in Nushagak District. In 2005, the total inshore run of sockeye salmon to Bristol Bay was 40.2 million fish. The total number of sockeye salmon commercially harvested in Bristol Bay was 24.5 million fish and total escapements to all rivers were 14.8 million fish. A total of 14 age classes were present in the 2005 sockeye salmon run, with age-1.3 (58.3%), age-2.2 (14.0%), age-2.3 (13.8%), and age-1.2 (12.0%) returns making up 98.1% of the total run.

Keywords: Bristol Bay, Pacific salmon, *Oncorhynchus* spp., sockeye salmon, *Oncorhynchus nerka*, catch, escapement, age composition, sex composition, size composition, total run, return, brood table.

INTRODUCTION

Bristol Bay supports catches of 5 species of Pacific salmon *Oncorhynchus* spp. including the largest sockeye salmon (*O. nerka*) fishery in the world. The Bristol Bay Management Area encompasses all waters east of a line from Cape Newenham to Cape Menshikof (Figure 1). The management area is divided into 5 fishing districts for the regulation of commercial salmon fisheries: Naknek-Kvichak, Egegik, Ugashik, Nushagak, and Togiak districts (Figure 1). Naknek-Kvichak, Egegik, and Ugashik districts are referred to as the Eastside fisheries, and Nushagak and Togiak districts are referred to as the Westside fisheries. Rivers that produce major salmon runs include the Kvichak, Naknek, Alagnak, Egegik, Ugashik, Wood, Igushik, Nushagak, and Togiak.

Bristol Bay sockeye salmon appear to be intercepted in the North Alaska Peninsula fishery at an unknown rate (Geiger 1989, Swanton and Murphy 1992). The South Alaska Peninsula June fishery also intercepts Bristol Bay sockeye salmon (Gilbert 1924, Gilbert and Rich 1926, Eggers et al. 1991). Eggers et al. (1991) found that among the fish tagged, Bristol Bay sockeye salmon stocks made up 83.8% of the Unimak and 53.7% of the Shumagin releases. The magnitude of interceptions of Bristol Bay salmon in other fisheries is unknown.

The Alaska Department of Fish and Game (ADF&G) conducts a variety of programs that supply information used to manage Bristol Bay salmon fisheries. These programs include (1) compiling catch statistics, (2) sampling catches for age, sex, and size composition, (3) estimating major spawning escapements by tower, sonar, or aerial survey, (4) sampling escapement for age, sex, and size composition, (5) test fishing at Port Moller, (6) test fishing in the rivers, and (7) test fishing in the districts. Data generated from these programs are used to manage fisheries inseason, review escapement goals, and forecast the abundance of future runs. This report summarizes 2005 commercial catch, escapement, age, sex, and size data (Programs 1–4) for Bristol Bay salmon; these data have been summarized annually since 1972 (McCurdy and Paulus 1972; Paulus and Nelson 1972a-b; McCurdy and Schroeder 1972; Krasnowski and Randall 1975a-b, 1976; Randall and Yuen 1978; Meacham and Randall 1979; Meacham and Nelson 1980; Yuen et al. 1981; Yuen and Nelson 1983, 1984a-b, 1985, 1987; Yuen and Meacham 1983; Yuen et al. 1984; Yuen 1984; Yuen et al. 1986; Cross and Stratton 1988; Yuen and Bill 1989a-b,

1990; Stratton 1990-1991; Stratton and Cross 1990; Stratton and Crawford 1992, 1994; Menard 1997; Gray 1998a-b; Gray and Link 1999; West and Gray 2001; West 2002-2003; West and Fair 2006; West et al. 2009).

Previous records of salmon spawning ground data were compiled and published individually by district due to different survey techniques and data analyses. Starting in 1984, all survey results from all districts were put under one cover and continued annually (Bill et al. 1984; Bucher 1987; Russell et al. 1988a-b, 1989-1992; Weiland et al. 1994, 1999; Regnart et al. 1997; Browning et al. 1998, 2002; Glick et al. 2000; Sands et al. 2001, 2003; Higgins et al. 2004). Beginning in 2004, aerial survey results became part of this report series.

BACKGROUND ESCAPEMENT INFORMATION BY DISTRICT

For over 50 years, counting towers have been the primary means to estimate sockeye salmon spawning abundance in Bristol Bay. However, aerial surveys also have a long history of use in the area, providing biologists with information regarding the abundance and distribution of sockeye, Chinook *O. tshawytscha*, chum *O. keta*, pink *O. gorbuscha*, and coho salmon *O. kisutch* escapements. This information is important to fishery managers for several reasons. It supplements relative abundance data gathered at escapement projects on mainstem rivers where escapement projects are not utilized, and for time periods and species not covered by escapement project operations. Readers must use caution when interpreting these data. Aerial surveys can be good indicators of general trends in fish distribution and abundance but do not provide precise or accurate estimates of abundance. Generally, aerial survey information is used to supplement better estimates of escapement, such as tower or weir estimates. Although data have been collected for more than 20 years in most cases, appendix tables contain only information from the last 20 years to give the data context.

Naknek-Kvichak District

Naknek-Kvichak District is comprised of 3 major rivers: (1) the Kvichak River, flowing from Iliamna Lake, (2) the Alagnak River (Branch River) flowing from Kukaklek and Nonvianuk lakes, and (3) the Naknek River flowing from Naknek Lake (Figure 2). All of these systems flow into Kvichak Bay.

Since 1955, Kvichak River sockeye salmon annual escapement has been estimated using counting towers located on the Kvichak's mainstem, approximately one-quarter mile downstream of Lake Iliamna's outlet. Escapement to the Kvichak River system has also been documented with spawning ground surveys as reported in Morstad (2002).

From 1957 to 1976, Alagnak River sockeye salmon annual escapement was estimated using a counting tower located near the upper extent of tidal influence. Since 1977, Alagnak sockeye salmon annual escapement has been estimated using aerial surveys. In 2002, a counting tower was established approximately 8 km upriver from the old site. Clark (2005) explored the relationship between historical tower counts and aerial surveys to standardize the time series of escapement in terms of tower counts. Since 2002, tower estimates have been the primary method used to estimate spawning abundance. Aerial survey estimates are still used to weight the age composition data collected at the spawning grounds to the tower estimate. Scales were used to determine age composition while the original tower was in operation and otoliths have been used since the aerial surveys started in 1977 because of difficulty in collecting scale samples at the tower site. Otoliths are collected in early September from 4 major tributaries of

the Alagnak drainage system. The collection sites consist of Kulik River, Battle River, Nanuktuk Creek, and Moraine Creek (Figure 2).

From 1950 to 1957, annual sockeye salmon escapement to the Naknek River system was counted using a weir on the mainstem of the river just upstream of the tidal influence. Since 1958, escapement has been estimated using counting towers near the Naknek River 'Rapids' downstream of the outlet of Naknek Lake. Escapements of other salmon species into Naknek-Kvichak District drainages have been estimated using aerial surveys.

Egegik District

The Egegik Bay watershed contains 2 major rivers: (1) the Egegik River, flowing from Becharof Lake and nearby coastal lowlands, and (2) the King Salmon River, issuing from runoff from the Kejulik Mountains and southern portions of Katmai National Park (Figure 3). Both rivers flow into Egegik Bay near the village of Egegik.

From 1952 through 1956, a weir was used in the Egegik River to count sockeye salmon escapement. The weir was located near the bottom of the Egegik River rapids. From 1957 to the present, counting towers, situated between the outlet of Becharof Lake and Egegik Lagoon, have been used to estimate sockeye salmon escapement. Escapements for other salmon species have been estimated using aerial surveys.

Ugashik District

The Ugashik Bay watershed is comprised of 4 major watersheds: (1) the Ugashik River, flowing from Lower Ugashik Lake and nearby coastal lowlands, (2) the Dog Salmon River, flowing from glacial melt and runoff in the Aleutian Range, (3) the King Salmon River, flowing from Mother Goose Lake and 3 major runoff tributaries, and (4) Dago Creek, issuing from a large lowland coastal area (Figure 4). All of these systems flow into the intertidal reaches of Ugashik River and Ugashik Bay.

From 1949 to 1956, a weir located downstream from the outlet of Lower Ugashik Lake was used to count sockeye salmon escapement. From 1957 to the present, sockeye salmon escapement has been estimated using counting towers located between the outlet of Lower Ugashik Lake and Ugashik Lagoon. Escapements for other salmon species have been estimated using aerial surveys.

Nushagak District

The Nushagak Bay watershed is comprised of 4 major rivers: (1) the Wood River, draining Grant, Kulik, Beverley, Nerka, and Aleknagik lakes, (2) the Nushagak River, draining Tikchik Lakes and the Nuyakuk, upper Nushagak, and Mulchatna rivers, (3) the Igushik River, draining Ualik and Amanka lakes, and (4) the Snake River, draining Lake Nunavaugaluk (Figures 5–8). All of these systems empty into Nushagak Bay.

Abundance and age composition of annual sockeye salmon escapement into the Wood River lake system has been estimated annually from counting towers at the outlet of Lake Aleknagik since 1953. Periodically, ADF&G personnel conduct aerial surveys to assess sockeye salmon spawner distribution within the Wood River lake system. Personnel from the University of Washington, Fisheries Research Institute (FRI) also conduct foot surveys on major creeks and some rivers of the system.

Salmon escapement in the Nushagak River was estimated by a sonar project, located on the Nushagak River below Portage Creek, approximately 32 km (20 miles) upstream from the river mouth. The Nushagak River sonar project has been used since 1980 to estimate annual escapements for all salmon species in the entire Nushagak drainage (Brazil and Buck 2010). Beginning in 2005, budget cuts reduced the operation of the sonar camp by a month, eliminating the coho and pink salmon enumeration portion of the sonar project. Prior to the advent of the sonar project, annual Nushagak River sockeye escapement was estimated by a counting tower project on the Nuyakuk River (1959–1988) and aerial surveys of the Nushagak-Mulchatna system (beginning in 1966). Initial aerial surveys provided escapement estimates for Chinook and chum salmon, while surveys since 1977 have estimated sockeye salmon abundance.

ADF&G staff continued to aerial survey the upper Nushagak and Mulchatna areas after the development of the sonar project to provide a comparison with sonar estimates and document spawner distribution for all species except coho salmon. Chum salmon surveys were discontinued in Nushagak District in 1980, and surveys of the Nushagak-Mulchatna Rivers for all other species were discontinued in 1991 due to the success of the sonar project and limited funding. The Nuyakuk tower project was halted after the 1988 season, but was reinitiated for the 1995 season and has been operated since that time. Aerial surveys of the Nushagak and Mulchatna systems have been conducted sporadically since 1991, providing infrequent information on spawning sockeye salmon distribution in the Nushagak River.

Aerial surveys were conducted sporadically in the Tikchik Lakes system from 1954 to 1987 to assess spawner distribution of sockeye salmon. Surveys of the Tikchik Lakes have been conducted, although infrequently, since 1990 to document an apparent change in spawner distribution, evidenced by changes observed in the age composition of Nushagak River sockeye escapement, and supported by reports of low numbers of spawners in the Tikchik Lake system. These changes were first noticed in 1990 when surveys documented lower than expected numbers of spawners in the Tikchik Lakes system, based on sonar estimates in the lower Nushagak River and historical distribution patterns (Russell et. al. 1991). However, few corresponding surveys were conducted in the Nushagak and Mulchatna drainages to completely assess distribution. In fact, due to funding cuts, no aerial surveys of the Upper Nushagak and Mulchatna drainages have been performed since 1991.

Sockeye salmon escapement was measured in the Igushik Lakes system at a counting tower located at the outlet of Amanka Lake. Spawner distribution has not been documented annually, and surveys have not been conducted on the Igushik system for sockeye salmon and other species since 1991 (Russell et. al. 1992). Spawning escapement and distribution of sockeye salmon in the Snake Lake system was estimated annually prior to 1998 by aerial surveys and a weir count between 1975 and 1979 and again in 1981, but with the closure of the Snake River section and funding shortages in recent years, these surveys were discontinued.

Togiak District

Two major river drainages flow into Togiak District: (1) the Togiak River, draining Togiak, Gechiak, Pungokepuk, and Ongivinuk lakes and Nayorurun and Kemuk rivers (Figure 9), and (2) the Kulukak River, draining Kulukak Lake (Figure 10). Various smaller systems within the district include the Kanik River draining Tithe Creek Ponds and the Quigmy, Matogak, Osviak, Slug, Negukthlik, and Ungalikthluk rivers. Kulukak River and the Kanik River flow into Kulukak Bay, located in the eastern portion of the district. The Togiak and Quigmy rivers flow

into Togiak Bay, located in the middle of the district, and the Matogak, Osviak, and Slug rivers flow into Hagemeister Straits and coastal waters in the western portion of the district (Figure 1).

Sockeye salmon escapement was estimated for the Togiak Lake system from counting towers operated at the outlet of Togiak Lake. Abundance and distribution of spawning populations of sockeye salmon in the Togiak River and tributaries below the counting towers, as well as other systems within Togiak District, were estimated by aerial surveys. Abundance and distribution of Chinook, chum, pink, and coho salmon spawning in Togiak District watersheds were also estimated entirely from aerial surveys.

Since 1991, the operational budget has not had sufficient funds to conduct spawning ground aerial surveys in Togiak District. The U.S. Fish and Wildlife Service Togiak National Wildlife Refuge (USFWS/TNWR) has provided funding for aircraft charters for aerial surveys, and has assisted with aerial surveys in Togiak District to monitor salmon populations within drainages on the refuge.

OBJECTIVES

1. Estimate the total number of sockeye, Chinook and chum salmon that return to the major river systems in Bristol Bay from early June to early September.
2. Estimate the proportion of each of the major age classes in the salmon catch and escapement in selected major river systems to within +/- 5% of the true proportion 90% of the time.
3. Estimate sex compositions of the salmon catch and escapements for selected major river systems in Bristol Bay such that all estimates are within +/- 5% of the true value 90% of the time.
4. Estimate the mean length by age of the salmon catch and escapements for selected major river systems such that the estimates are within +/- 5 percentage points of the true value 90% of the time.
5. Estimate the salmon mean weight by age of the catch for selected major river systems such that the estimates are within +/- 5 percentage points of the true value 90% of the time.
6. Document with aerial survey the relative number of salmon that return to the major rivers in Bristol Bay not estimated with counting tower or sonar operations.

METHODS

CATCH ESTIMATION

Commercial catches in numbers of salmon by district were taken from summaries of fish tickets (sales receipts given to fishers from buyers at the time of delivery).

The number of Bristol Bay sockeye salmon caught in the North Alaska Peninsula fishery is unknown, and therefore is not included in the estimation of Bristol Bay total runs. All sockeye salmon catches in the South Alaska Peninsula fishery around Unimak and Shumagin Islands in June were applied to the Bristol Bay total run based on the proportion of each Bristol Bay river systems' run to the total inshore run; in other words, we assume equal exploitation occurs in the fishery for all Bristol Bay stocks. Inshore total run and total run are defined as follows. Inshore

total run includes all stocks caught within the Bristol Bay Management area. Total Run includes inshore total run stocks plus the South Peninsula/Shumagin Islands catch. The application of all South Peninsula/Shumagin Islands catch to the Bristol Bay total run may change in the future as stock identification improves using genetic markers and as we gain knowledge of interannual variability of Bristol Bay interception.

ESCAPEMENT ESTIMATION

Bristol Bay salmon escapements in 2005 were estimated with various methods, including towers, sonar, and aerial surveys by Division of Commercial Fisheries (DCF) staff.

Tower

Sockeye salmon escapement estimates were based on visual counts from counting towers on the banks of the Kvichak, Alagnak, Naknek, Egegik, Ugashik, Wood, Igushik, Nuyakuk, and Togiak rivers (Anderson 2000). At all tower projects, counts were made for 10 minutes every hour on each riverbank. Counting began on one bank at the start of each hour, followed by counting on the opposite bank. Each 10 minute count was expanded into an hourly estimate (x6) and these were summed to arrive at a total daily escapement.

Sonar

Side-looking sonar located in the lower Nushagak River near Portage Creek was used to estimate sockeye, Chinook, and chum salmon escapements for the entire Nushagak River drainage (Brazil and Buck 2010).

Aerial Survey

Survey flights were conducted from any of the following aircraft: small fixed-wing, high-wing, wheeled aircraft (Super Cub, Cessna 180, Cessna 185, or Cessna 206) or helicopter (Robinson R-22) chartered from local air charter companies and flown by experienced survey pilots. ADF&G or USFWS biologists familiar with the streams and target species counted salmon. USFWS pilots and aircraft flew several of the surveys in the Togiak National Wildlife Refuge. Surveys occurred at low altitudes (200 to 400 feet) at air speeds of 50 to 90 mph. Polarized sunglasses and aircraft positioning minimized the effects of glare off the water. Surveys coincided around historical peak spawning abundance for the target species, taking into account weather, water conditions, and aircraft availability. Surveyors used a hand tally counter or tape player, transferring counts to data forms after each flight.

The accuracy of total escapement estimates based on aerial surveys depends upon the number of observations made and their distribution throughout the run, the accuracy of counts (observer efficiency), and the amount of time salmon entering the survey area are visible to observers (stream life) (Bue et al. 1998; Evzerov 1975; Nielson and Green 1981; Rogers 1984). Methods used to interpret aerial survey counts were described below for each commercial fishing district.

Naknek/Kvichak District

DCF staff flew aerial surveys during late summer and fall to assess escapements of sockeye, Chinook, and chum salmon in portions of Naknek-Kvichak District. Salmon counts for these drainages were indices of the total number of each species present in the spawning area at the time of the survey. No survey was flown for the Kvichak drainage. In the Alagnak drainage, due to unusually large escapements, 4 surveys were flown over the course of the season between

30 July and early September. The 30 July Alagnak survey also included the lower Alagnak for Chinook and chum salmon (2 weeks before the peak). For the Naknek drainage, all major Chinook salmon spawning areas were surveyed under poor conditions, yielding no estimates. We did not expand survey counts in 2005, although expansions have been made in some earlier years based on subjective criteria. Similar to previous years, we used counting towers to estimate total sockeye salmon escapement to the Kvichak, Alagnak, and Naknek rivers.

Egegik District

No systemwide aerial surveys occurred for sockeye salmon in 2005. DCF personnel flew an aerial survey of known Chinook and chum salmon spawning areas, in both the Egegik and King Salmon rivers, on 28 July. An aerial survey also occurred on selected index streams within the Egegik system on 24 September to estimate coho salmon escapement. All aerial survey counts in the Egegik drainage were unadjusted numbers of salmon sighted and should be considered minimum indications of abundance.

Ugashik District

DCF staff flew aerial surveys of known Chinook and chum salmon spawning areas in the Ugashik drainage on 8 August. With funding provided by Sport Fish Division (SFD), we flew an aerial survey on 26 September to estimate coho salmon escapement. Salmon counts in the Ugashik District reflect unadjusted numbers of salmon sighted on the spawning grounds and should be considered minimum indications of abundance.

Nushagak District

In conjunction with the University of Washington, FRI, ADF&G staff flew aerial surveys of the Wood River and Lake Chauekuktuli in the Tikchik Lake system in 2005. Surveys were flown on 15 and 21 August in a fixed wing aircraft with 2 observers on the same side of the aircraft. Observers recorded individual estimates of sockeye salmon on the lakeshore, either spawning or holding near stream mouths, and also for streams connecting lakes. The individual observations were discussed and one of the estimates was agreed upon. In addition, FRI estimated abundance with foot surveys for most of the small streams in the Wood River lake system.

Togiak District

Survey and data analyses applied to Togiak District were similar to those described by Nelson (1979), Bucher (1981), and Russell et al. (1990). This year, surveys were flown on 25, 26, 29 July, 4, 8, 15, 18, 21 August, and 1 September. Poor weather posed a severe limitation to survey completion in 2005. ADF&G staff surveyed the Togiak River drainage for Chinook and chum salmon. The Togiak River was also surveyed for sockeye salmon, although the survey appeared to be after the peak and followed an extreme high water event. USFWS/TNWR and ADFG staff cooperated in conducting surveys of the Kulukak, Quigmy, Negukthlik, Slug, Osviak, Matogak and Ungalikthluk rivers for Chinook and chum salmon and on the Osviak River for sockeye salmon. No river systems were surveyed for coho salmon this year due to weather, high water, and flight scheduling problems.

Total escapement was estimated for sockeye salmon in systems without counting towers (i.e. Kulukak River, mainstem and tributaries of the Togiak River below the towers) by multiplying peak aerial counts by an expansion factor between 1.5 and 3.0 depending on survey and water conditions (Appendix D4 lists expansion factors by stream). Since 1980, total escapement for Chinook salmon in Togiak District has been calculated by aerial counts using a multiplier of 2.5,

if the survey was timed properly relative to the spawning peak and visibility conditions were average. In 2005, an expansion factor of 2.0 was used for Chinook salmon surveys in all systems except the Neguthluk (expansion factor of 3.0). The same expansion factors were used for chum salmon in the same systems. An expansion factor of 3.0 has been used for coho salmon in all areas of Togiak District, since the initiation of coho salmon surveys in 1980. Expansion factors have been subjectively adjusted based on weather conditions, visibility, and survey timing with respect to the peak spawning activity.

AGE, SEX, AND SIZE ESTIMATION

Data Collection

Ages for all 2005 Bristol Bay salmon runs were determined by examining scales (Mosher 1968), except ages of sockeye salmon spawning in Alagnak River, which were determined from otoliths (Bilton and Jenkinson 1968). European notation (Koo 1962) was used to record ages; numerals preceding the decimal refer to the number of freshwater annuli and numerals following the decimal refer to the number of marine annuli. Total age in years of the fish from the time of egg deposition equals the sum of these numbers plus one (e.g. 2.2=2+2+1=5).

Samplers collected scales from the left side of the fish approximately 2 rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). We mounted scales on gum cards and impressed them onto cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). Salmon were measured to the nearest mm from the mideye to fork of tail. Weights were recorded to the nearest 0.1 kg using an Accu-weigh, model A-280 digital scale. Sex was determined by visually examining external morphology of the fish (Groot and Margolis 1991).

Sample Sizes

The sample sizes ensured that with repeated sampling, each major age group in each stratum would be estimated within 5% of its true value 90% of the time, based on Thompson's (1987) work on the "worst-case" parameter value for the multinomial distribution.

Catch

Sample size goals for sockeye and Chinook salmon catches were 500 fish per species per time and area stratum. Chum salmon catch sample goals were 400 individuals per stratum. Weights of approximately 100 fish per species per stratum were taken from the catch. Therefore, the number of time strata sampled for catch data sets differed among fisheries and rivers, depending on the number of samples collected. Sample size goals were often adjusted annually to account for high numbers of unreadable scales encountered in an area the previous year.

Catch sampling was stratified spatially by district. District catches of sockeye salmon were usually sampled each fishing period during the emergency order period for 2005 (1 June to 17 July). We defined a sampling period as no less than 48 hours; hence, with a full sample (500) on a Tuesday, we did not sample on Wednesday or we sampled 250 fish on both days. For dates not sampled, the age composition of sockeye salmon caught was assumed the same as that estimated for the most recent catch date. Chinook and chum salmon catches were sampled less frequently than sockeye salmon, while coho and pink salmon catches were not sampled at all.

Escapement

The sample size goal for sockeye at the towers and Chinook and chum salmon at Nushagak sonar was 500 fish per species per time and area stratum. The sample size goal for sockeye salmon at Nushagak sonar was 400 fish per time and area stratum. The Nushagak sonar coho salmon escapement sample goal was 250 individuals per stratum.

Escapement sampling was stratified spatially and temporally by major drainage. In general, for escapement projects with a season goal of 1,500 samples (Table 1), the first strata represents the early part of the run and encompasses about 10 days, the middle strata represents the peak of the run and encompasses about 5 days, and the final strata represents the end of the run and encompasses about 10 days.

Sample Periods

We tested for differences in age composition between sample periods using a Chi-square. Samples from successive periods were combined into the same period when their differences in age composition were not significant ($\propto > 0.05$). The resulting catch or escapement by age was used to allocate the catch where applicable and estimate the total run.

SOCKEYE SALMON CATCH STOCK COMPOSITION

Inshore Catch

Sockeye salmon caught in Egegik and Ugashik districts were assumed to be destined for Egegik and Ugashik rivers, respectively. Similarly, sockeye salmon caught in Togiak River section of Togiak District were assumed to be destined for Togiak River. Sockeye salmon caught in other sections of Togiak District were assumed to be returning to systems not monitored for escapement or age composition and were not assigned to Togiak River. All sockeye salmon caught in set gillnets fished from Igushik Beach were included in total run estimates for Igushik River. Sockeye salmon caught in Naknek-Kvichak District were assumed to be returning to Kvichak, Alagnak, and Naknek rivers with the exception of the Naknek River Special Harvest Area catch (i.e., inside the Naknek River), which was apportioned entirely to the Naknek River, and the Alagnak River Special Harvest Area catch, which was apportioned 25% to the Kvichak River and 75% to the Alagnak River. Sockeye salmon caught in Nushagak District were assumed to be returning to Wood, Igushik, and Nushagak rivers. The Naknek-Kvichak and Nushagak district's catch were allocated based on Bernard's (1983) pooled method in conjunction with run timing. This method allocates salmon catches to systems of interest having information on age composition of catch and escapement. This approach assumes catch age composition of a given stock is similar to its escapement age composition and that stocks are equally exploited. River escapements were lagged back to the fishery to account for run timing differences among the stocks.

Naknek-Kvichak District Allocation

In Naknek-Kvichak District, all district catches from 11 July to 19 August were allocated by dividing the catch into 2 strata based on age composition differences. In all instances using the pooled method, escapements were lagged back to the district to account for each river's unique run timing. In this case, Kvichak River escapement was lagged back to the fishery by 3 days, Alagnak River escapement by 2 days, and Naknek River escapement by one day.

Nushagak District Allocation

For Nushagak District, the catch was subjectively divided into 6 strata, and estimated by stock for each stratum to account for changing age composition through time. Next, the catch for each stratum was summed by stock for a seasonal total estimate of district catch. For this district, Igushik River escapement was lagged back to the fishery by 3 days, Nushagak River escapement by 2 days, and Wood River escapement by one day.

TOTAL RUN ESTIMATION

The final age composition for each district's catch and escapement was estimated by taking each stratum's age composition and weighting it by its respective catch or escapement from that stratum. The sum of each weighted stratum produced the final age composition.

DATA ANALYSES

Age and sex composition was estimated as a series of proportions p_{ijt} defining a multinomial distribution for sockeye salmon. The proportion was estimated for each combination of age and sex along with estimates of the proportions' variance (Cochran 1977):

$$\hat{p}_{ijt} = n_{ijt} / n_t \ , \tag{1}$$

$$Var(\hat{p}_{ijt}) = \frac{\hat{p}_{ijt}(1-\hat{p}_{ijt})}{n_t - 1} \ , \tag{2}$$

where, n_{ijt} is the number of fish age i and sex j in period t, and n_t is the number of fish in period t.

The standard error of length by age, sex, and period of fish sampled in the catch (or escapement) is:

$$se(\bar{\ell}_{ijt}) = \frac{1}{\sqrt{n_{ijt}}} \sqrt{\frac{\sum_{k=1}^{n_{ijt}} (\ell_{ijtk} - \bar{\ell}_{ijt})^2}{n_{ijt} - 1}} \ , \tag{3}$$

where, $\bar{\ell}_{ijt}$ = mean length of age i and sex j fish in period t, ℓ_{ijtk} = length of fish k that is age i and sex j in period t, and n_{ijt} = number of age i and sex j fish in period t.

the standard error of weight by age, sex, and period of fish sampled in the catch is:

$$se\left(\overline{w}_{ijt}\right)=\frac{1}{\sqrt{n_{ijt}}}\sqrt{\frac{\sum_{k=1}^{n_{ijt}}\left(w_{ijtk}-\overline{w}_{ijt}\right)^2}{n_{ijt}-1}}\ , \tag{4}$$

where, $\overline{w}_{ijt}$ = mean weight of age *i* and sex *j* fish in period *t*, w_{ijtk} = weight of fish *k* that is age *i* and sex *j* in period *t*, n_{ijt} = number of age *i* and sex *j* fish in period *t*.

Estimates of escapement (E_{bt}) were stratified by river bank (*b*) and period (*t*):

$$\widehat{E}_{bt}=\sum_{k=1}^{n_{bt}}6Y_{btk}\ , \tag{5}$$

where, Y_{btk} = 10 minute count on bank *b* in period *t* during hour *k*, n_{bt} = number of 10 minute counts by bank *b* in period *t*.

We calculated the between 10 minute count variance based on Wolter's V5 estimator for systematic sampling scheme, the least biased and most efficient estimator for tower counting (Reynolds et al. 2007):

$$Var(Y_{bt})=\frac{(1-f)}{n_{bt}(3.5(n_{bt}-4))}\sum_{k=5}^{n_{bt}}\left(\frac{Y_{btk}}{2}-Y_{btk-1}+Y_{btk-2}-Y_{btk-3}+\frac{Y_{btk-4}}{2}\right)^2\ , \tag{6}$$

where, f = sampling rate and Y_{btk} = 10 minute count on bank *b* in period *t* during hour *k*; and

$$\mathrm{Var}(\hat{\mathrm{E}}_{\mathrm{bt}})=(6n_{bt})^2Var(Y_{bt})\ . \tag{7}$$

Age and sex composition was used to apportion the escapement estimate by age *i* and sex *j* in period *t*:

$$\widehat{E}_{tij}=\hat{p}_{ij}\sum_{b=1}^{2}\widehat{E}_{bt}\ . \tag{8}$$

The variance (Goodman 1960) of the escapement estimate (E_{tij}) by age *i* and sex *j* in period *t* is

$$Var(\widehat{E}_{ijt})=\hat{p}_{ij}^2\sum_{b=1}^{2}Var(\widehat{E}_{bt})+\left[\sum_{b=1}^{2}\widehat{E}_{bt}\right]^2Var(\hat{p}_{ij})-Var(\hat{p}_{ij})\sum_{b=1}^{2}Var(\widehat{E}_{bt})\ . \tag{9}$$

We assigned sockeye salmon caught in Naknek-Kvichak and Nushagak districts to a natal river assuming that the catch age composition of a given stock was similar to its escapement age composition (Bernard 1983):

$$\hat{C}_{ijt} = \hat{C}_{jt} \frac{\hat{E}_{ijt}}{\sum_{i=1}^{n} \hat{E}_{ijt}} \quad (10)$$

where

$\hat{C}_{ijt}$ = estimated catch of sockeye salmon from river *i* and age *j* in period *t;*

$\hat{C}_{jt}$ = estimated district catch of sockeye salmon age *j* in period *t*;

$\hat{E}_{ijt}$ = estimated escapement to river *i* of sockeye salmon age *j* in period *t* lagged back to the fishery; and

n = number of rivers assumed to be contributing to the mixed stock catch.

RESULTS

BRISTOL BAY SOCKEYE SALMON RUN

The South Alaska Peninsula catch (often referred to as offshore catch) consists of fish caught during June fisheries around Unimak and Shumagin Islands. In 2005, the total number of sockeye salmon commercially caught in the South Alaska Peninsula fisheries was 1,004,395 fish (Table 2). We integrated this catch into the Bristol Bay brood tables according to the proportion of the specific age groups in the inshore runs to individual districts relative to the total inshore run to Bristol Bay.

Baywide Summary

An estimated 40,245,472 Bristol Bay sockeye salmon returned from sea in 2005 (inshore and offshore catches and escapements); 25,472,522 were caught and 14,772,950 escaped the fishery to spawn (Tables 2 and 3). The South Alaska Peninsula fishery caught an estimated 1,004,395 Bristol Bay sockeye salmon in June 2005, leaving a total inshore run of 39,241,077. Of this total inshore run, 24,468,127 were caught (does not include Matogak, Osviak, Kulukak, and Cape Pierce section catches of Togiak District that accounted for 54,052 in 2005), representing an inshore catch rate of 62% (Tables 2 and 4). Commercial catches were assigned to a river of origin based on 27,697 fish sampled using methods described previously (Table 5).

The 2005 total run was predominantly age-1.3 fish (58%), followed by age-2.2 (14%), age-2.3 (14%), and age-1.2 (12%) fish (Table 2). The mean length of all sockeye salmon returning (catch plus escapement) in 2005 was 551 mm with a SE of 0.2 and the mean weight was 2.93 kg with a SE of 0.01 (Table 6).

The 2005 run mean length of 551 mm was 2% longer than the recent 10 year average of 540 mm and the run mean weight of 2.93 kg was 6% heavier than the recent 10 year average of 2.74 kg (Table 7).

The 2005 inshore run was 24% greater than the recent 10 year average run and the third highest since 1995 (Table 8). The total catch was 16% greater than the recent 10 year average catch and the third highest since 1996 (Table 9). Total escapement was 37% greater than the recent 10 year average and the second highest since 1995.

Naknek-Kvichak District Sockeye Salmon Run (Kvichak, Alagnak, and Naknek rivers)

An estimated 16,012,413 sockeye salmon returned to Naknek-Kvichak District in 2005; 6,728,469 were caught and 9,283,944 escaped the fishery to spawn (Table 4). Total catch consisted of Naknek-Kvichak District (1,911,840), Kvichak Section Set (80,374), Alagnak River Special Harvest Area (ARSHA, 255,926), and the Naknek River Special Harvest Area (NRSHA; 4,480,329) (Appendices A1–A3). Age composition of the total run of Naknek-Kvichak stocks (based on catch and escapement) was primarily age-1.3 fish (69%) followed by age-1.2 (40%), age-2.2 (10%), and age-2.3 (10%) fish (Table 10). The commercial catch was composed of age-1.3 (67%), age-2.3 (15%), age-2.2 (12%), and age-1.2 (6%) fish. We collected 683 age, sex and size samples from the Naknek-Kvichak District commercial fishery for a total of 2 periods (Appendix A1). Mean length of fish caught in the district was 546 mm with a SE of 1.0 and mean weight was 2.9 kg with a SE of 0.04 (Appendix B1).

The estimated catch plus escapement in the district in 2005 was 30% greater than the recent 10 year average and the total catch was 10% larger than the recent 10 year average (Table 8). The commercial catch rate in the district was 42%, lower than the last 10 year average of 49%.

Kvichak River

An estimated 2,852,782 Kvichak River sockeye salmon returned to Bristol Bay in 2005; 532,450 were caught and 2,320,332 escaped the fishery to spawn (Table 4). This represented a catch rate of 19%. Of the district catch allocated to the Kvichak River, 64,125 were caught in the ARSHA (Appendix A4). A sample size of 1,424 was collected from the escapement for a total of 2 periods. Age composition of the run was dominated by age-1.3 fish (40%), followed by age-2.2 (31%), and age-1.2 (18%) fish (Table 10). The catch was predominantly age-2.2 (51%) and age-1.3 (25%) fish. The escapement was primarily composed of age-1.3 (44%) and age-2.2 (27%) fish (Appendix A4). Mean length in the escapement was 552 mm with a SE of 0.7 (Appendix B1). The largest daily escapement count of 234,966 occurred on 8 July (Table 11). Historical mean (1956–2000) return per spawner (R/S) was 2.2 (Appendix C1).

Alagnak River

An estimated 5,300,120 Alagnak River sockeye salmon returned to Bristol Bay in 2005; 1,081,130 were caught and 4,218,990 escaped the fishery to spawn (Table 4). This represented a catch rate of 20%. Of the district harvest allocated to the Alagnak River, 191,801 were caught in the ARSHA (Appendix A2). Age composition of the run was dominated by age-1.3 (75%) fish, followed by age-1.2 (13.5%), age-2.3 (7%), and age-2.3 (5%) fish (Table 10). The harvest was predominantly age-1.3 (60%), age-2.3 (17%), and age-2.2 (12%) fish.

We collected 906 age, sex and size samples from the ARSHA commercial fishery for a total of 2 periods (Appendix A2). A sample size of 743 otoliths was collected from the spawning grounds to estimate age composition of the escapement (Appendix A5). Age composition of the ARSHA catch (Appendix A2) was similar to the escapement (Table 10). Mean length of sockeye salmon harvested in the ARSHA was 552 mm with a SE of 0.8 and mean weight was 3.07 kg with a SE of 0.02 Appendix B1). The escapement was primarily composed of age-1.3 (79%), age-1.2 (14%), and age-2.3 (4%) fish (Appendix A5). Sockeye salmon escapement counts peaked on 7 July with a count of 430,794 fish (Table 11). Historical mean (1956–2000) return per spawner was 3.8 (Appendix C2).

Aerial surveys of sockeye salmon escapement into the Alagnak River and its tributaries were flown on 4 occasions in 2005 (Table 1; Appendix D1); the total aerial count was 1,776,000 fish (Appendix D1). The escapement counting tower on the lower Alagnak River operated from 25 June until 22 July and estimated 4,219,026 sockeye salmon. This was the second largest escapement documented to the Alagnak River system (Appendix E1).

Naknek River

An estimated 7,859,511 Naknek River sockeye salmon returned to Bristol Bay in 2005; 5,114,889 were caught and 2,744,622 escaped the fishery to spawn (Table 4). This represented a catch rate of 65%. Of the district harvest allocated to the Naknek River, 4,480,329 were caught in the NRSHA (Appendix A3). Age composition of the run was composed primarily of age-1.3 (76%) fish, followed by age-2.3 (13%), and age-2.2 (6%) fish (Table 10). The harvest was similar to the total run with age-1.3 (73%), age-2.3 (15%), and age-2.2 (8%), fish composing 96% of the harvest.

We collected 3,046 age, sex and size samples from the NRSHA commercial fishery for a total of 4 periods (Appendix A3). A sample size of 1,650 was collected from the escapement for a total of 3 periods. Age composition of the NRSHA catch (Appendix A3) and the Naknek River escapement (Appendix A6) were similar to the total run (Table 10). Mean length of fish harvested in the NRSHA was 558 mm with a SE of 0.5 and mean weight was 3.07 kg with a SE of 0.01 Appendix B1). Mean length in the escapement was 556 mm with a SE of 0.6 (Appendix B1). Escapement counts peaked on 1 July with a count of 289,674 fish (Table 11). Historical mean (1956–2000) return per spawner was 3.2 (Appendix C3).

