Fishery Data Series No. 09-11

Kanektok River Salmon Monitoring and Assessment, 2007

Annual Report for Project FIS 07-305

USFWS Office of Subsistence Management

Fisheries Information Services Division

by

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and

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March 2009

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)

Measures (fisheries)

fork length	FL
mideye to fork	MEF
mideye to tail fork	METF
standard length	SL
total length	TL

Mathematics, statistics

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

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March 2009

This investigation was partially financed by U. S. Fish and Wildlife Service, Office of Subsistence Management (Project No. FIS 04-305), Fisheries Resource Monitoring Program under agreement number 701811J334.

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.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm This publication has undergone editorial and peer review.

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This document should be cited as:
Clark, K. J., and J. C. Linderman Jr. 2009. Kanektok River salmon monitoring and assessment, 2007. Alaska Department of Fish and Game, Fishery Data Series No. 09-11, Anchorage.

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ABSTRACT

A resistance board weir was used on the Kanektok River to estimate escapement and provide a platform to collect samples used in estimating age, sex, and length for Chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka*, chum *O. keta*, and coho *O. kisutch* salmon. The weir was installed in early May and was operational from 19 June until 11 September. Escapement at the weir was estimated to be 14,120 Chinook, 307,738 sockeye, 133,215 chum, and 30,471 coho salmon. Aerial counts are used with weir escapement counts to derive escapement estimates for the Kanektok River drainage. The 2007 season was the fifth year Chinook, sockeye, and chum salmon escapement and age, sex, length composition data were collected and the sixth year coho salmon data were collected. Salmon in the Kanektok River are harvested in commercial, subsistence, and sport fisheries conducted both inriver and in adjacent marine waters of Kuskokwim Bay (District W-4). The Alaska Department of Fish and Game has quantified subsistence harvests in the Quinhagak area of the Kuskokwim Bay since 1968. From 1997 through 2006, annual subsistence harvests have averaged 3,337 Chinook, 1,522 sockeye, 1,238 chum, and 1,442 coho salmon. Subsistence harvest estimates for 2007 were not available at the time of publication. The 2005 District W-4 commercial salmon harvest was 19,573 Chinook, 109,343 sockeye, 34,710 coho, and 61,228 chum salmon, for a total of 224,854 fish. Samples were also collected from the District W-4 commercial catch for use in estimating age, sex, and length of the 2007 commercial harvest.

Key words: Kanektok River, Kuskokwim Area, District W-4, resistance board weir, Chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka*, chum *O. keta*, coho *O. kisutch*, salmon, Dolly Varden *Salvelinus malma*, rainbow trout *O. mykiss*, whitefish *Coregonus spp.*

INTRODUCTION

Though this report represents an annual report for project FIS 07-305 funded by the United States Fish and Wildlife Service (USFWS) Office of Subsistence Management (OSM), additional information necessary for sustainable management of fisheries harvesting Kanektok River salmon have been included. These types of data include harvests from subsistence, commercial, and sport fisheries, age, sex, and length (ASL) sampling of the commercial fishery, and resulting exploitation rates for Chinook *Oncorhynchus tshawytscha*, and sockeye *O. nerka* salmon. Eventually, run reconstruction and brood-year-return tables, which are built upon Kanektok River weir and area fishery information, will be included.

STUDY AREA

Kanektok River is located in Togiak National Wildlife Refuge in southwestern Alaska (Figure 1). The river originates from Kegati-Pegati Lake and flows westerly for 91 mi (146 km), emptying into Kuskokwim Bay near the village of Quinhagak. The upper portion of the river consists primarily as a single channel flowing through mountainous terrain. The lower portion of the river flows through a broad fluvial plain and is highly braided with many side channels. Kanektok River and its many tributaries drain approximately 500 mi^2 (1,295 km^2) of surface area dominated largely by undisturbed tundra. The surrounding riparian vegetation is composed primarily of cottonwood, willow, and alder. Kanektok River weir is located at river mile 42 (67.60 km), GPS coordinates N 59° 46.057, W 161° 03.616.

SALMON FISHERIES

Subsistence fishing for salmon occurs throughout the Kanektok River drainage, in nearby Quinhagak area streams, and in Kuskokwim Bay. Salmon caught for subsistence use make an important contribution to the annual subsistence harvests of residents from Quinhagak, Goodnews Bay, Eek, and Platinum (Whitmore et al. 2008). The Alaska Department of Fish and Game (ADF&G) has quantified subsistence harvests in the Quinhagak area since 1968.

Commercial salmon fishing has occurred in the Quinhagak area since before statehood. In 1960, commercial fishing District W-4 was established by ADF&G offshore of Quinhagak in Kuskokwim Bay (Figure 2). In 2004, the Alaska Board of Fisheries (BOF) extended the northern boundary 3 miles north up the coast from the southern edge of Oyak Creek to the southern edge of Weelung Creek. The northern boundary was expanded to address concerns about overcrowding of fishermen in the district during commercial openings. Since the inception of District W-4, its northern boundary has been shifted between Weelung Creek and Oyak Creek in response to overcrowding issues and concern over the interception of fish bound for the Kuskokwim River.

The commercial fishery targets Chinook, sockeye, and coho *O. kisutch* salmon. Chum *O. keta* and pink *O. gorbuscha* salmon are harvested incidentally with pink salmon being the least valuable species commercially. District W-4 commercial fishery participation has been declining since the early 1990s. Although participation has increased slightly in recent years, overall participation remains below the high levels seen through the 1980s and early 1990s. The decline is likely attributable to the poor market value of salmon since 1995, increasing fuel prices, limited number of tenders, limited processing capacity, and other economic opportunity in the area.

In addition to commercial and subsistence harvest, the Kanektok River also supports a popular sport fishery. Each year, sport anglers from around the world ply the drainage from mid June to the beginning of September targeting salmon, rainbow trout *O. mykiss*, and Dolly Varden *Salvelinus malma*. There are currently 3 seasonal sport fishing guide camp operations located on Kanektok River in addition to numerous guided and non-guided anglers that float the Kanektok River from its headwaters to the village of Quinhagak.

ESCAPEMENT MONITORING

The Kanektok River is the primary spawning stream in the Quinhagak area. Establishing a viable method for assessing salmon escapement in Kanektok River has been problematic. The first assessment project was a counting tower established in 1960 on the lower river near the village of Quinhagak (ADF&G 1960). This tower project was plagued by logistical problems, poor water visibility, and difficulties with species apportionment. In 1961, the tower was relocated to the outlet of Kegati/Pegati Lake and operated through 1962 (ADF&G 1961, 1962). Although successful in providing sockeye salmon escapement information, this site was discontinued after 1962. The next attempted assessment project was hydroacoustic sonar (1982 through 1987); however, the use of sonar on this system was deemed unfeasible because of technical obstacles, site limitations, and budget constraints (Huttunen 1984–1986, 1988; Schultz and Williams 1984). In 1996, a cooperative effort between the Native Village of Quinhagak (NVK), United States Fish and Wildlife Service (USFWS), and ADF&G reinitiated a counting tower located 15 mi upriver from the mouth of the Kanektok River. The counting tower again proved to have limited utility (Fox 1997) despite improvements to the project in 1998 (Menard and Caole 1999). In 1999, resources were redirected towards developing a resistance board weir (Burkey et al. 2001). The weir was operational briefly in 2000, but high water levels, technical limitations, and personnel problems precluded the project from meeting its objectives (Linderman 2000). During operation in 2000, the site was determined incapable of facilitating a weir because of extensive bank erosion.