Egegik District Sockeye Salmon Run

An estimated 9,637,684 sockeye salmon returned to Egegik District in 2005; 8,015,950 were caught and 1,621,734 escaped the fishery to spawn (Table 4). We collected 4,483 age, sex and size samples from the commercial fishery for a total of 6 periods. A sample size of 1,416 was collected from the escapement for a total of 3 periods. Age composition of the run to the district was predominantly age-2.2 (36%) fish, followed by age-2.3 (31%), and age-1.3 (29%) fish (Table 10). Similarly, the district commercial catch was composed of age-2.2 (35%), age-2.3 (31%), and age-1.3 (30%) fish (Appendix A7). Mean length of fish caught in the district was 552 mm with a SE of 0.4 and mean weight was 2.82 kg with a SE of 0.01 (Appendix B1). Age composition of the escapement was primarily age-2.2 (39%) fish, followed by age-2.3 (27%), age-2.3 (3%), and age-1.3 (26%) fish (Appendix A8, Table 10). Mean length in the escapement was 548 mm with a SE of 0.8 (Appendix B1). The largest daily escapement count of 176,829 occurred on 3 July (Table 11). Historical mean (1956–2000) return per spawner was 5.8 (Appendix C4).

No systemwide aerial surveys in the Egegik drainage were flown for sockeye salmon in 2005. However, the escapement includes an additional 150 sockeye salmon in the King Salmon River that were counted during a Chinook and chum salmon aerial survey on 8 August. The estimated total sockeye salmon catch plus escapement to Egegik District in 2005 was 15% greater than the recent 10 year average (Table 8). The total catch was 12% greater than the recent 10 year average. The commercial catch rate in the district was 83%, lower than the recent 10 year average of 86%.

Ugashik District Sockeye Salmon Run

An estimated 3,016,247 sockeye salmon returned to Ugashik District in 2005; 2,216,635 were caught and 799,612 escaped the fishery to spawn (Table 4). We collected 1,732 age, sex and size samples from the commercial fishery for a total of 3 periods (Appendix A9). A sample size of 1,386 was collected from the escapement for a total of 3 periods (Appendix A10). Age composition of the run to the district was primarily age-1.3 (71%) fish, followed by age-2.3 (13%), and age-1.2 (12%) fish (Table 10). The district commercial catch was essentially the same as the total run age composition. Mean length of sockeye salmon caught in the district was 563 mm with a SE of 0.6 and mean weight was 3.12 kg with a SE of 0.02 (Appendix B1). Similar to the commercial catch, age composition of the escapement was dominated by age-1.3 (71%) fish, followed by age-1.2 (16%), and age-2.3 (8%) fish (Appendix A10, Table 10). Mean length in the escapement was 562 mm with a SE of 0.8 (Appendix B1). Daily peak passage at the tower occurred on 10 July with a count of 133,350 (Table 11). Historical mean (1956–2000) return per spawner was 4.3 (Appendix C5).

The estimated total catch and escapement to Ugashik District in 2005 was 3% less than the recent 10 year average and total catch was 1% greater than the recent 10 year average (Table 8). The commercial catch rate in the district was 73%, higher than the recent 10 year average of 70%.

Systemwide aerial surveys were conducted in early August. Approximately 20,000 sockeye salmon were observed in the Dog Salmon River (Appendix D2). However, environmental conditions impacted all surveys in the King Salmon River system. An event known as a lahar took place on Mt. Chiginigak, a semi-active volcano from which the headwaters of Volcano and Indecision creeks flow. This runoff was extremely acidic and large enough to lower the pH of Mother Goose Lake and the King Salmon River to between 3.0 and 3.5. No fish were observed in the King Salmon River mainstem or Painter Creek, a tributary with a confluence just below Mother Goose Lake, or in Volcano or Indecision creeks.

Nushagak District Sockeye Salmon Run (Wood, Igushik, and Nushagak Rivers)

An estimated 10,007,913 sockeye salmon returned to Nushagak District in 2005; 7,096,031 were caught and 2,911,882 escaped the fishery to spawn (Table 4). Total catch in Nushagak District consisted of the Nushagak Section (6,965,059) and Igushik Section setnet (130,972; Appendices A11 and A12). We collected 3,316 age, sex and size samples from the commercial fishery for a total of 6 periods. Age composition of the run to the district was primarily age-1.3 fish (66%) and age-1.2 (23%) fish (Table 10). The district commercial catch was dominated by age-1.3 (68%) and age-1.2 (20%) fish. Mean length of sockeye salmon harvested in the district was 545 mm with a SE of 0.4 and mean weight was 2.86 kg with a SE of 0.02 (Appendix B1). The estimated catch and escapement to Nushagak District in 2005 was 41% larger than the recent 10 year average and the total catch was 46% larger than the recent 10 year average and the second

largest on record (Table 8). The commercial catch rate in the district was 71%, higher than the last 10 year average of 68%.

Wood River

An estimated 4,492,632 Wood River sockeye salmon returned to Bristol Bay in 2005; 2,996,082 were caught and 1,496,550 escaped the fishery to spawn (Table 4). This represented an inshore harvest rate of 67%. Age composition of the Wood River run was dominated by age-1.3 (47%) and age-1.2 (45%) fish (Table 10). The Wood River catch was predominantly age-1.3 (51%) and age-1.2 (40%) fish. A sample size of 1,518 was collected from the escapement for a total of 3 periods (Appendix A13). Age composition of the Wood River escapement was primarily composed of age-1.2 (54%) and age-1.3 (39%) fish (Table 10). Mean length in the Wood River escapement was 516 mm with a SE of 0.9 (Appendix B1). The largest count at the tower of 328,086 occurred on 1 July (Table 11). Historical mean (1956–2000) return per spawner was 2.8 (Appendix C6).

For overall perspective, additional spawning ground escapement information for the Wood River system is listed in this report (Appendices D3 and E2). The total count of sockeye salmon by aerial survey and foot survey was 247,748 fish, about one-sixth the escapement documented by the tower count.

The survey of Lake Chauekuktuli focused on the Allen River beaches, where 35,000 sockeye salmon were observed. An additional 800 sockeye salmon were observed near the rapids and across from the Allen River beaches. The rest of the system was not surveyed.

Igushik River

An estimated 2,036,744 Igushik River sockeye salmon returned to Bristol Bay in 2005; 1,671,032 were caught and 365,712 escaped the fishery to spawn (Table 4). This represented an inshore catch rate of 82%. The run was composed primarily of age-1.3 (79%), and age-2.3 (14%) fish (Table 10). From the Igushik Beach setnet fishery, we collected 551 age, sex and size samples (Appendix A12). Catch in the Igushik Beach setnet harvest was dominated by age-1.3 (74%) and age-2.3 (17%) fish. Mean length of fish harvested in the Igushik Beach setnet fishery was 560 mm with a SE of 1.0 and mean weight was 3.19 kg with a SE of 0.05 (Appendix B1). A sample size of 720 was collected in the escapement (Appendix A14). Age composition of the escapement was predominantly composed of age-1.3 (84%) fish, followed by age-2.3 (9%), and age-1.2 (6%) fish (Table 10). Mean length in the escapement was 562 mm with a SE of 0.8 (Appendix B1). The largest daily escapement count of 36,690 occurred on 7 July (Table 11). Historical mean (1956–2000) return per spawner was 4.5 (Appendix C7).

Nushagak River

An estimated 3,478,537 Nushagak River sockeye salmon returned to Bristol Bay in 2005; 2,428,917 were caught and 1,049,620 escaped the fishery to spawn (Table 4). This represented an inshore catch rate of 70%. Age composition of the run was predominantly age-1.3 (81%) and age-1.2 (8%) fish (Table 10). The catch was dominated by age-1.3 (82%) and age-1.2 (7%) fish. A sample size of 1,227 age, sex and size information was collected from the escapement for a total of 3 periods (Appendix A15). Escapement age composition was composed primarily of age-1.3 (79%) and age-1.2 (11%) fish (Table 10). Mean length in the escapement was 558 mm with a SE of 0.9 (Appendix B1). The largest daily escapement count of 229,757 occurred on 1 July (Table 11). Historical mean (1978–2000) return per spawner was 3.3 (Appendix C8).

An estimated 251,016 sockeye salmon passed the Nuyakuk River counting tower in 2005 (Table 11). A sample size of 906 age, sex and size information was collected for a total of 2 periods (Appendix A16). Age composition of the Nuyakuk River escapement was predominantly age-1.3 (46%) and age-1.2 (43%) fish. Mean length was 526 mm with a SE of 1.1 (Appendix B1).

Togiak and Kulukak Section Sockeye Salmon Run

An estimated 566,820 sockeye salmon returned to the Togiak River Section of Togiak District in 2005; 411,042 were caught and 155,778 escaped the fishery to spawn (Table 4). We collected 1,085 age, sex and size samples from the commercial fishery for a total of 3 periods (Appendix A17). A sample size of 905 was collected from the escapement for a total of 2 periods (Appendix A18). Age composition of the run to the district was primarily age-1.3 (55%), followed by age-2.2 (24%), age-1.2 (11%), and age-2.3 (9%) fish (Table 10). Similarly, the district commercial catch was composed mostly of age-1.3 (55%), age-2.2 (27%), and age-2.3 (10%) fish. Mean length of sockeye salmon caught in the district was 545 mm with a SE of 0.6 and mean weight was 3.33 kg with a SE of 0.08 (Appendix B1). The age composition of the escapement was predominantly age-1.3 (53%) fish, followed by age-1.2 (21%), age-2.2 (18%) and age-2.3 (6%) fish (Table 10). Mean length in the escapement was 555 mm with a SE of 0.8 (Appendix B1). Daily peak passage at the tower occurred on 28 July with a count of 9,966 (Table 11). No age, sex, and size samples were collected from the Kulukak Section harvest in 2005. Historical mean (1956–1999) return per spawner was 3.4 (Appendix C9).

The estimated catch and escapement to the Togiak Section in 2005 was 10% smaller than the recent 10 year average and the total catch was 2% smaller than the recent 10 year average (Table 8). The commercial catch rate in the district was 73%, which was higher than the last 10 year average of 66%.

Although a complete aerial survey was conducted for sockeye salmon in the Togiak River drainage, the survey followed an extreme high water event caused by high winds and a very high tide affecting water clarity. Additionally, the survey may have been too late for optimal observation. The survey of the Togiak River mainstem found 5,600 sockeye salmon plus an additional 1,000 in the tributaries (Appendix D4). These estimates were added to the tower estimate of 149,178 fish to give a total Togiak River escapement of 155,778 fish.

The spawning escapement of sockeye salmon in the Kulukak Section, including the Kulukak River, Kulukak Lake, and Tithe Creek Ponds, was not assessed this year (Appendices E3–E5). Total escapement for Togiak District (including only partial survey data) was 159,491 fish. All sockeye salmon aerial surveys were expanded by a factor of 2.0.

BRISTOL BAY CHINOOK SALMON RUN

In 2005, a total of 76,590 Chinook salmon were caught commercially in Bristol Bay. The majority originated from the Nushagak (62,308) and Togiak (10,605) districts (Table 3).

Naknek-Kvichak District Chinook Salmon Run

The estimated commercial Chinook salmon catch in Naknek-Kvichak District totaled 1,377 fish. No Chinook salmon catches or escapements were sampled for age, sex, and size information. There were no escapement aerial surveys conducted on the Kvichak River for Chinook salmon in 2005. Aerial surveys of Chinook salmon escapements into the Naknek River drainage were flown on 5 August (Paul's Creek, King Salmon Creek and Big Creek) and 21 August for the Naknek

mainstem (Appendix D5). No estimate was possible for 2005 due to high water and poor visibility. Alagnak River drainage Chinook salmon escapement was surveyed on 30 July, 2 weeks before the peak. The observed total was 5,084 (Appendix D5). From 1985 to 2004, Alagnak Chinook salmon counts ranged from a low of 1,720 in 1990 to a high of 15,210 fish in 1997 (Appendix E6).

Egegik District Chinook Salmon Run

The commercial Chinook salmon catch in Egegik District totaled approximately 485 fish, nearly 3 times below the 1985–2004 average harvest of 1,400 (Table 3). No Chinook salmon catches or escapements were sampled for age, sex, and size information. Aerial survey counts of known Chinook salmon spawning areas in the Egegik drainage yielded a total count of 550 (Appendix D6). No additional Chinook salmon were counted at the Egegik River tower. This total was 49% below the average count of 1,077 (Appendix E8).

Ugashik District Chinook Salmon Run

The Ugashik District's commercial catch of approximately 1,815 Chinook salmon was slightly less than the 20 year average harvest of 1,938 (Table 3). Chinook salmon escapement surveys of Dog Salmon, King Salmon, and Ugashik rivers were flown on 8 August 8. But, because of a new observer and doubts over the ability to identify some species; counts were considered unreliable (Appendix D7). The 2005 escapement did not reflect the 20 year average (1985–2004) of 4,476 (Appendix E9). No Chinook salmon catches or escapements were sampled for age, sex, and size information.

Nushagak District Chinook Salmon Run

An estimated 62,308 Chinook salmon were caught in Nushagak District (Table 3). Age, sex and size information was collected from 994 samples with age-1.3 (41%), age-1.4 (33%), and age-1.2 (25%) fish accounting for most of the catch sample (Appendix A19). Mean length in the catch was 716 mm with a SE of 2.2 and mean weight was 7.95 kg with a SE of 0.2 (Appendix B1). An estimated 172,708 Chinook salmon passed the Nushagak River sonar site (Appendix A20). The escapement sample of 607 was composed of 47% age-1.3, followed by 38% age-1.4, and 14% age-1.2 fish. Mean length in the escapement was 754 mm with a SE of 3.3 (Appendix B1).

Spawning surveys were flown for Chinook salmon only on the Koktuli, Stuyahok, King Salmon and a small portion of the Nushagak River. The survey information appears in Sport Fish Division annual management reports.

Togiak District Chinook Salmon Run

The estimated commercial Chinook salmon catch in Togiak District totaled 10,605 fish (Table 3). No catches or escapements were sampled for age, sex, and size information. The expanded escapement estimate Togiak District was 13,521 fish (Appendix D8). The escapement goal for Chinook salmon in the Togiak Drainage of 10,000 fish was met with an expanded count of 10,200. Escapement in the Togiak Drainage was 27% above the 10 year average and 44% above the 20 year average (Appendix E10). The Kulukak River escapement estimate (447) was 99% of the 10 year average count for the system and was 85% of the 20 year average (Appendix E11).

BRISTOL BAY CHUM SALMON RUN

In 2005, the total number of chum salmon commercially caught in Bristol Bay was 1,397,063 fish (Table 3). The majority were harvested in the Nushagak (966,050) and Naknek/Kvichak (204,777) districts.

Naknek-Kvichak District Chum Salmon Run

The estimated commercial chum salmon harvest in Naknek-Kvichak District totaled 204,777 fish (Table 3). There were no aerial survey chum estimates for the Naknek and Kvichak rivers in 2005, although historically there has been in the Alagnak River (Appendix E12). No chum salmon catches or escapements were sampled for age, sex, and size information.

Egegik District Chum Salmon Run

The 2004 commercial chum catch from Egegik District totaled 62,029 fish, or 35% below the 1985–2004 average catch of 85,700 (Table 3). No chum salmon catches or escapements were sampled for age, sex, and size information. The escapement index was 1,514 fish (Appendix D9), more than 4 times below the 20 year average of 7,100 (Appendix E13). Escapement indices of less than 2,000 have been recorded in 8 of the last 10 years. However, aerial surveys for chum salmon are not considered reliable indicators of abundance and it is believed that chum salmon escapement indices are greatly underestimated. For example, in 1999, an aerial survey count on 6 August was only about 2% of the Gertrude Creek weir count of 16,000 fish.

Ugashik District Chum Salmon Run

The 2005 Ugashik District's commercial chum salmon harvest of 39,513 (Table 3) was less than the 20 year average of 63,700. No chum salmon catches or escapements were sampled for age, sex, and size information. Aerial surveys of Dog Salmon, King Salmon, and Ugashik rivers for chum salmon on August 8 again resulted in an incomparable estimate because of new observer uncertainties (Appendices D10 and E14).

Nushagak District Chum Salmon Run

An estimated 966,050 chum salmon were caught in Nushagak District (Table 3). We collected 956 age, sex and size samples from the commercial fishery for a total of 2 periods (Appendix A21). Age-0.2 (88%) and age-0.3 (12%) dominated the catch. Mean length in the catch was 568 mm with a SE of 0.9 and mean weight was 3.29 kg with a SE of 0.07 (Appendix B1). An estimated 456,025 passed the Nushagak River sonar site (Appendix A22). A sample size of 585 was collected from the escapement for a total of 1 period. The escapement sample was primarily composed of 86% age-0.3 and 14% age-0.4 fish. Mean length in the escapement sample was 594 mm with a SE of 1.4 (Appendix B1). No additional spawning ground aerial surveys were conducted.

Togiak District Chum Salmon Run

The 2004 commercial chum catch from Togiak District totaled 124,694 fish (Table 3). No chum salmon catches or escapements were sampled for age, sex, and size information. Chum salmon counts were conducted coincidentally with Chinook salmon surveys. Total escapement to Togiak District was less (76% and 74% respectively) than the 20 year and 10 year averages. Escapement seemed to vary greatly between systems with the Matogak, Osviak, Neguthluk, and Quigmy rivers showing possible strong escapement and the Togiak, Kulukak, and Slug rivers

showing possible weak escapement. The Togiak River escapement estimate was 5,233, or 10% of the 10 year average. The Kulukak River escapement estimate was 790, also about 10% of the 10 year average for that system (Appendices D11, E15, and E16).

BRISTOL BAY PINK SALMON RUN

In 2005, the total number of pink salmon commercially caught in Bristol Bay was 2,695 fish with the most from Togiak District (2,108, Table 3). No pink salmon catches or escapements were sampled for age, sex, and size information. For context, historical survey counts from Naknek-Kvichak District are listed in this report (Appendix E17).

BRISTOL BAY COHO SALMON RUN

The total number of coho salmon commercially caught in Bristol Bay in 2005 was 74,551 . Most (42,456) were caught in Nushagak District (Table 3).

Naknek-Kvichak District Coho Salmon Run

An estimated 3,314 coho salmon were caught in Naknek-Kvichak District (Table 3). No coho salmon catches or escapements were sampled for age, sex, and size information. There were no aerial survey coho estimates for Naknek-Kvichak District in 2005.

Egegik District Coho Salmon Run

The 2005 commercial catch totaled 20,611 coho salmon (Table 3), about 41% below the 20 year (1985–2004) average of 31,800 (Table 3). No coho salmon catches or escapements were sampled for age, sex, and size information. The escapement was documented with an aerial survey conducted on 24 September (Appendix D12). A total of 22,450 were counted in the Egegik River and in several tributaries of Becharof Lake. The aerial counts were focused on major production areas. For context, historical survey counts are listed in this report (Appendix E18).

Ugashik District Coho Salmon Run

The 2005 coho salmon catch in Ugashik District was 8,162 fish (Table 3). No coho salmon catches or escapements were sampled for age, sex, and size information. An aerial survey occurred in the Ugashik drainage thanks to funding from SFD. A total of 9,850 coho salmon were observed on the 26 September flight (Appendix D13). Most of the count came from Lower Ugashik Lake, where 4,000 were observed. For context, historical escapement data are listed in this report (Appendix E19).

Nushagak District Coho Salmon Run

In 2005, an estimated 42,456 coho salmon were caught in Nushagak District (Table 3). No coho salmon catches or escapements were sampled for age, sex, or size information.

Togiak District Coho Salmon Run

The 2005 commercial coho catch from Togiak District totaled 8 fish (Table 3). No coho salmon catches or escapements were sampled for age, sex, or size information, and no aerial surveys flown in 2005. For context, historical survey counts are listed in this report (Appendices E20 and E21).

DISCUSSION

The objectives were successfully met for the Pacific salmon catch and escapement age, sex and size monitoring program in Bristol Bay. Total sockeye salmon runs were estimated with catch and escapement for each of the 9 major river systems in Bristol Bay. For each major river system's catch and escapement, we estimated the proportion of each major age class, sex composition, mean length, and mean weight; and salmon not counted during normal sonar or tower operations were documented. Even though we were able to meet the project objectives, there were concerns regarding catch allocation and sample sizes.

Accurately estimating the stock composition of a mixed-stock catch is critical to estimating the total run of each stock. There are concerns about correctly allocating the catch of fish within a district when there is more than one stock present within that district. Naknek-Kvichak and Nushagak districts each have 3 stocks. ADF&G currently uses age composition from catch and escapement, and run timing differences to allocate the catch to each stock (Bernard 1983). The current method assumes that the stocks present in a district are equally exploited. This is a big assumption that is probably incorrect for at least some of the stocks. The current method probably underestimates the productivity of some stocks and overestimates the productivity of other stocks. ADF&G is currently engaged in a sockeye salmon genetic sampling stock identification program that will be an additional tool to assist with allocation to the correct stock of origin in the future.

Sample sizes were successfully met for all district's commercial catch age, sex and size data but one escapement project fell short of its respective goal. Sampling goals are set to allow for approximately a 20% dropout rate because of poor or missing scales and data (e.g., a 500 sample goal allows for at least 400 usable samples). Igushik River sockeye salmon escapement has a sample goal of 1,000 (Table 1), but the project only collected 952 samples with 720 usable for a dropout rate of 24% and an overall deficiency rate of 28%. This is the second year that the Igushik River tower fell short of its goal. Two other rivers that fell short last year, Nushagak and Nuyakuk, both exceeded their goal of 1,200 and 1,000 samples respectively. Staff will continue striving to assess sampling shortfalls inseason to meet sampling goals.

An unusual event occurred in the Mother Goose Lake Drainage during the spring or early summer of 2005. An event known as a lahar took place on Mt. Chiginigak, a semi-active volcano from which the headwaters of Volcano and Indecision creeks flow. These creeks provide water to Mother Goose Lake, the source for the King Salmon River, a tributary that empties into Ugashik Bay.

A lahar is a runoff event, and while the mechanics or timing was not clear, the effects were dramatic. Sometime in the spring or early summer of 2005, an event took place near Mt. Chiginigak that melted snow on and within the summit crater, draining into the Mother Goose drainage and an unnamed tributary on the Pacific side of the Alaska Range. The runoff was extremely acidic and large enough to lower the pH of Mother Goose Lake and the King Salmon River to between 3.0 and 3.5. This condition persisted through most of the summer and into the fall, preventing salmon and other anadromous fish from migrating into the upper reaches of the system. Chinook and chum salmon were observed during aerial survey flights in 2 tributaries in the lower reaches of the King Salmon River, Pumice and Old creeks, but no fish were observed in the King Salmon River mainstem or Painter Creek, a tributary with a confluence just below

Mother Goose Lake, or in Volcano or Indecision creeks. Painter Creek is a major spawning area for Chinook salmon in the Ugashik system.

Long term ramifications from this event could be significant. At least 2 and possibly 3 age classes of salmon were impacted, depending on the timing of the event. The juvenile classes of 2004, which hatched in the spring of 2005, and the 2005 adult return were definitely affected. Depending on the timing of the lahar, the outgoing age class of the 2003 spawning event (smolts) could have outmigrated before the river was impacted by the acidic runoff. If the runoff ceases or diminishes over the winter, the watershed should become more habitable for all species. If however, the pH remains at low levels, the ability of the system to support aquatic life will be diminished.

In terms of impacts to the fisheries, escapement in the King Salmon/Mother Goose system ranges from approximately 4,000 to 30,000 sockeye salmon, averaging about 15,000. This is a fairly small number when compared to the overall Ugashik District. For Chinook salmon, the system contributes a significant percentage in Ugashik District. However, the latest 20 year average is only about 2,100 fish in the commercial fishery. A more significant impact may be felt by the sport fishing community since Painter Creek is one of the larger contributors to the that fishery within Ugashik District.

It is unknown at this time how long the acidic water will be produced and run off into the King Salmon River/Mother Goose Lake complex and there is no way to remedy the situation. Staff from the Volcano Observatory Group, the USFWS Alaska Peninsula National Wildlife Refuge, and from ADF&G, will continue to monitor the river and document impacts to the watershed.

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TABLES AND FIGURES

Table 1.–Age, sex and length sampling strategy and goals for each escapement project.

River System	Species	# of Strata	Sampling Goal Per Strata	Total Sample	Sampling Dates and Strategy [a]					
					Strata 1		Strata 2		Strata 3	
					Dates	Strategy	Dates	Strategy	Dates	Strategy
Alagnak	Sockeye	3	500	1500	6/26-7/05	50/d or 100 every other d [b]	7/06-7/11	100/d or 200 every other d	7/12-7/21	50/d or 100 every other d
Egegik	Sockeye	3	500	1500	6/18-6/27	50/d or 100 every other d [c]	6/28-7/04	100/d or 200 every other d	7/05-7/14	50/d or 100 every other d
Igushik	Sockeye	2	500	1000	6/25-7/06	50/d or 100 every other d [b]	7/07-7/18	50/d or 100 every other d		
Kvichak	Sockeye	3	500	1500	6/24-7/03	50/d or 100 every other d [c]	7/04-7/09	100/d or 200 every other d	7/10-7/19	50/d or 100 every other d
Naknek	Sockeye	3	500	1500	6/20-6/29	50/d or 100 every other d [d]	6/30-7/05	100/d or 200 every other d	7/06-7/15	40/d or 80 every other d
Nushagak	Sockeye	3	400	1200	6/10-7/02	[e]	7/03-7/07	[e]	7/08-7/24	[e]
Nushagak	Chinook	1	500	500	6/10-8/20	[f]				
Nushagak	Chum	1	500	500	6/10-8/20	[f]				
Nushagak	Coho	1	250	250	7/05-8/20	[g]				
Nuyakuk	Sockeye	2	500	1000	6/26-7/12	50/d or 100 every other d [f]	7/13-7/23	50/d or 100 every other d		
Togiak	Sockeye	2	500	1000	7/03-7/20	40/d or 80 every other d [b]	7/21-8/08	40/d or 80 every other d		
Ugashik	Sockeye	3	500	1500	6/28-7/09	50/d or 100 every other d [d]	7/10-7/12	100/d or 200 every other d	7/13-7/24	50/d or 100 every other d
Wood	Sockeye	3	500	1500	6/20-6/29	50/d or 100 every other d [d]	6/30-7/04	100/d or 200 every other d	7/05-7/17	50/d or 100 every other d

[a] Sampling strategy does not have to be strictly followed. The goal was to get the total sample from each of the strata and to spread the sampling throughout the stratum.

[b] Do not sample if daily passage is <2,000.

[c] Do not sample if daily passage is <10,000.

[d] Do not sample if daily passage is <5,000.

[e] 400 scales weighted on the numbers passing the site. Samples should be taken throughout the time period.

[f] The goal was to get 500 scales throughout the counting period. Fish should be sampled in proportion to the run, however some samples should be taken throughout the run, not just from the peak.

[g] The goal was to get 250 scales throughout the counting period. Fish should be sampled in proportion to the run, however some samples should be taken throughout the run, not just from the peak.

[h] Do not sample if daily passage is <1,000.

Table 2.–Number of sockeye salmon by age class and river system in the catch and escapement of 10 river systems in Bristol Bay, Alaska, 2005.

		Age Group																	
System[a]		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	0.5	1.4	2.3	3.2	1.5	2.4	3.3	3.4	Total
Kvichak	C	40	116	7,886	46,451	38	0	132,774	273,607	0	0	76	71,424	38	0	0	0	0	532,450
	E	2,301	6,694	24,580	469,730	2,196	0	1,017,194	615,328	0	0	4,392	175,721	2,196	0	0	0	0	2,320,332
	I	2,341	6,810	32,466	516,181	2,234	0	1,149,968	888,935	0	0	4,468	247,145	2,234	0	0	0	0	2,852,782
	S	60	174	831	13,212	57	0	29,434	22,753	0	0	114	6,326	57	0	0	0	0	73,018
	%	0.1	0.2	1.1	18.1	0.1	0.0	40.3	31.2	0.0	0.0	0.2	8.7	0.1	0.0	0.0	0.0	0.0	100.0
Alagnak	C	0	98	0	115,437	0	280	649,749	132,807	0	0	36	182,723	0	0	0	0	0	1,081,130
	E	0	10,276	0	598,077	0	0	3,312,772	112,479	0	0	3,810	181,576	0	0	0	0	0	4,218,990
	I	0	10,374	0	713,514	0	280	3,962,521	245,286	0	0	3,846	364,299	0	0	0	0	0	5,300,120
	S	0	266	0	18,263	0	7	101,423	6,278	0	0	98	9,324	0	0	0	0	0	135,659
	%	0.0	0.2	0.0	13.5	0.0	0.0	74.8	4.6	0.0	0.0	0.1	6.9	0.0	0.0	0.0	0.0	0.0	100.0
Naknek	C	0	379	379	206,424	463	0	3,739,918	389,078	0	0	7,170	771,078	0	0	0	0	0	5,114,889
	E	0	51,500	0	184,442	11,357	0	2,199,523	78,103	0	0	6,944	212,753	0	0	0	0	0	2,744,622
	I	0	51,879	379	390,866	11,820	0	5,939,441	467,181	0	0	14,114	983,831	0	0	0	0	0	7,859,511
	S	0	1,328	10	10,004	303	0	152,023	11,958	0	0	361	25,182	0	0	0	0	0	201,169
	%	0.0	0.7	0.0	5.0	0.2	0.0	75.6	5.9	0.0	0.0	0.2	12.5	0.0	0.0	0.0	0.0	0.0	100.0
Egegik	C	0	0	0	231,612	1,111	0	2,421,373	2,834,123	0	0	5,380	2,498,424	20,684	0	3,088	155	0	8,015,950
	E	0	29,617	0	55,515	55,023	0	412,805	631,327	0	0	0	436,697	750	0	0	0	0	1,621,734
	I	0	29,617	0	287,127	56,134	0	2,834,178	3,465,450	0	0	5,380	2,935,121	21,434	0	3,088	155	0	9,637,684
	S	0	758	0	7,349	1,437	0	72,542	88,700	0	0	138	75,126	549	0	79	4	0	246,682
	%	0.0	0.3	0.0	3.0	0.6	0.0	29.4	36.0	0.0	0.0	0.1	30.5	0.2	0.0	0.0	0.0	0.0	100.0
Ugashik	C	0	0	4,358	248,007	0	0	1,562,812	74,005	0	0	5,140	322,188	0	0	125	0	0	2,216,635
	E	9,082	7,951	3,032	124,052	1,964	0	569,107	15,827	0	0	1,446	67,151	0	0	0	0	0	799,612
	I	9,082	7,951	7,390	372,059	1,964	0	2,131,919	89,832	0	0	6,586	389,339	0	0	125	0	0	3,016,247
	S	232	204	189	9,523	50	0	54,568	2,299	0	0	169	9,965	0	0	3	0	0	77,202
	%	0.3	0.3	0.2	12.3	0.1	0.0	70.7	3.0	0.0	0.0	0.2	12.9	0.0	0.0	0.0	0.0	0.0	100.0
Wood	C	5,966	8,845	32,299	1,199,758	0	0	1,539,964	94,496	0	0	6,610	108,144	0	0	0	0	0	2,996,082
	E	8,766	26,632	8,758	807,990	0	0	586,214	22,916	0	0	3,346	31,928	0	0	0	0	0	1,496,550
	I	14,732	35,477	41,057	2,007,748	0	0	2,126,178	117,412	0	0	9,956	140,072	0	0	0	0	0	4,492,632
	S	377	908	1,051	51,390	0	0	54,420	3,005	0	0	255	3,585	0	0	0	0	0	114,991
	%	0.3	0.8	0.9	44.7	0.0	0.0	47.3	2.6	0.0	0.0	0.2	3.1	0.0	0.0	0.0	0.0	0.0	100.0

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Table 2.–Page 2 of 2.

System[a]		Age Group 0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	0.5	1.4	2.3	3.2	1.5	2.4	3.3	3.4	Total
Igushik	C	0	0	0	42,661	0	0	1,309,391	62,393	0	0	0	255,872	0	0	715	0	0	1,671,032
	E	0	0	0	19,977	0	0	305,467	7,004	0	0	0	33,264	0	0	0	0	0	365,712
	I	0	0	0	62,638	0	0	1,614,858	69,397	0	0	0	289,136	0	0	715	0	0	2,036,744
	S	0	0	0	1,603	0	0	41,333	1,776	0	0	0	7,401	0	0	18	0	0	52,131
	%	0.0	0.0	0.0	3.1	0.0	0.0	79.3	3.4	0.0	0.0	0.0	14.2	0.0	0.0	0.0	0.0	0.0	100.0
Nuyakuk	E	2,714	464	9,979	108,629	0	0	115,702	9,191	0	0	1,481	2,856	0	0	0	0	0	251,016
Nush-Mul	C	5,426	0	173,524	168,223	0	5,961	1,993,361	20,501	0	0	42,250	19,301	0	0	370	0	0	2,428,917
	E	4,183	0	60,610	118,041	0	4,149	826,939	1,872	0	953	26,737	6,136	0	0	0	0	0	1,049,620
	I	9,609	0	234,134	286,264	0	10,110	2,820,300	22,373	0	953	68,987	25,437	0	0	370	0	0	3,478,537
	S	246	0	5,993	7,326	0	259	72,188	573	0	24	1,766	651	0	0	9	0	0	89,035
	%	0.3	0.0	6.7	8.2	0.0	0.3	81.1	0.6	0.0	0.0	2.0	0.7	0.0	0.0	0.0	0.0	0.0	100.0
Togiak	C	0	0	5,326	29,147	0	0	227,385	108,883	0	0	1,063	39,098	0	0	140	0	0	411,042
	E	178	167	1,202	32,722	0	0	82,849	28,344	0	0	178	9,971	0	0	167	0	0	155,778
	I	178	167	6,528	61,869	0	0	310,234	137,227	0	0	1,241	49,069	0	0	307	0	0	566,820
	S	5	4	167	1,584	0	0	7,941	3,511	0	0	32	1,256	0	0	8	0	0	14,508
	%	0.0	0.0	1.2	10.9	0.0	0.0	54.7	24.2	0.0	0.0	0.2	8.7	0.0	0.0	0.1	0.0	0.0	100.0
Summary	C	11,432	9,438	223,772	2,287,720	1,612	6,241	13,576,727	3,989,893	0	0	67,725	4,268,252	20,722	0	4,438	155	0	24,468,127
	E	24,510	132,837	98,182	2,410,546	70,540	4,149	9,312,870	1,513,200	0	953	46,853	1,155,197	2,946	0	167	0	0	14,772,950
	I	35,942	142,275	321,954	4,698,266	72,152	10,390	22,889,597	5,503,093	0	953	114,578	5,423,449	23,668	0	4,605	155	0	39,241,077
	S	920	3,642	8,241	120,254	1,847	266	585,872	140,853	0	24	2,933	138,816	606	0	117	4	0	1,004,395
	%	0.1	0.4	0.8	12.0	0.2	0.0	58.3	14.0	0.0	0.0	0.3	13.8	0.1	0.0	0.0	0.0	0.0	100.0

[a] C = Catch, E = Escapement, I = Inshore Return, S = South Peninsula Catch, and % = Percent of Total Run. Egegik escapement includes King Salmon River drainage; Ugashik escapement includes Dog Salmon River drainage; Togiak catch is Togiak River Section only; Togiak escapement includes the tower counts, and lower river and tributaries aerial survey estimate. Nuyakuk escapement is not totaled because it is a component of Nushagak. Nush-Mul = Nushagak-Mulchatna River drainage.

Table 3.–Commercial catch of Bristol Bay salmon by species and district, 2005.

District	Catch in Numbers of Fish					
	Sockeye	Chinook	Chum	Pink	Coho	Total
Naknek-Kvichak	6,728,469	1,377	204,777	32	3,314	6,937,969
Egegik	8,015,950	485	62,029	0	20,611	8,099,075
Ugashik	2,216,635	1,815	39,513	1	8,162	2,266,126
Nushagak	7,096,031	62,308	966,050	554	42,456	8,167,399
Togiak	465,094	10,605	124,694	2,108	8	602,509
Total	24,522,179	76,590	1,397,063	2,695	74,551	26,073,078

Table 4.–Total runs, harvests, escapement and harvest rates for sockeye salmon in Bristol Bay fishing districts and river systems, 2005.

District	River System	Total Run	Harvests[a] Inshore	Harvests[a] S. Pen.[b]	Harvests[a] Total	Esc.	Inshore Run	Harvest Rate (%) Total	Harvest Rate (%) Inshore
Naknek-Kvichak									
	Kvichak	2,925,800	532,450	73,018	605,468	2,320,332	2,852,782	21	19
	Alagnak	5,435,779	1,081,130	135,659	1,216,789	4,218,990	5,300,120	22	20
	Naknek	8,060,680	5,114,889	201,169	5,316,058	2,744,622	7,859,511	66	65
	All combined	16,422,259	6,728,469	409,846	7,138,315	9,283,944	16,012,413	43	42
Egegik		9,884,366	8,015,950	246,682	8,262,632	1,621,734	9,637,684	84	83
Ugashik		3,093,449	2,216,635	77,202	2,293,837	799,612	3,016,247	74	73
Nushagak									
	Wood	4,607,623	2,996,082	114,991	3,111,073	1,496,550	4,492,632	68	67
	Igushik	2,088,875	1,671,032	52,131	1,723,163	365,712	2,036,744	82	82
	Nush-Mul[c]	3,567,572	2,428,917	89,035	2,517,952	1,049,620	3,478,537	71	70
	All combined	10,264,070	7,096,031	256,157	7,352,188	2,911,882	10,007,913	72	71
Togiak		581,328	411,042	14,508	425,550	155,778	566,820	73	73
Baywide totals		40,245,472	24,468,127	1,004,395	25,472,522	14,772,950	39,241,077	63	62

[a] Inshore harvest includes General District catch.

[b] S. Pen. = South Alaska Peninsula. The South Alaska Peninsula harvest refers to all sockeye salmon caught during June fisheries around Unimak and Shumagin Islands.