In 2001, the weir was relocated approximately 20 miles upriver from the original site. The weir was successfully installed and operated in 2001; however, installation was delayed until

10 August because of high water. In 2002, an attempt was made to install the weir just after ice-out in early May, but high water still delayed complete installation until late June. In 2003, crews arrived on-site even earlier and successfully installed the weir during the last week in April before snowmelt and spring precipitation raised water levels beyond a workable water stage level. Installation and successful operation of the weir is dependent upon "early installation" in late April, just after ice-out. When feasible, an early installation strategy is employed annually. The project continues as a cooperative venture between ADF&G, USFWS Togiak National Wildlife Refuge, USFWS OSM, and NVK.

Kanektok River drainage salmon escapements have also been monitored by aerial surveys techniques since 1962 (Appendix C1). Aerial survey escapement assessment can be variable depending on viewing conditions and observers; however, when observers, timing, and methods are standardized to the extent feasible and survey conditions meet acceptable criteria, the resulting counts are used as an index of escapement. Procedures established in recent years have increased the annual consistency of Kanektok River aerial surveys through the creation of an aerial survey location database, intensive pre-flight planning, and the establishment of a dedicated aerial survey project staff. Additionally, variability between observers and methods has been addressed through standardized training and consistency of the observers, pilots, and aircraft used.

Aerial surveys targeting Chinook and sockeye salmon are the most reliable for indexing spawning populations. Chum salmon have protracted run timing, which requires multiple surveys throughout the run to ensure accuracy of the index. In addition to timing issues, chum salmon can be problematic because of the difficulty of seeing mature spawning populations in deep or slightly turbid conditions in the water column. Chum salmon aerial surveys have been discontinued as an escapement index until survey methods can be improved or funding can be secured to allow for multiple aerial surveys of chum salmon populations throughout the duration of their runs. Additionally, Kanektok River coho salmon have been difficult to survey because of poor fall weather and water conditions. Coho salmon aerial surveys have been conducted when funding and weather conditions allow.

Spawning occurs downstream of the weir for Chinook, sockeye, chum, pink, and coho salmon. Escapement counts obtained from the weir are evaluated as an index of escapement for these species and are used in combination with aerial survey counts to estimate escapement for the entire Kanektok River drainage.

Age, Sex, and Length Composition Estimates

Annual escapement and commercial age, sex, and length (ASL) composition estimates are used to develop stock-recruitment models, in turn providing information used for projecting future run sizes. Available escapement ASL information for Chinook, sockeye, chum, and coho salmon is limited. Historical summaries of existing ASL information for salmon returning to Kanektok River can be found in Folletti (*Unpublished*[1]). Historical escapement ASL samples prior to 1997 are not included in these summaries (e.g. Huttunen 1984–1986, 1988).

[1] Folletti, D. *Unpublished*. Salmon age, sex, and length catalog for the Kuskokwim Area, 2007 progress report tables. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

OBJECTIVES

The annual project objectives for Kanektok River weir are to:

1. Enumerate the daily passage of Chinook, chum, sockeye and coho salmon through the weir from mid June through September.
2. Describe the run-timing or proportional daily passage of Chinook, sockeye, chum, and coho salmon through the weir.
3. Estimate the weekly sex and age composition of Chinook, sockeye, chum, and coho salmon such that simultaneous 90% confidence intervals have a maximum width of 0.20.
4. Estimate the mean length of Chinook, chum, sockeye, and coho salmon and Dolly Varden by sex and age.
5. Monitor environmental variables at the weir site, such as relative water level, discharge rate, water chemistry, and water temperature.

METHODS

RESISTANCE BOARD WEIR

Design, construction, and installation of the Kanektok River weir follow Stewart (2002, 2003, 2004), and Tobin (1994). The approximately 250 ft (76.2 m) weir used at the Kanektok River site is comprised of 3 major parts: the substrate rail, the resistance board panel section, and the fixed picket section. During weir operations, picket spacing of the weir panels allows for a complete census of all but the smallest returning Chinook, sockeye, chum, and coho salmon. The picket spacing allows smaller fish, such as pink salmon and other non-salmon species, to pass through the weir between pickets. Additional details concerning the resistance board weir components used on Kanektok River are described in Estensen and Diesinger (2004).

Two fish passage chutes were installed on the weir, (looking downstream) one approximately 100 ft (30.48 m) from the left bank and the other approximately 25 feet (7.62 m) from the right bank. Gates were attached on both chutes to regulate fish passage. A 10 ft (3 m) by 15 ft (4.6 m) live trap was used to collect fish for ASL sampling and installed directly upstream of the right bank passage chute. The general practice was to open the live trap entrance gate and leave the live trap exit gate closed to allow fish to accumulate inside the holding pen. The holding pen was typically allowed to fill with fish and sampling was done during scheduled counting periods. To avoid potential bias caused by the selection or capture of individual fish, all fish within the trap were included in the sample, even if the sample size objective was exceeded.

For various reasons, fish migrated downstream and required an avenue for safe passage over the weir. This behavior was typical among non-salmon species such as rainbow trout, Dolly Varden, and whitefish species *Coregonus spp.* The resistance board weir provided a means of accommodating downstream fish passage through downstream passage chutes. Each chute consisted of a single panel with its resistance board adjusted to allow a small flow of water over the distal end of the panel. Further details of downstream passage chutes are described in Linderman et al. (2002). Fish do not typically pass upstream over these chutes and they are only utilized during periods of active downstream fish migration. However, downstream passage chutes were not used during periods of strong upstream salmon passage. Downstream fish passage over these chutes was not enumerated.

Boat passage was accomplished through a designated boat gate located in the center of the weir and boat operators were able to pass independently of the weir crew. The boat gate consisted of passage panels designed to allow boats to pass over the weir without damaging the panels and are described in Estensen and Diesigner (2004). Boats with jet-drive engines were the most common and could pass over the boat gate panels independent of the crew by reducing speed. Rafts could pass downstream by submerging the boat passage panels and drifting over the weir. Boats with propeller-drive engines were uncommon and required a towrope when passing upstream.

Aerial Surveys

Aerial surveys are flown annually during peak spawning periods for each species in order to maximize the number of observable fish on the spawning grounds. Peak spawning periods were developed from run timing estimates and vary by species. Aerial surveys are numerically ranked on the scale: 1 = good, 2 = fair, and 3 = poor. Ranking criteria are based on survey method, weather and water conditions, time of survey, and spawning stage. Only surveys with rankings of fair or good (1 or 2) conducted within the peak spawning period are used for run reconstruction estimates for the Kanektok River.

Chinook and coho aerial surveys focus on the main river channel and larger tributaries; while sockeye aerial surveys focus on the main river channel, larger tributaries, lakes, and larger lake tributaries. Kanektok River aerial survey counts are tallied by index area to obtain a total count of observable fish throughout the drainage, which the Sustainable Escapement Goals (SEG) requirements are judged by. Aerial survey counts are also tallied by the total count of fish observed upstream and downstream of the weir to apportion weir counts to obtain total Kanektok River escapement estimates.

Escapement Monitoring and Estimates

To determine salmon escapement past the weir, fish passage counts were made daily during the operational period of the project. Passage counts occurred regularly throughout the day, typically for 1–2 hour periods, beginning in the morning and continuing as late as light permitted. During counting periods, fish passage chute gates were opened allowing fish through the weir. Crew members identified and enumerated all fish by species as they exited the passage chutes. Any fish observed traveling downstream through the fish passage chutes were subtracted from the tally.

Weir escapement was estimated for periods when the weir was inoperable and when breach events occurred. Estimates were assumed to be zero if passage was considered negligible based on historical data and run timing indicators. Estimates were calculated based on the proportional relationship between observed weir counts at the Kanektok River weir and weir counts from a model data set. The model data set may be from a different year at Kanektok River or from the same year at a neighboring project. The model data set was selected based on the strongest (Pearson) correlation between observed passage during the operational period at Kanektok River weir and observed passage from the model data set during the same time period. Daily passage estimates were the result of relative daily passage proportions of the model data set minus any observed passage from the day being estimated, and were calculated using the formula:

$$\breve{n}_d = \frac{\left(n_{d_c} \times \left(\sum_{d_z}^{d_a} y_e\right)\right)}{\left(\left(\sum_{d_z}^{d_a} y_c\right) - n_{d_e}\right)} \tag{1}$$

where:

$\breve{n}_d$ = passage estimate for the day weir was not operational,

$n_{d\,c}$ = the number of fish per species that passed the weir on that day for the corresponding year,

$\sum_{d_z}^{d_a} y_e$ = the sum of all daily counts per species for the year being estimated,

$\sum_{d_z}^{d_a} y_c$ = the corresponding sum of all daily counts per species, for the year with the strongest correlation to the year being estimated, and

n_{d_e} = the number of fish per species that passed the weir on that day for the year being estimated.

Drainage wide escapement estimates for Chinook and sockeye salmon were calculated by summing the weir escapement count with the estimated number of fish that spawn below the weir. In 2007, aerial Chinook and sockeye salmon aerial surveys were incomplete because of high water and poor weather conditions during the peak Chinook and sockeye salmon spawning period. The number of fish estimated to spawn below the weir is typically calculated by applying the proportion of fish observed upstream and downstream of the weir during the aerial surveys to the weir escapement. In the absence of complete aerial survey data from 2007, the recent 5 year average proportion of Chinook and sockeye salmon observed upstream and downstream of the weir was used. The drainage escapement estimates account for the number of fish counted past the weir after the aerial survey date and was calculated using the following formula:

$$N_d = \left(\frac{\left(n_{a_d} \times n_{w_2} \right)}{n_{a_u}} \right) + n_{w_2} \qquad (2)$$

where:

N_d = total drainage escapement estimate,

n_{a_d} = recent 5 year average aerial survey count downstream of the weir,

n_{a_u} = recent 5 year average aerial survey count upstream of the weir, and

n_{w_2} = final weir escapement count including any estimates.

AGE, SEX, AND LENGTH SAMPLING

Scales were removed from the preferred area of the fish (INPFC 1963). A minimum of 3 scales were removed from each Chinook and coho salmon, and one scale was removed from chum and sockeye. Removed scales were mounted on numbered and labeled gum cards. Sex was determined by visually examining external morphology, keying in on the development of the kype, roundness of the belly and the presence or absence of an ovipositor for escapement samples. All commercially harvested fish sampled were sex determined by visual inspection of internal gonads. Length was measured to the nearest millimeter from mideye to tail fork. In the case of escapement sampling, after each fish was sampled it was released into a recovery area upstream of the weir.

Escapement sampling for Chinook, sockeye, and chum salmon ASL composition estimates were conducted based on the pulse sampling design of DuBois and Molyneaux (2000). Intensive sampling was conducted for 1 to 3 days followed by a few days without sampling. The goal for each pulse is to collect samples from 210 Chinook, 210 sockeye, 200 chum, and 170 coho salmon. These sample sizes were selected for simultaneous 95% confidence interval estimates of age composition ± 0.1 and are adjusted from sample sizes recommended by Bromaghin (1993) to account for regenerated and otherwise unreadable scales. The minimum number of pulse samples was one per species from each third of the run.

Salmon were sampled from the live trap installed in the weir. After sampling was completed, relevant information such as sex, length, date, and location was copied from field forms to computer mark–sense forms. The completed gum cards and data forms were sent to the Bethel and Anchorage ADF&G offices for processing. Further details of sampling procedures can be found in DuBois and Molyneaux (2000) and Estensen and Diesigner (2004).

The weir crew conducted active sampling to increase Chinook salmon sample sizes. Active sampling consisted of capturing and sampling Chinook salmon while actively passing and enumerating all other fish. Further details of active sampling procedures are described in Linderman et al. (2002). During times when the abundance of Chinook passing through the weir was low, the crew also used dip nets to capture Chinook from behind the weir for sampling purposes.

In a cooperative effort between Coastal Villages Region Fund (CVRF) and ADF&G, student interns sampled salmon from the Quinhagak dock area where fishers deliver their catch to the on-site processor. An area was set aside for the sampling crew and processor workers supplied the crew with totes of iced fish for sampling. Pulse samples were collected from a minimum of 3 commercial openings, each representing a third of the total harvest. The goal for each pulse was to collect samples from 210 Chinook, 210 sockeye, 200 chum, and 170 coho salmon. Fish were sampled as efficiently and carefully as possible to reduce processing delays and maintain fish quality.

After sampling was concluded, completed gum cards and data forms were returned to the Bethel ADF&G offices for processing. Further details of sampling procedures can be found in DuBois and Molyneaux (2000).

AGE, SEX, AND LENGTH COMPOSITION ESTIMATES

ADF&G staff in Bethel and Anchorage processed ASL data and generated data summaries (DuBois and Molyneaux 2000). Two types of summary tables were compiled for each species; one described the age and sex composition and the other described length characteristics. These summaries account for ASL composition changes over the season by first partitioning the season into temporal strata based on pulse sample dates, applying age and sex composition of individual pulse samples to the corresponding temporal strata, and finally summing the strata to generate the estimated age and sex composition for the season. This procedure ensured ASL composition estimates were weighted by fish abundance in the escapement or harvest rather than fish abundance in the samples. Likewise, estimated mean length composition was calculated by weighting sample mean lengths from each stratum by the escapement or harvest of salmon during that stratum.

Ages were reported in the tables using European notation. European notation is composed of two numerals separated by a decimal, where the first numeral indicates the number of winters spent in fresh water and the second numeral indicates the number of winters spent in the ocean (Groot and Margolis 1991). Total age is equal to the sum of these two numerals plus one to account for the single winter of egg incubation in the gravel. The original ASL gum cards, acetates, and mark–sense forms are archived at the ADF&G office in Anchorage. The computer files were archived by ADF&G in the Anchorage and Bethel offices.

ATMOSPHERIC AND HYDROLOGICAL MONITORING

Atmospheric and hydrologic conditions were recorded two times a day normally, at 0700 hours and 1700 hours. Cloud cover was judged from clear to overcast; wind speed was recorded in miles per hour and direction was noted; precipitation was measured in inches per 24 hours, daily air and water temperature were recorded in degrees Celsius. The river gauge height was recorded daily and was pegged to a benchmark established in 2001 and consists of a ¾ inch diameter steel rebar driven into the river bed adjacent to the camp. The top of the benchmark represents a river stage of 100 cm. The river gauge is a steel rule installed near shore in the river and the 100 cm mark is pegged level with the top of a benchmark to achieve relative water level between years.