[c] Nush-Mul = Nushagak-Mulchatna River drainage.

Table 5.–Total age composition of sockeye salmon sampled in the commercial catch and escapement, Bristol Bay, 2005.

	Age Group														
	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	0.5	1.4	2.3	3.2	2.4	3.3	Total
Percent (%)	0.09	0.36	0.82	11.97	0.18	0.03	58.33	14.02	0.00	0.29	13.82	0.06	0.01	0.00	100.00
SE (%)	0.42	0.54	0.58	0.53	0.53	0.51	0.39	0.59		0.55	0.58	0.58	0.54		
Number of Fish	35,942	142,275	321,954	4,698,266	72,152	10,390	22,889,597	5,503,093	953	114,578	5,423,449	23,668	4,605	155	39,241,077
SE (Number)	151	768	1,852	24,861	380	53	88,257	32,689		631	31,472	137	25		
Sample Size	53	125	247	3,765	67	11	16,350	3,418	1	97	3,538	19	5	1	27,697

Table 6.–Total sex composition by age, mean length (mm) and mean weight (Kg) by age and sex of sockeye salmon commercial catch and escapement, Bristol Bay, 2005.

	Age Group														
	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	0.5	1.4	2.3	3.2	2.4	3.3	Total
Males:															
Percent (%)	67.8	91.6	60.3	43.1	94.8	78.5	50.9	44.5	0.0	54.3	45.6	62.2	30.1	0.0	48.6
Males (Number)	24,362	130,374	194,004	2,026,982	68,392	8,157	11,647,585	2,451,037	0	62,189	2,470,415	14,714	1,387	0	19,099,597
SE (Males)	21	35	84	264	20	11	667	309	0	46	310	25	4	0	851
Sample Size	30	108	128	1,452	59	10	7,613	1,554	0	46	1,578	9	3	0	12,590
Mean Length [a]	431	361	575	499	379	607	577	531	0	600	581	551	607	0	560
SE (Length)	4.5	4.0	2.3	1.0	3.3	1.8	0.3	0.8	0.0	5.3	0.7	11.3	0.0	0.0	0.3
Sample Size (Length)	30	108	128	1,449	59	10	7,611	1,550	0	46	1,578	9	3	0	12,581
Mean Weight [b]	0.00	0.00	3.87	2.24	0.00	0.00	3.41	2.47	0.00	3.59	3.41	2.49	0.00	0.00	3.18
SE (Weight)	0.00	0.00	0.18	0.04	0.00	0.00	0.02	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.01
Sample Size (Weight)	0	0	7	102	0	0	869	178	0	6	230	2	0	0	1,394
Females:															
Percent (%)	32.0	8.7	40.4	57.1	5.2	22.0	49.1	55.5	0.0	45.5	54.4	37.8	69.9	100.0	51.5
Females (Number)	11,580	11,901	127,950	2,671,284	3,760	2,233	11,242,012	3,052,056	953	52,389	2,953,034	8,954	3,218	155	20,141,480
SE (Females)	15	10	65	312	3	6	645	358		41	342	14	15		875
Sample Size	14	12	94	1,804	8	3	7,590	1,796	1	42	1,847	10	2	1	13,224
Mean Length [a]	430	379	552	494	433	594	557	515	595	574	562	531	503	576	542
SE (Length)	10.2	16.1	1.7	0.6	0.7	1.6	0.3	0.6	0.0	2.6	0.5	4.8	0.0	0.0	0.2
Sample Size (Length)	14	12	93	1,798	8	3	7,576	1,796	1	42	1,847	10	2	1	13,203
Mean Weight [b]	0.00	0.00	3.06	1.94	0.00	0.00	2.92	2.23	0.00	2.72	2.94	2.24	2.83	2.93	2.69
SE (Weight)	0.00	0.00	0.14	0.03	0.00	0.00	0.01	0.03	0.00	0.00	0.02	0.00	0.00	0.00	0.01
Sample Size (Weight)	0	0	5	115	0	0	812	193	0	1	272	1	1	1	1,401
Total:															
Number of Fish	35,942	142,275	321,954	4,698,266	72,152	10,390	22,889,597	5,503,093	953	114,578	5,423,449	23,668	4,605	155	39,241,077
SE (Number)	151	768	1,852	24,861	380	53	88,257	32,689		631	31,472	137	25		
Sample Size	44	120	222	3,280	67	13	15,556	3,418	1	88	3,527	19	5	1	26,361
Mean Length [a]	431	363	566	496	381	604	567	522	595	588	571	544	535	576	551
SE (Length)	4.4	3.9	1.6	0.6	3.0	1.4	0.2	0.5	0.0	3.1	0.4	6.3	0.0	0.0	0.2
Sample Size (Length)	44	120	221	3,247	67	13	15,187	3,346	1	88	3,425	19	5	1	25,784
Mean Weight [b]	0.00	0.00	3.59	2.06	0.00	0.00	3.18	2.34	0.00	3.54	3.15	2.39	2.83	2.93	2.93
SE (Weight)	0.00	0.00	0.12	0.02	0.00	0.00	0.01	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.01
Sample Size (Weight)	0	0	12	217	0	0	1,681	371	0	7	502	3	1	1	2,795

[a] Alagnak escapement data not included.

[b] Weight measurements are only collected from the commercial catch.

Table 7.–Size-at-age for sockeye salmon commercial catch and escapement, Bristol Bay, 1957–2005 (length in mm, weight in kg).

	Age 1.2				Age 1.3				Age 2.2				Age 2.3				Baywide [a]			
Return	Length		Weight		Length		Weight		Length		Weight		Length		Weight		Length		Weight	
Year	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]
1957	524	6.8			564	1.0			518	1.6			572	1.4			554	1.3		
1958	510	4.9			571	5.5			531	3.6			578	1.7			551	3.4		
1959	506	2.4			571	3.5			520	0.7			581	1.2			526	1.2		
1960	489	3.8			561	19.4			505	12.6			570	6.6			498	7.7		
1961	515	14.8			571	5.8			519	2.4			576	11.0			554	6.2		
1962	515	17.3			575	9.8			524	1.4			574	2.4			536	5.4		
1963	514	2.9	2.3	0.1	577	3.9	3.1	0.1	531	2.7	2.5	0.1	584	2.0	3.2	0.1	547	2.4	2.8	0.1
1964	501	0.9			571	1.7			517	1.4			578	2.3			517	1.1		
1965	507	1.8			560	1.5			497	2.3			567	2.2			502	1.9		
1966	496	2.0			565	1.2			516	2.0			571	1.1			555	1.3		
1967	505	1.5			576	1.6			531	1.1			584	1.7			544	1.4		
1968	508	1.5			578	1.5			523	1.4			589	1.9			535	1.5		
1969	515	0	2.3	0	577	0	3.1	0	524	0	2.4	0	585	0	3.1	0	520	0	2.5	0
1970	497	0	2.1	0	557	0	2.8	0	507	0	2.2	0	567	0	2.8	0	511	0	2.3	0
1971	513	0	2.1	0	572	0	3.1	0	526	0	2.3	0	574	0	3.0	0	552	0	2.7	0
1972	501	24.2	2.2	0.7	574	22.6	3.1	0.9	520	24.2	2.3	0.6	577	21.8	3.1	0.8	544	17.2	2.8	0.3
1973	511	4.3	2.5	0.2	583	2.3	3.5	0.5	529	4.9	2.6	0.3	592	2.4	3.4	0.2	573	2.3	3.3	0.2
1974	515	2.7	2.2	0.1	569	4.2	3.2	0.2	519	2.0	2.5	0.1	583	5.8	3.4	0.3	528	2.2	2.6	0.1
1975	512	3.3	2.4	0.2	573	1.9	3.2	0.2	509	2.0	2.3	0.1	575	2.8	3.1	0.3	523	2.0	2.4	0.1
1976	519	2.5	2.5	0.1	580	1.7	3.4	0.1	524	1.7	2.5	0.0	576	3.5	3.1	0.1	544	1.8	2.8	0.1
1977	511	3.5	2.3	0.1	586	2.0	3.7	0.1	534	2.4	2.6	0.1	586	2.5	3.5	0.1	558	2.1	3.0	0.1
1978	511	2.0	2.3	0.0	580	2.2	3.3	0.1	524	3.4	2.4	0.1	591	2.3	3.5	0.0	537	2.1	2.8	0.1
1979	525	0.89	2.64	0.05	575	1.02	3.44	0.03	538	1.39	2.70	0.15	525	5.65	3.16	0.13	537	0.03	2.82	0.00
1980	500	0.34	2.31	0.02	551	0.26	3.23	0.03	514	0.28	2.35	0.02	561	0.82	2.88	0.06	520	0.16	2.57	0.01
1981	520	0.34	2.40	0.02	570	0.21	3.22	0.02	534	0.26	2.44	0.02	577	0.39	3.25	0.03	552	0.14	2.85	0.01
1982	506	1.43	2.25	0.00	566	0.71	3.22	0.06	531	12.28	2.46	0.00	582	1.58	3.33	0.20	554	0.04	3.03	0.00
1983	518	0.91	2.38	0.03	563	1.38	3.10	0.05	534	1.61	2.54	0.05	579	8.44	3.16	0.23	530	0.03	2.55	0.00
1984	486	1	2.10	0.09	560	1	2.99	0.06	514	0	2.34	0.05	571	1	3.07	0.05	524	0	2.54	0.03
1985	508	1	2.18	0.04	567	1	2.93	0.03	523	0	2.27	0.02	580	1	2.96	0.04	541	0	2.54	0.01

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Table 7.–Page 2 of 2.

Return	Age 1.2				Age 1.3				Age 2.2				Age 2.3				Baywide[a]			
	Length		Weight		Length		Weight		Length		Weight		Length		Weight		Length		Weight	
Year	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]	Mean	SE[b]
1986	497	1	2.23	0.05	567	0	2.95	0.10	531	0	2.36	0.05	575	1	3.07	0.06	548	0	2.69	0.02
1987	501	0	2.06	0.03	563	0	2.99	0.02	518	1	2.32	0.13	574	1	2.93	0.03	530	0	2.47	0.01
1988	501	0	2.06	0.02	577	0	3.07	0.02	528	0	2.29	0.03	587	0	3.18	0.02	549	0	2.70	0.01
1989	489	0	2.07	0.02	572	0	2.98	0.03	518	0	2.18	0.01	578	1	3.05	0.04	529	0	2.38	0.01
1990	481	0	1.95	0.02	563	0	2.96	0.02	503	0	2.10	0.02	573	0	2.98	0.02	528	0	2.45	0.01
1991	490	0	1.91	0.03	558	0	2.80	0.02	501	0	2.12	0.02	565	1	2.78	0.04	533	0	2.49	0.01
1992	487	0	1.77	0.03	553	0	2.73	0.02	507	0	2.01	0.02	562	0	2.85	0.03	530	0	2.40	0.01
1993	498	0	2.10	0.02	566	0	2.94	0.02	526	0	2.28	0.02	572	0	3.00	0.02	545	0	2.62	0.01
1994	472	1	2.09	0.03	554	0	2.74	0.02	507	0	2.05	0.03	567	0	2.74	0.04	522	0	2.29	0.01
1995	502	0	2.17	0.01	560	0	2.90	0.09	513	0	2.21	0.01	573	0	2.92	0.02	526	0	2.37	0.01
1996	494	1	2.03	0.02	565	0	3.05	0.01	512	1	2.29	0.03	573	0	2.97	0.03	552	0	2.83	0.01
1997	494	1	1.99	0.02	561	0	2.95	0.02	517	0	2.18	0.02	582	1	3.18	0.03	536	0	2.54	0.01
1998	494	0	1.97	0.01	556	0	2.78	0.02	513	1	2.37	0.03	568	0	2.75	0.02	531	0	2.45	0.01
1999	507	0	1.72	0.02	564	1	2.82	0.03	519	0	1.91	0.02	574	1	3.01	0.06	525	0	2.91	0.01
2000	470	1	2.22	0.07	564	0	3.04	0.01	506	1	2.34	0.07	567	1	3.02	0.03	542	0	2.84	0.04
2001	499	1	2.06	0.06	577	0	3.12	0.01	518	1	2.32	0.04	582	0	3.17	0.02	573	0	3.09	0.01
2002	492	0	2.07	0.02	571	0	3.11	0.02	518	0	2.23	0.01	584	1	3.24	0.03	531	0	2.48	0.01
2003	509	0	2.72	0.03	577	0	3.29	0.02	526	1	2.64	0.03	586	0	3.82	0.02	553	0	3.17	0.01
2004	507	0	2.27	0.01	576	0	3.24	0.01	521	0	2.36	0.01	581	1	3.21	0.03	532	0	2.69	0.01
2005	496	1	2.06	0.02	567	0	3.18	0.01	522	1	2.34	0.02	571	0	3.15	0.02	551	0	2.93	0.01
Averages																				
57–64	509				570				521				577				535			
65–74	507		2.23		571		3.13		519		2.38		579		3.13		536		2.70	
75–84	511		2.36		570		3.28		526		2.46		572		3.21		538		2.74	
85–94	492		2.04		564		2.91		516		2.20		573		2.95		536		2.50	
95–04	497		2.12		567		3.03		516		2.29		577		3.13		540		2.74	
57–04	503		2.19		568		3.08		520		2.33		576		3.10		537		2.67	

[a] Weighted average for all age classes combined.

[b] SE=standard error; Standard error and mean weight were taken directly from annual reports. The number of significant digits used varied among years.

Table 8.–Annual inshore harvests, escapement, and harvest rates (in thousands) for Bristol Bay sockeye salmon, by district, 1956–2005.

	Inshore Catch (thousands)					Escapement (thousands)									Inshore Harvest Rate(%)				
Year	N/K	Ege.	Uga.	Nush.	Tog.	Kvi.	Alag.[a]	Nak.	Ege.	Uga.	Wood	Igu.	Nush.	Tog.	N/K	Ege.	Uga.	Nush.	Tog.
1956	5,988	1,187	341	1,303	102	9,443	784	1,773	1,104	425	773	400	35	225	33	52	45	52	31
1957	4,579	814	351	441	40	2,843	127	635	391	215	289	130	77	25	56	68	62	47	62
1958	923	501	434	1,092	36	535	95	278	246	280	960	107	201	72	50	67	61	46	34
1959	1,689	662	423	1,720	113	680	825	2,232	1,072	219	2,209	644	49	210	31	38	66	37	35
1960	9,848	1,447	753	1,518	140	14,630	1,241	828	1,799	2,304	1,016	495	146	163	37	45	25	48	46
1961	8,167	2,686	357	455	189	3,706	90	351	702	349	461	294	100	122	66	79	51	35	61
1962	2,281	639	243	1,447	92	2,581	91	723	1,027	255	874	16	46	62	40	38	49	61	60
1963	958	696	189	823	186	339	203	905	998	388	721	92	212	116	40	41	33	45	61
1964	2,244	1,104	577	1,392	242	957	249	1,350	850	473	1,076	129	122	105	47	57	55	51	70
1965	19,140	3,180	926	793	211	24,326	175	718	1,445	997	675	181	231	96	43	69	48	42	69
1966	5,398	2,101	445	1,170	191	3,775	174	1,016	804	704	1,209	206	211	104	52	72	39	42	65
1967	2,337	1,071	164	658	72	3,216	203	756	637	239	516	282	67	81	36	63	41	43	47
1968	1,217	672	82	749	65	2,557	194	1,023	339	71	649	195	129	50	24	66	54	44	56
1969	4,655	889	170	773	130	8,394	182	1,331	1,016	160	604	512	87	117	32	47	51	39	53
1970	17,804	1,404	172	1,189	153	13,935	177	733	920	735	1,162	371	409	203	55	60	19	38	43
1971	5,857	1,307	954	1,257	201	2,387	187	936	634	530	851	211	283	200	63	67	64	48	50
1972	1,102	840	17	381	51	1,010	151	587	546	79	431	60	36	79	39	61	18	42	40
1973	168	221	4	272	76	227	35	357	329	39	330	60	190	107	21	40	9	32	41
1974	538	172	2	511	111	4,434	215	1,241	1,276	62	1,709	359	185	104	8	12	3	18	52
1975	3,085	964	15	646	185	13,140	100	2,027	1,174	429	1,270	241	752	181	17	45	3	22	51
1976	2,547	1,330	175	1,265	293	1,965	82	1,321	509	356	817	186	470	189	43	72	33	46	61
1977	2,167	1,781	93	619	201	1,341	109	1,086	693	202	562	96	553	163	46	72	31	34	55
1978	5,124	1,207	8	3,137	422	4,149	584	813	896	82	2,267	536	664	306	48	57	9	48	58
1979	14,992	2,257	391	3,327	393	11,218	794	925	1,032	1,707	1,706	860	498	198	54	69	19	52	66
1980	15,120	2,623	886	4,498	591	22,505	804	2,645	1,061	3,335	2,969	1,988	3,317	527	37	71	21	35	53
1981	10,993	4,361	2,116	7,493	620	1,754	222	1,796	695	1,328	1,233	591	1,009	307	74	86	61	73	67
1982	5,006	2,448	1,139	5,916	582	1,135	646	1,156	1,035	1,186	976	424	601	289	63	70	49	75	67
1983	21,559	6,755	3,349	5,120	530	3,570	260	888	792	1,001	1,361	180	404	213	82	90	77	72	71
1984	14,547	5,190	2,658	1,993	213	10,491	581	1,242	1,165	1,270	1,003	185	593	151	54	82	68	53	59
1985	8,179	7,537	6,469	1,308	133	7,211	319	1,850	1,095	1,006	939	212	498	153	47	87	87	44	46
1986	2,892	4,853	5,003	2,719	191	1,179	621	1,978	1,152	1,016	819	308	990	203	43	81	83	56	48
1987	4,986	5,357	2,129	3,255	275	6,066	416	1,062	1,274	687	1,337	169	388	278	40	81	76	63	50
1988	3,481	6,457	1,524	1,707	673	4,065	525	1,038	1,613	654	867	170	483	309	38	80	70	53	69
1989	13,810	8,902	3,146	2,788	68	8,318	531	1,162	1,612	1,713	1,186	462	513	104	58	85	65	56	40

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Table 8.–Page 2 of 2.

	Inshore Catch (thousands)					Escapement (thousands)										Inshore Harvest Rate(%)				
Year	N/K	Ege.	Uga.	Nush.	Tog.	Kvi	Alag.[a]	Nak.	Ege.	Uga.	Wood	Igu.	Snake	Nush.	Tog.	N/K	Ege.	Uga.	Nush.	Tog.
1990	17,272	10,372	2,149	3,533	168	6,970	456	2,093	2,192	749	1,069	366		680	166	64	83	74	63	50
1991	10,475	6,797	2,946	5,054	522	4,223	749	3,579	2,787	2,482	1,160	756		493	254	55	71	54	68	67
1992	9,396	15,647	3,321	2,790	611	4,726	612	1,607	1,946	2,195	1,286	305		695	210	58	89	60	55	74
1993	8,908	21,601	4,177	5,237	476	4,025	940	1,536	1,517	1,413	1,176	406		715	189	58	93	75	70	72
1994	16,328	10,750	4,353	3,393	321	8,338	655	991	1,898	1,095	1,472	446	22	509	174	62	85	80	58	65
1995	20,280	14,426	4,509	4,446	527	10,039	582	1,111	1,267	1,321	1,482	473	17	281	211	63	92	77	66	71
1996	8,212	10,809	4,411	5,694	385	1,451	828	1,078	1,076	692	1,650	401		504	187	71	91	86	69	67
1997	589	7,517	1,403	2,507	92	1,504	589	1,026	1,104	657	1,512	128	8	373	152	16	87	68	55	38
1998	2,595	3,529	730	2,991	113	2,296	681	1,202	1,111	925	1,756	216	11	459	175	38	76	44	55	39
1999	9,453	7,388	2,256	6,175	347	6,197	1,251	1,625	1,728	1,662	1,512	446		312	196	51	81	58	73	64
2000	4,727	7,051	1,539	6,367	727	1,828	1,218	1,375	1,032	638	1,300	413		404	352	52	87	71	75	67
2001	5,281	2,873	481	4,735	798	1,095	721	1,830	969	866	1,459	410		811	303	59	75	36	64	72
2002	1,419	4,610	1,573	2,840	214	704	767	1,264	1,036	906	1,284	123		316	179	34	82	63	62	55
2003	3,348	2,292	1,749	6,665	650	1,687	3,676	1,831	1,152	790	1,460	194		581	232	32	67	69	75	74
2004	5,124	11,188	3,219	6,294	357	5,500	5,397	1,940	1,290	815	1,543	110		492	136	29	90	80	75	72
2005	6,728	8,016	2,217	7,096	411	2,320	4,219	2,745	1,622	800	1,497	366		1,050	156	42	83	73	71	73
Averages																				
1956–64	4,075	1,082	408	1,132	127	3,968	412	1,008	910	545	931	256	26	110	122	43	54	43	46	51
1965–74	5,822	1,186	294	775	126	6,426	169	870	794	362	814	244	9	183	114	44	60	45	38	52
1975–84	9,514	2,892	1,083	3,401	403	7,127	418	1,390	905	1,090	1,417	529	16	886	252	52	76	50	54	62
1985–94	9,573	9,827	3,522	3,178	344	5,512	582	1,689	1,708	1,301	1,131	360	18	597	204	55	85	73	60	63
1995–04	6,103	7,168	2,187	4,871	421	3,230	1,571	1,428	1,177	927	1,496	291	12	453	212	49	86	70	68	66

[a] The 1956–1976 and 2002–2004 escapements based on Alagnak tower count. The 1977–2001 escapements based on modified aerial survey estimates (Clark 2005).

Table 9.–Annual total runs, harvests, escapement and harvest rates for Bristol Bay.

Year	Total Run	Harvests				Escapement	Inshore Run	Harvest Rate (%)	
		Inshore	S. Pen.[a]	Other[b]	Total			Total	Inshore
1956	24,178,393	8,921,467	330,349		9,251,816	14,966,577	23,888,044	38	37
1957	18,522,510	6,225,502	164,222	7,349,000	13,738,724	4,733,786	10,959,288	74	57
1958	6,281,052	2,985,666	135,000	377,000	3,497,666	2,783,386	5,769,052	56	52
1959	13,534,132	4,608,119	78,463	598,000	5,284,582	8,280,450	12,888,569	39	36
1960	40,225,936	13,705,002	156,000	3,727,000	17,588,002	22,637,934	36,342,936	44	38
1961	24,416,100	11,854,073	254,000	6,129,000	18,237,073	6,179,027	18,033,100	75	66
1962	11,665,502	4,702,364	326,000	960,000	5,988,364	5,677,138	10,379,502	51	45
1963	8,013,969	2,850,639	149,000	1,001,000	4,000,639	4,013,330	6,863,969	50	42
1964	11,438,331	5,558,683	244,000	314,000	6,116,683	5,321,648	10,880,331	53	51
1965	60,822,808	24,249,092	775,000	6,943,000	31,967,092	28,855,716	53,104,808	53	46
1966	20,032,492	9,305,921	582,000	1,935,000	11,822,921	8,209,571	17,515,492	59	53
1967	11,485,059	4,301,109	255,000	922,000	5,478,109	6,006,950	10,308,059	48	42
1968	9,455,405	2,784,739	575,000	885,000	4,244,739	5,210,666	7,995,405	45	35
1969	21,918,143	6,617,061	857,000	2,031,000	9,505,061	12,413,082	19,030,143	43	35
1970	45,039,815	20,720,137	1,683,000	3,968,000	26,371,137	18,668,678	39,388,815	59	53
1971	18,462,272	9,575,434	610,000	2,049,000	12,234,434	6,227,838	15,803,272	66	61
1972	7,194,044	2,392,326	519,000	1,302,000	4,213,326	2,980,718	5,373,044	59	45
1973	3,516,869	741,292	262,000	839,000	1,842,292	1,674,577	2,415,869	52	31
1974	11,502,364	1,334,070	60,000	510,000	1,904,070	9,598,294	10,932,364	17	12
1975	25,811,149	4,894,757	239,000	1,353,000	6,486,757	19,324,392	24,219,149	25	20
1976	12,827,413	5,610,425	307,000	1,001,000	6,918,425	5,908,988	11,519,413	54	49
1977	10,671,057	4,860,433	239,000	768,000	5,867,433	4,812,624	9,673,057	55	50
1978	20,798,730	9,898,223	487,000	452,000	10,837,223	10,316,107	20,214,330	52	49
1979	40,974,911	21,360,960	862,000	304,000	22,526,960	18,947,751	40,308,711	55	53
1980	66,292,853	23,718,655	3,303,000	590,000	27,611,655	39,187,298	62,905,953	42	38
1981	37,039,596	25,583,662	1,825,000	818,000	28,226,662	8,952,724	34,536,386	76	74
1982	24,705,700	15,090,413	2,121,000	443,000	17,654,413	7,457,987	22,548,400	71	67
1983	48,107,873	37,313,599	1,961,000	324,000	39,598,599	8,673,054	45,986,653	82	81
1984	42,630,124	24,601,393	1,388,000	291,200	26,280,593	16,715,161	41,316,554	62	60
1985	38,714,171	23,626,380	1,709,000	259,900	25,595,280	13,319,861	36,946,241	66	64
1986	24,313,787	15,658,526	466,000	298,000	16,422,526	8,282,081	23,940,607	68	65
1987	28,377,096	16,000,656	794,859	165,000	16,960,515	11,678,371	27,679,027	60	58
1988	23,996,394	13,841,078	756,687		14,597,765	9,728,999	23,570,077	61	59
1989	45,754,092	28,714,749	1,744,505		30,459,254	15,629,078	44,343,827	67	65
1990	49,323,010	33,493,550	1,346,295		34,839,845	14,770,405	48,263,955	71	69
1991	43,364,381	25,794,049	1,548,930		27,342,979	16,492,813	42,286,862	63	61
1992	47,415,171	31,763,805	2,457,856		34,221,661	13,580,867	45,344,672	72	70
1993	54,696,386	40,397,990	2,973,744		43,371,734	11,916,677	52,314,667	79	77
1994	51,752,387	35,125,526	1,461,263		36,586,789	15,578,003	50,703,529	71	69
1995	62,692,143	44,185,372	2,105,321		46,290,693	16,767,737	60,953,109	74	72

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Table 9.–Page 2 of 2.

Year	Total Run	Harvests				Escapement	Inshore Run	Harvest Rate (%)	
		Inshore	S. Pen.[a]	Other[b]	Total			Total	Inshore
1996	37,892,861	29,510,279	1,037,360		30,547,639	7,866,472	37,376,751	81	79
1997	20,349,687	12,107,847	1,568,326		13,676,173	7,044,399	19,152,246	67	63
1998	19,662,531	9,958,132	1,301,020		11,259,152	8,832,179	18,790,311	57	53
1999	41,167,019	25,619,227	1,405,478		27,024,705	14,929,714	40,548,941	66	63
2000	29,477,140	20,411,342	1,271,585		21,682,927	8,560,913	28,972,255	74	70
2001	22,328,293	14,166,935	150,632		14,317,567	8,464,726	22,631,661	64	63
2002	17,825,459	10,656,817	591,106		11,247,923	6,577,536	17,234,353	63	62
2003	26,761,167	14,704,873	453,146		15,158,019	11,603,148	26,308,021	57	56
2004	44,751,446	26,181,316	1,348,073		27,529,389	17,222,057	43,403,373	62	60
2005	40,245,472	24,468,127	1,004,395		25,472,522	14,772,950	39,241,077	63	62
Averages									
1956–64	17,586,214	6,823,502	204,115	2,556,875	9,300,394	8,288,142	15,111,643	53	45
1965–74	20,942,927	8,202,118	617,800	2,138,400	10,958,318	9,984,609	18,186,727	52	45
1975–84	32,985,941	17,293,252	1,273,200	634,420	19,200,872	14,029,609	31,322,861	58	55
1985–94	40,770,688	26,441,631	1,525,914	240,967	28,039,835	13,097,716	39,539,346	69	67
1995–04	32,290,775	20,750,214	1,123,205		21,873,419	10,786,888	31,537,102	68	66

[a] S. Pen. = South Alaska Peninsula. The South Alaska Peninsula harvest refers to all sockeye salmon caught during June fisheries around Unimak and Shumagin Islands.

[b] Other harvest refers to estimated high seas interception of Bristol Bay sockeye salmon.

Table 10.–Summary of age composition in the catch and escapement by district and river system for major age classes of Bristol Bay sockeye salmon, 2005.

		Percent of Total by Age Class											
		1.2			2.2			1.3			2.3		
District	River System	Catch	Esc.	Total[a]	Catch	Esc.	Total[a]	Catch	Esc.	Total[a]	Catch	Esc.	Total[a]
Naknek-Kvichak													
	Kvichak	8.7	20.2	18.1	51.4	26.5	31.2	24.9	43.8	40.3	13.4	7.6	8.7
	Alagnak	10.7	14.2	13.5	12.3	2.7	4.6	60.1	78.5	74.8	16.9	4.3	6.9
	Naknek	4.0	6.7	5.0	7.6	2.8	5.9	73.1	80.1	75.6	15.1	7.8	12.5
	All combined	5.5	13.5	10.1	11.8	8.7	10.0	67.2	70.3	69.0	15.2	6.1	10.0
Egegik		2.9	3.4	3.0	35.4	38.9	36.0	30.2	25.5	29.4	31.2	26.9	30.5
Ugashik		11.2	15.5	12.3	3.3	2.0	3.0	70.5	71.2	70.7	14.5	8.4	12.9
Nushagak													
	Wood	40.0	54.0	44.7	3.2	1.5	2.6	51.4	39.2	47.3	3.6	2.1	3.1
	Igushik	2.6	5.5	3.1	3.7	1.9	3.4	78.4	83.5	79.3	15.3	9.1	14.2
	Nush-Mul[b]	6.9	11.2	8.2	0.8	0.2	0.6	82.1	78.8	81.1	0.8	0.6	0.7
	All combined	19.9	32.5	23.5	2.5	1.1	2.1	68.2	59.0	65.6	5.4	2.4	4.5
Togiak		7.1	21.0	10.9	26.5	18.2	24.2	55.3	53.2	54.7	9.5	6.4	8.7
Baywide totals		9.3	16.3	12.0	16.3	10.2	14.0	55.5	63.0	58.3	17.4	7.8	13.8

[a] The total column represents the age composition of the total inshore return (catch and escapement).

[b] Nush-Mul = Nushagak-Mulchatna River drainage.

Table 11.–Daily sockeye salmon escapement counts by river system, Bristol Bay, 2005.

	Kvichak River		Alagnak River		Naknek River		Egegik River [a]		Ugashik River [a]	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/08										
6/09										
6/10										
6/11										
6/12										
6/13										
6/14										
6/15										
6/16										
6/17							6,348	6,348		
6/18					4,938	4,938	6,540	12,888		
6/19					12,912	17,850	3,930	16,818		
6/20	144	144			13,302	31,152	2,562	19,380		
6/21	126	270			1,488	32,640	36,468	55,848		
6/22	402	672			660	33,300	27,156	83,004		
6/23	426	1,098			390	33,690	5,850	88,854		
6/24	336	1,434			48	33,738	4,188	93,042		
6/25	420	1,854	12	12	54,504	88,242	870	93,912		
6/26	204	2,058	1,476	1,488	106,602	194,844	9,324	103,236		
6/27	1,938	3,996	16,650	18,138	13,512	208,356	39,246	142,482		
6/28	22,410	26,406	2,730	20,868	46,110	254,466	166,536	309,018		
6/29	4,242	30,648	13,008	33,876	120,030	374,496	163,506	472,524		
6/30	32,310	62,958	107,658	141,534	140,196	514,692	103,956	576,480	60	60
7/01	131,670	194,628	178,794	320,328	289,674	804,366	137,292	713,772	2,118	2,178
7/02	191,190	385,818	307,800	628,128	110,940	915,306	139,944	853,716	6,318	8,496
7/03	206,346	592,164	235,182	863,310	180,846	1,096,152	176,892	1,030,608	46,746	55,242
7/04	172,584	764,748	207,096	1,070,406	175,098	1,271,250	154,290	1,184,898	65,040	120,282
7/05	123,630	888,378	138,036	1,208,442	135,900	1,407,150	107,676	1,292,574	27,630	147,912
7/06	98,496	986,874	304,614	1,513,056	172,860	1,580,010	103,854	1,396,428	20,430	168,342
7/07	165,186	1,152,060	430,794	1,943,850	188,160	1,768,170	58,878	1,455,306	10,368	178,710
7/08	234,966	1,387,026	264,546	2,208,396	103,914	1,872,084	34,512	1,489,818	14,424	193,134
7/09	189,894	1,576,920	229,176	2,437,572	109,344	1,981,428	25,158	1,514,976	89,484	282,618
7/10	130,872	1,707,792	252,672	2,690,244	188,364	2,169,792	23,514	1,538,490	133,350	415,968
7/11	177,822	1,885,614	438,390	3,128,634	136,518	2,306,310	23,688	1,562,178	56,316	472,284
7/12	150,690	2,036,304	387,708	3,516,342	81,090	2,387,400	18,528	1,580,706	80,796	553,080
7/13	100,140	2,136,444	196,074	3,712,416	35,250	2,422,650	14,556	1,595,262	50,004	603,084
7/14	51,498	2,187,942	56,586	3,769,002	77,310	2,499,960	16,758	1,612,020	34,746	637,830
7/15	24,750	2,212,692	62,190	3,831,192	59,142	2,559,102	9,564	1,621,584	25,026	662,856

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Table 11.–Page 2 of 4.

Date	Nushagak River [b] Daily	Nushagak River [b] Cum.	Wood River Daily	Wood River Cum.	Igushik River Daily	Igushik River Cum.	Togiak River [a] Daily	Togiak River [a] Cum.	Nuyakuk River Daily	Nuyakuk River Cum.
6/08	824	824								
6/09	175	999								
6/10	196	1,195								
6/11	173	1,368								
6/12	192	1,560								
6/13	449	2,009								
6/14	365	2,374								
6/15	1,568	3,942								
6/16	1,793	5,735								
6/17	1,133	6,868								
6/18	20,819	27,687								
6/19	42,794	70,481	29,742	29,742						
6/20	16,596	87,077	23,346	53,088						
6/21	44,412	131,489	27,822	80,910	3,270	3,270				
6/22	25,075	156,564	17,148	98,058	6,900	10,170				
6/23	23,209	179,773	62,928	160,986	3,732	13,902				
6/24	68,594	248,367	60,900	221,886	2,256	16,158			360	360
6/25	45,588	293,955	16,614	238,500	6,240	22,398			636	996
6/26	19,184	313,139	14,070	252,570	7,494	29,892			2,664	3,660
6/27	14,404	327,543	8,862	261,432	2,064	31,956			4,458	8,118
6/28	6,398	333,941	7,098	268,530	1,104	33,060			9,624	17,742
6/29	10,547	344,488	23,268	291,798	1,062	34,122			10,608	28,350
6/30	30,292	374,780	116,814	408,612	660	34,782			4,560	32,910
7/01	229,757	604,537	328,086	736,698	9,072	43,854			2,130	35,040
7/02	159,361	763,898	172,464	909,162	16,194	60,048	1,068	1,068	3,744	38,784
7/03	50,767	814,665	59,568	968,730	17,694	77,742	2,106	3,174	5,526	44,310
7/04	21,655	836,320	28,254	996,984	21,570	99,312	3,318	6,492	22,014	66,324
7/05	12,677	848,997	28,158	1,025,142	26,988	126,300	3,486	9,978	37,824	104,148
7/06	14,083	863,080	37,098	1,062,240	35,256	161,556	3,540	13,518	34,776	138,924
7/07	26,381	889,461	61,212	1,123,452	36,690	198,246	6,222	19,740	19,146	158,070
7/08	42,390	931,851	88,494	1,211,946	32,940	231,186	3,840	23,580	11,850	169,920
7/09	24,660	956,511	71,346	1,283,292	19,458	250,644	2,094	25,674	11,268	181,188
7/10	23,344	979,855	66,396	1,349,688	17,628	268,272	906	26,580	10,368	191,556
7/11	23,364	1,003,219	43,752	1,393,440	15,366	283,638	774	27,354	11,166	202,722
7/12	13,953	1,017,172	32,172	1,425,612	16,818	300,456	2,250	29,604	5,094	207,816
7/13	7,624	1,024,796	21,546	1,447,158	14,868	315,324	4,578	34,182	4,218	212,034
7/14	7,214	1,032,010	12,972	1,460,130	12,072	327,396	5,748	39,930	7,974	220,008
7/15	4,482	1,036,492	9,288	1,469,418	7,854	335,250	8,040	47,970	10,476	230,484

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Table 11.–Page 3 of 4.

Date	Kvichak River Daily	Kvichak River Cum.	Alagnak River Daily	Alagnak River Cum.	Naknek River Daily	Naknek River Cum.	Egegik River [a] Daily	Egegik River [a] Cum.	Ugashik River [a] Daily	Ugashik River [a] Cum.
7/16	24,558	2,237,250	65,160	3,896,352	55,416	2,614,518			17,424	680,280
7/17	17,760	2,255,010	88,506	3,984,858	43,242	2,657,760			9,942	690,222
7/18	21,006	2,276,016	61,998	4,046,856	45,012	2,702,772			7,902	698,124
7/19	15,120	2,291,136	85,434	4,132,290	28,296	2,731,068			12,870	710,994
7/20	17,808	2,308,944	44,328	4,176,618	10,020	2,741,088			14,526	725,520
7/21	9,096	2,318,040	21,828	4,198,446	3,534	2,744,622			15,876	741,396
7/22	2,292	2,320,332	20544	4,218,990					13,032	754,428
7/23									6,198	760,626
7/24									8,094	768,720
7/25									5,040	773,760
7/26									5,412	779,172
7/27										
7/28										
7/29										
7/30										
7/31										
8/01										
8/02										
8/03										
8/04										
8/05										
8/06										
8/07										
8/08										

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Table 11.–Page 4 of 4.