RESULTS

SALMON FISHERIES

Subsistence, commercial, and sport fishing activities occurred in District W-4 or Kanektok River in 2007. At the time of this writing, 2007 subsistence harvest estimates for Quinhagak were not final though discussions with participants in season indicated subsistence needs were met. In District W-4, 125 permit holders fished commercially for total harvests of 19,573 Chinook, 109,343 sockeye, 61,228 chum, and 34,710 coho salmon (Table 1). Exvessel value by species was $162,972 for Chinook, $372,416 for sockeye, $21,039 for chum, and $101,295 for coho for a total exvessel value of $657,723. Sport fish harvest estimates for Kanektok River in 2007 have not yet been determined.

PROJECT OPERATIONS

Kanektok River weir was operated from 19 June to 11 September in 2007 (Table 2; Appendix B1). For the purposes of this report, the operational period is defined as 25 June through 18 September, inclusive of estimates.

Low water coincided with ice out the last week of April allowing installation of the weir. Weir operation began 18 June. The Kanektok River weir became inoperable after 11 September and the water remained high through early October. In mid October the crew was able to successfully remove the weir panels. The weir cable and substrate rail remained in river for the winter as planned.

Breaches in the weir caused by broken weir panel pickets also occurred in 2007. Breaches occurred for 1.5 hours on 3 July, approximately 36 hours from 21 through 22 August, and on 12 September high water condition halted counting for the remainder of the scheduled operation period. Counts were concurrent with these breach events and fish were observed passing through the breaches before they were repaired. Fish observed passing through the breaches were not enumerated.

AERIAL SURVEYS

An aerial survey of the Kanektok River drainage was conducted on 3 August 2007. The survey was flown with a Piper PA-18 aircraft and was rated as poor (3). Conditions encountered by the observer in the upper sections of the drainage were adequate for aerial surveys. As the survey progressed downstream, however, water and weather conditions in the lower sections of the drainage deteriorated to the point where fish abundance could not be accurately determined. This resulted in an overall poor rating for the 3 August aerial survey of the Kanektok River drainage. A total of 5,185 Chinook and 226,700 sockeye salmon were counted in the Kanektok River drainage during the limited survey completed in 2007 (Table 3; Appendix C1). The limited Chinook and sockeye salmon aerial survey results were still able to meet or exceeded their respective SEG ranges. No chum or coho salmon aerial surveys were conducted in 2007.

WEIR ESCAPEMENT

Chinook salmon escapement past Kanektok River weir in 2007 was estimated to be 14,120 fish (Table 2). No weir escapement estimates were made for Chinook salmon in 2007 as weir operations were uninterrupted during the majority of the Chinook salmon run. The first Chinook salmon was observed on 22 June, three days after the start of operations, and the last Chinook salmon was observed on 8 September. Based on the operational period and inclusive of estimated passage, the median passage date was 24 July and the central 50% of the run occurred between 18 July and 29 July (Appendix D1).

Sockeye salmon escapement past Kanektok River weir in 2007 was estimated to be 307,750 fish (Table 2). A total of 307,738 sockeye salmon were observed passing upstream through the weir and 12 fish (less that 1%) were estimated to have passed upstream uncounted during breach events and inoperable periods. The first sockeye salmon was observed on 19 June, the first day of operation, and the last sockeye salmon was observed on 11 September. Based on the operational period and inclusive of estimated passage, the median passage date was 17 July and the central 50% of the run occurred between 11 July and 23 July (Appendix D1).

Chum salmon escapement past Kanektok River weir in 2007 was estimated to be 133,215 fish (Table 2). No weir escapement estimates were made for chum salmon in 2007 as weir operations were uninterrupted during the majority of the chum salmon run. The first chum salmon was observed on 19 June, the first day of operation, and the last chum salmon was observed on 11 September. Based on the operational period and inclusive of estimated passage, the median passage date was 22 July and the central 50% of the run occurred between 15 July and 29 July (Appendix D1).

Coho salmon escapement past Kanektok River weir in 2007 was estimated to be 30,471 fish (Table 2), of which 26,452 coho were observed passing upstream through the weir and 4,019 fish (13.2%) were estimated to have passed upstream uncounted during breach events and inoperable periods. The first coho salmon was observed on 14 July and the last coho salmon was observed on 11 September when the weir became inoperable. Based on the operational period, the median passage date was 28 August and the central 50% of the run occurred between 21 August and 6 September (Appendix D1).

The total count of pink salmon upstream of Kanektok River weir in 2007 was 3,075 fish (Table 4). No escapement estimate was made for pink salmon that may have passed during periods the weir was inoperable in 2007 because weir panel picket spacing allows pink salmon to freely pass through the weir unobserved; additionally, pink salmon are not a species that is targeted for escapement estimation. The first pink salmon was observed on 2 July and the last pink salmon was observed on 10 September.

Dolly Varden, whitefish, and rainbow trout were also counted through the weir in 2007. A total of 12,774 Dolly Varden, 319 whitefish, and 235 rainbow trout were observed passing upstream through the weir during project operations (Table 4). No passage estimates were made for these species during periods when the weir was inoperable because picket spacing of the weir panels allow them to freely pass through the weir unobserved.

DRAINAGE ESCAPEMENT

Drainage wide Kanektok River escapement was estimated for Chinook and sockeye salmon in 2007. Aerial survey average proportions for species counted above and below the weir site in 2005 and 2006 were used to apportion weir counts because aerial survey conditions below the weir site were unobservable in 2007 (*Note:* 2005 and 2006 were chosen based on completeness of the data from aerial surveys in those years). Chinook salmon drainage wide total escapement was estimated to be 28,758 fish, of which 14,638 (50.9%) were estimated to have spawned downstream of the weir. Sockeye salmon total drainage escapement was estimated to be 327,742 fish, of which 19,992 (6.1%) were estimated to have spawned downstream of the weir (Table 3).

AGE, SEX, AND LENGTH COMPOSITION ESTIMATES

Kanektok River Weir Escapement

Scale samples, sex, and length were collected from 527 Chinook salmon at the weir in 2007. The samples achieved the minimum sample objectives and were adequate for estimating ASL composition of estimated escapement past the weir. Age was determined for 431 fish sampled (82%). Observed escapement was partitioned into 3 temporal strata based on sample dates. Applied to observed escapement, age-1.4 Chinook salmon was the most abundant age class (44.2%), followed by age-1.2 (32.9%), age-1.3 (19.1%), age-1.5 (2.6%), age-1.1 (0.9%), and age 2.4 (0.2%) fish (Table 5). Sex composition of observed escapement was 65.1% males and 34.9% females. Mean male length by age class was 409 mm for age-1.1 fish, 528 mm for age-1.2 fish, 685 mm for age-1.3 fish, 864 mm for age-1.4, and 882 for age-1.5 fish (*Note*: there were no 2.3 males). Mean female length by age class was 581 mm for age-1.2 fish, 730 mm for age-1.3 fish, 835 mm for age-1.4, 851 for age 1.5, and 800 for age-2.4 fish. *Note:* no age-1.1 female fish were sampled. Overall, male lengths ranged from 370 to 1,101 mm and female lengths ranged from 545 to 980 mm (Table 6).

Scale samples, sex, and length were collected from 1,090 sockeye salmon at the weir in 2007. The samples achieved the minimum sample objectives and were adequate for estimating ASL composition of escapement at the weir. Age was determined for 793 of the 1,090 fish sampled (73%). Observed escapement was partitioned into 6 temporal strata based on sample dates. Applied to observed escapement, age-1.3 sockeye salmon was the most abundant age class (48.3%), followed by age-1.2 (45.3%), age-0.3 (2.9%), age-1.4 (2.2%), age-2.3 (0.8%), age 0.2 (0.5%), and age-2.2 (less than 1%) fish (Table 7). Sex composition of observed escapement was 64.0% males and 36.0% females. Mean male length by age class was 560 mm for age-0.2 fish, 527 mm for age-0.3 fish, 577 mm for age-1.2 fish, 521 mm for age-1.3, 521 mm for age-2.2, 580 mm for age-1.4, and 567 for age-2.3 fish. Mean female length by age class was 535 mm for age-0.2, 532 mm for age-0.3, 501 mm for age-1.2, 541 for age-1.3, 552 for age-1.4, and 530 mm for age 2.3 fish. There were no female age-2.2 fish in the sample. Overall, male lengths ranged from 398 to 666 mm and female lengths ranged from 424 to 616 mm (Table 8).

Scale samples, sex, and length were collected from 1,367 chum salmon at the weir in 2007. The samples achieved the minimum sample objectives and were adequate for estimating ASL composition of estimated escapement past the weir. Age was determined for 1,121 of the 1,367 fish sampled (82.0%). Observed escapement was partitioned into 7 temporal strata based on sample dates. Applied to observed escapement, age-0.3 chum salmon was the most abundant age class (71.2%), followed by age-0.4 (26.9 %), age-0.5 (1.8%), and age-0.2 (0.2%) fish (Table 9). Sex composition of observed escapement was 63.5% males and 36.5% females. Mean male length of sampled fish by age class was 576 mm for age-0.3 fish, 589 mm for age-0.4 fish, and 589 mm for age-0.5. Mean female length by age class was 550 mm for age-0.2 fish, 547 mm for age-0.3 fish, 557 mm for age-0.4, and 558 age-0.5 fish. Overall, male lengths ranged from 481 to 692 mm and female lengths ranged from 471 to 663 mm (Table 10).

Scale samples, sex, and length were collected from 643 coho salmon at the weir in 2007. The samples achieved the minimum sample objectives and were adequate for estimating ASL composition of estimated escapement past the weir. Age was determined for 470 of the 643 fish sampled (73%). Observed escapement was partitioned into 4 temporal strata based on sample dates. Applied to observed escapement, age-2.1 coho salmon was the most abundant age class (81.9%), followed by age-1.1 (13.6%), and age-1.3 (4.5%) fish (Table 11). Sex composition of observed escapement was 59.4% males and 40.6% females. Mean male length by age class was 547 mm for age-1.1 fish, 563 mm for age-2.1 fish, and 559 mm for age-3.1 fish. Mean female length by age class was 585 mm for age-1.1 fish, 567 mm for age-2.1 fish, and 577 mm for age-3.1 fish. Overall, male lengths ranged from 427 to 620 mm and female lengths ranged from 473 to 630 mm (Table 12).

District W-4 Commercial Harvest

Scale samples, sex, and length were collected from 817 Chinook salmon harvested in the 2007 District W-4 commercial fishery. The samples achieved the minimum sample objectives and were adequate for estimating ASL composition of District W-4 commercial harvest. Age was determined for 615 of the 817 fish sampled (75%) and was partitioned into 5 temporal strata based on sample dates. Applied to total commercial harvest, age-1.4 and age-1.2 Chinook salmon were the most abundant age classes comprising 74.0% of the total harvest (38.0% and 36.0% respectively), followed by age-1.3 (23.2%), age-1.5 (1.6%), age-2.4 (0.6%), age-1.1 (0.4%), and age-2.3 (0.2%) fish (Table 13). Estimated sex composition was 73.1% males and 26.9% females. Mean male length by age class was 418 mm for age-1.1, 526 mm for age-1.2 fish, 672 mm for age-1.3 fish, 802 mm for age-1.4 fish, 755 mm for age-2.3 fish, 900 mm for age-1.5 fish, and 706 mm for age-2.4 fish (Table 14). Mean female length by age class was 501 mm for age-1.2 fish, 743 mm for age-1.3 fish, 829 mm for age-1.4 fish, 853 mm for age-1.5 fish, and 847 mm for age 2.4 fish. Overall, male lengths ranged from 380 to 1,040 mm and female lengths ranged from 480 to 970 mm.

Scale samples, sex, and length were collected from 1,260 sockeye salmon harvested in the 2007 District W-4 commercial fishery. The samples achieved the minimum sample objectives and were adequate for estimating ASL composition of District W-4 commercial harvest. Age was determined for 1,005 of the 1,260 fish sampled (79.8%). The harvest was partitioned into 6 temporal strata based on sample dates. Applied to total harvest, age-1.2 and age-1.3 sockeye salmon were the most abundant age classes and represent 91.5% of the overall harvest (45.7% and 45.8% respectively), followed by age-0.3 (4.4%), age-1.4 (2.4%), age-2.3 (1.6%), and age-2.2 (0.1%) fish (Table 15). Sex composition was estimated to be 54.2% males and (45.8%) females. Mean male length by age class was 440 mm for age-0.2 fish, 538 mm for age-0.3 fish, 510 mm for age-1.2 fish, 548 mm for age-1.3 fish, 576 mm for age-1.4 fish, and 554 mm for age-2.3 fish (Table 16). Mean female length by age class was 525 mm for age-0.3 fish, 494 mm for age-1.2 fish, 525 mm for age-1.3 fish, 485 mm for age-2.2 fish, 542 mm for age-1.4 fish, and 527 mm for age-2.3 fish. Overall, male lengths ranged from 333 to 668 mm and female lengths ranged from 413 to 590 mm.

Scale samples, sex, and length were collected from 1,321 chum salmon harvested in the 2005 District W-4 commercial fishery. The samples achieved the minimum sample objectives and were adequate for estimating ASL composition of District W-4 commercial harvest. Age was determined for 1,134 of the 1,321 fish sampled (85.8%). The harvest was partitioned into 7 temporal strata based on sample dates. Applied to total harvest, age-0.3 chum salmon was the most abundant age class (79.1%), followed by age-0.4 (19.2%), age-0.5 (1.8%), and age-0.2 fish were not contained within the sampled fish in 2007 (Table 17). Sex composition was estimated to contain 44.4% males and 55.6% females. Mean male length by age class was 556 mm for age-0.3 fish, 566 mm for age-0.4 fish, and 580 mm for age-0.4 fish (Table 18). Mean female length by age class was 536 mm for age-0.3 fish, 542 mm for age-0.4 fish, and 549 mm for age-0.5 fish. Overall, male lengths ranged from 415 to 775 mm and female lengths ranged from 427 to 636 mm.