	Nushagak River [b]		Wood River		Igushik River		Togiak River [a]		Nuyakuk River	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/16	2,915	1,039,407	8,244	1,477,662	7,362	342,612	5,376	53,346	4,446	234,930
7/17	10,213	1,049,620	8,046	1,485,708	5,928	348,540	3,168	56,514	2,934	237,864
7/18			10,842	1,496,550	5,412	353,952	1,518	58,032	4,374	242,238
7/19					5,028	358,980	1,386	59,418	2,100	244,338
7/20					5,184	364,164	4,176	63,594	1,716	246,054
7/21					1,548	365,712	8,472	72,066	1,578	247,632
7/22							4,392	76,458	2,154	249,786
7/23							2,226	78,684	948	250,734
7/24							2,478	81,162	282	251,016
7/25							1,578	82,740		
7/26							4,590	87,330		
7/27							8,244	95,574		
7/28							9,966	105,540		
7/29							5,778	111,318		
7/30							5,112	116,430		
7/31							3,996	120,426		
8/01							5,508	125,934		
8/02							5,394	131,328		
8/03							5,028	136,356		
8/04							6,294	142,650		
8/05							3,108	145,758		
8/06							1,998	147,756		
8/07							1,422	149,178		
8/08										

[a] Escapements do not include aerial survey estimates of fish counted in the lower tributaries and below the tower sites.

[b] Count includes Nuyakuk and Mulchatna river drainages.

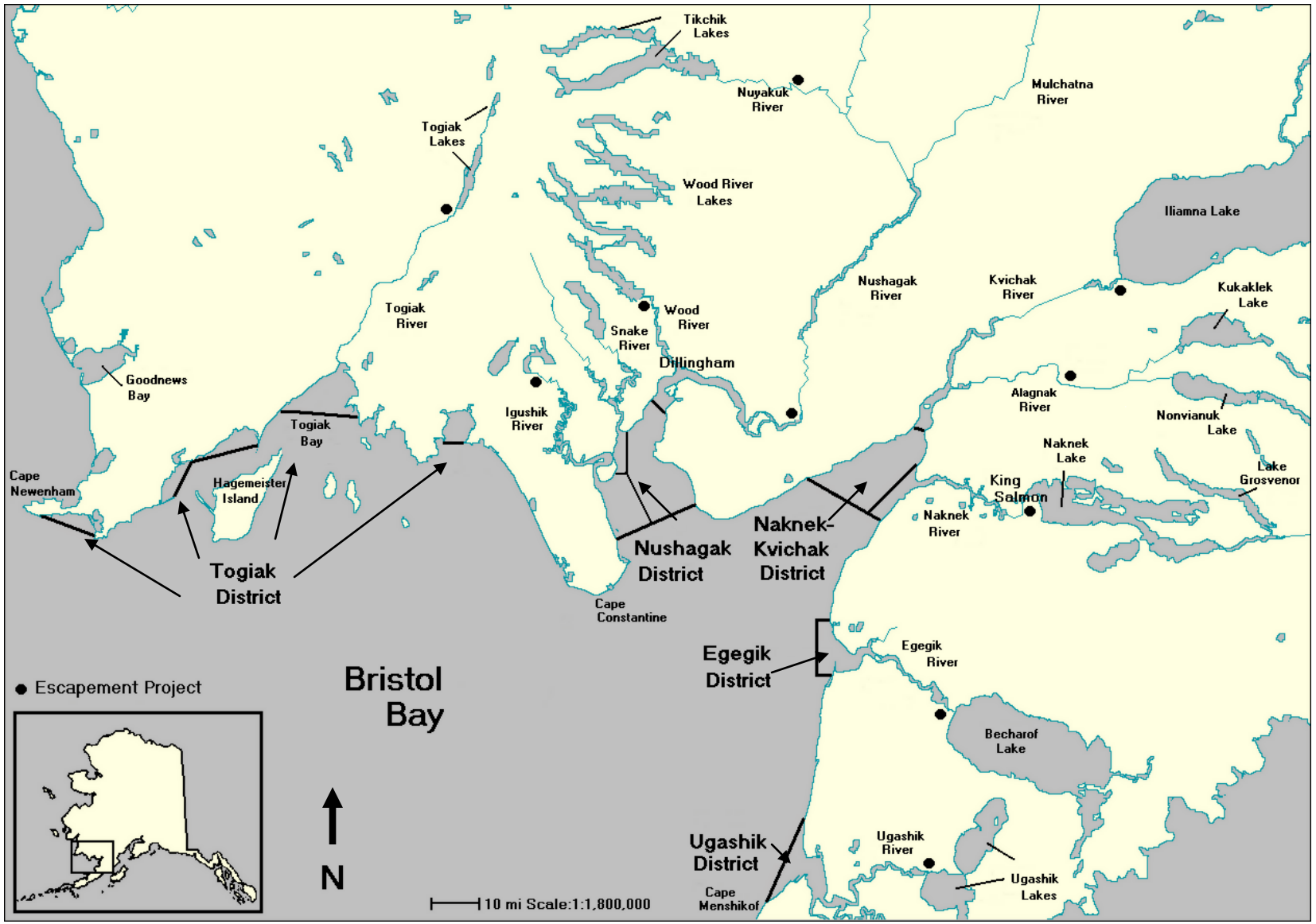

Figure 1.–Bristol Bay major river systems and commercial salmon fishing districts.

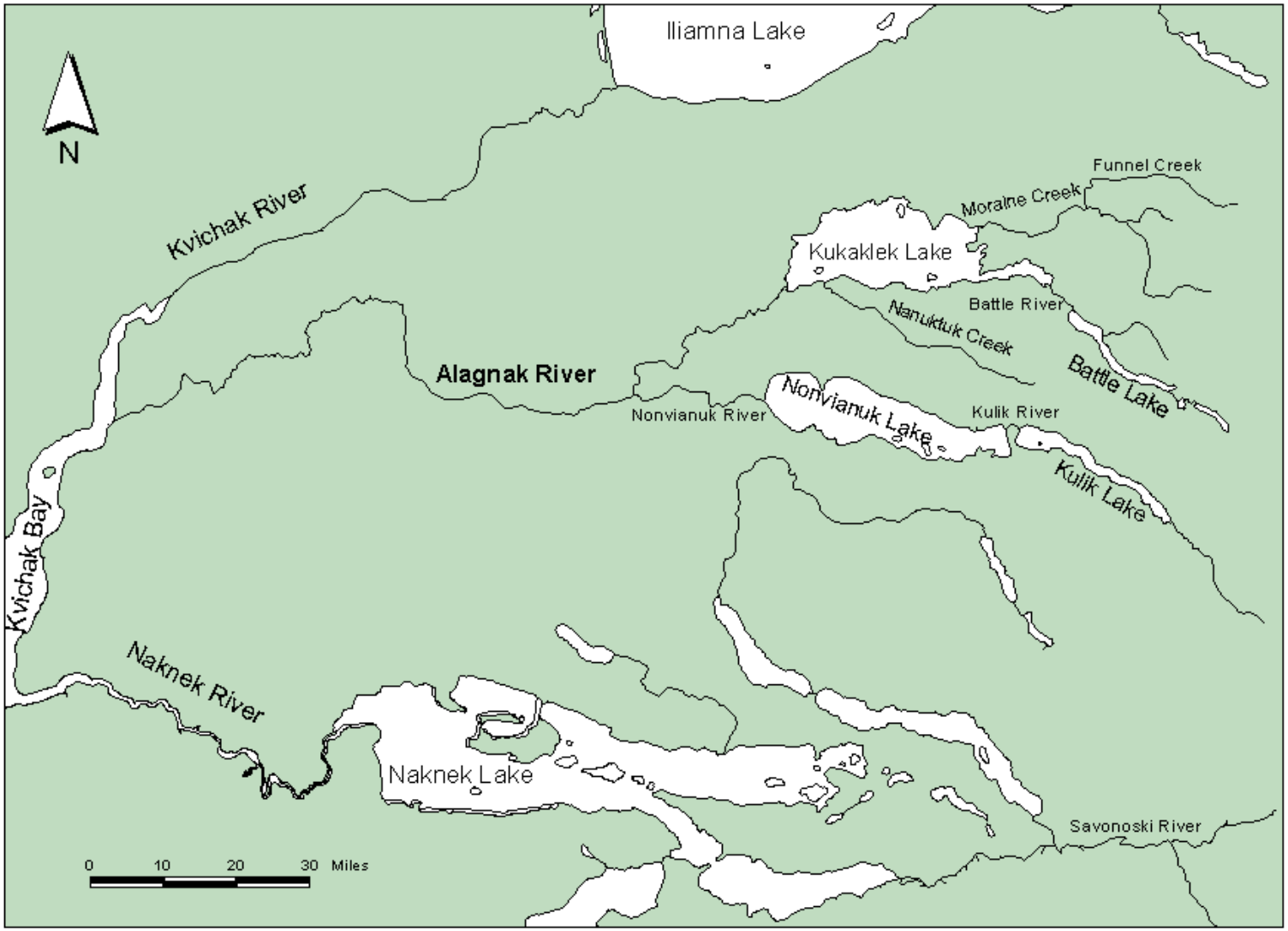

Figure 2.–Alagnak River drainage, Bristol Bay.

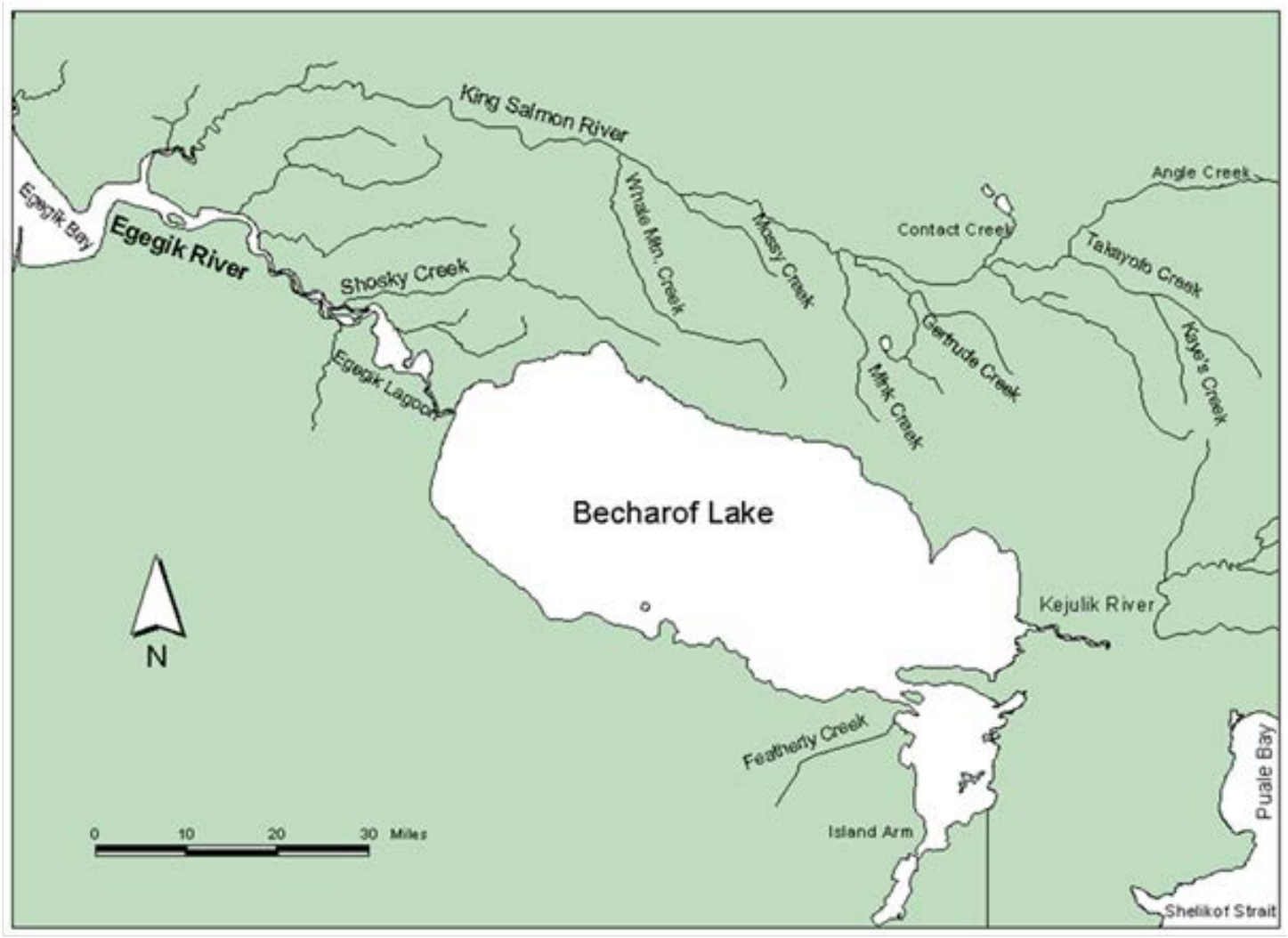

Figure 3.–Egegik River drainage, Bristol Bay, Alaska.

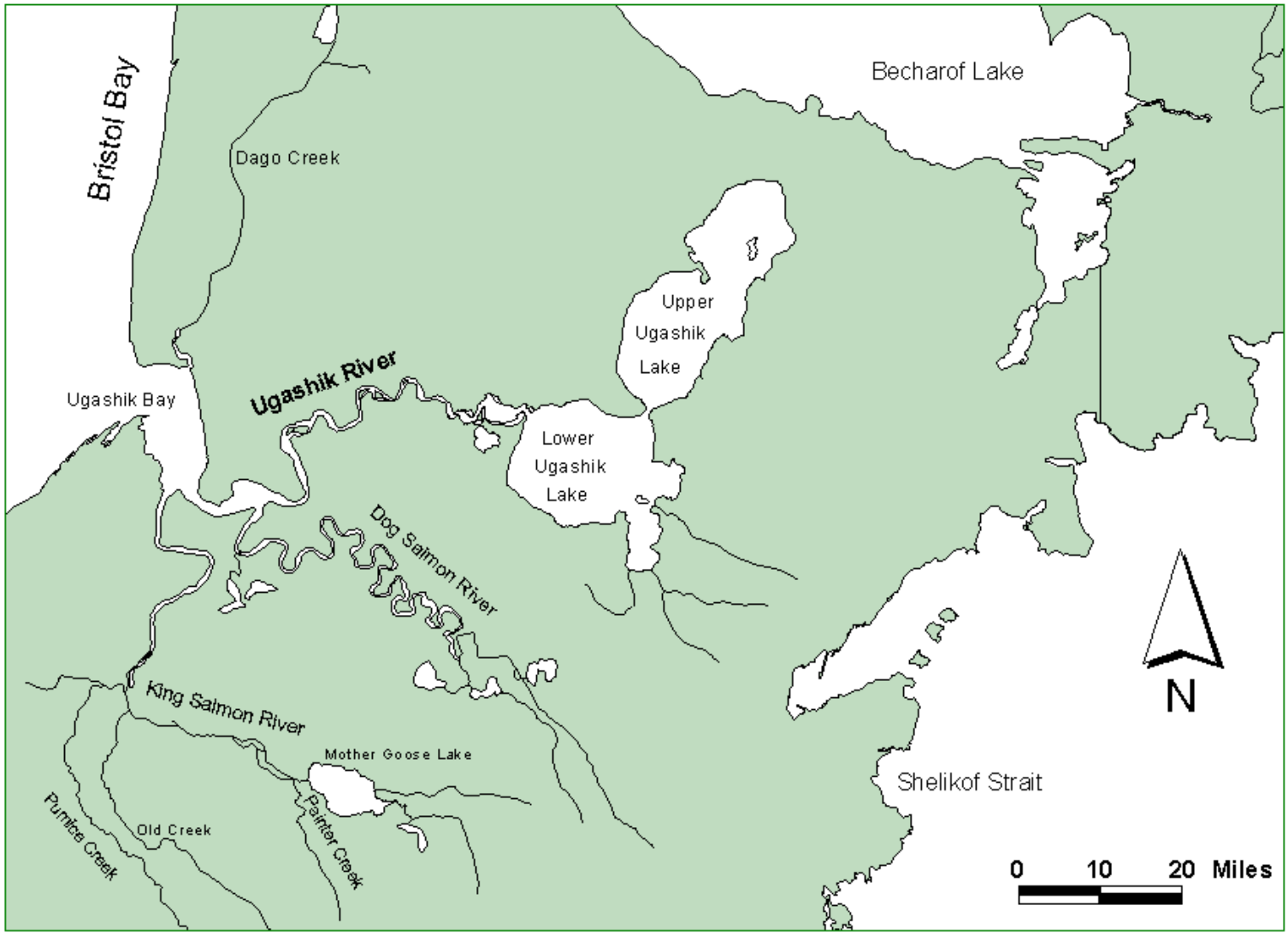

Figure 4.–Ugashik River drainage, Bristol Bay, Alaska.

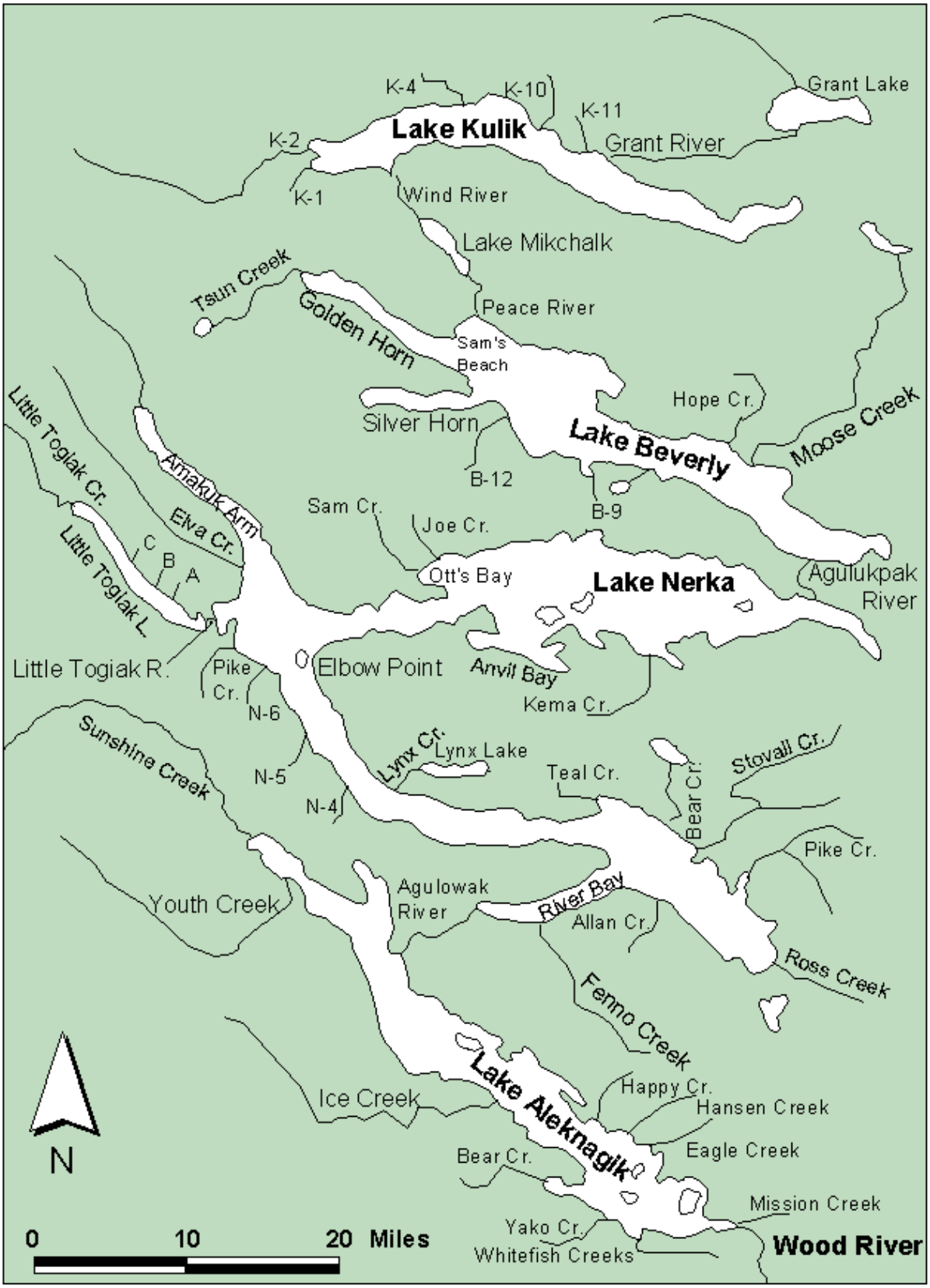

Figure 5.–Wood River Lakes system, Bristol Bay, Alaska.

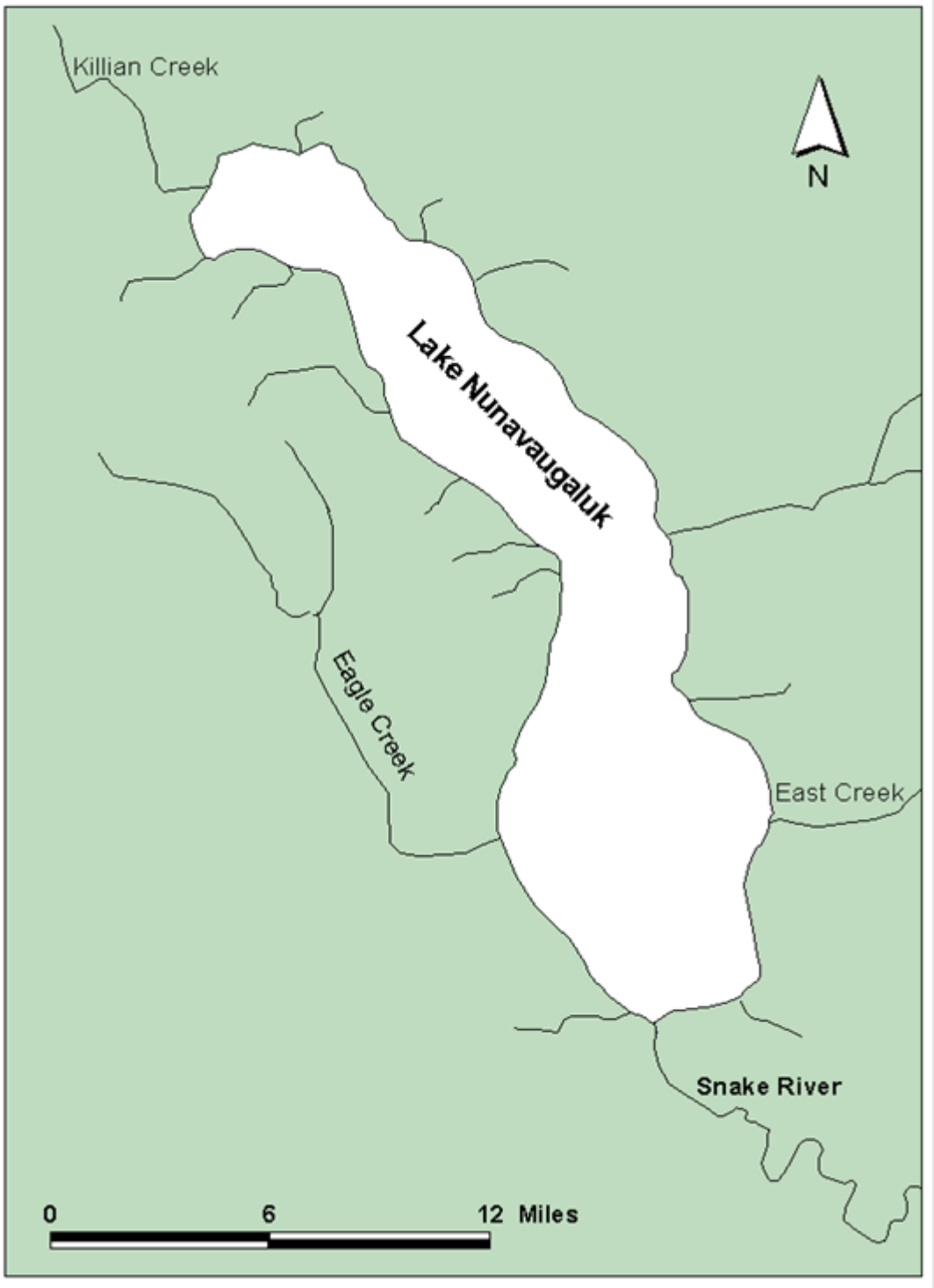

Figure 6.–Lake Nunavaugaluk system, Bristol Bay, Alaska.

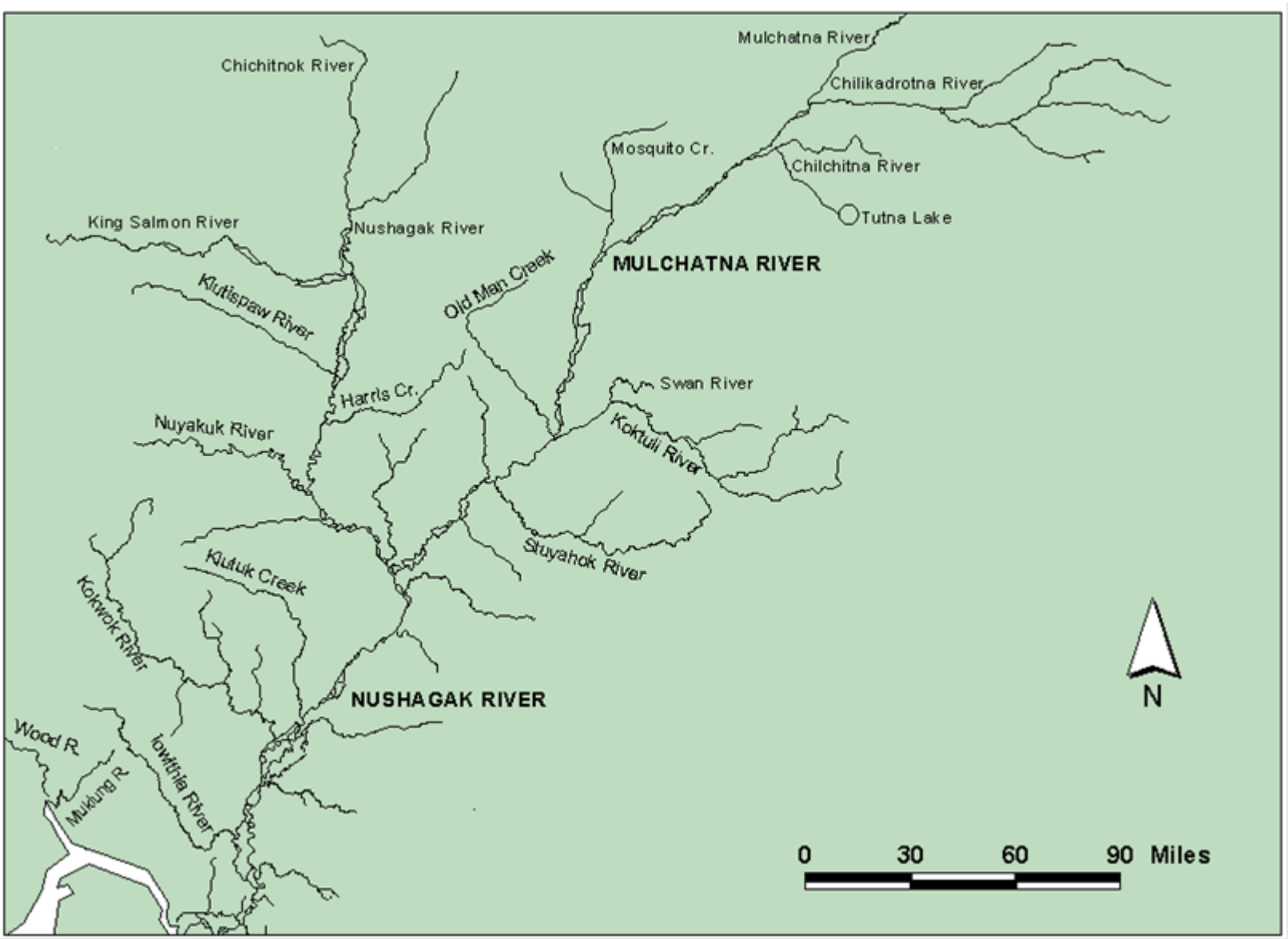

Figure 7.–Nushagak-Mulchatna River system, Bristol Bay, Alaska.

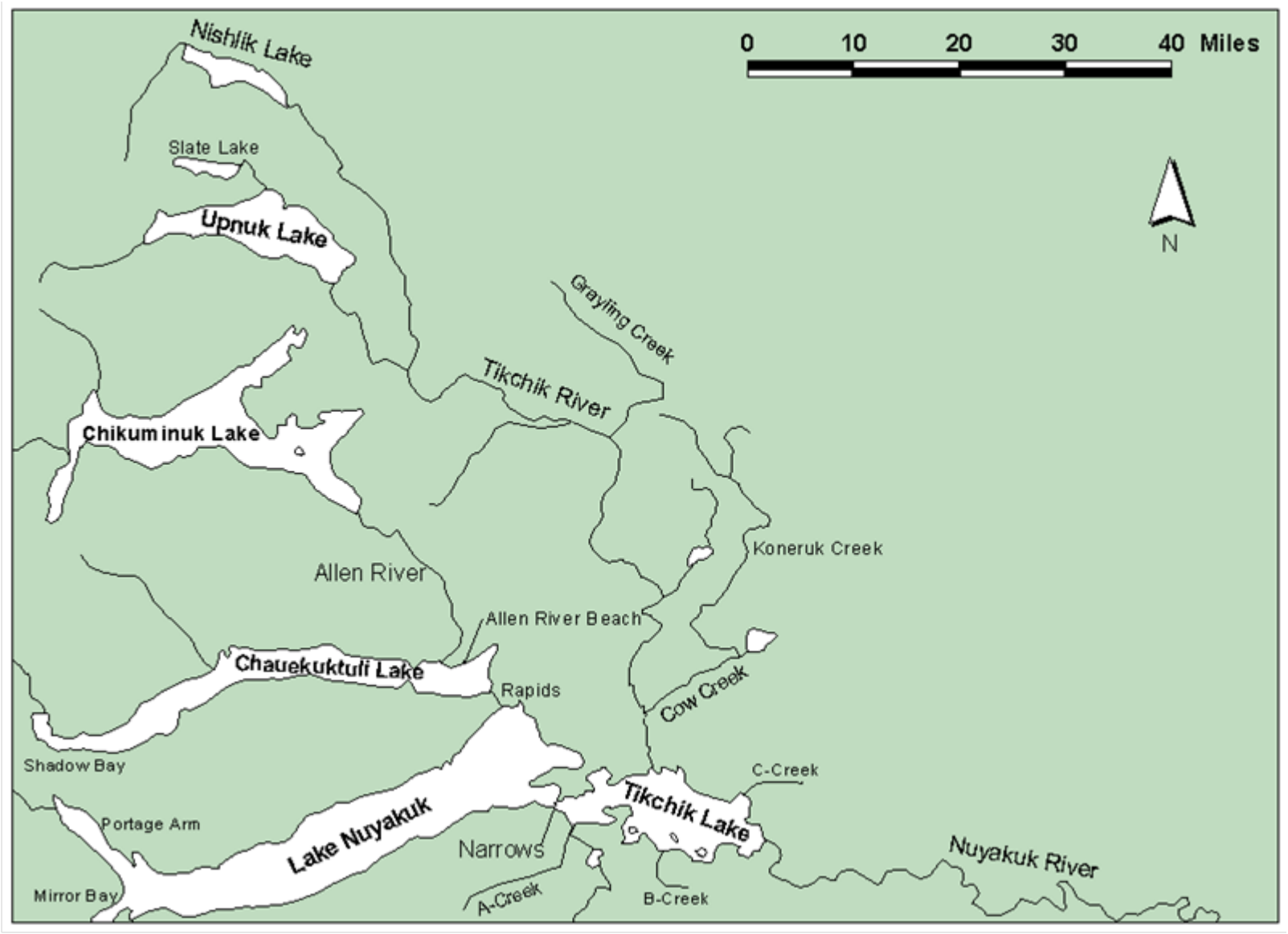

Figure 8.–Tikchik Lakes system, Bristol Bay, Alaska.

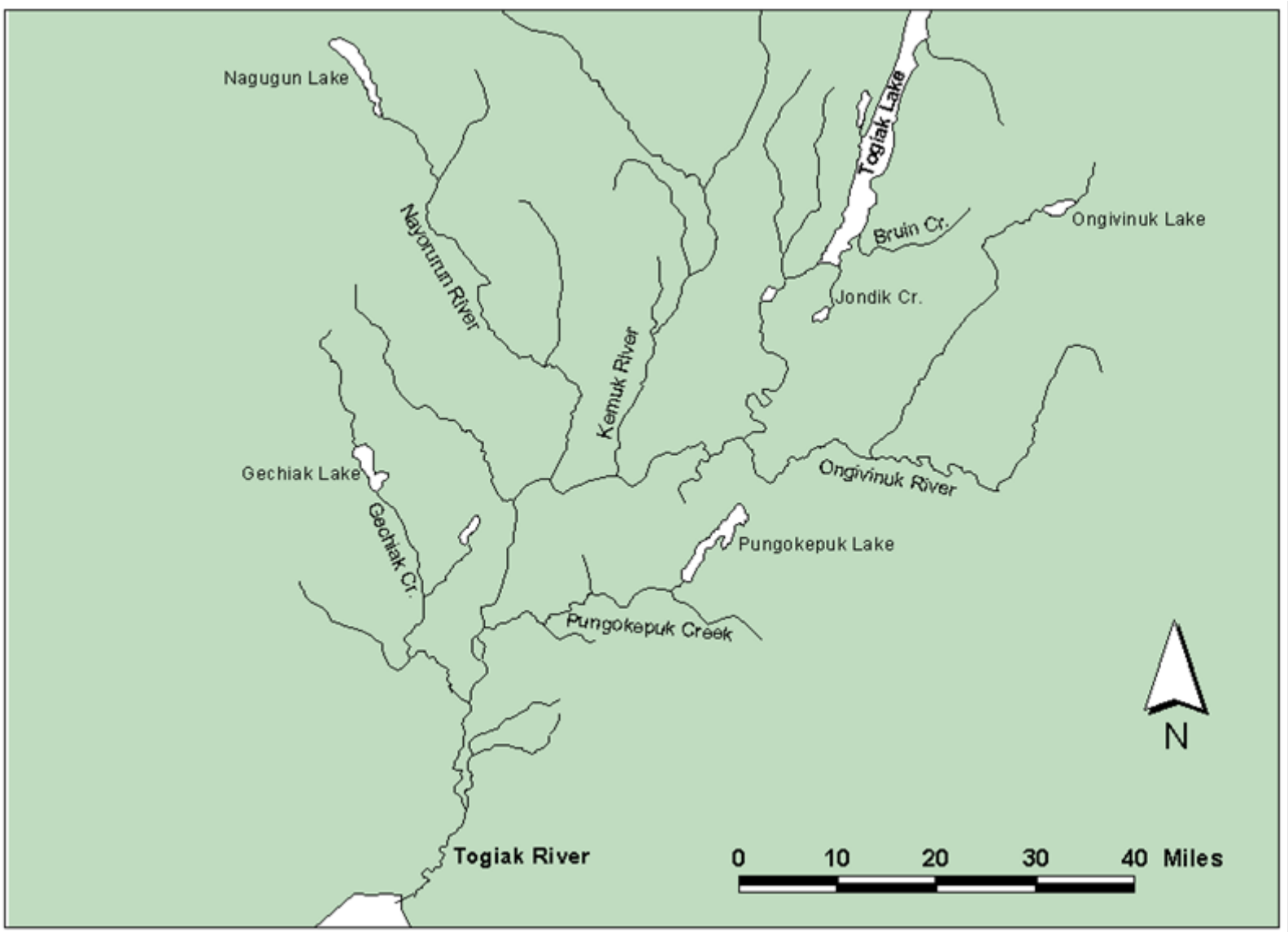

Figure 9.–Togiak River system, Bristol Bay, Alaska.

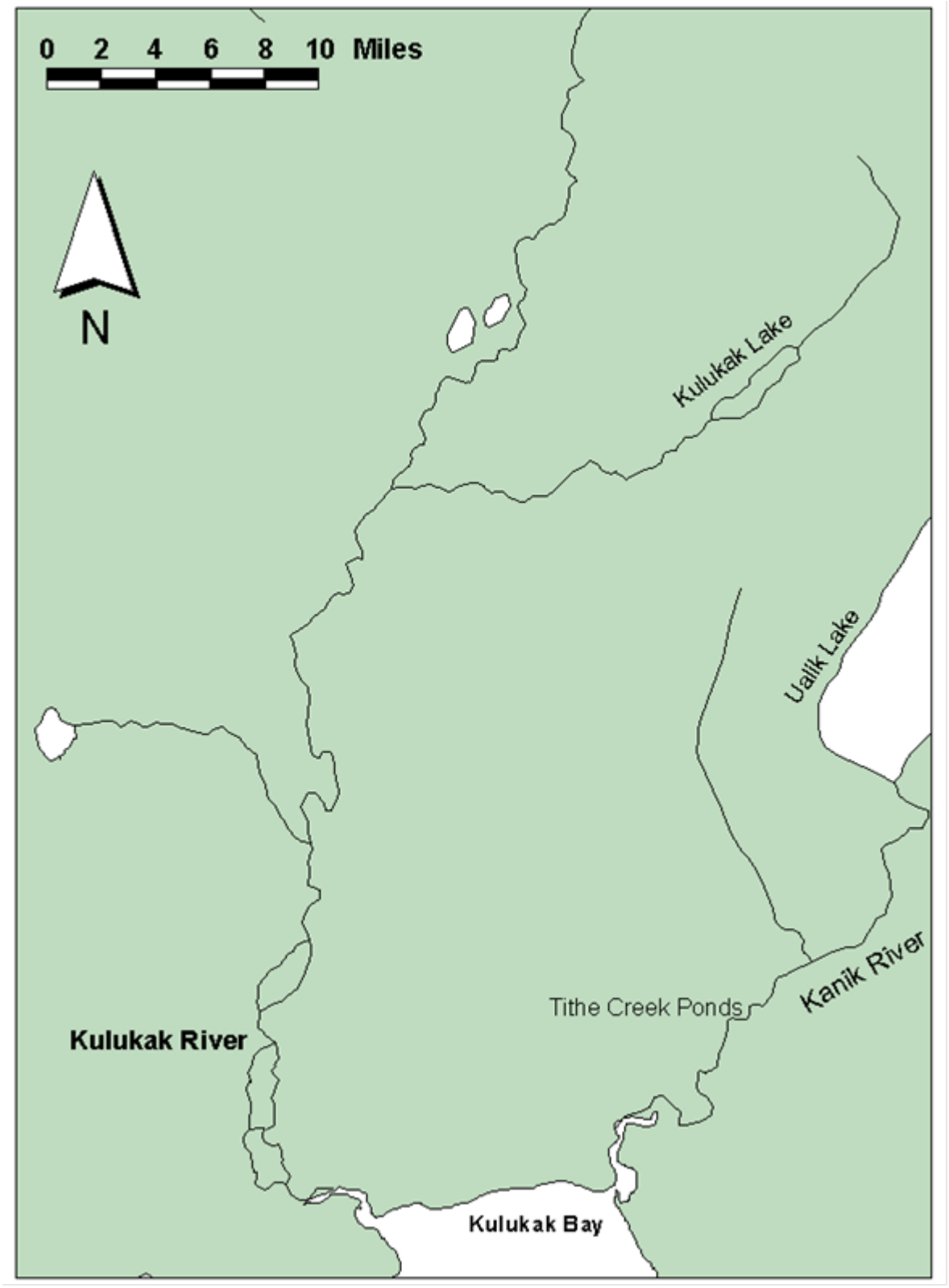

Figure 10.–Kulukak River system, Bristol Bay, Alaska.

APPENDIX A. AGE COMPOSITION OF THE CATCH AND ESCAPEPMENT BY DISTRICT

Appendix A1.–Age composition of sockeye salmon in the Naknek/Kvichak District harvest, 2005.

Sampling	Date		Age Group					
Period	Start	End	0.3	1.2	1.3	2.2	2.3	Total
Period 1:	11 Jul	13 Jul						
	Percent (%)		0.2	5.3	80.6	2.6	11.2	100.0
	SE (%)			1.1	1.9	0.8	1.5	1.8
	Number of Fish		1,194	28,662	437,091	14,331	60,906	542,184
	SE (Number)			5,700	10,070	4,086	8,044	9,549
	Sample Size		1	24	366	12	51	454
Period 2:	14 Jul	19 Aug						
	Percent (%)		0.4	9.2	29.7	34.1	26.6	100.0
	SE (%)			1.9	3.0	3.1	2.9	2.9
	Number of Fish		5,981	125,602	406,710	466,520	364,843	1,369,656
	SE (Number)			26,179	41,445	42,988	40,099	40,381
	Sample Size		1	21	68	78	61	229
Total								
	Percent (%)		0.4	8.1	44.1	25.2	22.3	100.0
	SE (%)			1.8	2.5	3.1	2.8	2.7
	Number of Fish		7,175	154,263	843,801	480,851	425,749	1,911,840
	SE (Number)			23,749	29,673	42,348	37,244	34,555
	Sample Size		2	45	434	90	112	683

Appendix A2.–Age composition of sockeye salmon in the ARSHA harvest, 2005.

Sampling	Date		Age Group						
Period	Start	End	0.3	1.2	0.4	1.3	2.2	2.3	Total
Period 1:	03 Jul	07 Jul							
	Percent (%)			11.5	0.2	68.5	12.0	7.8	100.0
	SE (%)			1.5		2.2	1.5	1.3	2.0
	Number of Fish			14,574	280	86,602	15,134	9,809	126,399
	SE (Number)			1,903		2,767	1,934	1,594	2,512
	Sample Size			52	1	309	54	35	451
Period 2:	08 Jul	15 Jul							
	Percent (%)		0.2	7.3		76.0	4.4	12.1	100.0
	SE (%)			1.2		2.0	1.0	1.5	1.9
	Number of Fish		285	9,394		98,497	5,693	15,657	129,527
	SE (Number)			1,577		2,595	1,246	1,982	2,417
	Sample Size		1	33		346	20	55	455
Total									
	Percent (%)		0.1	9.4	0.1	72.3	8.1	10.0	100.0
	SE (%)			1.4		2.1	1.4	1.4	1.9
	Number of Fish		285	23,968	280	185,099	20,828	25,466	255,926
	SE (Number)			1,782		2,677	1,773	1,842	2,464
	Sample Size		1	85	1	655	74	90	906

Appendix A3.–Age composition of sockeye salmon in the NRSHA harvest, 2005.

Sampling	Date		Age Group							
Period	Start	End	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	Total
Period 1:	20 Jun	24 Jun									
	Percent (%)				5.0	0.7	78.1	3.6	1.1	11.5	100.0
	SE (%)				1.3	0.5	2.4	1.1	0.6	1.9	2.3
	Number of Fish				583	83	9,077	416	125	1,332	11,617
	SE (Number)				152	59	288	130	72	222	269
	Sample Size				14	2	218	10	3	32	279
Period 2:	25 Jun	27 Jun									
	Percent (%)		0.2	0.2	3.8	0.2	82.5	1.6	0.2	11.5	100.0
	SE (%)				0.8		1.5	0.5		1.3	1.5
	Number of Fish		379	379	9,108	379	196,573	3,795	379	27,323	238,316
	SE (Number)				1,825		3,618	1,191		3,032	3,464
	Sample Size		1	1	24	1	518	10	1	72	628
Period 3:	28 Jun	04 Jul									
	Percent (%)				3.3		79.8	6.0	0.1	10.8	100.0
	SE (%)				0.5		1.1	0.7		0.9	1.1
	Number of Fish				64,909		1,589,480	120,319	1,583	215,308	1,991,599
	SE (Number)				9,974		22,550	13,383		17,443	21,278
	Sample Size				41		1,004	76	1	136	1,258
Period 4:	05 Jul	17 Jul									
	Percent (%)				4.5		73.7	7.0	0.2	14.5	100.0
	SE (%)				0.7		1.5	0.9	0.2	1.2	1.4
	Number of Fish				101,648		1,649,239	157,554	5,082	325,274	2,238,797
	SE (Number)				15,712		33,240	19,303	3,592	26,595	30,890
	Sample Size				40		649	62	2	128	881
Total											
	Percent (%)		0.0	0.0	3.9	0.0	76.9	6.3	0.2	12.7	100.0
	SE (%)				0.6	0.2	1.3	0.8	0.2	1.1	1.3
	Number of Fish		379	379	176,248	463	3,444,368	282,085	7,170	569,237	4,480,329
	SE (Number)				13,386	25	27,649	16,868	3,024	22,797	26,052
	Sample Size		1	1	119	3	2,389	158	7	368	3,046

Appendix A4.–Age composition of sockeye salmon in the Kvichak River escapement, 2005.

Sampling	Date		Age Group										
Period	Start	End	0.2	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	3.2	Total
Period 1:	20 Jun	05 Jul											
	Percent (%)		0.3	0.3	1.0	18.3		46.8	25.3		8.2		100.0
	SE (%)		0.2	0.2	0.4	1.4		1.8	1.6		1.0		1.6
	Number of Fish		2,301	2,301	9,206	162,256		415,420	224,396		72,497		888,378
	SE (Number)		1,626	1,626	3,240	12,362		15,963	13,901		8,759		14,222
	Sample Size		2	2	8	141		361	195		63		772
Period 2:	06 Jul	22 Jul											
	Percent (%)			0.3	1.1	21.5	0.2	42.0	27.3	0.3	7.2	0.2	100.0
	SE (%)			0.2	0.4	1.6		1.9	1.7	0.2	1.0		1.7
	Number of Fish			4,392	15,374	307,475	2,196	601,772	390,932	4,392	103,224	2,196	1,431,954
	SE (Number)			3,104	5,784	23,046		27,702	25,003	3,104	14,515		24,956
	Sample Size			2	7	140	1	274	178	2	47	1	652
Total													
	Percent (%)		0.1	0.3	1.1	20.2	0.1	43.8	26.5	0.2	7.6	0.1	100.0
	SE (%)		0.2	0.2	0.4	1.5		1.9	1.7	0.2	1.0		1.7
	Number of Fish		2,301	6,694	24,580	469,730	2,196	1,017,192	615,328	4,392	175,721	2,196	2,320,332
	SE (Number)		1,626	2,689	4,986	20,011		23,624	21,625	3,104	12,467		21,490
	Sample Size		2	4	15	281	1	635	373	2	110	1	1,424

Appendix A5.–Age composition of sockeye salmon in the Alagnak River escapement, 2005.

System [a]		Age 1.1	1.2	1.3	1.4	2.2	2.3	Total
Battle River	Percent (%)	0.00	13.83	85.11	0.00	0.00	1.06	100.00
	SE (%)	0.00	2.52	2.60	0.00	0.00	0.75	2.58
	Number of Fish	0	41,457	255,122	0	0	3,189	299,768
	SE (Number)	0	7,567	7,805	0	0	2,249	11,101
	Sample Size	0	26	160	0	0	2	188
Kulik River	Percent (%)	0.54	10.27	87.57	0.54	0.00	1.08	100.00
	SE (%)	0.00	0.05	0.06	0.00	0.00	0.01	0.06
	Number of Fish	1,568	29,784	253,946	1,568	0	3,135	290,000
	SE (Number)	1,568	6,490	7,054	1,568	0	2,211	10,084
	Sample Size	1	19	162	1	0	2	185
Moraine Creek	Percent (%)	0.00	12.69	75.63	0.00	5.58	6.09	100.00
	SE (%)	0.00	2.38	3.07	0.00	1.64	1.71	2.86
	Number of Fish	0	87,044	518,785	0	38,300	41,781	685,910
	SE (Number)	0	16,308	21,032	0	11,249	11,718	31,180
	Sample Size	0	25	149	0	11	12	197
Nunuktuk Creek	Percent (%)	0.58	19.08	72.83	0.00	1.73	5.78	100.00
	SE (%)	0.58	3.00	3.39	0.00	1.00	1.78	3.21
	Number of Fish	2,661	87,807	335,263	0	7,982	26,608	460,322
	SE (Number)	2,661	13,790	15,613	0	4,582	8,191	23,002
	Sample Size	1	33	126	0	3	10	173
Total Aerial Survey	Percent (%)	0.27	13.86	80.35	0.13	1.88	3.50	100.00
	SE (%)	0.56	2.62	2.96	0.54	1.55	1.68	2.84
	Number of Fish	4,228	246,093	1,363,116	1,568	46,282	74,714	1,736,000
	SE (Number)	3,088	23,569	28,228	1,568	12,147	14,641	41,547
	Sample Size	2	103	597	1	14	26	743
Alagnak Tower	Percent (%)	0.24	14.18	78.52	0.09	2.67	4.30	100.00
	SE (%)	0.56	2.62	2.96	0.54	1.55	1.68	2.84
	Number of Fish	10,276	598,077	3,312,772	3,810	112,479	181,576	4,218,990
	SE (Number)	4,814	36,743	44,005	2,444	18,936	22,824	64,770
	Sample Size	2	103	597	1	14	26	743

[a] Weighted age composition by aerial survey applied to the total Alagnak tower count.

Appendix A6.–Age composition of sockeye salmon in the Naknek River escapement, 2005.

Sampling	Date		Age Group							
Period	Start	End	1.1	1.2	2.1	1.3	2.2	1.4	2.3	Total
Period 1:	18 Jun	30 Jun								
	Percent (%)		4.4	9.4	0.4	73.0	3.0	0.2	9.6	100.0
	SE (%)		0.9	1.3	0.3	2.0	0.8		1.3	1.8
	Number of Fish		22,646	48,381	2,059	375,725	15,441	1,029	49,410	514,692
	SE (Number)		4,726	6,724	1,454	10,229	3,930		6,788	9,301
	Sample Size		22	47	2	365	15	1	48	500
Period 2:	01 Jul	07 Jul								
	Percent (%)		1.1	5.1	0.2	84.9	2.0	0.3	6.4	100.0
	SE (%)		0.4	0.9		1.4	0.6	0.2	1.0	1.4
	Number of Fish		14,361	63,597	2,052	1,064,738	24,618	4,103	80,009	1,253,478
	SE (Number)		5,401	11,138		18,150	7,042	2,899	12,406	17,242
	Sample Size		7	31	1	519	12	2	39	611
Period 3:	08 Jul	21 Jul								
	Percent (%)		1.5	7.4	0.7	77.7	3.9	0.2	8.5	100.0
	SE (%)		0.5	1.1	0.4	1.8	0.8		1.2	1.7
	Number of Fish		14,493	72,464	7,246	759,060	38,044	1,812	83,334	976,452
	SE (Number)		5,091	11,034	3,613	17,513	8,146		11,762	16,197
	Sample Size		8	40	4	419	21	1	46	539
Total										
	Percent (%)		1.9	6.7	0.4	80.1	2.8	0.3	7.8	100.0
	SE (%)		0.7	1.1	0.3	1.7	0.7	0.2	1.2	1.6
	Number of Fish		51,500	184,442	11,357	2,199,524	78,103	6,944	212,753	2,744,622
	SE (Number)		5,025	10,123	2,952	16,828	7,142	2,228	11,080	15,663
	Sample Size		37	118	7	1,303	48	4	133	1,650

Appendix A7.–Age composition of sockeye salmon in the Egegik District harvest, 2005.

Sampling	Date		Age Group								
Period	Start	End	1.2	2.1	1.3	2.2	1.4	2.3	3.2	2.4	3.3	Total
Period 1:	13 Jun	25 Jun										
	Percent (%)		1.9		35.9	25.6	0.1	35.6	0.7		0.1	100.0
	SE (%)		0.4		1.6	1.4		1.6	0.3			1.5
	Number of Fish		2,788		52,050	37,178	155	51,740	1,084		155	145,150
	SE (Number)		651		2,275	2,071		2,272	409			2,192
	Sample Size		18		336	240	1	334	7		1	937
Period 2:	26 Jun	26 Jun										
	Percent (%)		2.0		36.7	25.3	0.2	35.8				100.0
	SE (%)		0.7		2.3	2.1		2.3				2.2
	Number of Fish		18,884		346,207	239,197	2,098	337,814				944,200
	SE (Number)		6,238		21,473	19,380		21,359				20,693
	Sample Size		9		165	114	1	161				450
Period 3:	27 Jun	30 Jun										
	Percent (%)		3.8		34.5	33.7		27.7	0.3			100.0
	SE (%)		0.6		1.6	1.5		1.5	0.2			1.5
	Number of Fish		69,766		627,894	612,391		503,866	5,814			1,819,730
	SE (Number)		11,409		28,246	28,076		26,587	3,353			27,227
	Sample Size		36		324	316		260	3			939
Period 4:	01 Jul	06 Jul										
	Percent (%)		2.1		27.8	36.0	0.1	33.7	0.2			100.0
	SE (%)		0.5		1.5	1.6		1.6	0.2			1.5
	Number of Fish		59,411		794,225	1,028,740	3,127	963,076	6,254			2,854,831
	SE (Number)		13,495		42,362	45,385		44,696	4,420			43,809
	Sample Size		19		254	329	1	308	2			913
Period 5:	07 Jul	10 Jul										
	Percent (%)		3.4		22.7	44.3		29.1	0.2	0.2		100.0
	SE (%)		0.9		2.0	2.4		2.2				2.2
	Number of Fish		46,327		308,845	602,247		395,321	3,088	3,088		1,358,916
	SE (Number)		11,769		27,180	32,219		29,457				29,750
	Sample Size		15		100	195		128	1	1		440
Period 6:	11 Jul	18 Aug										
	Percent (%)		3.9	0.1	32.7	35.2		27.6	0.5			100.0
	SE (%)		0.7		1.7	1.7		1.6	0.2			1.6
	Number of Fish		34,436	1,111	292,153	314,370		246,609	4,443			893,123
	SE (Number)		6,068		14,787	15,053		14,091	2,218			14,406
	Sample Size		31	1	263	283		222	4			804
Total												
	Percent (%)		2.9	0.0	30.2	35.4	0.1	31.2	0.3	0.0	0.0	100.0
	SE (%)		0.7		1.7	1.8		1.8	0.2			1.7
	Number of Fish		231,612	1,111	2,421,373	2,834,123	5,380	2,498,424	20,684	3,088	155	8,015,950
	SE (Number)		11,058		31,339	34,576		33,635	3,183			32,795
	Sample Size		128	1	1,442	1,477	3	1,413	17	1	1	4,483

Appendix A8.–Age composition of sockeye salmon in the Egegik River escapement, 2005.

Sampling	Date		Age Group							
Period	Start	End	1.1	1.2	2.1	1.3	2.2	2.3	3.2	Total
Period 1:	17 Jun	29 Jun								
	Percent (%)		1.5	2.6	3.9	21.1	47.9	22.9		100.0
	SE (%)		0.6	0.7	0.9	1.9	2.3	2.0		2.1
	Number of Fish		7,206	12,354	18,530	99,858	226,482	108,094		472,524
	SE (Number)		2,706	3,523	4,286	9,014	11,030	9,274		9,814
	Sample Size		7	12	18	97	220	105		459
Period 2:	30 Jun	05 Jul								
	Percent (%)		1.5	4.4	2.9	28.4	34.6	28.2		100.0
	SE (%)		0.5	0.9	0.7	2.0	2.1	2.0		1.9
	Number of Fish		12,665	36,411	23,747	232,717	283,376	231,134		820,050
	SE (Number)		4,447	7,429	6,048	16,260	17,151	16,226		15,959
	Sample Size		8	23	15	147	179	146		518
Period 3:	06 Jul	15 Jul								
	Percent (%)		3.0	2.1	3.9	24.4	36.9	29.6	0.2	100.0
	SE (%)		0.8	0.7	0.9	2.1	2.3	2.2		2.1
	Number of Fish		9,743	6,745	12,741	80,192	121,411	97,429	749	329,010
	SE (Number)		2,665	2,228	3,033	6,749	7,586	7,177		6,947
	Sample Size		13	9	17	107	162	130	1	439
Total										
	Percent (%)		1.8	3.4	3.4	25.5	38.9	26.9	0.0	100.0
	SE (%)		0.6	0.8	0.8	2.0	2.2	2.0		2.0
	Number of Fish		29,614	55,510	55,018	412,766	631,270	436,656	749	1,621,584
	SE (Number)		3,546	6,290	4,910	13,325	13,666	13,121		12,910
	Sample Size		28	44	50	351	561	381	1	1,416

Appendix A9.–Age composition of sockeye salmon in the Ugashik District harvest, 2005.

Sampling	Date		Age Group							
Period	Start	End	0.3	1.2	1.3	2.2	1.4	2.3	2.4	Total
Period 1:	09 Jun	01 Jul								
	Percent (%)		1.4	2.3	63.1	6.1	0.5	26.2	0.5	100.0
	SE (%)		0.8	1.0	3.3	1.6		3.0		3.1
	Number of Fish		374	623	16,818	1,619	125	6,976	125	26,659
	SE (Number)		215	276	881	436		803		820
	Sample Size		3	5	135	13	1	56	1	214
Period 2:	02 Jul	10 Jul								
	Percent (%)		0.3	11.1	71.7	1.8		15.1		100.0
	SE (%)		0.2	1.0	1.4	0.4		1.1		1.3
	Number of Fish		3,985	148,755	964,251	23,907		203,210		1,344,108
	SE (Number)		2,298	13,262	19,034	5,587		15,143		17,737
	Sample Size		3	112	726	18		153		1,012
Period 3:	11 Jul	19 Aug								
	Percent (%)			11.7	68.8	5.7	0.6	13.2		100.0
	SE (%)			1.4	2.1	1.0	0.3	1.5		1.9
	Number of Fish			98,629	581,743	48,479	5,015	112,002		845,868
	SE (Number)			12,081	17,443	8,749	2,890	12,758		15,883
	Sample Size			59	348	29	3	67		506
Total										
	Percent (%)		0.2	11.2	70.5	3.3	0.2	14.5	0.0	100.0
	SE (%)		0.3	1.2	1.7	0.9	0.3	1.3		1.6
	Number of Fish		4,358	248,007	1,562,812	74,005	5,140	322,188	125	2,216,635
	SE (Number)		2,198	12,788	18,352	7,761	2,854	14,186		16,942
	Sample Size		6	176	1,209	60	4	276	1	1,732

Appendix A10.–Age composition of sockeye salmon in the Ugashik River escapement, 2005.

Sampling	Date		Age Group									
Period	Start	End	0.2	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	Total[a]
Period 1:	30 Jun	09 Jul										
	Percent (%)		0.2	0.5		15.5		69.7	2.3	0.2	11.6	100.0
	SE (%)			0.3		1.7		2.2	0.7		1.5	2.0
	Number of Fish		644	1,288		43,777		196,996	6,438	644	32,833	282,618
	SE (Number)			909		4,886		6,206	2,015		4,327	5,728
	Sample Size		1	2		68		306	10	1	51	439
Period 2:	10 Jul	13 Jul										
	Percent (%)		0.4	0.8	0.2	12.1		77.4	1.8		7.2	100.0
	SE (%)		0.3	0.4		1.5		1.9	0.6		1.2	1.8
	Number of Fish		1,316	2,632	658	38,824		248,081	5,922		23,031	320,466
	SE (Number)		930	1,312		4,743		6,079	1,958		3,754	5,695
	Sample Size		2	4	1	59		377	9		35	487
Period 3:	14 Jul	26 Jul										
	Percent (%)		3.9	2.2	1.3	21.7	1.1	62.2	1.7	0.4	5.4	100.0
	SE (%)		0.9	0.7	0.5	1.9	0.5	2.3	0.6	0.3	1.1	2.0
	Number of Fish		6,890	3,828	2,297	38,280	1,914	109,481	3,062	766	9,570	176,088
	SE (Number)		1,594	1,199	933	3,390	852	3,986	1,074	541	1,863	3,569
	Sample Size		18	10	6	100	5	286	8	2	25	460
Total												
	Percent (%)		1.1	1.0	0.4	15.5	0.2	71.2	2.0	0.2	8.4	100.0
	SE (%)		0.8	0.5	0.5	1.7	0.5	2.1	0.7	0.2	1.3	1.9
	Number of Fish		8,850	7,748	2,955	120,881	1,914	554,558	15,423	1,409	65,434	779,172
	SE (Number)		1,451	1,197	822	4,417	852	5,775	1,843	399	3,855	5,303
	Sample Size		21	16	7	227	5	969	27	3	111	1,386

[a] Total does not include escapement (20,440) to King Salmon and Dog Salmon rivers.

Appendix A11.–Age composition of sockeye salmon in the Nushagak Section harvest, 2005.

Sampling	Date		Age Group										
Period	Start	End	0.2	1.1	0.3	1.2	0.4	1.3	2.2	1.4	2.3	2.4	Total[a]
Period 1:	06 Jun	24 Jun											
	Percent (%)				1.9	17.2		73.7	1.8	1.3	4.0		100.0
	SE (%)				0.5	1.5		1.7	0.5	0.4	0.8		1.6
	Number of Fish				5,422	47,968		206,053	5,005	3,754	11,262		279,464
	SE (Number)				1,490	4,074		4,755	1,433	1,244	2,125		4,450
	Sample Size				13	115		494	12	9	27		670
Period 2:	25 Jun	29 Jun											
	Percent (%)		0.2	0.8	2.0	27.3	0.4	65.1	0.6	0.8	2.8		100.0
	SE (%)			0.4	0.6	2.0	0.3	2.1	0.3	0.4	0.7		2.0
	Number of Fish		2,653	10,611	26,527	366,074	5,305	872,742	7,958	10,611	37,138		1,339,619
	SE (Number)			5,290	8,313	26,592	3,748	28,433	4,586	5,290	9,797		26,918
	Sample Size		1	4	10	138	2	329	3	4	14		505
Period 3:	30 Jun	02 Jul											
	Percent (%)			0.2	4.3	17.8		67.4	2.8	0.4	7.1		100.0
	SE (%)				0.9	1.7		2.1	0.7	0.3	1.1		1.9
	Number of Fish			3,039	66,859	273,515		1,036,319	42,547	6,078	109,406		1,537,764
	SE (Number)				13,955	26,167		32,078	11,224	4,294	17,591		29,143
	Sample Size			1	22	90		341	14	2	36		506
Period 4:	03 Jul	07 Jul											
	Percent (%)		0.8	0.2	3.4	28.8		59.4	3.4	0.6	3.4		100.0
	SE (%)		0.4		0.7	1.8		2.0	0.7	0.3	0.7		1.8
	Number of Fish		18,275	3,655	76,756	650,597		1,341,400	76,756	14,620	76,756		2,258,815
	SE (Number)		8,146		16,476	41,180		44,660	16,476	7,292	16,476		41,248
	Sample Size		5	1	21	178		367	21	4	21		618
Period 5:	08 Jul	11 Jul											
	Percent (%)				1.6	21.3	0.4	69.7	2.7	0.2	4.1		100.0
	SE (%)				0.5	1.7	0.3	1.9	0.7		0.8		1.8
	Number of Fish				16,962	224,279	3,769	733,148	28,270	1,885	43,348		1,051,662
	SE (Number)				5,613	18,252	2,663	20,475	7,207		8,858		19,196
	Sample Size				9	119	2	389	15	1	23		558

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Sampling	Date		Age Group									
Period	Start	End	0.2	1.1	0.3	1.2	0.4	1.3	2.2	1.4	2.3	2.4	Total[a]
Period 6:	12 Jul	17 Aug											
	Percent (%)				2.0	10.0	0.2	76.0	2.0	1.3	8.3	0.2	100.0
	SE (%)				0.6	1.4		2.0	0.6	0.5	1.3		1.8
	Number of Fish				9,760	49,882	1,084	378,452	9,760	6,506	41,207	1,084	497,735
	SE (Number)				3,225	6,984		9,928	3,225	2,642	6,409		9,151
	Sample Size				9	46	1	349	9	6	38	1	459
Total													
	Percent (%)		0.3	0.2	2.9	23.1	0.1	65.6	2.4	0.6	4.6	0.0	100.0
	SE (%)		0.3	0.3	0.8	1.8	0.3	2.0	0.7	0.4	1.0		1.9
	Number of Fish		20,928	17,305	202,286	1,612,315	10,159	4,568,113	170,296	43,454	319,117	1,084	6,965,059
	SE (Number)		7,613	4,142	13,403	31,770	3,157	32,404	12,810	5,337	14,095		30,677
	Sample Size		6	6	84	686	5	2,269	74	26	159	1	3,316

[a] Total does not include Igushik Beach setnet catch (130,972).

Appendix A12.–Age composition of sockeye salmon in the Igushik Section setnet harvest, 2005.

Sampling	Date		Age Group				
Period	Start	End	1.2	1.3	2.2	2.3	Total
Period 1:	17 Jun	14 Jul					
	Percent (%)		6.5	74.4	1.6	17.4	100.0
	SE (%)		1.1	1.9	0.5	1.6	1.8
	Number of Fish		8,557	97,456	2,139	22,819	130,972
	SE (Number)		1,380	2,437	708	2,118	2,309
	Sample Size		36	410	9	96	551

Appendix A13.–Age composition of sockeye salmon in the Wood River escapement, 2005.

Sampling	Date		Age Group							
Period	Start	End	0.2	1.1	0.3	1.2	1.3	2.2	1.4	2.3	Total
Period 1:	19 Jun	30 Jun									
	Percent (%)			1.6		50.7	42.5	2.6	0.2	2.3	100.0
	SE (%)			0.6		2.4	2.4	0.8		0.7	2.3
	Number of Fish			6,714		207,184	173,612	10,551	959	9,592	408,612
	SE (Number)			2,520		9,909	9,798	3,144		3,001	9,547
	Sample Size			7		216	181	11	1	10	426
Period 2:	01 Jul	06 Jul									
	Percent (%)		0.7	1.5	0.4	48.4	44.5	1.6		2.9	100.0
	SE (%)		0.4	0.5	0.3	2.1	2.1	0.5		0.7	2.1
	Number of Fish		4,788	9,577	2,394	316,040	290,900	10,774		19,154	653,628
	SE (Number)		2,388	3,364	1,691	13,992	13,914	3,565		4,722	13,487
	Sample Size		4	8	2	264	243	9		16	546
Period 3:	07 Jul	18 Jul									
	Percent (%)		0.9	2.4	1.5	65.6	28.0	0.4	0.5	0.7	100.0
	SE (%)		0.4	0.7	0.5	2.0	1.9	0.3	0.3	0.4	1.9
	Number of Fish		3,977	10,341	6,364	284,767	121,702	1,591	2,386	3,182	434,310
	SE (Number)		1,772	2,836	2,235	8,840	8,355	1,124	1,375	1,586	8,433
	Sample Size		5	13	8	358	153	2	3	4	546
Total											
	Percent (%)		0.6	1.8	0.6	54.0	39.2	1.5	0.2	2.1	100.0
	SE (%)		0.4	0.6	0.5	2.2	2.2	0.6	0.3	0.7	2.1
	Number of Fish		8,766	26,632	8,758	807,991	586,215	22,916	3,346	31,928	1,496,550
	SE (Number)		2,131	2,965	2,101	11,371	11,790	3,258	1,161	4,041	11,179
	Sample Size		9	28	10	838	577	22	4	30	1,518

Appendix A14.–Age composition of sockeye salmon in the Igushik River escapement, 2005.

Sampling	Date		Age Group				
Period	Start	End	1.2	1.3	2.2	2.3	Total
Period 1:	21 Jun	09 Jul					
	Percent (%)		4.9	86.2	1.4	7.5	100.0
	SE (%)		1.2	1.8	0.6	1.4	1.8
	Number of Fish		12,244	216,072	3,601	18,726	250,644
	SE (Number)		2,900	4,640	1,601	3,538	4,466
	Sample Size		17	300	5	26	348
Period 2:	10 Jul	21 Jul					
	Percent (%)		6.7	77.7	3.0	12.6	100.0
	SE (%)		1.3	2.2	0.9	1.7	2.0
	Number of Fish		7,733	89,394	3,403	14,538	115,068
	SE (Number)		1,496	2,487	1,012	1,985	2,342
	Sample Size		25	289	11	47	372
Total							
	Percent (%)		5.5	83.5	1.9	9.1	100.0
	SE (%)		1.2	1.9	0.8	1.6	1.9
	Number of Fish		19,977	305,467	7,004	33,264	365,712
	SE (Number)		2,454	4,128	1,348	2,961	3,923
	Sample Size		42	589	16	73	720

Appendix A15.–Age composition of sockeye salmon in the Nushagak River escapement, 2005.

Sampling	Date		Age Group								
Period	Start	End	0.2	0.3	1.2	0.4	1.3	2.2	0.5	1.4	2.3	Total
Period 1:	08 Jun	24 Jun										
	Percent (%)		0.5	2.9	13.1	0.5	79.5			2.1	1.3	100.0
	SE (%)		0.4	0.9	1.7	0.4	2.1			0.7	0.6	2.0
	Number of Fish		1,325	7,285	32,453	1,325	197,369			5,298	3,312	248,367
	SE (Number)		935	2,167	4,328	935	5,188			1,856	1,473	4,908
	Sample Size		2	11	49	2	298			8	5	375
Period 2:	25 Jun	02 Jul										
	Percent (%)		0.6	5.2	10.7	0.4	80.8	0.2	0.2	1.7	0.4	100.0
	SE (%)		0.3	1.0	1.3	0.3	1.7			0.6	0.3	1.6
	Number of Fish		2,859	26,682	55,269	1,906	416,427	953	953	8,576	1,906	515,531
	SE (Number)		1,647	4,915	6,864	1,346	8,742			2,838	1,346	8,258
	Sample Size		3	28	58	2	437	1	1	9	2	541
Period 3:	03 Jul	17 Jul										
	Percent (%)			9.3	10.6	0.3	74.6	0.3		4.5	0.3	100.0
	SE (%)			1.7	1.7		2.5			1.2		2.3
	Number of Fish			26,643	30,318	919	213,143	919		12,862	919	285,722
	SE (Number)			4,719	4,998		7,064			3,365		6,516
	Sample Size			29	33	1	232	1		14	1	311
Total												
	Percent (%)		0.4	5.8	11.2	0.4	78.8	0.2	0.1	2.5	0.6	100.0
	SE (%)		0.3	1.3	1.6	0.3	2.0			0.9	0.5	1.9
	Number of Fish		4,183	60,610	118,041	4,149	826,939	1,872	953	26,737	6,136	1,049,620
	SE (Number)		1,460	4,581	5,799	1,055	7,601			2,951	1,317	7,124
	Sample Size		5	68	140	5	967	2	1	31	8	1,227

Appendix A16.–Age composition of sockeye salmon in the Nuyakuk River escapement, 2005.

Sampling	Date		Age Group								
Period	Start	End	0.2	1.1	0.3	1.2	1.3	2.2	1.4	2.3	Total
Period 1:	24 Jun	05 Jul									
	Percent (%)		0.4	0.4	1.6	47.2	43.2	5.1	1.1	0.9	100.0
	SE (%)		0.3	0.3	0.6	2.4	2.3	1.0	0.5	0.4	2.2
	Number of Fish		464	464	1,624	49,175	44,999	5,335	1,160	928	104,148
	SE (Number)		328	328	610	2,456	2,437	1,085	516	462	2,343
	Sample Size		2	2	7	212	194	23	5	4	449
Period 2:	06 Jul	24 Jul									
	Percent (%)		1.5		5.7	40.5	48.1	2.6	0.2	1.3	100.0
	SE (%)		0.6		1.1	2.3	2.3	0.7		0.5	2.2
	Number of Fish		2,250		8,356	59,454	70,702	3,856	321	1,928	146,868
	SE (Number)		845		1,593	3,376	3,436	1,100		783	3,239
	Sample Size		7		26	185	220	12	1	6	457
Total											
	Percent (%)		1.1	0.2	4.0	43.3	46.1	3.7	0.6	1.1	100.0
	SE (%)		0.5	0.3	1.0	2.3	2.3	0.9	0.4	0.5	2.2
	Number of Fish		2,714	464	9,979	108,629	115,702	9,191	1,481	2,856	251,016
	SE (Number)		781	328	1,478	2,995	3,087	1,091	457	695	2,901
	Sample Size		9	2	33	397	414	35	6	10	906

Appendix A17.–Age composition of sockeye salmon in the Togiak Section harvest, 2005.

Sampling	Date		Age Group							
Period	Start	End	0.3	1.2	1.3	2.2	1.4	2.3	2.4	Total
Period 1:	08 Jun	03 Jul								
	Percent (%)		0.9	9.2	80.9	4.0	0.9	3.8	0.2	100.0
	SE (%)		0.5	1.4	1.9	0.9	0.5	0.9		1.8
	Number of Fish		561	5,466	48,213	2,383	561	2,242	140	59,565
	SE (Number)		279	835	1,136	567	279	551		1,065
	Sample Size		4	39	344	17	4	16	1	425
Period 2:	04 Jul	10 Jul								
	Percent (%)		1.6	9.1	71.1	12.6	0.4	5.1		100.0
	SE (%)		0.8	1.8	2.9	2.1		1.4		2.6
	Number of Fish		2,009	11,551	90,396	16,070	502	6,529		127,057
	SE (Number)		998	2,301	3,626	2,660		1,767		3,303
	Sample Size		4	23	180	32	1	13		253
Period 3:	11 Jul	28 Jul								
	Percent (%)		1.2	5.4	39.6	40.3		13.5		100.0
	SE (%)		0.5	1.1	2.4	2.4		1.7		2.3
	Number of Fish		2,757	12,131	88,775	90,430		30,327		224,420
	SE (Number)		1,227	2,519	5,446	5,463		3,808		5,107
	Sample Size		5	22	161	164		55		407
Total										
	Percent (%)		1.3	7.1	55.3	26.5	0.3	9.5	0.0	100.0
	SE (%)		0.6	1.5	2.5	2.4	0.3	1.6		2.3
	Number of Fish		5,326	29,147	227,384	108,883	1,063	39,098	140	411,042
	SE (Number)		1,079	2,207	4,133	5,083	203	3,433		4,216
	Sample Size		13	84	685	213	5	84	1	1,085

Appendix A18.–Age composition of sockeye salmon in the Togiak River escapement, 2005.

Sampling	Date		Age Group									
Period	Start	End	0.2	1.1	0.3	1.2	1.3	2.2	1.4	2.3	2.4	Total[a]
Period 1:	02 Jul	21 Jul										
	Percent (%)		0.2		0.7	11.1	64.5	17.1	0.2	6.2		100.0
	SE (%)				0.4	1.5	2.3	1.8		1.2		2.1
	Number of Fish		171		512	8,026	46,450	12,296	171	4,440		72,066
	SE (Number)				295	1,105	1,681	1,321		845		1,517
	Sample Size		1		3	47	272	72	1	26		422
Period 2:	22 Jul	07 Aug										
	Percent (%)			0.2	0.8	30.2	42.7	19.3		6.6	0.2	100.0
	SE (%)				0.4	2.1	2.2	1.8		1.1		2.0
	Number of Fish			160	639	23,309	32,888	14,848		5,109	160	77,112
	SE (Number)				318	1,613	1,737	1,385		874		1,579
	Sample Size			1	4	146	206	93		32	1	483
Total												
	Percent (%)		0.1	0.1	0.8	21.0	53.2	18.2	0.1	6.4	0.1	100.0
	SE (%)				0.4	2.0	2.3	1.8		1.1		2.1
	Number of Fish		171	160	1,151	31,336	79,338	27,143	171	9,549	160	149,178
	SE (Number)				308	1,499	1,705	1,356		860		1,549
	Sample Size		1	1	7	193	478	165	1	58	1	905

[a] Total does not include (6,600) sockeye salmon counted in tributaries and mainstem Togiak River below the counting towers.

Appendix A19.–Age composition of Chinook salmon in the Nushagak District harvest, 2005.