Scale samples, sex, and length were collected from 340 coho salmon harvested in the 2007 District W-4 commercial fishery. The samples did not achieve the minimum sample objectives and may not have been adequate for estimating ASL composition of District W-4 commercial harvest. Age was determined for 224 of the 340 fish sampled (65.9%). The harvest was partitioned into 2 temporal strata based on sample dates. Applied to total harvest, age-2.1 coho salmon was the most abundant age class (82.4%), followed by age-1.1 (16.3%), and age-3.1 (1.3%) fish (Table 19). Sex composition was estimated to contain 56.5% males and 43.5% females. Mean male length by age class was 564 mm for age-1.1 fish, 557 mm for age-2.1 fish, and 558 mm for age-3.1 fish (Table 20). Mean female length by age class was 559 mm for age-1.1 fish, 549 mm for age-2.1 fish, and 480 mm for age-3.1 fish. Overall, male lengths ranged from 450 to 629 mm and female lengths ranged from 420 to 664 mm.

ATMOSPHERIC AND HYDROLOGICAL MONITORING

Atmospheric and hydrological observations were recorded at 0700 hours daily from 18 June through 12 September (Table 21). Air temperatures ranged from 0˚ to 17˚ C. Water temperature was more consistent ranging from 6˚ to 17˚ C. The largest single rain event occurred on 13 July and resulted in an accumulation of 8.0 in (20.3 cm) during this 24 hour period. The Kanektok River weir experienced several localized heavy rain events in 2007; however due to the localized nature of the heavy rain events and the dryness of the surrounding area early in the season, these heavy rain events did not cause the water level to raise to inoperable levels. Relative water level ranged from 14 to 63 cm; however, the river displayed the entire range of stream levels over a relatively short time period from 2 September to when the water level made the weir inoperable for the remainder of the season on 12 September. With the exception of the last week in August and from 1 September till the weir became inoperable, water levels at the weir site remained fairly stable and ranged from approximately 20 cm to 54 cm for the majority of the operational period.

DISCUSSION

PROJECT OPERATIONS

Operation of the weir in 2007 was successful with a nearly complete census of Chinook, sockeye, and chum salmon escapement passed the weir and the majority (approximately 86%) of the coho salmon escapement being enumerated. Installation of the weir occurred in late April after ice-out. The weir crew arrived on site in mid June and the weir became operational 19 June. Efforts will be made to install the weir as soon after ice-out as possible each year; however, it must be conceded that variations in ice-out timing and water levels may hamper this strategy in any given year. To the extent feasible, aerial reconnaissance flights should be conducted and water level should be evaluated at the weir site in mid April each year to facilitate early installation.

Trapping Chinook salmon for ASL sampling continued to be problematic at times. Chinook are generally reluctant to enter the trap when other fish species are present or when the fyke doors on the trap were set. Active sampling Chinook salmon helped mitigated some of these problems.

Water levels throughout the Kuskokwim area, including the Kanektok River, were below average from mid July through mid August. Low water did not appear to hamper fish passage through the weir; however, navigation of the river by jet boat proved difficult during low water conditions.

High water in mid September precluded removal of the weir into late September. As a result, a crew returned to the weir site in October after water levels had receded and successfully removed the weir panels. The weir rail and cable remained inriver as planned to facilitate early install the following spring.

ESCAPEMENT MONITORING AND ESTIMATES

Weir escapements were estimated for periods when the weir was breached and to a larger extent when the weir was inoperable after 11 September. The percentage of estimated escapement ranged from 0% for Chinook, sockeye, and chum salmon to 13% for coho salmon. This variation is primarily a function of species run timing in relation to the timing of the inoperable period at the end of the season. The escapement estimates are believed to be a reasonable approximation of unobserved passage during breach events and inoperable periods.

The 2007 Chinook salmon weir escapement of 14,120 fish was near the 2005 escapement (Table 3; Figure 3). The Chinook salmon aerial survey count of 5,185 was within the SEG range for the Kanektok River drainage (Table 3; Appendix C1). It should be noted that although the 2007 Chinook salmon aerial survey was incomplete, the aerial survey escapement goal was still achieved. The drainage wide escapement estimate was 28,758 Chinook salmon, of which approximately 50% spawned downstream of the weir (Table 3). Total exploitation of Kanektok River Chinook salmon in 2007 was estimated to be 44.2%. This estimate is based on the drainage escapement estimate, District W-4 commercial harvest, and estimates of subsistence and sport fishing harvest. Subsistence and sport fish harvest estimates were not available at the time of publication so the most recent 5 year average (2001 through 2006) of Quinhagak subsistence and Kanektok River sport fish harvest was used to calculate total run and exploitation rates.

Sockeye salmon estimated weir escapement in 2007 of 307,750 fish was the highest escapement of 5 years with complete data (Table 3; Figure 3). Weir escapement in 2007 was 21.3% higher than the second highest escapement of 242,208 sockeye salmon in 2005. The sockeye salmon aerial survey count of 226,700 fish exceeded the upper end of the SEG range by 148,700 fish (Appendix C1). It should be noted that similar to Chinook aerial surveys, conditions in 2007 below the weir site were not able to be surveyed. Even so, the aerial survey escapement estimates that were derived from the upper sections of the drainage were over four times the upper end of the SEG range in 2007. The drainage escapement estimate of 327,742 sockeye salmon, of which approximately 6% of sockeye salmon returning to Kanektok River spawned downstream of the weir in 2007 (Table 3). Total exploitation of Kanektok River sockeye salmon in 2007 was estimated to be 25.3%. This estimate is based on the drainage escapement estimate, District W-4 commercial harvest, and estimates of subsistence and sport fishing harvest. Subsistence and sport fish harvest estimates were not available at the time of publication so the most recent 5 year average (2001 through 2006) of Quinhagak subsistence and Kanektok River sport fish harvest was used to determine total run and exploitation.

The methodology used to estimate drainage escapement for Chinook and sockeye salmon in 2007 was not optimal and is subject to the limitations inherent to aerial surveys. However in 2007, historic aerial survey data were used to determine the proportion of fish upstream and downstream of the weir. Therefore, the drainage escapement estimate represents a more accurate index compared to an aerial survey because it is weighted by weir escapement counts.

Data are not available to estimate the productivity of salmon stocks in the Kanektok River and place 2007 estimates of exploitation in perspective. ADF&G staff generally uses a Ricker-type spawner-recruit model to estimate the number of spawners that provide maximum sustained yield (MSY), total return at MSY, and the resulting exploitation fraction. Exploitation at MSY for 9 sockeye stocks in Bristol Bay averaged 65% (Fair et al. 2004) and ranged from 49% for the least productive Kvichak River off-peak runs to 77% for Ugashik sockeye salmon. Similarly, derived estimates of exploitation at MSY for 26 Chinook salmon stocks in Oregon, Washington, and Alaska averaged 67% (C. Parkin, Department of Fisheries and Oceans Canada; personal communication). Exploitation at MSY for Bering Sea Chinook salmon from Salcha, Chena (Evenson 2002), and Nushagak Rivers (Fair et al. 2004) averaged 75%. In comparison to these stocks, the exploitation of Kanektok River sockeye salmon is below the level providing MSY and Chinook salmon exploitation is well below other northern Alaskan stocks.