Sampling	Date		Age Group							
Period	Start	End	1.1	1.2	1.3	2.2	1.4	2.4	1.5	Total
Period 1:	01 Jun	21 Jun								
	Percent (%)		0.5	19.5	44.8		34.7	0.2	0.2	100.0
	SE (%)		0.3	1.9	2.4		2.3			2.3
	Number of Fish		159	6,594	15,173		11,757	79	79	33,842
	SE (Number)		112	650	816		782			770
	Sample Size		2	83	191		148	1	1	426
Period 2:	22 Jun	15 Aug								
	Percent (%)		0.2	31.5	35.6	0.4	31.7		0.7	100.0
	SE (%)			1.9	2.0	0.2	1.9		0.3	1.9
	Number of Fish		50	8,971	10,123	100	9,021		200	28,466
	SE (Number)			555	572	71	556		100	558
	Sample Size		1	179	202	2	180		4	568
Total										
	Percent (%)		0.3	25.0	40.6	0.2	33.3	0.1	0.4	100.0
	SE (%)		0.3	1.9	2.2	0.2	2.1		0.3	2.1
	Number of Fish		209	15,564	25,297	100	20,778	79	280	62,308
	SE (Number)		98	597	729	71	693		85	682
	Sample Size		3	262	393	2	328	1	5	994

Appendix A20.–Age composition of Chinook salmon in the Nushagak River escapement, 2005.

Sampling	Date		Age Group				
Period	Start	End	1.2	1.3	1.4	1.5	Total
Period 1:	08 Jun	17 Jul					
	Percent (%)		14.2	47.0	37.9	1.0	100.0
	SE (%)		1.4	2.0	2.0	0.4	1.9
	Number of Fish		24,469	81,090	65,441	1,707	172,708
	SE (Number)		2,447	3,501	3,403	694	3,316
	Sample Size		86	285	230	6	607

Appendix A21.–Age composition of chum salmon in the Nushagak District harvest, 2005.

Sampling	Date		Age Group			
Period	Start	End	0.2	0.3	0.4	Total
Period 1:	06 Jun	30 Jun				
	Percent (%)		87.4	12.4	0.2	100.0
	SE (%)		1.6	1.5		1.5
	Number of Fish		508,431	72,271	1,268	581,970
	SE (Number)		9,035	8,968		9,017
	Sample Size		401	57	1	459
Period 1:	01 Jul	15 Aug				
	Percent (%)		89.3	10.5	0.2	100.0
	SE (%)		1.4	1.4		1.4
	Number of Fish		343,122	40,185	773	384,080
	SE (Number)		5,323	5,278		5,313
	Sample Size		444	52	1	497
Total						
	Percent (%)		88.1	11.6	0.2	100.0
	SE (%)		1.5	1.5		1.5
	Number of Fish		851,553	112,456	2,041	966,050
	SE (Number)		7,756	7,851		7,759
	Sample Size		845	109	2	956

Appendix A22.–Age composition of chum salmon in the Nushagak River escapement, 2005.

Sampling	Date		Age Group				
Period	Start	End	0.2	0.3	0.4	0.5	Total
Period 1:	08 Jun	17 Jul					
	Percent (%)		0.2	85.5	14.2	0.2	100.0
	SE (%)			1.5	1.4		1.5
	Number of Fish		780	389,765	64,701	780	456,025
	SE (Number)			6,650	6,584		6,629
	Sample Size		1	500	83	1	585

APPENDIX B. MEAN LENGTH, AND MEAN WEIGHT BY AGE FOR THE CATCH AND ESCAPEMENT BY DISTRICT

Appendix B1.–Length and weight for Pacific salmon commercial harvest and escapement by district and river system, Bristol Bay, 2005 (length in mm, weight in kg).

	Length[a]		Weight[ab]	
District and River System	Mean	SE	Mean	SE
Sockeye Salmon				
Naknek-Kvichak Catch[c]	546	1.0	2.94	0.04
Naknek River Special Harvest Area	558	0.5	3.07	0.01
Alagnak River Special Harvest Area	552	0.8	3.07	0.02
Kvichak Escapement	552	0.7		
Naknek Escapement	556	0.6		
Egegik Catch	552	0.4	2.82	0.01
Egegik Escapement	548	0.8		
Ugashik Catch	563	0.6	3.12	0.02
Ugashik Escapement	562	0.8		
Nushagak Catch	545	0.4	2.86	0.02
Igushik Set Catch	560	1.0	3.19	0.05
Wood River Escapement	516	0.9		
Igushik Escapement	562	0.8		
Nushagak Escapement	558	0.9		
Nuyakuk Escapement	526	1.1		
Togiak Section Catch	545	0.6	3.33	0.08
Togiak Escapement	555	0.8		
Chinook Salmon				
Nushagak Catch	716	2.2	7.95	0.2
Nushagak Escapement	754	3.3		
Chum Salmon				
Nushagak Catch	568	0.9	3.29	0.07
Nushagak Escapement	594	1.4		

Note: Blank cells denotes no data.

[a] Weighted average for all age classes combined.

[b] Weight measurements were only collected from the commercial catch. No weight data available for escapements.

[c] Alagnak escapement age data were sampled using otoliths. No length data available.

APPENDIX C. BROOD TABLES

Appendix C1.–Kvichak River sockeye salmon escapement and return by brood year (in thousands), 1950–2005.

Brood		Return by Age Class																
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1950	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	248	0	0	0	0	248 [d]	
1951	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	221	3,377	0	0	983	0	1	0	0	4,582 [d]	
1952	0 [b]	0 [c]	0 [c]	0	9,954	0	0	6,681	2,956	0	0	654	1	0	1	0	20,247 [d]	
1953	0 [b]	0	0	0	91	0	0	62	365	0	0	60	0	0	0	16	594	
1954	0 [b]	0	0	0	81	17	0	29	638	0	0	0	0	0	29	0	794	
1955	0 [b]	0	0	0	249	14	0	100	588	0	0	531	20	0	0	0	1,502	
1956	9,443	0	14	0	24,246	0	0	6,968	6,472	0	0	1,308	0	0	0	0	39,008	4.13
1957	2,843	8	0	0	243	0	0	244	3,333	0	2	259	0	0	2	0	4,091	1.44
1958	535	0	0	0	76	0	0	48	135	0	0	26	0	0	3	0	288	0.54
1959	674	0	0	0	212	1	0	117	206	0	0	11	0	0	0	0	547	0.81
1960	14,602	0	0	1	1,314	134	0	563	46,746	0	0	6,472	10	0	6	0	55,246	3.78
1961	3,706	1	0	0	334	0	0	190	2,287	0	0	679	5	0	0	0	3,496	0.94
1962	2,581	0	0	0	104	2	0	152	4,675	0	0	408	12	0	4	0	5,357	2.08
1963	339	0	0	0	49	3	0	50	639	0	0	366	3	0	9	0	1,119	3.30
1964	957	0	8	0	2,232	105	0	407	2,341	0	0	647	8	0	3	0	5,751	6.01
1965	24,326	0	25	0	9,853	484	0	471	32,951	0	0	1,239	2	0	1	0	45,026	1.85
1966	3,755	4	11	6	497	11	0	1,086	4,262	0	0	385	0	1	0	0	6,263	1.67
1967	3,216	0	0	5	349	2	0	272	812	0	0	86	0	0	0	0	1,526	0.47
1968	2,557	0	0	0	293	0	0	34	77	0	5	132	0	0	2	0	543	0.21
1969	8,394	0	0	1	129	7	0	321	4,221	0	0	595	19	0	11	0	5,304	0.63
1970	13,935	0	1	0	43	40	0	13	14,463	6	0	848	412	0	7	0	15,832	1.14
1971	2,387	0	0	0	244	18	0	93	2,169	0	0	303	2	0	0	0	2,829	1.19
1972	1,010	0	0	0	255	1	0	159	1,206	0	22	297	0	0	0	0	1,940	1.92
1973	227	0	0	2	576	2	2	1,028	274	0	3	543	28	0	0	0	2,458	10.83
1974	4,434	0	9	1	6,328	309	0	2,009	16,725	0	8	763	23	0	5	0	26,180	5.90
1975	13,140	0	5	0	5,683	302	0	1,232	30,263	0	0	599	2	0	0	0	38,087	2.90
1976	1,965	0	5	11	5,298	43	0	826	4,115	0	4	273	0	0	0	0	10,575	5.38
1977	1,341	11	43	6	1,934	2	0	935	208	0	0	99	0	0	0	0	3,239	2.42
1978	4,149	0	0	0	1,835	16	0	1,157	1,318	0	0	817	11	0	6	0	5,160	1.24
1979	11,218	1	57	3	18,331	73	0	2,234	17,931	0	0	3,512	0	0	0	0	42,142	3.76
1980	17,505 [e]	0	2	5	2,889	20	0	1,641	8,076	0	2	413	0	0	0	0	13,048	0.75

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Brood		Return by Age Class																
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1981	1,754	0	0	12	789	0	0	231	931	0	0	167	0	0	0	0	2,130	1.21
1982	1,135	25	0	2	445	1	0	544	524	0	6	139	0	0	0	0	1,686	1.49
1983	3,570	0	1	5	8,596	3	0	3,010	1,195	0	5	573	0	2	1	0	13,391	3.75
1984	10,491	0	0	4	2,532	44	1	1,924	16,952	0	0	2,483	8	0	2	0	23,950	2.28
1985	7,211	4	7	30	1,024	29	0	1,282	13,465	0	2	1,560	1	15	2	0	17,421	2.42
1986	1,179	10	0	27	688	0	1	1,079	1,390	0	25	1,332	2	0	4	0	4,558	3.87
1987	6,066	29	4	69	4,179	31	4	2,519	4,499	0	5	700	4	0	2	0	12,045	1.99
1988	4,065	11	5	19	2,503	19	1	2,470	4,385	0	5	557	11	0	6	0	9,991	2.46
1989	8,318	29	2	54	2,147	117	2	1,679	18,841	0	2	3,316	13	1	0	0	26,203	3.15
1990	6,970	6	8	11	1,542	83	0	1,192	21,105	0	0	1,162	0	1	0	0	25,110	3.60
1991	4,223	0	1	4	2,688	2	0	1,232	699	0	6	170	0	0	0	0	4,802	1.14
1992	4,726	2	0	13	429	2	0	226	567	0	0	175	0	0	6	0	1,420	0.30
1993	4,025	0	1	1	852	1	4	890	624	0	8	574	0	0	0	0	2,955	0.73
1994	8,356	0	3	0	1,811	29	0	1,204	3,777	0	1	250	1	0	0	0	7,076	0.85
1995	10,039	0	17	0	7,736	0	0	1,810	600	0	5	76	0	0	0	0	10,244	1.02
1996	1,451	4	0	0	369	0	0	1,203	19	0	9	16	0	0	0	0	1,620	1.12
1997	1,504	0	0	4	130	0	1	107	263	0	0	75	0	5	0	0	585	0.39
1998	2,296	0	0	2	323	1	4	278	245	0	7	58	1	0	0	[d]	919 [d]	0.40
1999	6,197	4	1	0	1,070	78	0	244	5,769	0	5	253	2	[d]	[d]	[d]	7,426 [d]	1.20
2000	1,828	0	0	13	1,808	0	0	1,179	912	0	[d]	[d]	[d]	[d]	[d]	[d]	3,912 [d]	2.14
2001	1,095	0	0	33	529	2	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2002	704	2	7	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2003	1,687	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2004	5,500	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2005	2,320	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
1956-2000 Ave.																		2.24

[a] R/S = return per spawner.

[b] Escapement not available.

[c] Younger age groups not available.

[d] Incomplete returns from brood year escapement.

[e] The 1980 brood year escapement of 22.5 million was reduced to 17.5 million in the brood table to reflect the estimated 5 million sockeye salmon that did not spawn successfully because of the extreme velocity barrier at the falls on the Newhalen River.

Appendix C2.–Alagnak River sockeye salmon escapement and return by brood year (in thousands), 1950–2005.

Brood		Return by Age Class																
Year	Escapement[ab]	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1950	0 [d]	[e]	[e]	[e]	[e]	[e]	[e]	[e]	[e]	[e]	0	262	0	0	0	0	262 [f]	
1951	0 [d]	[e]	[e]	[e]	[e]	[e]	0	294	343	0	0	43	0	0	0	0	680 [f]	
1952	0 [d]	[e]	[e]	0	383	0	0	295	131	0	0	115	0	0	1	0	925 [f]	
1953	0 [d]	0	0	0	5	0	0	11	64	0	0	0	0	0	0	0	80	
1954	0 [d]	0	0	0	14	3	0	109	392	0	0	141	0	0	1	0	660	
1955	0 [d]	0	0	0	788	0	0	237	26	0	0	44	0	0	0	0	1,095	
1956	784	5	0	0	1,885	0	0	459	0	0	0	38	3	0	0	0	2,390	3.05
1957	127	0	0	0	5	0	0	23	43	0	0	13	0	0	1	0	85	0.67
1958	95	0	0	0	43	0	0	26	27	0	0	52	0	0	0	0	148	1.56
1959	825	0	0	0	302	0	0	265	122	0	0	76	1	0	2	0	768	0.93
1960	1,241	0	0	0	105	0	0	185	135	0	0	31	0	0	0	0	456	0.37
1961	90	0	10	1	89	1	0	185	7	0	0	0	0	0	0	0	293	3.25
1962	91	0	19	0	129	0	0	91	3	0	0	19	1	0	0	0	262	2.88
1963	203	0	0	0	199	1	0	140	34	0	0	1	0	0	0	0	375	1.85
1964	249	0	5	0	100	2	0	98	113	0	0	17	0	0	0	0	336	1.35
1965	175	0	6	0	104	1	0	161	10	0	0	17	0	0	0	0	299	1.71
1966	174	0	13	0	282	0	0	262	12	0	0	11	0	0	0	0	580	3.33
1967	203	0	9	8	291	1	0	51	46	0	0	7	0	0	0	0	413	2.04
1968	194	3	5	0	127	0	0	40	2	0	0	3	0	0	0	0	180	0.93
1969	182	0	0	0	4	1	0	54	105	0	0	25	0	0	0	0	189	1.04
1970	177	0	0	0	73	0	0	71	6	0	0	2	0	0	0	0	152	0.86
1971	187	0	2	0	26	0	0	28	31	0	0	40	0	0	5	0	132	0.70
1972	151	0	1	0	91	0	0	19	8	0	0	33	0	0	0	0	152	1.00
1973	35	0	0	0	105	1	0	317	44	0	0	6	0	0	0	0	473	13.52
1974	215	0	4	0	730	12	0	47	341	0	0	6	0	0	1	0	1,141	5.31
1975	100	0	38	0	1,099	0	0	62	342	0	1	3	0	0	0	0	1,545	15.45
1976	82	0	70	0	1,111	0	0	433	52	0	0	138	0	0	0	0	1,804	22.00
1977	109	0	73	0	367	2	0	1768	0	0	10	22	0	0	0	0	2,242	20.57
1978	584	0	3	0	259	0	0	177	103	0	0	385	1	0	0	0	928	1.59
1979	794	0	8	6	1,208	5	0	779	85	0	0	9	0	0	0	0	2,101	2.65
1980	804	0	0	0	272	0	0	545	33	0	5	24	0	2	0	0	881	1.10

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Appendix C2.–Page 2 of 2.

Brood		Return by Age Class																
Year	Escapement[a]	0.2	1.1	0.3	1.2	2.1	0.4	1	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1981	222	0	1	0	145	0	0	452	140	0	4	28	0	0	0	0	770	3.47
1982	646	0	1	1	463	0	0	370	12	0	0	8	0	0	0	0	855	1.32
1983	260	0	1	0	393	0	0	349	86	0	0	9	0	0	0	0	838	3.22
1984	581	0	2	0	420	1	0	385	111	0	0	61	1	0	1	0	982	1.69
1985	319	0	9	0	947	1	0	300	245	0	0	22	0	0	0	0	1,524	4.78
1986	621	0	4	0	910	0	0	704	509	0	0	20	0	0	1	0	2,148	3.46
1987	416	0	0	0	415	0	0	449	454	0	7	210	1	0	0	0	1,536	3.69
1988	525	0	2	0	413	0	0	388	719	0	0	113	1	0	0	0	1,636	3.12
1989	531	0	13	0	919	6	0	445	477	0	0	43	0	0	0	0	1,903	3.58
1990	456	0	7	0	697	0	0	324	873	0	0	628	0	0	0	0	2,529	5.55
1991	749	0	1	0	526	10	0	586	432	0	0	0	0	0	0	0	1,554	2.08
1992	612	0	5	0	259	0	0	187	165	0	0	22	0	1	0	0	639	1.04
1993	940	0	12	0	326	0	0	404	212	0	4	130	0	0	0	0	1,088	1.16
1994	655	0	2	0	419	6	0	717	106	0	1	108	1	0	0	0	1,360	2.08
1995	582	0	10	0	1,875	0	0	516	324	0	15	69	0	0	0	0	2,809	4.83
1996	828	1	8	0	1,057	1	0	815	28	0	4	20	0	0	0	0	1,934	2.34
1997	589	0	7	0	174	0	0	273	117	0	23	486	0	2	0	0	1,082	1.84
1998	681	0	6	0	369	1	0	1,704	467	0	5	197	0	0	0	[f]	2,749 [f]	4.04
1999	1,251	0	9	0	991	72	0	1,316	895	0	4	374	0	[f]	[f]	[f]	3,661 [f]	2.93
2000	1,218	0	48	0	4,234	0	0	4,064	252	0	[f]	[f]	[f]	[f]	[f]	[f]	8,598 [f]	7.06
2001	721	0	18	0	732	0	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
2002	767	0	11	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
2003	3,676	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
2004	5,397	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
2005	4,219	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
56-00 Avg.																		3.84

[a] The 1956–1976 and 2002–2005 escapements based on Alagnak tower count. The 1977–2001 escapements based on aerial survey.

[b] Brood table updated by Doug Eggers and John H Clark in spring of 2005. Aerial surveys expanded by 2.7 and catch added to Alagnak based on original allocation proportion between Kvichak, Naknek, and Alagnak (Clark 2005).

[c] R/S = return per spawner.

[d] Escapement not available.

[e] Younger age groups not available.

[f] Incomplete returns from brood year escapement.

Appendix C3.–Naknek River sockeye salmon escapement and return by brood year (in thousands), 1950–2005.

Brood		Return by Age Class																
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1950	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	1,093	0	2	5	0	1,100 [d]	
1951	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	1,295	688	0	0	1,250	0	1	0	0	3,234 [d]	
1952	0 [b]	0 [c]	0 [c]	0	79	0	0	1,199	108	0	7	176	1	0	2	0	1,572 [d]	
1953	0 [b]	0	0	0	24	0	0	135	177	3	0	206	42	0	1	1	589	
1954	0 [b]	0	0	0	85	19	0	302	2,129	0	0	587	0	13	3	0	3,138	
1955	0 [b]	0	0	0	720	1	0	820	214	0	0	88	2	4	2	0	1,851	
1956	1,773	0	1	0	473	0	0	1,701	3	0	17	304	0	0	0	0	2,499	1.41
1957	635	0	0	0	53	2	0	329	505	0	1	674	5	0	3	0	1,572	2.48
1958	278	0	0	0	112	4	0	211	539	0	0	168	3	0	2	0	1,039	3.74
1959	2,232	0	0	0	349	7	0	351	742	0	0	705	0	0	0	0	2,154	0.97
1960	828	0	1	1	1,408	9	0	625	696	0	0	1,278	1	1	2	0	4,022	4.86
1961	351	0	0	0	239	3	0	744	315	0	3	640	0	0	8	0	1,952	5.56
1962	723	0	0	0	76	4	0	230	351	0	2	397	13	0	1	0	1,074	1.49
1963	905	0	0	0	136	8	0	390	833	0	0	627	7	0	1	0	2,002	2.21
1964	1,350	0	1	0	447	24	0	264	1,135	0	0	177	11	0	1	0	2,060	1.53
1965	718	0	5	0	540	44	0	360	732	0	0	437	1	0	1	0	2,120	2.95
1966	1,016	1	4	0	728	2	0	2,304	167	0	1	630	0	1	0	0	3,839	3.78
1967	756	0	0	2	326	6	0	625	401	0	0	356	0	1	0	0	1,717	2.27
1968	1,023	0	3	0	152	0	0	234	83	0	0	269	2	0	2	0	745	0.73
1969	1,331	0	0	0	47	3	0	307	976	0	0	1,211	5	0	3	0	2,552	1.92
1970	733	0	1	0	154	19	0	318	1,845	0	0	370	12	0	0	0	2,718	3.71
1971	936	0	1	0	397	24	0	559	1,428	0	0	1,844	3	9	8	0	4,273	4.57
1972	587	0	3	0	245	3	0	241	161	0	3	599	9	0	1	0	1,264	2.15
1973	357	0	0	0	494	0	0	618	524	0	0	598	0	0	0	0	2,234	6.26
1974	1,241	0	2	0	232	3	0	228	1,026	0	1	783	5	0	5	0	2,284	1.84
1975	2,027	0	1	0	425	11	0	1,746	1,393	0	0	1,641	1	8	0	0	5,226	2.58
1976	1,321	0	4	0	1,084	3	0	4,048	1,575	0	21	1,491	0	28	1	0	8,255	6.25
1977	1,086	2	10	7	635	0	0	2,272	95	0	64	401	0	1	5	0	3,492	3.22
1978	813	0	1	0	331	4	0	1,695	1,121	0	11	530	2	0	0	0	3,695	4.55
1979	925	0	4	1	2,438	4	0	973	792	0	9	408	4	0	3	0	4,636	5.01
1980	2,645	0	1	1	723	14	0	1,505	1,192	0	9	828	0	2	0	0	4,275	1.62

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Appendix C3.–Page 2 of 2.

Brood		Return by Age Class																	
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1981	1,796	0	4	0	782	9	0	2,568	473	0	12	937	0	3	0	0	4,789	2.67
1982	1,156	0	3	3	185	0	0	1,172	191	0	23	457	0	9	0	0	2,043	1.77
1983	888	0	0	1	163	7	0	484	336	0	5	480	0	0	1	0	1,477	1.66
1984	1,242	0	1	0	469	23	0	911	1,214	0	21	1,828	5	1	4	0	4,477	3.60
1985	1,850	0	2	6	656	20	1	3,533	1,293	0	44	1,441	0	28	10	0	7,034	3.80
1986	1,978	0	3	6	1,981	6	1	7,167	1,276	0	367	2,817	1	38	2	0	13,665	6.91
1987	1,062	3	0	12	336	4	1	1,251	565	0	95	3,225	2	12	0	0	5,506	5.18
1988	1,038	0	0	0	273	13	0	796	516	0	37	544	2	2	1	0	2,184	2.10
1989	1,162	0	1	0	226	5	0	930	1,154	0	0	566	4	0	1	0	2,887	2.48
1990	2,093	0	0	0	405	46	0	1,236	1,345	0	12	1,316	3	12	0	0	4,375	2.09
1991	3,579	1	13	0	546	1	0	5,209	250	0	45	343	0	1	0	0	6,408	1.79
1992	1,607	0	0	16	268	1	0	552	250	1	10	379	5	2	0	0	1,484	0.92
1993	1,536	0	0	2	293	12	0	1,390	473	0	23	692	0	0	0	0	2,885	1.88
1994	991	0	6	0	503	15	0	631	553	0	7	526	4	7	0	0	2,251	2.27
1995	1,111	0	9	0	2,067	1	1	3,896	156	0	65	280	0	5	0	0	6,479	5.83
1996	1,078	1	1	0	345	0	0	6,117	83	0	109	354	1	2	0	0	7,013	6.51
1997	1,026	0	0	2	119	9	0	854	824	0	19	1,596	5	4	0	0	3,432	3.34
1998	1,202	0	1	0	625	3	0	2,099	598	0	16	690	0	0	0	[d]	4,032 [d]	3.35
1999	1,625	0	0	0	854	7	0	1,339	712	0	14	1,009	0	[d]	[d]	[d]	3,935 [d]	2.42
2000	1,375	0	3	0	1,187	0	0	6,091	479	0	[d]	[d]	[d]	[d]	[d]	[d]	7,760 [d]	5.64
2001	1,830	0	0	0	401	12	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2002	1,264	0	53	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2003	1,831	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2004	1,939	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2005	2,745	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
56–00 Avg.																		3.20

[a] R/S = return per spawner.

[b] Escapement not available.

[c] Younger age groups not available.

[d] Incomplete returns from brood year escapement.

Appendix C4.–Egegik River sockeye salmon escapement and return by brood year (in thousands), 1949–2005.

Brood		Return by Age Class																
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1949	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	0	0	0	14	0	14 [d]	
1950	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	0	0	0	0	274	70	4	23	0	371 [d]	
1951	0 [b]	0 [c]	0 [c]	0	0	0	0	325	1,018	0	1	1,301	2	0	6	0	2,653 [d]	
1952	0 [b]	0	0	0	623	0	0	446	241	0	1	295	19	2	5	0	1,632	
1953	0 [b]	0	0	0	26	0	0	39	435	2	0	337	254	0	12	0	1,105	
1954	0 [b]	0	0	0	11	4	0	13	1,190	0	0	641	87	0	46	0	1,992	
1955	0 [b]	0	1	0	20	0	0	163	672	0	0	396	6	1	6	0	1,265	
1956	1,104	0	6	0	2,025	0	0	3,190	925	0	2	685	1	0	12	0	6,846	6.20
1957	391	0	0	0	37	0	0	43	1,096	0	0	927	70	0	62	0	2,235	5.72
1958	246	0	0	0	42	2	0	73	817	0	0	308	16	0	3	0	1,261	5.13
1959	1,053	0	0	0	73	2	0	164	1,037	0	0	467	14	0	24	0	1,781	1.69
1960	1,799	8	0	0	447	21	0	328	4,447	0	1	2,560	49	0	50	0	7,911	4.40
1961	702	0	0	3	82	0	0	229	446	0	1	791	28	0	10	0	1,590	2.27
1962	1,027	0	0	0	22	0	0	69	950	0	0	375	28	0	30	0	1,474	1.44
1963	998	0	0	1	16	2	0	112	538	1	1	506	74	0	7	0	1,258	1.26
1964	850	0	1	0	126	6	0	69	1,454	1	0	242	73	0	12	0	1,983	2.33
1965	1,445	0	0	0	104	35	0	72	2,016	0	4	845	6	2	20	0	3,104	2.15
1966	804	0	0	1	249	0	0	752	600	0	2	890	7	0	10	0	2,511	3.12
1967	637	0	0	2	60	2	0	257	665	0	0	622	1	1	2	0	1,612	2.53
1968	339	0	0	0	41	0	0	56	87	0	0	258	3	5	9	0	459	1.35
1969	1,016	0	0	0	12	1	0	111	1,096	0	0	1,141	279	2	113	0	2,755	2.71
1970	920	0	0	0	59	0	0	89	796	0	1	175	95	0	25	0	1,240	1.35
1971	634	0	0	0	45	2	0	109	1,477	0	0	970	74	1	55	0	2,733	4.31
1972	546	0	0	1	57	2	0	61	1,508	0	0	1,264	48	0	18	0	2,959	5.42
1973	329	0	0	0	76	0	0	135	578	0	0	851	35	0	4	0	1,679	5.10
1974	1,276	0	0	0	131	18	0	99	2,224	0	0	496	54	0	3	0	3,025	2.37
1975	1,174	0	0	0	148	9	0	241	2,449	2	0	797	14	2	1	0	3,664	3.12
1976	509	1	1	2	612	59	0	789	3,003	0	4	846	0	0	0	0	5,317	10.45
1977	693	0	2	0	823	1	0	1,969	688	0	14	655	52	0	13	0	4,217	6.09
1978	896	0	0	2	398	6	0	510	6,071	0	0	2,184	25	4	8	0	9,208	10.28
1979	1,032	0	3	0	712	9	3	520	3,036	0	4	1,659	0	0	0	0	5,947	5.76

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Brood		Return by Age Class																	
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1980	1,061	0	1	13	803	26	0	2,225	4,576	0	6	917	7	0	0	0	8,575	8.08
1981	695	0	0	6	544	64	0	953	3,284	0	11	1,438	9	0	7	0	6,316	9.09
1982	1,035	2	2	4	988	12	0	1,874	1,796	0	9	1,638	11	2	2	0	6,339	6.12
1983	792	0	3	0	1,748	7	1	2,763	3,235	0	7	2,822	21	23	16	0	10,646	13.44
1984	1,165	0	1	8	608	85	0	978	6,539	3	10	5,029	215	13	39	0	13,528	11.61
1985	1,095	4	0	9	567	32	0	1,404	4,358	0	9	1,262	8	0	18	0	7,671	7.01
1986	1,152	0	2	14	1,850	10	0	3,733	3,912	0	92	4,515	86	83	34	0	14,331	12.44
1987	1,274	2	0	9	886	66	0	4,561	8,863	3	101	11,239	133	31	57	0	25,951	20.37
1988	1,599	0	1	0	413	62	0	1,278	11,061	0	4	5,650	261	3	152	0	18,885	11.81
1989	1,612	1	0	6	513	34	0	456	6,063	1	6	3,979	170	1	31	0	11,261	6.99
1990	2,192	0	0	2	403	66	0	867	9,598	1	3	4,721	21	28	30	0	15,739	7.18
1991	2,787	4	1	3	1,397	20	2	3,939	3,113	0	47	2,607	19	2	9	0	11,163	4.01
1992	1,946	5	0	32	335	54	3	1,117	4,963	2	4	3,099	53	16	17	0	9,701	4.99
1993	1,517	0	2	10	497	31	0	573	880	0	11	992	6	0	1	0	3,002	1.98
1994	1,898	1	8	0	368	65	0	982	4,228	0	0	3,071	11	15	9	0	8,758	4.61
1995	1,267	0	7	0	3,151	4	0	3,175	1,644	0	16	1,455	10	11	12	0	9,485	7.49
1996	1,076	0	1	0	497	5	0	1,791	515	3	40	1,727	28	4	7	0	4,617	4.29
1997	1,104	0	0	0	34	19	0	322	3,572	9	3	1,971	246	4	38	0	6,674	6.05
1998	1,111	0	0	0	104	13	0	206	602	1	2	684	22	3	0	[d]	1,637 [d]	1.47
1999	1,728	1	0	0	249	213	0	676	9,686	0	6	3,010	22	[d]	[d]	[d]	13,863 [d]	8.02
2000	1,032	0	2	0	1,726	27	0	2,907	3,224	0	[d]	[d]	[d]	[d]	[d]	[d]	7,886 [d]	7.64
2001	969	0	0	0	294	58	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2002	1,036	0	30	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2003	1,152	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2004	1,290	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2005	1,622	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
56–00 Avg.																		5.80

[a] R/S = return per spawner.

[b] Escapement not available.

[c] Younger age groups not available.

[d] Incomplete returns from brood year escapement.

Appendix C5.–Ugashik River sockeye salmon escapement and return by brood year (in thousands), 1949–2005.

Brood		Return by Age Class																
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1949	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	0	0	0	2	0	2 [d]	
1950	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	0	0	0	1	45	0	0	3	0	49 [d]	
1951	0 [b]	0 [c]	0 [c]	0	0	0	1	47	174	0	2	118	1	0	0	0	343 [d]	
1952	0 [b]	0	0	1	508	0	0	391	209	0	0	78	2	0	0	0	1,189	
1953	0 [b]	0	0	0	216	0	0	249	420	0	0	216	7	0	0	0	1,108	
1954	0 [b]	0	0	0	24	3	0	28	395	0	0	61	0	0	0	0	511	
1955	0 [b]	0	0	1	17	1	0	33	118	0	0	7	0	0	0	0	178	
1956	425	1	12	0	3,165	0	0	837	80	0	2	35	0	0	0	0	4,132	9.72
1957	215	0	0	1	35	0	0	105	354	0	2	100	4	0	2	0	603	2.80
1958	280	0	0	0	63	0	0	105	444	0	0	66	0	0	0	0	678	2.42
1959	219	0	0	0	18	0	0	38	310	0	0	132	0	0	1	0	499	2.28
1960	2,304	0	0	0	674	11	0	296	1,563	0	0	487	0	0	0	0	3,031	1.32
1961	349	0	0	3	240	2	0	500	247	0	1	120	0	0	0	0	1,114	3.19
1962	255	0	0	2	77	2	0	130	185	0	0	27	0	0	0	0	423	1.66
1963	388	0	0	0	13	0	0	21	91	0	0	23	0	0	0	0	148	0.38
1964	473	0	0	0	31	9	0	16	245	0	0	18	0	0	2	0	322	0.68
1965	997	0	0	0	86	2	0	38	249	0	1	162	1	0	0	0	539	0.54
1966	704	1	0	2	723	0	0	1,478	90	0	0	21	0	0	0	0	2,315	3.29
1967	239	0	0	0	56	0	0	50	44	0	0	34	0	0	0	0	184	0.77
1968	71	0	0	0	14	0	0	7	15	0	0	3	0	0	0	0	39	0.55
1969	160	0	0	0	4	0	0	5	53	0	0	26	2	0	2	0	92	0.58
1970	735	0	0	0	4	1	0	2	256	0	1	28	2	0	1	0	295	0.40
1971	530	0	0	0	178	0	0	236	290	0	0	130	0	0	1	0	835	1.58
1972	79	0	0	0	35	0	0	58	119	0	0	41	2	0	3	0	258	3.27
1973	39	0	0	1	16	0	0	8	17	0	0	46	4	0	0	0	92	2.36
1974	62	0	0	0	13	10	0	15	602	0	0	83	2	0	0	0	725	11.69
1975	429	0	3	0	1,484	4	0	575	1,721	0	0	325	2	1	0	0	4,116	9.59
1976	356	0	0	2	2,027	58	0	1,527	1,248	0	7	437	0	0	3	0	5,309	14.91
1977	202	0	2	18	585	0	0	1,614	266	0	10	186	6	1	4	0	2,692	13.33
1978	82	0	0	5	247	7	0	413	863	0	6	523	1	0	0	0	2,065	25.18
1979	1,707	0	20	0	3,076	8	0	851	1,471	0	14	562	0	5	0	0	6,006	3.52
1980	3,335	0	1	13	1,183	39	0	2,309	3,371	0	10	850	3	2	0	0	7,781	2.33

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Brood Year	Escapement	Return by Age Class															Total	R/S [a]
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4		
1981	1,328	0	2	10	1,603	4	0	2,632	2,278	0	4	933	1	1	0	0	7,468	5.62
1982	1,186	0	1	15	423	1	1	713	606	0	9	737	0	2	0	0	2,508	2.11
1983	1,001	0	0	10	650	6	1	342	632	0	3	319	1	1	0	0	1,965	1.96
1984	1,270	0	0	5	472	55	0	568	3,635	0	13	709	3	0	4	0	5,464	4.30
1985	1,006	2	1	6	508	2	0	721	978	0	4	469	0	5	0	0	2,695	2.68
1986	1,016	5	1	46	503	1	0	2,427	1,874	0	71	1,750	4	15	0	0	6,696	6.59
1987	687	7	1	9	828	11	0	1,626	1,875	0	25	2,310	10	20	24	0	6,745	9.82
1988	654	1	2	1	463	27	0	692	2,144	0	37	2,252	22	3	7	0	5,650	8.64
1989	1,713	3	7	7	694	14	0	391	2,479	0	12	955	6	1	4	0	4,573	2.67
1990	749	0	1	13	345	15	2	709	2,302	0	2	1,218	2	2	0	0	4,611	6.16
1991	2,482	1	6	0	2,034	1	0	3,167	597	0	14	326	0	4	0	0	6,151	2.48
1992	2,195	6	3	49	191	4	1	597	1,013	0	1	827	0	10	1	0	2,703	1.23
1993	1,413	1	2	2	265	7	0	352	241	0	17	198	0	0	1	0	1,086	0.77
1994	1,095	0	12	4	333	12	0	327	689	0	6	274	1	2	0	0	1,660	1.52
1995	1,321	3	18	7	2,808	1	0	1,562	185	0	19	82	0	1	0	0	4,686	3.55
1996	692	0	0	40	231	0	3	978	36	0	16	81	1	1	1	0	1,388	2.01
1997	657	1	0	2	234	0	0	701	1,553	0	11	534	23	0	2	0	3,061	4.66
1998	925	0	1	0	204	1	0	292	603	0	5	241	2	0	0	[d]	1,349 [d]	1.46
1999	1,662	0	6	3	1,088	25	0	769	1,425	0	7	399	0	[d]	[d]	[d]	3,722 [d]	2.24
2000	638	0	3	2	1,711	0	0	2,186 [d]	92 [d]	0 [d]	[d]	[d]	[d]	[d]	[d]	[d]	3,994 [d]	6.26
2001	866	1	2	8	382 [d]	2 [d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2002	892	9 [d]	8 [d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2003	790	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2004	815	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2005	800	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
56–00 Avg.																		4.33

[a] R/S = return per spawner.

[b] Escapement not available.

[c] Younger age groups not available.

[d] Incomplete returns from brood year escapement.

Appendix C6.–Wood River sockeye salmon escapement and return by brood year (in thousands), 1950–2005.

Brood		Return by Age Class																
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1950	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	1	57	0	0	0	0	58 [d]	
1951	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	456	290	0	3	54	0	0	1	0	804 [d]	
1952	0 [b]	0 [c]	0 [c]	0	690	0	0	558	29	0	2	34	0	0	0	0	1,313 [d]	
1953	0 [b]	0	0	0	301	0	0	331	139	0	2	34	0	0	1	0	808	
1954	0 [b]	0	0	0	1,237	0	0	140	1,085	0	1	66	0	0	0	0	2,529	
1955	0 [b]	0	0	0	2,407	0	0	833	401	0	5	143	0	0	0	0	3,789	
1956	773	0	0	48	774	0	0	627	24	0	0	0	0	0	0	0	1,473	1.91
1957	289	0	0	21	136	0	0	257	35	0	0	0	0	0	0	0	449	1.56
1958	960	0	1	0	2,145	1	0	389	75	0	0	32	0	0	0	0	2,643	2.75
1959	2,209	0	0	1	979	10	0	398	359	0	1	55	0	0	2	0	1,805	0.82
1960	1,016	0	6	0	1,474	0	0	1,039	106	0	2	105	1	0	0	0	2,734	2.69
1961	461	0	0	10	255	0	0	1,183	24	0	2	20	0	1	1	0	1,496	3.25
1962	874	1	2	0	992	1	2	340	116	0	6	43	0	0	0	0	1,503	1.72
1963	721	0	0	0	536	1	0	769	76	0	0	46	0	0	0	0	1,428	1.98
1964	1,076	0	1	6	452	0	0	347	338	0	0	74	0	0	2	0	1,220	1.13
1965	675	2	1	8	472	1	0	999	90	0	0	213	0	0	1	0	1,786	2.65
1966	1,209	0	7	29	974	0	0	988	46	0	7	69	0	0	1	0	2,121	1.75
1967	516	0	3	21	642	0	0	269	75	0	2	80	0	0	0	0	1,092	2.12
1968	649	0	1	0	514	0	0	565	5	0	4	19	0	0	0	0	1,108	1.71
1969	604	0	0	4	57	0	0	445	201	0	10	116	0	0	0	0	833	1.38
1970	1,162	0	2	0	1,539	0	0	1,002	231	0	0	26	0	0	0	0	2,800	2.41
1971	851	3	0	18	456	0	0	576	198	0	1	49	0	0	0	0	1,301	1.53
1972	431	2	1	22	779	0	0	631	32	0	20	27	0	0	0	0	1,514	3.51
1973	330	1	1	0	213	0	0	1,148	74	0	3	44	0	0	0	0	1,484	4.50
1974	1,709	0	3	6	2,956	4	0	1,698	421	0	5	71	0	0	0	0	5,164	3.02
1975	1,270	13	47	12	1,592	2	0	1,977	406	0	2	734	0	0	0	0	4,785	3.77
1976	817	0	3	0	2,278	3	0	2,589	572	0	10	265	0	0	0	0	5,720	7.00
1977	562	0	20	0	1,029	0	0	2,173	40	0	0	26	2	0	0	0	3,290	5.85
1978	2,267	0	0	0	1,364	3	0	1,029	784	0	12	96	0	0	0	0	3,288	1.45
1979	1,706	0	10	0	2,643	0	0	1,491	24	0	1	13	0	0	0	0	4,182	2.45
1980	2,969	0	0	0	453	0	0	978	72	0	1	101	0	0	0	0	1,605	0.54

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Brood Year	Escapement	Return by Age Class																Total	R/S [a]
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4			
1981	1,233	0	0	0	626	0	0	1,137	60	0	0	86	0	0	0	0		1,909	1.55
1982	976	0	4	0	522	0	0	765	121	0	12	14	0	0	0	0		1,438	1.47
1983	1,361	0	1	5	1,940	0	2	1,154	15	0	2	75	0	0	0	0		3,194	2.35
1984	1,003	0	0	0	586	0	2	1,340	32	0	15	23	0	0	0	0		1,998	1.99
1985	939	8	3	15	1,127	0	1	1,390	29	0	2	12	0	1	0	0		2,588	2.76
1986	819	7	2	25	1,179	0	1	1,970	70	0	12	64	0	0	0	0		3,330	4.07
1987	1,337	25	0	30	1,334	0	14	756	98	0	8	92	0	1	0	0		2,358	1.76
1988	867	4	1	8	1,613	0	3	1,425	90	0	15	34	0	0	0	0		3,193	3.68
1989	1,186	1	4	16	2,293	0	0	1,922	13	0	2	39	0	0	0	0		4,290	3.62
1990	1,069	10	1	10	1,104	1	3	1,208	286	0	2	169	0	0	0	0		2,794	2.61
1991	1,160	0	12	9	2,633	0	0	2,466	54	0	65	71	0	0	0	0		5,310	4.58
1992	1,286	10	1	57	2,398	0	2	1,674	90	0	0	49	0	0	1	0		4,282	3.33
1993	1,176	14	0	3	1,715	0	9	1,161	129	0	3	191	0	0	0	0		3,225	2.74
1994	1,472	0	10	0	2,747	1	0	1,993	448	0	2	91	0	0	0	0		5,292	3.59
1995	1,482	1	5	0	3,524	0	0	2,594	149	0	61	35	0	0	0	0		6,369	4.30
1996	1,650	0	0	0	2,705	0	0	3,676	3	0	58	13	0	0	0	0		6,455	3.91
1997	1,512	4	0	63	174	0	4	675	164	0	25	203	0	0	0	0		1,312	0.87
1998	1,756	0	3	11	2,910	1	0	3,516	176	0	9	104	0	0	0		[d]	6,729 [d]	3.83
1999	1,512	4	2	42	1,778	1	0	2,239	403	0	10	144	0		[d]	[d]	[d]	4,623 [d]	3.06
2000	1,300	0	3	5	3,184	0	0	2,181	120	0		[d]	[d]	[d]	[d]	[d]	[d]	5,493 [d]	4.23
2001	1,459	4	0	42	2,059	0		[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2002	1,284	15	36	[d]		[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2003	1,460	[d]	[d]	[d]		[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2004	1,543	[d]	[d]	[d]		[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2005	1,497	[d]	[d]	[d]		[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
56–00 Avg.																			2.75

[a] R/S = return per spawner.

[b] Escapement not available.

[c] Younger age groups not available.

[d] Incomplete returns from brood year escapement.

Appendix C7.–Igushik River sockeye salmon escapement and return by brood year (in thousands), 1950–2005.

Brood		Return by Age Class																
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1950	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	1	78	0	0	0	0	79 [d]	
1951	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	615	62	0	1	29	0	0	2	0	709 [d]	
1952	0 [b]	0 [c]	0 [c]	0	147	0	0	303	9	0	5	73	0	0	0	0	537 [d]	
1953	0 [b]	0	0	0	98	0	0	1	20	0	3	65	0	0	1	0	188	
1954	0 [b]	0	0	0	175	0	0	269	204	0	0	113	0	1	0	0	762	
1955	0 [b]	0	0	0	454	0	0	781	113	0	0	94	0	0	0	0	1,442	
1956	400	0	0	0	169	0	0	523	12	0	3	36	0	0	0	0	743	1.86
1957	130	0	0	0	2	0	0	35	19	0	0	20	0	0	0	0	76	0.58
1958	107	0	0	0	14	0	0	71	20	0	0	28	0	0	0	0	133	1.24
1959	644	0	0	0	101	0	0	155	93	0	0	22	0	0	0	0	371	0.58
1960	495	0	0	1	61	0	0	310	44	0	0	57	0	0	0	0	473	0.96
1961	294	0	0	1	33	0	1	364	20	0	0	17	0	0	0	0	436	1.48
1962	16	0	0	8	20	0	0	280	9	0	0	9	0	0	0	0	326	20.38
1963	92	0	0	3	254	0	0	190	36	0	0	25	0	0	0	0	508	5.52
1964	129	0	0	1	162	0	0	585	133	0	0	49	0	0	0	0	930	7.21
1965	181	0	0	0	371	0	0	436	203	0	0	80	0	0	0	0	1,090	6.02
1966	206	0	0	0	66	0	0	383	6	0	0	15	0	0	0	0	470	2.28
1967	282	0	0	3	57	0	0	90	13	0	0	12	0	0	0	0	175	0.62
1968	195	0	0	0	43	0	0	120	0	0	2	10	0	0	0	0	175	0.90
1969	512	0	0	0	1	0	0	131	301	0	2	103	0	0	0	0	538	1.05
1970	371	0	0	1	26	0	0	170	41	0	0	71	0	0	0	0	309	0.83
1971	211	0	0	1	48	0	0	164	60	0	0	30	0	0	0	0	303	1.44
1972	60	0	0	4	89	0	0	109	6	0	8	13	0	0	0	0	229	3.82
1973	60	0	0	0	19	0	0	650	25	0	2	29	0	0	0	0	725	12.08
1974	359	0	0	7	441	1	0	750	346	0	4	25	0	0	0	0	1,574	4.39
1975	241	0	0	0	783	0	0	2,556	137	0	2	503	0	0	0	0	3,981	16.52
1976	186	0	0	0	551	3	0	1,411	194	0	20	215	0	0	0	0	2,394	12.87
1977	96	0	0	6	294	0	0	1,689	9	0	8	9	0	0	0	0	2,015	20.99
1978	536	0	0	0	96	0	0	330	84	0	1	15	0	0	0	0	526	0.98
1979	860	0	0	0	422	0	0	406	13	0	0	5	0	0	0	0	846	0.98
1980	1,988	0	0	0	20	0	0	271	25	0	0	56	0	0	0	0	372	0.19

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Brood		Return by Age Class																	
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1981	591	0	0	0	188	0	0	779	8	0	1	49	0	0	0	0	1,025	1.73
1982	424	0	0	7	57	0	0	434	9	0	2	10	0	0	0	0	519	1.22
1983	180	1	0	0	151	0	0	353	8	0	2	29	0	0	0	0	544	3.02
1984	185	0	0	0	41	0	0	641	56	0	5	36	0	1	0	0	780	4.22
1985	212	0	0	7	515	0	0	938	86	0	7	79	0	1	0	0	1,633	7.70
1986	308	3	0	14	236	0	1	2,231	27	0	15	30	0	0	0	0	2,557	8.30
1987	169	2	0	11	158	0	0	587	7	0	12	29	0	0	0	0	806	4.77
1988	170	0	0	1	189	0	1	1,056	41	0	3	36	0	0	0	0	1,327	7.81
1989	462	0	0	15	508	0	0	1,119	59	0	7	53	0	0	0	0	1,761	3.81
1990	366	1	0	3	159	0	0	1,429	183	0	4	146	0	0	0	0	1,925	5.26
1991	756	0	0	1	318	0	0	1,314	3	0	5	20	0	0	0	0	1,661	2.20
1992	305	0	0	3	44	0	0	148	8	0	0	26	0	0	0	0	229	0.75
1993	406	0	0	1	132	0	2	316	20	0	0	35	0	0	0	0	506	1.25
1994	446	0	0	0	238	0	0	846	92	0	1	26	0	0	0	0	1,203	2.70
1995	473	0	0	0	653	0	0	1,599	15	0	21	13	0	0	0	0	2,301	4.86
1996	401	0	0	0	171	0	0	1,237	1	0	4	4	0	0	0	0	1,417	3.53
1997	128	0	0	19	34	0	0	52	10	0	5	58	0	0	0	0	178	1.39
1998	216	0	0	0	143	0	0	732	28	0	8	30	0	1	0	0 [d]	942 [d]	4.36
1999	446	0	0	7	206	0	0	310	71	0	0	297	0	0 [d]	0 [d]	0 [d]	891 [d]	2.00
2000	413	0	0	0	104	0	0	1,656	71	0	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	1,831 [d]	4.43
2001	410	0	0	0	64	0	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	64 [d]	
2002	123	0	0	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	
2003	194	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	
2004	110	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	
2005	366	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]	
56–00 Avg.																		4.47

[a] R/S = return per spawner.

[b] Escapement not available.

[c] Younger age groups not available.

[d] Incomplete returns from brood year escapement.

Appendix C8.–Nushagak River sockeye salmon escapement and return by brood year (in thousands), 1974–2005.

Brood		Return by Age Class																			
Year	Escapement [a]	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	0.5	1.4	2.3	3.2	1.5	2.4	3.3	3.4	Total		R/S [b]
1974	185	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	0			
1975	752	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	0	1	0	0	1	[d]	
1976	470	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	0	38	281	0	0	0	0	319	[d]	
1977	553	[c]	[c]	[c]	[c]	[c]	67	1,946	3	0	0	134	11	1	0	0	0	0	2,162	[d]	
1978	664	[c]	[c]	436	100	0	149	779	20	0	0	1	6	0	0	1	0	0	1,491		2.24
1979	499	18	1	466	494	0	16	854	6	0	0	42	5	0	0	0	0	0	1,902		3.81
1980	3,317	19	0	447	84	0	67	344	162	0	0	4	156	0	0	0	0	0	1,284		0.39
1981	1,012	9	0	137	170	0	14	1,476	2	0	0	86	32	0	0	0	0	0	1,926		1.90
1982	601	35	0	351	164	0	49	894	2	0	0	62	7	0	0	0	0	0	1,563		2.60
1983	404	100	0	608	114	0	122	553	6	0	0	16	3	0	0	0	0	0	1,521		3.77
1984	593	10	0	226	51	0	32	566	2	0	0	20	6	0	0	0	0	0	912		1.54
1985	498	68	0	510	64	0	62	612	6	0	0	13	16	0	0	1	0	0	1,351		2.71
1986	990	68	0	837	114	0	58	676	0	0	0	182	64	0	0	0	0	0	1,999		2.02
1987	388	140	0	933	36	0	253	535	36	0	0	101	10	0	0	1	0	0	2,047		5.28
1988	483	68	0	546	214	0	120	1,426	12	0	0	62	8	0	0	0	0	0	2,457		5.09
1989	513	68	0	483	124	0	35	703	1	0	0	18	4	0	0	0	0	0	1,436		2.80
1990	680	53	0	761	36	0	104	253	18	0	0	11	7	0	0	4	0	0	1,247		1.83
1991	493	10	1	137	172	0	6	1,010	3	0	0	131	19	0	0	0	0	0	1,491		3.03
1992	695	85	0	496	228	0	11	650	9	0	0	63	11	0	0	0	0	0	1,551		2.23
1993	715	43	0	43	63	0	2	803	1	0	0	119	49	0	0	0	0	0	1,124		1.57
1994	509	0	0	55	81	0	2	665	6	0	0	9	53	0	0	0	0	0	872		1.71
1995	281	5	1	8	143	0	0	923	34	0	0	109	15	0	0	0	0	0	1,239		4.41
1996	504	0	0	6	502	0	5	1,795	3	0	0	58	5	0	0	0	0	0	2,374		4.71
1997	373	0	0	129	71	0	6	254	14	0	0	19	86	0	4	0	0	0	583		1.56
1998	459	2	0	10	312	0	3	1,633	64	0	0	182	80	0	0	0	0	[d]	2,286	[d]	4.98
1999	312	4	0	40	421	0	5	1,598	25	0	1	71	26	0	[d]	[d]	[d]	[d]	2,191	[d]	7.02
2000	404	7	0	89	233	0	10	2,892	23	0	0	[d]	[d]	[d]	[d]	[d]	[d]	[d]	3,254	[d]	8.05
2001	811	11	0	240	294	0	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]		[d]	
2002	316	10	0	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]		[d]	
2003	581	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]		[d]	
2004	492	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]		[d]	
2005	1,049	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]		[d]	
78–00 Avg.																					3.27

[a] Escapement for brood years 1974–1983 and 1985–1986 based on Nuyakuk tower plus aerial survey estimates. Escapement for brood years 1984 and 1987 - present based on Nushagak sonar estimates.

[b] R/S = return per spawner.

[c] Younger age groups not available.

[d] Incomplete returns from brood year escapement.

Appendix C9.–Togiak River sockeye salmon escapement and return by brood year (in thousands), 1950–2005.

Brood		Return by Age Class																
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1950	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	28	0	0	0	0	28 [d]	
1951	0 [b]	0 [c]	0 [c]	0 [c]	0 [c]	0 [c]	0	98	53	0	0	9	0	0	0	0	160 [d]	
1952	0 [b]	0 [c]	0 [c]	0	152	0	0	58	9	0	0	6	0	0	0	0	225 [d]	
1953	0 [b]	0	0	1	31	0	0	84	8	0	0	16	0	0	0	0	140	
1954	0 [b]	0	0	0	20	0	0	146	12	0	0	17	2	0	0	0	197	
1955	0 [b]	0	0	0	136	0	0	190	9	0	1	38	0	0	0	0	374	
1956	225	0	0	4	114	0	0	306	22	0	1	13	0	0	0	0	460	2.04
1957	25	2	0	5	48	0	0	70	20	0	0	36	1	0	0	0	182	7.29
1958	72	0	1	2	68	0	0	115	59	0	0	25	0	0	0	0	270	3.76
1959	210	0	0	0	141	0	0	92	56	0	0	7	0	0	0	0	296	1.41
1960	163	0	0	2	191	0	0	274	22	0	0	52	0	0	0	0	541	3.32
1961	122	1	0	3	85	0	0	216	15	0	1	19	0	0	0	0	340	2.79
1962	62	0	0	7	48	0	0	102	4	0	0	8	0	0	0	0	169	2.73
1963	116	0	0	2	43	0	0	65	18	0	0	24	0	0	0	0	152	1.31
1964	105	0	0	1	43	0	0	84	41	0	0	6	0	0	0	0	175	1.67
1965	96	0	0	2	154	0	0	181	31	0	0	37	0	0	0	0	405	4.22
1966	104	1	0	6	200	0	0	419	4	0	1	9	0	0	0	0	640	6.15
1967	81	1	0	6	18	0	0	99	16	0	1	40	0	0	0	0	181	2.23
1968	50	0	0	1	49	0	0	190	6	0	3	13	0	0	0	0	262	5.24
1969	117	0	0	5	28	0	0	142	25	0	3	13	0	0	0	0	216	1.85
1970	203	0	0	1	54	0	0	226	55	0	1	70	0	0	0	0	407	2.00
1971	200	0	0	4	106	0	0	317	62	0	1	68	0	0	0	0	558	2.79
1972	79	0	0	2	93	0	0	150	21	0	2	34	0	0	0	0	302	3.83
1973	107	1	0	10	151	0	0	442	18	0	1	31	0	0	0	0	654	6.11
1974	104	0	0	2	271	0	0	307	73	0	3	45	0	1	0	0	702	6.75
1975	181	1	0	7	195	0	0	848	87	0	2	59	0	0	0	0	1,199	6.62
1976	189	0	0	1	189	0	0	558	142	0	4	175	0	0	0	0	1,069	5.66
1977	163	0	0	5	232	0	0	617	14	0	4	14	0	0	0	0	886	5.44
1978	306	0	0	12	149	0	0	430	65	0	1	25	0	0	0	0	682	2.23
1979	198	1	0	1	270	0	0	293	12	0	2	5	0	0	0	0	584	2.95
1980	527	0	0	5	45	0	1	224	10	0	0	19	0	0	0	0	304	0.58

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Brood		Return by Age Class																
Year	Escapement	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	Total	R/S [a]
1981	307	2	0	11	53	0	0	245	15	0	1	16	0	0	0	0	343	1.12
1982	289	0	0	16	109	0	0	255	14	0	5	26	0	0	0	0	425	1.47
1983	213	1	0	3	285	0	2	924	9	0	2	21	0	0	0	0	1,247	5.86
1984	151	0	0	14	21	0	0	109	4	0	1	17	0	0	0	0	166	1.10
1985	153	0	0	7	35	0	0	194	35	0	1	77	0	1	0	0	350	2.29
1986	203	0	0	18	77	0	1	445	83	0	14	121	0	0	0	0	759	3.74
1987	278	0	0	7	190	0	1	575	31	0	7	81	0	0	0	0	892	3.21
1988	309	1	0	9	111	0	3	403	34	0	3	53	0	0	0	0	617	2.00
1989	104	0	0	36	132	0	1	328	7	0	1	41	0	0	0	0	546	5.25
1990	166	1	0	23	101	0	1	460	75	0	5	37	0	0	0	0	703	4.23
1991	254	1	3	3	189	0	1	429	28	0	8	29	0	0	0	0	691	2.72
1992	210	1	0	35	50	0	1	124	33	0	1	30	0	0	0	0	275	1.31
1993	189	0	0	4	64	0	0	229	6	0	4	15	0	0	0	0	322	1.71
1994	174	1	0	3	43	0	0	167	31	0	1	8	0	0	0	0	254	1.46
1995	211	0	1	6	341	0	1	1,010	11	0	5	66	0	0	0	0	1,441	6.83
1996	187	1	0	9	87	0	0	987	4	0	8	21	1	0	0	0	1,444	7.72
1997	152	0	0	5	43	0	0	305	16	0	5	87	0	2	0	0	463	3.05
1998	175	0	0	1	54	0	0	633	24	0	5	91	0	0	0	[d]	808 [d]	4.62
1999	196	0	0	11	137	0	0	290	29	0	1	50	0	[d]	[d]	[d]	518 [d]	2.64
2000	352	0	0	4	87	0	0	318	141	0	[d]	[d]	[d]	[d]	[d]	[d]	550 [d]	1.56
2001	303	0	0	7	63	0	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2002	162	0	0	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2003	232	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2004	136	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
2005	156	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
56–00 Avg.																		3.44

[a] R/S = return per spawner.

[b] Escapement not available.

[c] Younger age groups not available.

[d] Incomplete returns from brood year escapement.

APPENDIX D. 2005 AERIAL SURVEY COUNTS

Appendix D1.–Aerial survey counts of sockeye salmon, Alagnak River system, 2005.

Location	Survey Date	Number of Fish	Percent of Total
Nonvianuk River	5 Aug	0	0.0
Nonvianuk Lake			
Kulik River	5 Aug	290,000	16.4
Kulik Lake			
Alagnak River		0	0.0
Kukaklek Lake	5 Aug	23,000	1.3
Nanuktuk Creek	5 Aug	453,000	25.7
Battle River	5 Aug	245,000	13.9
Battle Lake	5 Aug	80,000	4.5
Moraine/Spectacle Creek	5 Aug	460,000	26.0
Funnel Creek	5 Aug	215,000	12.2
Total		1,766,000	100.0

Note: Blank cells NS = not surveyed. Aerial surveys were conducted with fixed-wing aircraft.

Appendix D2.–Aerial survey peak counts of sockeye salmon escapement, King Salmon and Dog Salmon River, Ugashik District, 2005.

Location	Survey Date	Number of Sockeye Salmon Counted
King Salmon River System:		
Goose Lake and outlet	8 Aug	See Text for Ugashik District
Needle Lake	8 Aug	See Text for Ugashik District
Volcano Creek	8 Aug	See Text for Ugashik District
Painter Creek	8 Aug	See Text for Ugashik District
Indecision Creek	8 Aug	See Text for Ugashik District
Dog Salmon River System:		
Figure-Eight Creek	8 Aug	12,840
Goblet Creek	8 Aug	ND
Oldham Creek	8 Aug	7,100
Wandering Creek	8 Aug	500
Mainstem Dog Salmon River	8 Aug	ND
Total		20,440

Note: ND = No Data.

Appendix D3.–Peak aerial live counts and total escapement estimates of sockeye salmon in the Wood River System, 2005.

Area	Date	Aerial Count	Tower Count	Population Estimate	Observed Distribution
Wood River	15 Aug	11,000	1,496,550	16,400	4.4%
Lake Aleknagik		31,702		355,800	12.8%
Eagle Creek[a]	20 Aug	499			
Hansen Creek[a]	21 Aug	3,928			
Happy Creek[a]	3 Aug	4,723			
Bear Creek[a]	9 Aug	3,057			
Yako Creek[a]	6 Aug	3,487			
Whitefish Creek[a]	27 Aug	641			
Ice Creek[a]	7 Aug	9,935			
Mission Creek[a]	18 Aug	296			
Sunshine Creek	16 Aug	1836			
Youth Creek					
Northshore Beaches	15 Aug	1,200			
Southshore Beaches	15 Aug	1,150			
Yako Beaches	15 Aug	950			
Agulowok River & lower River Bay	15 Aug	86,000		128,400	34.7%
Lake Nerka		41,648		467,400	16.8%
Fenno Creek[a]	9 Aug	3,600			
Pike Creek[a]	15 Aug	1,437			
Stovall Creek[a]	25 Aug	1,889			
Bear Creek					
Teal Creek[a]	15 Aug	23			
Pick Creek[a]	16 Aug	6,326			
Elva Creek[a]	21 Aug	62			
Kema Creek[a]	24 Aug	2,584			
Hidden Lake Creek[a]	18 Aug	3,008			
Lynx Creek[a]	22 Aug	4,219			
Sam Creek[a]					
Joe Creek[a]					
Upper River Bay Beaches, NW					
Upper River Bay Beaches, SE	15 Aug	900			
Allan Cr. - Ross Cr. Beaches	15 Aug	400			
N6 - River Bay Beach	15 Aug	3,500			

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Area	Date	Aerial Count	Tower Count	Population Estimate	Observed Distribution
Pick Creek Beach	15 Aug	1,900			
Elva Creek Beach	15 Aug	200			
Amakuk Arm Beaches	15 Aug	2,000			
Amakuk Arm - Ott's Bay Beach	15 Aug	0			
Ott's Bay Beach	15 Aug	1,000			
Anvil Bay Beaches	15 Aug	2,500			
Anvil Bay - Elbow Pt. Beach	15 Aug	1,100			
Elbow Pt. - Lynx Cr. Beach	15 Aug	500			
Lynx Cr. - Teal Cr. Beach	15 Aug	2,400			
Kema Lake Beaches	15 Aug	600			
Hidden Lake Beaches	15 Aug	0			
Lynx Lake Beaches	15 Aug	1,500			
Little Togiak River[a]	30 Aug	13,135			5.3%
Little Togiak Lake	15 Aug	5,300			2.1%
Northshore Beaches	15 Aug	3,800			
Southshore Beaches	15 Aug	0			
D Slough Beaches	15 Aug	1,500			
Agulukpak River	15 Aug	12,500			5.0%
Lake Beverley		8,021			3.2%
Tsun Creek					
Moose Creek[a]	14 Aug	1,521			
Hope Creek					
Hardluck Bay Beaches	21 Aug	2,100			
Sam's Beach	21 Aug	0			
Golden Horn Beaches	21 Aug	0			
Silver Horn Beaches	21 Aug	300			
B12 & B9 Beaches	21 Aug	600			
B9-B1	21 Aug	2,800			
Other	21 Aug	700			
Hope Lake Beach	21 Aug				

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Area	Date	Aerial Count	Tower Count	Population Estimate	Observed Distribution
Peace River	21 Aug	5,500			2.2%
Lake Mikchalk	21 Aug	1,500			0.6%
Narrows					
Northshore Beaches					
Southshore Beaches					
Wind River	21 Aug	3,100			1.3%
Lake Kulik		27,100			10.9%
K1 & K2 creeks	21 Aug	0			
K5 Creek - Grant River Beaches	21 Aug	0			
Grant River - K2 Creek Beaches	21 Aug	24,000			
Southshore Beaches	21 Aug	3,100			
Grant River[a]	21 Aug	1,242			0.5%
Total		247,748		1,496,500	100.0%

[a] Ground survey counts conducted by FRI, University of Washington.

Appendix D4.–Peak aerial counts of live sockeye salmon and total escapement estimates, Togiak District, 2005.

	Aerial Counts		Total Escapement Estimate	
Stream	Date	Number	Factor [a]	Number
Togiak Section				
Togiak Tower				149,178
Togiak River mainstem	01 Sep	2790	2.0	5,580
Gechiak Lake System	01 Sep	320	1.5	480
Pungokepuk Lake	01 Sep	120	1.5	180
Nayorurun River	01 Sep	10	1.5	15
Kemuk River	01 Sep	120	1.5	180
Ongivinuk Lake System	01 Sep	110	1.5	165
Subtotal		3,470		6,600
Kulukak Section				
Kulukak River		NS	2.0	
Kulukak Lake		NS	2.0	
Tithe Creek Ponds		NS	1.5	
Subtotal				
Matogak, Osviak, and Cape Pierce Sections				
Matogak River		NS	3.0	
Osviak River	18 Aug	1,485	2.5	3,713
Slug River		NS	2.0	
Subtotal		1,485		3,713
Other				
Quigmy River		NS	2.5	
Negukthlik River		NS	3.0	
Ungalikthluk River		NS	2.0	
Subtotal		0		0
Total		4,955		159,491

Note: NS = not surveyed.

[a] Derived by expanding peak live count to reflect fish not counted due to variables such as schooled and dead fish, late or poor survey conditions, bad weather, etc.

Appendix D5.–Aerial survey counts of Chinook, chum, pink, and coho salmon, Naknek-Kvichak District, 2005.

Location	Survey Date	Number of Salmon			
		Chinook	Chum	Pink	Coho
Kvichak River		NS	NS	NS	NS
Alagnak River	17 Aug	5,084	33,000	NS	NS
Naknek River : [a]					
Paul's Creek	11 Aug	NS	NS	NS	NS
King Salmon Creek	12 Aug	NS	NS	NS	NS
Big Creek	13 Aug	NS	NS	NS	NS
Mainstem Naknek River	21 Aug	NS	NS	NS	NS
Total		5,084	33,000		

Note: NS = not surveyed.

[a] Naknek River drainage flown under poor conditions no estimate possible.

Appendix D6.–Aerial survey peak counts of Chinook salmon escapement, Egegik District, 2005.

Location	Survey Date	Chinook Salmon Counted
Egegik River	28 Jul	0[a]
Shosky Creek	28 Jul	21
Whale Mountain Creek	28 Jul	8
Mossy Creek	28 Jul	36
Mink Creek	28 Jul	0
Gertrude Creek	28 Jul	165
Kaye's Creek	28 Jul	71
Takayoto Creek	28 Jul	99
Angle Creek		NS
Contact Creek	28 Jul	150
Mainstem King Salmon River		NS
Total		550

[a] Tower count.

Note: NS = not surveyed.

Appendix D7.–Peak survey counts of Chinook salmon escapement, Ugashik District, 2005.

Location	Survey Date	Number of Chinook Salmon Counted
King Salmon River System		
Old Creek	8 Aug	54 [a]
Pumice Creek	8 Aug	124 [a]
Painter Creek	8 Aug	See Text for Ugashik District
Mainstem King Salmon River	8 Aug	See Text for Ugashik District
Indecision Creek	8 Aug	See Text for Ugashik District
Volcano Creek	8 Aug	See Text for Ugashik District
Dog Salmon River System		
Figure-Eight Creek	8 Aug	ND [a]
Goblet Creek	8 Aug	ND [a]
Oldham Creek	8 Aug	ND [a]
Wandering Creek	8 Aug	ND [a]
Mainstem Dog Salmon River	8 Aug	ND [a]
Ugashik River System		
Mainstem Ugashik River	8-Aug	ND [a]
Grassy Creek	8-Aug	25 [a]
Total		203

Note: ND = No Data.

[a] New observer, counts not reliable.

Appendix D8.–Peak aerial counts of live Chinook salmon and total escapement estimates, Togiak District, 2005.

		Aerial Counts		Total Escapement Estimates	
River		Date	Number	Factor [a]	Number
Togiak Section					
Togiak River mainstem					
	A	08 Aug	117	2.0	234
	B	08 Aug	414	2.0	828
	C	08 Aug	927	2.0	1,854
	D	08 Aug	576	2.0	1,152
	E	08 Aug	635	2.0	1,270
	F	08 Aug	1,139	2.0	2,278
	Subtotal		3,808		7,616
Gechiak River		08 Aug	144	2.0	288
Pungokepuk River		08 Aug	170	2.0	340
Nayorurun River		08 Aug	360	2.0	720
Kemuk River		08 Aug	265	2.0	530
Ongivinuk River		08 Aug	347	2.0	694
	Subtotal		1,286		2,572
	Togiak River Drainage Total		5,094		10,188
Kulukak Section					
Kulukak River		04 Aug	447	2.0	894
Matogak, Osviak, and Cape Pierce Sections					
Matogak River		26 Jul	133	2.0	266
Osviak River		26 Jul	202	2.0	404
Slug River		25 Jul	90	2.0	180
	Subtotal		425		850
Other					
Quigmy River		26 Jul	16	2.0	32
Negukthlik River		29 Jul	255	3.0	765
Ungalikthluk River		29 Jul	396	2.0	792
	Subtotal		667		1,589
Total			6,633		13,521

[a] Derived by expanding peak live count to reflect fish not counted due to variables such as schooled and dead fish, late or poor survey conditions, bad weather, etc.

Appendix D9.–Aerial survey peak counts of chum salmon escapement, Egegik District, 2005.

Location	Survey Date	Number of Chum Salmon Counted
Egegik River	28 Jul	0[a]
Shosky Creek	28 Jul	0
Whale Mountain Creek	28 Jul	300
Mossy Creek	28 Jul	10
Mink Creek	28 Jul	14
Gertrude Creek	28 Jul	770
Kaye's Creek	28 Jul	30
Takayoto Creek	28 Jul	0
Angle Creek		NS
Contact Creek	28 Jul	390
Mainstem King Salmon River		NS
Total		1,514

Note: NS = not surveyed.

[a] Tower count.

Appendix D10.–Peak survey counts of chum salmon escapement, Ugashik District, 2005.

Location	Survey Date	Number of Chum Salmon	
King Salmon River System			
Old Creek	8 Aug	2,030	[a]
Pumice Creek	8 Aug	1,310	[a]
Painter Creek	8 Aug	See Text for Ugashik District	
Mainstem King Salmon River	8 Aug	See Text for Ugashik District	
Needle Lake	8 Aug	See Text for Ugashik District	
Indecision Creek	8 Aug	See Text for Ugashik District	
Volcano Creek	8 Aug	See Text for Ugashik District	
Dog Salmon River System			
Figure-Eight Creek	8 Aug	ND	[a]
Goblet Creek	8 Aug	ND	[a]
Oldham Creek	8 Aug	ND	[a]
Wandering Creek	8 Aug	ND	[a]
Mainstem Dog Salmon River	8 Aug	ND	[a]
Ugashik River System			
Mainstem Ugashik River	8 Aug	24	
Grassy Creek	8 Aug	0	
Total		3,364	

Note: ND = No Data.

[a] New observer, counts not reliable.

Appendix D11.–Peak aerial counts of live chum salmon and total escapement estimates, Togiak District, 2005.

	Aerial Counts		Total Escapement Estimate	
River	Date	Number	Factor [a]	Estimate
Togiak Section				
Togiak River mainstem				
A	08 Aug	720	2.0	1,440
B	08 Aug	730	2.0	1,460
C	08 Aug	450	2.0	900
D	08 Aug	105	2.0	210
E	08 Aug	445	2.0	890
F	08 Aug	638	2.0	1,276
Subtotal		3,088		6,176
Gechiak River	08 Aug	765	2.0	1,530
Pungokepuk River	08 Aug	60	2.0	120
Nayororun River	08 Aug	420	2.0	840
Kemuk River	08 Aug	120	2.0	240
Ongivinuk River	08 Aug	780	2.0	1,560
Subtotal		2,145		4,290
Togiak River Drainage Total		5,233		10,466
Kulukak Section				
Kulukak River	04 Aug	790	2.0	1,580
Matogak, Osviak, and Cape Pierce Sections				
Matogak River	26 Jul	17,200	2.0	34,400
Osviak River	26 Jul	15,300	2.0	30,600
Slug River	25 Jul	1,350	2.0	2,700
Subtotal		33,850		67,700
Other				
Quigmy River	26 Jul	8,100	2.0	16,200
Negukthlik River	29 Jul	1,760	2.0	3,520
Ungalikthluk River	29 Jul	4,440	2.0	8,880
Subtotal		14,300		28,600
Total		54,173		108,346

[a] Derived by expanding peak live count to reflect fish not counted due to variables such as schooled and dead fish, late or poor survey conditions, bad weather, etc.

[b] U.S. Fish and Wildlife Service estimate.

Appendix D12.–Aerial survey counts of coho salmon escapement, Egegik District, 2005.

Location [a]	Survey Date	Coho Salmon Observed	Comments
Egegik River Rapids	24 Sep	10,500	
Stream 115.8 (Featherly Creek)	24 Sep	1,600	All along the lake shore in front of the creek.
Stream 107.6 (Burl's Creek)	24 Sep	2,200	All along the lake shore in front of the creek.
Stream 90.3 (Salmon Creek)	24 Sep	3,000	Most up creek
Stream 89.8	24 Sep	400	Along the shore in front of the creek.
Stream 87.0 (Bear Creek)	24 Sep	2,500	Along the shore in front of the creek.
Stream 73.5 (Becharof Creek)	24 Sep	1,700	Most up creek
Stream 48.1 (Kejulik River)	24 Sep	550	Margaret Cr., Albert Cr. And mainstem
Total		22,450	

[a] Streams tributary to Becharof Lake are designated by the number of miles between their mouth and the outlet of Becharof Lake (Egegik River) as one travels around the lake in a clockwise fashion from the Becharof lake outlet. This is the same system of designation used for years by previous investigators.

Appendix D13.–Aerial survey counts of coho salmon escapement, Ugashik District, 2005.

Location	Survey Date	Number of Coho Salmon Counted	Comments
Upper Ugashik Lake			
Crooked Creek	26 Sep	2,500	Most fish were along lake shore
Deer Creek	26 Sep	250	Most fish were up the creek
Lower Ugashik Lake			
Black Creek to Cabin	26 Sep	1,500	Most were along the lake shore
Black Creek to Elizabeth Lake	26 Sep	2,500	Most were along the lake shore
Ugashik Outlet	26 Sep	650	Below counting towers
King Salmon River Tributaries			
Pumice Creek	26 Sep	1,000	
Old Creek	26 Sep	650	
Painter Creek	26 Sep	ND	No fish seen, 1/2 of section surveyed
Dog Salmon River Tributaries			
Figure Eight Creek	26 Sep	800	
District Total		9,850	

Note: ND = No Data

APPENDIX E. 1985–2005 AERIAL SURVEY COUNTS

Appendix E1.–Sockeye salmon total escapement estimates, Naknek-Kvichak District, 1985–2005.