It is difficult to assess the quality or any directional bias of the estimates of total abundance and exploitation. Three main issues affect these estimates for 2007: 1) lack of 2007 estimates of subsistence and sport fish harvests, 2) lack of escapement monitoring of other tributaries and salmon stocks that are harvested in District W-4, and 3) the lack of aerial surveys of the Kanektok River below the weir. The 5 year average subsistence and sport fish harvest was added to the 2007 commercial harvest for an estimate of total harvest. The contribution of other stocks of salmon to the District W-4 harvest is unknown. An important assumption underlying the estimate of total drainage escapement is that the proportions of observable salmon counted during aerial surveys flown above and below the weir have remained similar between recent years.

The use of the 5 year average sport and subsistence harvest should not have a large affect on the 2007 estimates of total abundance and exploitation due to these harvests being somewhat constant through time and these harvests being a small proportion of the total run.

The direction of the bias in total abundance and exploitation rates due to the omission of other stocks of Chinook and sockeye salmon in the escapement is known. The estimates of total abundance will be biased low and the exploitation will be biased high. The Arolik River is the only other significant salmon-producing river that drains into District W-4, and is thought to have lower abundance relative to the Kanektok River. In 2005, the first aerial survey of the Arolik River was conducted with a total of 4,061 Chinook and 37,410 sockeye, which supports what has been assumed historically. Kuskokwim River salmon potentially pass through District W-4 during their migration. Few Chinook salmon and no sockeye salmon tagged in District W-4 in 1969 and 1970 were recovered in the Kuskokwim River (Baxter *Unpublished*[2]). The bias is thought to be small and in a direction that it leads managers to take a conservative approach to fishery management.

An assumption necessary for an unbiased estimate of total escapement, abundance, and exploitation is that the proportion of observable salmon counted during aerial surveys upriver and downriver of the Kanektok River weir is equal. Differences could arise with differences in environmental conditions or salmon run timing. If a higher proportion of observable salmon are counted above the weir and that relationship is assumed for the area below the weir, total escapement and abundance will be underestimated and exploitation will be biased higher. The inverse will occur if observable salmon have a lower proportion to counted salmon during the aerial survey above the weir than the survey below the weir.

Aerial surveys of the Kanektok River, both above and below the weir are typically conducted on the same day to remove possible bias associated with conditions on different days. Additionally, surveys are conducted by the same observer in a given year when possible. This reduces the possibility of bias caused by differences in methods or different observers employed between the two areas; however, experienced staff has described hydrologic differences between river sections above and below the weir that may affect Kanektok River aerial surveys. Although overall depth, watercolor, riparian vegetation, and substrate type is nearly identical between river sections, the river becomes more braided and spreads out over a wider channel below the weir. This braiding makes it difficult to observe every channel during a given survey. This may result in a higher proportion of observable fish being counted upstream of the weir if fewer salmon are observable in the braided sections downstream. Determining whether this actually occurs or not is difficult to do, but the result would bias escapement estimates low and exploitation high.

Differing proportions of observable fish during aerial surveys from above and below the weir may also arise if timing or area is not similar. For Chinook and coho salmon, these factors are not as pronounced because they primarily spawn in the main channel, their peak spawning period is consistent between areas, and similar areas are surveyed. In contrast, the majority of sockeye salmon are lake and lake tributary spawners. The timing of when sockeye salmon enter the lakes and later move into lake tributaries to spawn is a critical factor for sockeye salmon aerial surveys. If few sockeye salmon are observed in the lakes and the lake tributaries are not surveyed, it will be unknown whether abundance was actually low (small percent observed) or the majority of sockeye salmon had already moved into the lake tributaries to spawn. In order to reduce this potential for bias, sockeye salmon aerial surveys should be conducted around the perimeter of the lakes but also in the lake spawning tributaries on an annual basis. Historically,

[2] Baxter, R. E. *Unpublished*. Quinhagak tagging program 1969–1970. Alaska Department of Fish and Game, Division of Commercial Fisheries, Kuskokwim Stock Separation Report No. 4, Anchorage.

it is unclear whether sockeye salmon aerial surveys of the Kanektok River drainage have consistently included lake tributaries. This uncertainty has been addressed in recent years through improvements and standardization of the Kuskokwim Area aerial survey program.

Additionally, the timing of aerial surveys should insure that the majority of salmon counted below the weir will not pass the weir after the survey has been conducted. Historically, 90% of Chinook and sockeye salmon have passed the weir by late July and early August when surveys are conducted.

Though it is not known for certain, estimates of exploitation rates for Chinook and sockeye salmon in 2007 seem reasonable. No large source of bias is apparent and any overall bias would likely skew actual exploitation high. The exploitation percents for Kanektok River Chinook and sockeye salmon seem low given the productivity seen in other and adjacent salmon stocks.

Chum salmon weir escapement in 2007 of 133,215 fish was the highest escapement of 6 years with comparable methods and complete data (Table 3; Figure 3). Weir escapement in 2007 was over two times higher than the next highest escapement of 53,580 chum salmon in 2005. It is notable that chum salmon escapements in 4 years with comparable data were similar and within 21% of each other indicating chum salmon escapement to Kanektok River weir is relatively stable. However, chum salmon escapement in 2007 was well above previous weir counts and it is known that large numbers of chum salmon, perhaps in excess of weir escapements, spawn downstream of the weir. Aerial surveys have proven to be an ineffective method for determining chum salmon escapement proportions from above and below the weir because chum salmon have protracted run timing and spawning coloration have negative impacts on the quality of aerial survey counts for this species. Continued accumulation of chum salmon weir escapement data will enhance the ability of the department evaluate Kanektok River chum salmon escapements in the future.

Coho salmon weir escapement in 2007 of 30,471 fish was the fourth lowest escapement of 6 years with complete data (Table 3; Figure 3). The 2007 Kanektok River weir escapement was 34.7% below the 2004 coho salmon escapement of 87,828 but 19.5% greater that the 2001 escapement of 24,883. Coho salmon aerial surveys were not conducted in 2007 because of poor weather and high water conditions in late September. During inriver spawning migration, coho salmon typically move in pulses that seem to be triggered by even small increases in water level (Linderman et al. 2003). Water levels remained fairly constant throughout late August and early September; however water levels after 11 September rendered the weir inoperable during the peak coho migration. Given the percentage (13.2%) of estimated coho salmon escapement in 2007, the total escapement reported here should be viewed as a relatively strong index of coho salmon escapement past the weir. Coho salmon estimates in 2007 after the weir became inoperable were based on the relative daily proportion of fish passage in 2003. This year was used as the model data set because it indicated the strongest correlation with observed passage in 2007 compared to the 5 other years of project operations.

Chinook salmon run timing in 2007 was the latest timing since the weir has been operated in its current location (Figure 4; Appendix D1). Sockeye salmon run timing in 2007 was similar to 2002, both of which have the latest run timing of the project's history. Chum salmon run timing in 2007 was similar to 2003 and 2005 but later than observed in 2002 and 2004. It is unknown at this time if the Kanektok River chum salmon run timing will continue to have an odd/ever year correlation as the current data seems to suggest. Coho salmon run timing in 2007 was most comparable to 2002 if slightly earlier; however, coho salmon run timing at the Kanektok River weir has remained relatively consistent in the years of operation. The inter-annual run timing pattern between these species has varied; however, with only 5 years of data from the Kanektok River weir it is likely that no long term pattern in run timing has yet emerged.