Year	Kvichak	Naknek	Alagnak		Total	Alagnak Percent of Total
1985	7,211,046	1,849,938	118,030	[a]	9,179,014	1
1986	1,179,322	1,977,645	230,180	[a]	3,387,147	7
1987	6,065,880	1,061,806	154,210	[a]	7,281,896	2
1988	4,065,216	1,037,862	194,630	[a]	5,297,708	4
1989	8,317,500	1,161,984	196,760	[a]	9,676,244	2
1990	6,970,020	2,092,578	168,760	[a]	9,231,358	2
1991	4,222,788	3,578,508	277,589	[a]	8,078,885	3
1992	4,725,864	1,606,650	226,643	[a]	6,559,157	3
1993	4,025,166	1,535,658	347,975	[a]	5,908,799	6
1994	8,337,840	990,810	242,595	[a]	9,571,245	3
1995	10,038,720	1,111,140	215,713	[a]	11,365,573	2
1996	1,450,578	1,078,098	306,750	[a]	2,835,426	11
1997	1,503,732	1,025,664	218,115	[a]	2,747,511	8
1998	2,296,074	1,202,172	252,200	[a]	3,750,446	7
1999	6,196,914	1,625,364	463,600	[a]	8,285,878	6
2000	1,827,780	1,375,488	451,300	[a]	3,654,568	12
2001	1,095,348	1,830,360	267,000	[a]	3,192,708	8
2002	703,884	1,263,918	282,100	[a]	2,249,902	13
2003	1,686,804	1,831,170	2,110,000	[a]	5,627,974	37
2004	5,500,134	1,939,374	5,396,592		12,836,100	42
2005	2,320,422	2,744,622	4,219,026		9,284,070	45
Mean	4,371,031	1,558,809	353,903	[b]	6,535,877	7

Note: Estimates based on visual counts from towers unless otherwise noted.

[a] Aerial survey counts.

[b] Mean of counts from 1985 to 2003.

Appendix E2.–Spawner distribution and total escapement estimates of sockeye salmon, Wood River system, 1985–2005.

Year	Spawner Distribution (%)			Total Escapement[a]
	Creeks	Beaches	Rivers	
1985	18.6	22.2	59.1	939,000
1986	16.1	23.3	60.6	819,000
1987	27.6	56.1	16.3	1,337,000
1988	31.0	44.4	24.6	866,800
1989	19.6	28.9	51.5	1,186,400
1990				1,069,400
1991				1,159,900
1992	24.9	56.7	18.4	1,286,300
1993	40.9	34.1	25.0	1,176,100
1994	25.5	36.4	38.1	1,471,900
1995	33.5	52.9	13.6	1,482,200
1996	25.8	39.3	34.9	1,649,600
1997	15.6	60.8	23.6	1,512,400
1998	20.0	66.2	13.8	1,755,800
1999				1,512,400
2000				1,300,000
2001				1,458,700
2002				1,283,700
2003				1,459,800
2004				1,543,400
Mean	24.9	43.4	31.6	1,313,490
2005	39.8	46.6	13.6	1,496,600

Note: Blank cells represent no data.

[a] Estimated from Wood River tower counts. Rounded to the nearest hundred.

Appendix E3.–Peak aerial counts of live sockeye salmon, Togiak River drainage, 1985–2005.

Year	Togiak Mainstem	Gechiak River	Pungokepuk River	Narogurum River	Kashaiak River	Ongivinuk River	Total	
1985	1,800	400	500	0	0	1,700	4,400	
1986	13,500						13,500	
1987	5,200	3,600	600	0	0	4,900	14,300	
1988	9,400	2,000	1,100	0	0	3,700	16,200	
1989	7,600	1,500	630			150	9,880	
1990	8,770	5,720	5,980	0	2,550	1,190	24,210	
1991	7,990	1,640	1,220			1,010	11,860	
1992	3,030	1,280	1,400			2,200	7,910	
1993	2,300	1,270	540			2,950	7,060	
1994	3,100	560	1,870			3,900	9,430	
1995	3,260	1,745	1,000		4,200	2,330	12,535	
1996	9,160	2,270	150	100	240	3,190	15,110	
1997	8,200	1,600	450	50	650	2,800	13,750	
1998	4,890	3,100	150	10	0	2,800	10,950	
1999	5,400	11,275	1,475	100	75	6,700	25,025	
2000	12,600	8,100	925	150	100	775	22,650	
2001	3,260					100	3,360	
2002	2,050	5,000	75	1,525	0	1,450	10,100	
2003								
2004	3,050					50	3,100	
Mean	6,029	3,191	1,129	194	710	2,328	12,386	[a]
%	48.7%	25.8%	9.1%	1.6%	5.7%	18.8%	100.0%	
2005	2,790	320	120	10	120	110	3,470	

Note: Blank cells represent no data.

[a] Sum of means for all streams.

Appendix E4.–Aerial estimates of sockeye salmon escapements, Togiak District, 1985–2005.

Year	Togiak River & Tributaries[a]	Kulukak Systems [b]
1985	8,800	36,600
1986	35,000	42,800
1987	28,600	37,800
1988	32,400	31,700
1989	19,800	10,800
1990	47,100	49,600
1991	23,700	23,900
1992	16,500	26,400
1993	15,900	31,800
1994	19,400	29,700
1995	25,500	14,600
1996	30,200	19,000
1997	20,600	8,000
1998	21,900	13,000
1999	40,200	12,300
2000	40,300	22,400
2001[c]	6,700	17,000
2002	16,200	8,500
2003		8,000
2004	3,100	
1985–04 Mean (20 Year)	23,784	23,363
1985–94 Mean (10 Year)	24,720	32,378
1995–04 Mean (10 Year)	22,744	15,250
2005	3,470	NS

Note: Blank cells represent no data. All counts are rounded to the nearest hundred.

[a] Estimates do not include fish spawning above the counting tower (Togiak Lake outlet); estimates for Ungalikthluk, Osviak,. Matogak and Slug rivers are not included in the 1977–1994 data as reported in Bristol Bay Data Reports 73 and 81.

[b] Includes Kulukak River, Kulukak Lake, and Tithe Creek Ponds.

[c] Togiak count includes only the Togiak mainstem and Ongivinuk rivers.

Appendix E5.–Peak aerial counts of live sockeye salmon, Togiak District, 1985–2005.

Year	Togiak River [a]	Kulukak River [b]	Tithe Creek Ponds	Quigmy River	Matogak River	Osviak River	Slug River	Negukthlik River	Ungalikthluk River	Total	
1985	4,400	6,700	11,600		0	200	2,300	260	1,310	26,770	
1986	13,500	10,900	14,000							38,400	
1987	14,300	10,500	8,400							33,200	
1988	16,200	12,600	3,250	250	100	380	5,880	200	2,700	41,560	
1989	9,880	2,920	2,500					5,000		20,300	
1990	24,210	10,600	14,200	100	400	2,200	3,540	9,700	3,800	68,750	
1991	11,860	8,650	3,320	35	860	2,530	560	3,400	2,650	33,865	
1992	7,910	7,530	4,950	40	300	3,340	1,460	3,600	3,760	32,890	
1993	7,060	9,600	6,300					3,100	5,680	31,740	
1994	9,430	10,270	4,600	580	990	1,750	6,070	2,230	3,240	39,160	
1995	12,535	3,000	4,310	200	610	1,470	2,820	390	1,720	27,055	
1996	15,110	2,490	7,000		360	780	1,045	1,000		27,785	[c]
1997	13,750	2,300	3,000		360	780	1,045	1,000		22,235	
1998	10,950	2,175	4,300	20	900	2,600	5,010	2,300	240	28,495	
1999	25,025	3,250	3,200	1,100	2,400	750	1,400	1,625	625	39,375	
2000	22,650	6,100	5,075	125	526	1,512	1,201	2,175	575	39,939	
2001	3,360	5,140	3,500	160	370	210	4,620	740	2,340	20,440	
2002	10,100	2,375	1,875	660	1,450	1,705	371	160	0	18,696	
2003		900	4,136	110	500	2,180	2,330	1,500	2,580	14,236	
2004	3,100			330	1,096	1,381	1,499	1,200	2,440	11,046	
Mean	12,386	6,211	5,764	285	701	1,486	2,572	2,199	2,244	30,797	[d]
%	40.2%	20.2%	18.7%	0.9%	2.3%	4.8%	8.4%	7.1%	7.3%	100.0%	
2005	3,470					1,485				4,955	

Note: Blank cells represent no data.

[a] Includes all surveyed sections of Togiak River proper and all tributaries to the Togiak River.

[b] Includes surveys of Kulukak Lake. Counts prior to 1977 include Kulukak Lake only and are not included in the mean.

[c] Complete count not available.

[d] Sum of means for all streams.

[e] Togiak River count includes mainstem and Ongivinuk River only.

Appendix E6.–Chinook salmon escapement data, Naknek-Kvichak District, 1985–2005.

	Non-expanded Escapement Indices by Drainage [a]			
Year	Naknek	Alagnak	Kvichak	Total
1985	590 [b]	3,920		4,510
1986	3,917	3,090		7,007
1987	4,450	2,420		6,870
1988	11,730	4,600	190	16,520
1989	2,710	3,650	100	6,460
1990	7,000	1,720	170	8,890
1991	4,391	2,531		6,922
1992	2,691	3,042	264	5,997
1993	8,016	10,170	115	18,301
1994	9,678	8,480	306	18,464
1995	4,960	6,860	96	11,916
1996	5,010	9,885	132	15,027
1997	10,453	15,210	103	25,766
1998	5,505	4,148	187	9,840
1999	3,320 [c]	2,178	1,200	6,698
2000	3,233	2,220	6	5,459
2001	6,340	5,458	36	11,834
2002	7,503	3,765		11,268
2003	6,081 [d]	8,209		14,290
2004	12,878	6,755		19,633
2005	[e]	5,084		
Mean	6,023	5,416	223	11,149

Note: Blank cells represent no data.

[a] Includes aerial indices from all streams surveyed in drainage.

[b] Naknek River mainstem only.

[c] No index count for Naknek River.

[d] No index count for Big Creek.

[e] No estimate is possible because of high water and poor visibility.

Appendix E7.–Aerial survey counts of Chinook salmon escapements, Naknek River Drainage, 1985–2005.

Year	Mainstem Naknek River	Paul's Creek	King Salmon Creek	Big Creek	Total
1985	590	[a]	[a]	[a]	590
1986	2,200	73	102	1,542	3,917
1987	2,800	7	290	1,353	4,450
1988	7,380	150	600	3,600	11,730
1989	1,700	50	100	860	2,710
1990	4,500	150	350	2,000	7,000
1991	1,655	121	275	2,340	4,391
1992	1,550	88	158	895	2,691
1993	5,520	86	700	1,710	8,016
1994	5,970	203	974	2,531	9,678
1995	2,790	26	239	1,905	4,960
1996	2,965	157	312	1,576	5,010
1997	7,520	248	902	1,783	10,453
1998	2,150	210	1,060	2,085	5,505
1999	[a]	223	847	2,250	3,320
2000	1,900	43	178	1,112	3,233
2001	3,800	118	413	2,009	6,340
2002	4,240	314	934	2,015	7,503
2003	4,150	583	1,348	[a]	6,081
2004	6,900	315	1,582	4,081	12,878
2005 [a]					
Mean	3,699	167	598	1,980	6,444

Note: Blank cells represent no data.

[a] Counts unavailable due to poor conditions.

Appendix E8.–Aerial survey counts of Chinook salmon escapement, Egegik District, 1985–2005.

Year	Egegik River	Shosky Creek	Whale Mountain Creek	Mossy Creek	Mink Creek	Gertrude Creek	Kaye's Creek	Takayoto Creek	Angle Creek[a]	Contact Creek	King Salmon River	Total
1985	75	80	0	15	10	260	230	315		95		1,080
1986	65	150	48	0	0	150	46	40		18	15	532[b]
1987	15	174	2	74	0	408	284	232	2	88		1,279
1988	50	151	0	12		248	120	177		110		868
1989	14	90	13	43	7	310	120	300		100		997
1990	24[c]	85	7	35	2	260	175	175		205		968
1991	0[c]	62	60	30	33	83	117	95		73		553
1992[d]	15	143	52	54	22	416	320	190		296		1,508
1993	80	58	6	38	6	350	170	200		235		1,143
1994[d]	66[c]	48	32	118	77	840	214	230		705		2,330
1995[d]	60[c]	32	10	53	103	456	248	130		275		1,367
1996	42[c]	102	8	38	20	230	74	123	6	203		846
1997	30[c]	39	2	18	10	260	173	374		740		1,646
1998	0[c]	29	45	55		320	165	120		329		1,063
1999	6[c]	75	10	51		165	6	115		145		573
2000	0[c]	4	0	16		85	41	73		341		560
2001	0[c]	32	0	35		116	120	153		299		755
2002	0[c]	24	4	0		277	220	149		238		912
2003	0[c]	35	0	20	10	297	180	313		197		1,052
2004	0	20	0	40	4	226	134	219		870		1,513
Average	27	72	15	37	22	288	158	186	4	278	15	1,077
2005	0[c]	21	8	36	0	165	71	99		150		550
Deviation		-71%	-46%	-3%		-43%	-55%	-47%		-46%		-49%

Note: Blank cells represent no data. Peak aerial counts unless otherwise noted, no expanded counts and blanks indicate no count.

[a] Angle Creek is usually too turbid to survey.

[b] Survey 10–14 days later than normal.

[c] Tower count.

[d] Helicopter surveys.

Appendix E9.–Aerial survey counts of Chinook salmon escapement, Ugashik District, 1985–2005.

Year	Ugashik River	Dog [a] Salmon River	King Salmon	Painter Creed	Pumice Creek	Old Creek	Total
1985	150 [c]	560	4,600	410	930	410	7,060
1986	66 [c]	252	1,777	646	705	739	4,185
1987	54 [b]	751	981	1,051	1,602	1,155	5,594
1988	249 [d]	900	5,820	1,170	1,025	660	9,824
1989	226 [cd]	848	1,670	1,030	510	520	4,804
1990	67 [bd]	540	1,500	590	450	610	3,757
1991	131 [bd]	449	700	365	375	420	2,440
1992[e]	260 [bd]	821	1,260	855	750	815	4,761
1993	188 [bd]	579	1,970	865	450	635	4,687
1994[e]	233 [bd]	1,741	2,225	1,005	2,530	1,490	9,224
1995	149 [bd]	882	440	366	501	505	2,843
1996	76 [bd]	1,079	1,200	403	[f]	[f]	2,758
1997	839 [bd]	906	802	525	536	558	4,166
1998	458 [bd]	1,411	883	1,230	352	438	4,772
1999	237 [bd]	535	[f]	166	340	213	1,491
2000	26 [b]	425	[f]	314	339	246	1,350
2001	346 [bcd]	929	828	563	646	530	3,842
2002	618 [bcd]	1,121	430	472	586	408	3,635
2003	469 [bcd]	1,053	334	490	596	351	3,293
2004	309 [bcd]	1,640	1176	1069	470	374	5,038
Average	258	871	1,589	679	721	583	4,476
2005	[g]	[g]	[g]	[g]	124 [h]	54 [h]	178

Note: Blank cells represent no data.

[a] Includes Figure-Eight, Goblet, Oldham, and Wandering creeks.

[b] Tower counts.

[c] Tower count plus later aerial survey counts of main river.

[d] Survey included Grassy Creek (tributary downstream of Ugashik Lagoon).

[e] Helicopter surveys.

[f] No count.

[g] Aerial survey was flown but no was estimate was made.

[h] New observer.

Appendix E10.–Peak aerial counts of live Chinook salmon, Togiak River drainage, 1985–2005.

	Togiak River Section [a]											
Year	A	B	C	D	E	F	Gechiak River	Pungokepuk River	Nayorurun River	Kemuk River	Ongivinuk River	Total
1985	270	320	640	340	470	970	470	250	290	310	460	4,790
1986	150	80	160	30	110	350						880
1987	20	70	170	120	200	480	610	180	100	120	320	2,390
1988	70	70	160	160	170	710	390	180	60	70	90	2,130
1989	10	30	370			940	190	80			40	1,660
1990	230	170	680	365	805	1,085	370	125	75	400	10	4,315
1991	505	165	475	225	520	455	460	105	90	100	150	3,250
1992	150	250	440	225	450	690	250	160	70	175	105	2,965
1993	170	120	220	160		1,810 [b]	595	240	130	65	440	3,950
1994				215	815	1,580	420	215	225	570	380	4,420
1995	120	220	750	255	800	800	715	140	425	520	295	5,040
1996	75	150	160	100	255	625	335	120	120	235	325	2,500
1997	100	350	1,300	600	820	1,000	275	180	150	275	100	5,150
1998	10	20	250	50	400	1,200	400	150	275	140	275	3,170
1999	150	210	540	510	225	480	365	90	240	305	270	3,385
2000	75	50	500	400	850	1,450	350	85	125	100	75	4,060
2001	610	500	500	200	300	950	700	270	550	1,050	160	5,790
2002	140	410	820	250	390	690	400	45	65	210	125	3,545
2003				180	265	495			115	100	135	1,290
2004	198	549	1,044	603	657	1,598	90	320	666	239	198	6,162
Mean	170	207	510	263	472	918	410	163	210	277	208	3,542 [c]
Percent	4.8%	5.9%	14.4%	7.4%	13.3%	25.9%	11.6%	4.6%	5.9%	7.8%	5.9%	100.0%
2005	117	414	927	576	635	1139	144	170	360	265	347	5,094

Note: Blank cells represent no data.

[a] Section A; Togiak Bay - Gechiak River
Section B; Gechiak River - Pungokepuk River
Section C; Pungokepuk River - Nayorurun River
Section D; Nayorurun River - Kashaiak River
Section E; Kemuk River - Ongivinuck River
Section F; Ongivinuck River - Togiak Lake

[b] Includes count for Section E.

[c] Sum of means for all streams.

Appendix E11.–Peak aerial counts of live Chinook salmon, Togiak District, 1985–2005.

Year	Togiak River [a]	Quigmy River	Kulukak River	Matogak River	Osviak River	Slug River	Negukthlik River	Ungalikthluk River	Total	
1985	4,790	0	540	100	50	ND	80	90	5,650	
1986	880	ND	ND	ND	ND	ND	ND	ND	880	
1987	2,390	ND	300	30	40	ND	660	80	3,500	
1988	2,130	10	490	0	40	0	650	170	3,490	
1989	1,660	ND	740	ND	ND	ND	560	ND	2,960	
1990	4,315	30	635	75	60	0	930	25	6,070	
1991	3,250	25	285	75	100	ND	1,175	55	4,965	
1992	2,965	15	485	40	105	30	490	35	4,165	
1993	3,950	ND	1,140	80	110	100	830	70	6,280	
1994	4,420	20	835	40	60	10	540	190	6,115	
1995	5,040	35	430	65	135	50	740	80	6,575	
1996	2,500	35	698	35	71	30	402	ND	3,771	
1997	5,150	10	310	50	65	33	ND	10	5,628	
1998	3,170	45	375	92	58	39	75	25	3,879	
1999	3,385	10	240	105	40	150	345	130	4,405	
2000	4,060	26	340	65	42	6	1,100	226	5,865	
2001	5,790	24	330	58	84	2	201	74	6,563	
2002	3,545	28	860	54	62	7	1,203	161	5,920	
2003	1,290	17	360	28	99	66	466	40	2,366	[b]
2004	6,162	4	594	17	63	15	720	60	7,635	
Mean	3,542	21	526	56	71	36	620	89	4,834	[c]
Percent	73.3%	0.4%	10.9%	1.2%	1.5%	0.7%	12.8%	1.9%	100.0%	
2005	5,094	16	447	133	202	90	255	396	6,633	

[a] Includes all surveyed sections of Togiak River proper and all tributaries to the Togiak River.

[b] Sum of means for all streams.

[c] Partial aerial survey for Togiak District

Appendix E12.–Chum salmon escapement survey history, Alagnak River, 1990–2005.

Year	Count Dates	Aerial Index Estimate	Comments
1990	8/08	8,500	Pre-peak.
	8/18	48,800	Near Peak
1991	8/09	43,000	Pre-peak.
	8/19	64,300	Near Peak.
1992	8/10	114,000	Near Peak.
1993	8/09	4,600	Near Peak.
1994	8/08	62,900	Near Peak.
1995	8/10	132,000	Near Peak.
1996	8/12	145,000	Near Peak
1997	8/07	37,800	Near Peak
1998	8/12	3,150	Poor survey conditions
1999	8/10	11,800	Near Peak
2000	8/07	10,120	Near Peak
2001	8/08	70,800	Near Peak
2002	8/02	157,800	Near Peak
2003	8/13	78,000	Near Peak
2004			
2005	7/30	20,300	Survey 2 weeks early

Note: Blank cells represent no data.

Appendix E13.–Aerial survey counts of chum salmon escapement, Egegik District, 1985–2005.

Year	Egegik River	Shosky Creek	Whale Mountain Creek	Mossy Creek	Mink Creek	Gertrude Creek	Kaye's Creek	Takayoto Creek	Angle Creek[a]	Contact Creek	King Salmon River	Total
1985	400	0	600	200	35	2,600	800	0		500	50	5,185
1986	0	0	6,025			140	3	5	0	15	25	6,213 [b]
1987	150	0	19,000	16	1,000	3,770	2,780	0		2,850		29,566
1988	500	50	4,400	100	50	5,200	1,600	0		3,200		15,100
1989	0	10	3,200	25	100	1,100	0	0		200	14	4,649
1990	72 [c]	0	2,000	0	150	1,675	80	0		750		4,727
1991	0 [c]	0	1,500	70	100	990	280	0		480		3,420
1992[d]	50	0	680	15	25	4,500	400	0		3,630	200	9,500
1993	100	0	1,020	8	1	1,075	0	0		100		2,304
1994[d]	42 [c]	0	1,700	5	7	760	175	30		260		2,979
1995[d]	144 [c]	2	395	15	30	560	162	5		600		1,913
1996	12		438	4	20	530		24		633		1,661
1997	0 [c]		220	8	10	495	290	60		640		1,723
1998	17 [c]	8	1,480	4		920	4	4		140		2,577
1999	6 [c]		1,040	4		243		4		140		1,437
2000	0 [c]		492	4		475	32	6		180		1,189
2001	0 [c]		424	6		494	40	30		1,240		2,234
2002	0 [c]		284	5		302	16			150		757
2003	0 [c]	0	540	70	50	690	0	0		3,800		5,150
2004	0 [c]	0	260	50	20	610	50	0		750		1,740
Average	75	5	2,285	32	114	1,356	373	9	0	1,013	72	5,201
2005	0 [c]	0	300	10	14	770	30	0		390		1,514

Note: Blank cells represent no data. Peak aerial counts unless otherwise noted, no expanded counts and blanks indicate no count.

[a] Angle Creek is usually too turbid to survey.

[b] Survey 10–14 days later than normal.

[c] Tower count.

[d] Helicopter surveys.

Appendix E14.–Aerial survey counts of chum salmon escapement, Ugashik District, 1985–2005.

Year	Ugashik River		Dog [a] Salmon River	King Salmon River	Painter Creek	Pumice Creek	Old Creek	Other	Total	
1985	42	[c]	350	20,000	1,925	6,000	670	300	29,287	
1986	0	[c]	120	8,650	1,200	2,000	630	125	12,725	
1987	130	[c]	340	9,750	2,290	10,340	2,090	40	24,980	
1988	752	[c,d]	2,290	25,000	10,500	11,650	5,800	950	56,942	
1989	600	[c,d]	1,005	7,500	3,700	2,200	2,010	625	17,640	
1990	312	[c,d]	170	6,200	1,150	1,630	410	10	9,882	
1991	315	[c,d]	240	7,400	750	2,550	2,525	130	13,910	
1992[e]	510	[a,c,d]	1,210	8,525	4,000	14,000	15,000	0	43,245	
1993	93	[c,d]	105	7,000	720	2,040	1,025	8	10,991	
1994[e]	66	[b,c]	851	9,150	1,625	12,750	6,975	150	31,567	
1995	6	[b,c]	160	3,900	1,370	2,600	1,800	0	9,836	
1996	138	[b]	85	16,500	700	7,400	2,500	0	27,323	
1997	100	[b,c]	450	10,500	4,200	5,300	9,480	115	30,145	
1998	607	[b,c]	840	10,600	3,800	2,000	4,350	224	22,421	
1999	278	[b,c]	400	ND	650	1,660	2,020	50	5,058	
2000	7	[b]	510	ND	2,150	7,300	5,850		15,817	
2001	78	[bc]	1,140	8,100	6,000	13,500	7,800	200	36,818	
2002	0	[bc]	1,000	8,200	3,100	5,100	4,200	100	21,700	
2003	142	[bc]	1,130	5,500	8,000	4,000	3,000	50	21,822	
2004	24	[bc]	950	1,800	20,000	5,700	5,000	50	33,524	
Average	210		667	9,682	3,892	5,986	4,157	294	23,782	[f]
2005		[h]		[h]		[h]	1,310 [i]	2,030 [i]	[i]	3,340

Note: Blank cells represent no data.

[a] Includes Figure-Eight, Goblet, Oldham, and Wandering creeks.

[b] State tower counts, (Federal tower count was 5,700 in 2001, 870 in 2002, and 630 in 2003.

[c] Survey included Grassy Creek (tributary downstream of Ugashik Lagoon).

[d] Included tower count plus later aerial survey count.

[e] Helicopter surveys.

[f] Average of the sums of indices for all locations.

[g] 2004 deviation from 1980 to 2003 average.

[h] Aerial survey flown but no estimate was made.

[i] New observer.

Appendix E15.–Peak aerial counts of live chum salmon, Togiak River drainage, 1985–2005.

	Togiak River Section [a]											
Year	A	B	C	D	E	F	Gechiak River	Pungokepuk River	Nayorurun River	Kemuk River	Ongivinuk River	Total
1985	8,300	6,500	3,200	900	6,700	10,200	4,100	600	9,600	1,800	8,300	60,200
1986												
1987	12,000	9,400	2,700	500	13,200	33,000	2,600	1,200	4,100	700	13,100	92,500
1988	10,000				4,900	3,800	3,700	5,000	3,500	200	3,800	34,900
1989		2,600	2,100		5,000	8,100	290	700			1,200	19,990
1990	2,200	1,275	1,350	400	650	4,200	3,150	1,150	3,400	250	125	18,150
1991	10,200	3,900	2,800	600	5,500	6,000	2,300	500	3,500	800	3,480	39,580
1992[b,c]	1,800	1,800	300	100	1,200	1,500	2,000	500	1,800	900	800	22,700
1993	6,500	3,500	2,300	60		4,400 [d]	1,950	450	4,380	620	3,500	27,660
1994				1,300	5,200	10,400	900	2,400	7,100	900	5,700	33,900
1995	15,700	7,100	4,700	1,800	6,800	5,900	4,800	1,900	9,700	2,700	8,200	69,300
1996	3,700	10,250	5,500	1,300	5,750	8,250	2,600	750	900	550	3,400	42,950
1997	3,900	3,100	3,800	2,750	7,100	4,550	3,200	800	4,750	1,800	3,900	39,650
1998	2,300	1,400	2,750	1,300	4,300	8,950	3,600	1,050	3,000	250	1,650	30,550
1999	3,975	1,950	2,375	1,300	1,725	2,200	1,840	440	4,230	480	2,540	23,055
2000												
2001	9,400	6,500	5,250	1,000	3,500	9,850	7,800	2,850	200	21,450	6,000	73,800
2002	3,350	5,300	4,200	800	4,650	2,100	4,950	650	2,700	1,800	650	31,150
2003				25	675	1,000			175	1,125	1,125	4,125
2004	5,175	2,175	1,575	330	1,875	18,975	750	290	6,675	1,688	450	39,958
Mean	6,907	4,639	3,186	958	4,845	8,346	3,033	1,296	4,244	2,320	3,948	40,083
Percent	17.2%	11.6%	7.9%	2.4%	12.1%	20.8%	7.6%	3.2%	10.6%	5.8%	9.9%	109.1%
2005	720	730	450	105	445	638	765	60	420	120	780	5,233

Note: Blank cells represent no data.

[a] Section A; Togiak Bay - Gechiak River
Section B; Gechiak River - Pungokepuk River
Section C; Pungokepuk River - Narogurum River
Section D; Narogurun River - Kashaiak River
Section E; Kemuk River - Ongivinuck River
Section F; Ongivinuck River - Togiak Lake

[b] Counts by section are not representative due to post-peak survey, and are not included in the mean.

[c] Preferred total estimate; management survey count conducted 7/15/92.

[d] Includes count for Section E.

Appendix E16.–Peak aerial counts of live chum salmon, Togiak District, 1985–2005.

Year	Togiak River [a]	Quigmy River	Kulukak River	Matogak River	Osviak River	Slug River	Negukthlik River	Ungalikthluk River	Total
1985	60,200	1,800	7,800	2,860	5,460	8,800	130	14,650	101,700
1986									
1987	92,500	1,500	22,000	2,300	2,160				120,460
1988	34,900	10,800	35,000	12,000	17,400	7,600	400	11,300	129,400
1989	19,990	2,820	5,580	7,450	4,900		560		41,300
1990	18,150	555	5,550	1,475	2,300	3,650	750	1,300	33,730
1991	39,580	4,420	9,540	4,730	8,700		120	3,020	70,110
1992	22,700 [b]	600	4,800 [b]	4,400	7,100	1,700	100	4,000	45,400
1993	27,660		6,950	1,970	1,360	3,060	20	4,020	45,040
1994	33,900	890	10,700	1,630	2,000	4,360	230	1,090	54,800
1995	138,600	2,200	7,600	5,200	13,920	6,440	1,000	7,200	182,160
1996	42,950	960	7,560	560	810	2,670	40		55,550
1997	39,650	1,700	4,550	3,000	2,500	1,890			53,290
1998	30,550	2,630	2,700	4,980	3,870	1,060	150	1,300	47,240
1999	23,055	1,340	3,430	5,700	3,650	4,750	410	11,360	53,695
2000		2,870	4,950	9,090	10,880	4,150	200	5,520	37,660
2001	75,600	2,590	22,300	2,840	2,220	5,570	220	5,480	116,820
2002	31,150	3,300	15,400	7,600	6,360	800	530	6,940	72,080
2003	4,125 [c]	720	3,425	1,340	3,480	1,030	30	4,970	19,120
2004	39,958	1,080	5,831	2,310	1,970	416	100	250	51,915
Mean	43,068	2,376	9,772	4,286	5,318	3,622	294	5,493	70,077 [d]
Percent	61.5%	3.4%	13.9%	6.1%	7.6%	5.2%	0.4%	7.8%	105.9%
2005	5,233	8,100	790	17,200	15,300	1,350	1,760	4,440	54,173

Note: Blank cells represent no data.

[a] Includes all surveyed sections of Togiak River proper and tributaries to the Togiak River.

[b] Preferred estimate from a management survey due to post-peak spawning ground survey.

[c] Partial aerial survey data

[d] Sum of means for all streams.

Appendix E17.–Pink salmon escapement survey history, Naknek/Kvichak District 1984–2005.

Year	Count Dates	Non-expanded Escapement Indices by Drainage		
		Alagnak	Kvichak	Naknek
1984	8/14	296,500		286,000
1986	8/11	48,600	94,000	187,000
1988	8/12	415,000	25,300	
1990	8/08	45,100		
1990	8/18	240,500		
1992	8/10	15,000		
1994	8/08			
1996	8/12		7,000	10,000
1998	8/12	3,200		20,000
2000	8/07	30,000		
2002	8/02	127,500		
2004	8/17	650,000		
Mean		135,711	42,100	125,750

Note: Blank cells represent no data.

Appendix E18.–Aerial survey counts of coho salmon escapement, Egegik District, 1985–2005.

Year		Number of Surveys	Coho Salmon Count	Comments
1985		3	5,260	Peak surveys on August 26.
1986		1	12,575	Surveyed August 19.
1987		6	6,930	Included King Salmon River & tributaries.
1988		6	13,715	Included King Salmon River & tributaries.
1989		9	4,485	Included Gertrude & Whale Mountain creeks.
1990		7	13,400	Peak survey on August 17.
1991		0	220	Incidental observation made August 6.
1992	[a]	0	200	Incidental observation in Egegik River August 6.
1993		0	1,130	Incidental observation from Egegik River August 16.
1994	[a,b]	2	7,412	Included King Salmon River & tributaries.
1995	[c]	2	5,258	Included King Salmon River & tributaries.
1996	[d]	2	9,043	Included King Salmon River & tributaries.
1997		3	4,106	Gertrude Weir Count & selected Becharof Lake tributaries.
1998		1	6,075	Gertrude Weir Count & selected Becharof Lake tributaries.
1999		1	4,353	Gertrude Weir Count & selected Becharof Lake tributaries.
2000		1	4,870	Selected Becharof Lake tributaries
2001		1	5,100	Selected Becharof Lake tributaries
2002		1	7,050	Selected Becharof Lake tributaries
2003		1	5,280	Selected Becharof Lake tributaries
2004		1	41,400	Selected Becharof Lake tributaries
2005		1	22,450	Selected Becharof Lake tributaries

Note: Blank cells represent no data.

[a] Helicopter surveys.

[b] The Egegik River Tower counted through September 11, estimated 10,140 coho salmon.

[c] The Egegik River Tower counted through August 30, estimated 7,470 coho salmon.

[d] The Egegik River Tower counted from August 7 to September 11 estimated 24,918 coho salmon.

Appendix E19.–Aerial survey counts of coho salmon escapement, Ugashik District, 1985–2005.

Year	Number of Surveys	Salmon Counts	Comments
1985	2	18,880	16,500 in King Salmon River on September 12.
1986	2	8,455	Surveyed on August 19 and 25.
1987	2	17,000	16,700 in King Salmon River on August 23.
1988	7	28,280	12,900 in King Salmon River on September 7.
1989	4	11,515	7,615 observed on August 14.
1990	5	12,610	
1991	0	400	Incidental observation made August 12.
1992[a]	0	790	Incidental observation made August 11.
1993	0	705	Incidental observation made August 16.
1994[a]	0	760	Incidental observation made August 11.
1995	0		
1996 [b]	1	8,275	Surveyed on September 27 and 28.
1997 [b]	2	9,400	Surveyed on September 30 and October 17.
1998 [b]	1	1,459	Surveyed on November 19.
1999[b]	1	10,210	Surveyed on October 14.
2000[b]	1	12,070	Surveyed on October 12.
2001[b]	1	4,540	Surveyed on September 27.
2002[b]	1	3,805	Surveyed on September 22.
2003[b]	1	19,670	Surveyed on September 21.
2004[bc]	1	5,440	Surveyed on September 26.
2005	1	9,850	Surveyed on September 20.

Note: Blank cells represent no data.

[a] Helicopter survey.

[b] Surveys are of selected areas in the Ugashik Lakes, King Salmon and Dog Salmon River drainages.

[c] In 2004, surveys of Painter, Old, and Pumice creeks could not be completed, 5,360 coho were counted from the Ugashik Lakes area and it was the second highest count for this area in 9 years.

Appendix E20.–Peak aerial counts of live coho salmon, Togiak River drainage, 1985–2005.

	Togiak River Section [a]												
Year	A	B	C	D	E	F	Mainstem Total	Gechiak River	Pungokepuk River	Narogurum River	Kashaiak River	River	Ongivinuk Total
1985	800 [c]	660 [c]	110 [c]	70 [c]	150	820	2,610	1,340	750	40	80	6,250	11,070
1986			60	400	100	400	960					2,560	3,520
1987	340	500	250	200	240	530	2,060	1,020	70			1,060	4,210
1988		370		140	210	360	2,030	1,530				4,100	7,660
1989													
1990	1,650	390	400	0	540	660	3,640	920	450	260	130	1,730	7,130
1991	4,900	400	700	600	1,680	140	8,020					100	140 [d]
1992		1,120	1,180	540	2,940	3,080	13,280	5,240	1,440	780	1,500	4,460	26,700
1993													
1994								1,290 [d]	220 [d]	120 [d]	95 [d]	1,930	3,655
1995								1,450			200	1,180	2,830
1996	2,550	1,090	150	250	1,600	5,020	10,910	2,080	1,170	575	725	6,450	21,910
1997	600	200	400	100	400	1,800	3,500	1,000	650	350	475	900	6,875
1998	460	625	100	100	310	1,075	2,670	2,550	575	400	500	1,750	8,445
1999		75	50	25	100	75	575	275	35	100	25	175	1,185
2000													
2001													
2002													
2003													
2004													
Mean	1,614	543	340	220	752	1,269	4,569	1,700	596	328	414	2,511	8,102 [b]
Percent	19.9%	6.7%	4.2%	2.7%	9.3%	15.7%	56.4%	21.0%	7.4%	4.0%	5.1%	31.0%	100.0%
2005													

Note: Blank cells represent no data.

[a] Section A; Togiak Bay - Gechiak River
Section B; Gechiak River - Pungokepuk River
Section C; Pungokepuk River - Narogurum River
Section D; Narogurum River - Kashaiak River
Section E; Kashaiak River - Ongivinuck River

[b] Sum of means for all streams.

[c] Proportional estimates based on 1984 data.

[d] Timing of aerial surveys did not coincide with the period of peak spawning activity, and therefore, counts were not included in the mean or percent.

Appendix E21.–Peak aerial counts of live coho salmon, Togiak District, 1985–2005.

Year	Togiak River [a]	Quigmy River	Kulukak River	Matogak River	Osviak River	Slug River	Negukthlik River	Ungalikthluk River	Total
1985	9,430	200	7,790	610	420				18,450
1986	3,520								3,520
1987	4,210	30	910	440	120			130	5,840
1988	8,590	460	1,840	310	490	470	370	3,170	15,700
1989									
1990	7,130	1,029	5,195	2,675	1,491	810		4,153	22,483
1991[c]	140		4,200						4,340
1992	26,700		12,640						39,340
1993									
1994									
1995		855	1,185	1,392	1,080	1,149		5,196 [d]	10,857
1996	21,660	1,211	10,290	3,062	2,805	1,944	851	5,917	47,740
1997	6,875	325	1,675	150	1,046	1,397		1,690	13,158
1998	8,445	390	3,650	1,785	2,001	523		2,770	19,564
1999	1,185	169	500	220	213	117	95	450	2,949
2000									
2001		149		372	370	418			1,309
2002		421		597	539	62		1,027	2,646
2003		680	1,610	1,620					3,910
2004									
Mean	8,899	520	4,290	1,148	961	766	439	2,723	0 14,120 [b]
Percent	63.0%	3.7%	30.4%	8.1%	6.8%	5.4%	3.1%	19.3%	100.0%
2005									

Note: Blank cells represent no data.

[a] Includes all surveyed sections of Togiak River proper and tributaries to the Togiak River.

[b] Sum of means for all streams.

[c] Timing of aerial surveys did not coincide with the period of peak spawning activity, and therefore, counts were not included in the mean or percent.

[d] Negukthlik and Ungalikthluk rivers combined.