AGE, SEX, AND LENGTH COMPOSITION ESTIMATES

Chinook salmon ASL sampling met the minimum sampling objective. Meeting the sampling goals for Chinook salmon in 2007 was the result of the crew actively targeting Chinook salmon for sampling and the revision of the sampling goals in this system. Historically, it was difficult in most years to obtain sampling goals of 210 Chinook salmon each week for a minimum of 6 weeks. The sampling goals were changed in 2006 to bring the Kanektok River weir sampling goals inline with other escapement projects in the Kuskokwim Area while still being able to accurately describe the age, sex, and length composition of escapement.

Chum and sockeye salmon ASL sampling objectives were met in 2007. Chum and sockeye salmon sampling goals were also reestablished in alignment with sampling objectives from other assessment projects in the Kuskokwim Area. Obtaining 210 pulse samples at the onset and end of their respective runs can be difficult when weekly counts may be less than the sample objectives; however, adjusting the sampling goals to at least one pulse from each third of the run alleviated problems encountered from low abundance of these species at the tails of their perspective runs.

Coho salmon ASL sampling objectives were achieved in 2007. Historically it has been difficult in most years to obtain the sampling goals of 6 pulse samples of 170 coho salmon each because of weather and water conditions often render the weir inoperable for long periods of time late in the season. This time period often coincides with the majority of coho salmon passage. Similar to Chinook, sockeye, and chum salmon, the escapement sampling goals for coho salmon were reestablished to a minimum of one pulse per each third of the run.

In 2007, ADF&G continued its partnership with CVRF to collect District W-4 and commercial ASL samples, as has been the commercial sampling protocol since 2005. ADF&G staff trained and maintained oversight of Quinhagak-based CVRF staff and student interns that collected ASL and genetics samples from Chinook, sockeye, chum, and coho salmon harvested in the District W-4 commercial fisheries. All sample goals were achieved for District W-4 commercial harvest Overall, this sampling program in partnership with CVRF was successful in the 2007 season. Utilizing local sampling crews to achieve annual ASL sample objectives has advantages over the ability of ADF&G staff alone to successfully achieve sample goals. CVRF crew samples were generally collected and organized well, which helped to streamline ASL sample processing and data analysis.

The following discussion focuses on describing ASL trends seen within the Kanektok River weir escapement and District W-4 commercial harvest in 2007. Some comparisons are made indicating similarities and differences between the weir escapement and commercial harvest ASL estimates. The limited historical data set for Kanektok River weir precludes long-term comparisons in escapement ASL trends. Probably the greatest value in collecting ASL information is for future development of spawner-recruit models used for establishing escapement goals (e.g., Clark and Sandone 2001). The information can also be used for forecasting future runs, and to illustrate long-term trends in ASL composition (e.g., Bigler et al. 1996).

Chinook Salmon

Age 1.4 was the dominant age class for both the escapement samples and District W-4 commercial ASL estimates. The percentage of age-1.4 Chinook salmon were similar at 44.2% for escapement samples and 38.0% for commercial estimates, resulting in a difference of approximately 6% (Tables 5 and 13; Figure 5). Due to the weir being inoperable for the entire season in 2006, no ASL data was collected from the escapement and no comparison is possible for the annual variation in age classes passing the weir. Commercial ASL samples for District W4 in 2007 were dominated by age-1.4 and age-1.2 with 38% and 36% respectively, which mirrored the age percentages from Kanektok River weir escapement ASL assessment. Males dominated both the weir samples and commercial estimates with similar percentages of 65.1% for escapement samples and 73.1% for commercial estimates. The high male percentage in both estimates was likely a function of the high percentage of age-1.2 fish, which are predominantly male. Males exhibited mean length partitioning by age class for age-1.1 through age-1.4 fish in both weir escapement samples and commercial ASL estimates (Figure 6). Mean male lengths by age class were nearly identical between the escapement samples and commercial estimates. Females exhibited similar mean length partitioning by age class and female length by age class was also similar between escapement samples and commercial ASL estimates (Figure 7).

Similarities between commercial ASL estimates and escapement samples collected indicate escapement samples collected in 2007 may be adequate to estimate escapement ASL composition. The relatively high percentage of age-1.2 Chinook salmon may be indicative of better returns as this age class should return in greater abundance as age-1.3 in 2008.

Sockeye Salmon

Age-1.2 and age-1.3 dominated escapement samples and commercial ASL collected in 2007 with approximately 94% of the weir escapement and 92% of the commercial samples. (Tables 7 and 15; Figure 5), which is similar to the trends witnessed in 2002 and 2003 (Figure 8). Females comprised 44.6% of the commercial estimates and 36.0% of escapement samples. Males were dominant in each age class throughout out all strata in the escapement data; however, male sockeye salmon in the commercial harvest in District W4 showed a trend of decreasing male abundance in the commercial harvest as the season progressed (Table 15). It is unclear why this discrepancy exists, but it may be attributed to an unknown weir or commercial harvest bias. Males did not exhibit length partitioning by age class for both weir escapement samples and commercial ASL estimates (Figure 6). Females also did not exhibit mean length partitioning by age class (Figure 7). Mean male and female lengths by age class were similar between the escapement samples and commercial estimates for the two major age groups. The minor age classes showed variability that was likely caused by the small sample sizes for those ages.

Chum Salmon

Age 0.3 was the dominant age class for escapement samples and commercial ASL estimates and comprised approximately 71% of the weir escapement and 79% of the commercial harvest (Tables 9 and 17; Figure 5). The two predominant age classes that comprise both the District W4 commercial harvest and the Kanektok River weir escapement are age-0.3 and -0.4 chum salmon. It is common for the proportion of age-0.3 and -0.4 chum salmon in the District W4 harvest and the Kanektok River escapement to be the dominate age class and to alternate between years. Since 2003, age-0.3 has been the dominate age class in the commercial harvest in odd years; whereas, age-0.4 have dominated the even year commercial harvest. This pattern of age-0.3

chum salmon being the dominate age class in odd years has not been constant over longer time periods there have been periods when age-0.3 dominated in even years. Additional collection of paired escapement and commercial ASL data in coming years will aid in analyzing this pattern. The male-to-female ratio was not 50-50 (Folletti *Unpublished*[3]) for the escapement estimates with females comprising 36.5% of the escapement past the weir. Commercial ASL samples were consistent with a 50-50 male to female ratio with females comprising 55.6% of the commercial harvest. It is notable that male chum salmon percentages fluctuated throughout project operations and female percentages increased towards then end of the chum salmon run, which is a typical pattern (Table 9). Males did not display mean length partitioning by age class from weir escapement samples in 2007 with age-0.4 and 0.5 being identical. However, there was minor mean length partitioning by age class for the commercial ASL estimates (Figure 6). In 2007, mean male lengths by age class were not similar between the escapement samples and commercial estimates with escapement samples having larger mean length in the two younger age classes. Females exhibited minor mean length partitioning by age class (Figure 7).

Some similarities existed between commercial ASL estimates and escapement samples collected. However, it remains unclear whether commercial samples can be used to adequately estimate escapement ASL composition, as discrepancies exist between commercial and escapement estimates. The discrepancies noted in the commercial and escapement data may indicate a potential bias in sample collection. However, the discrepancy may be due to the fact that large numbers of chum salmon spawn below the location of the weir site and the commercial fishery is located near the mouth of the river, which may have an affect on the male-to-female ratio because of the spawning habits of chum salmon. Additionally, the inconsistency between male to female ratios in the escapement and commercial samples may indicate that more males than females passed upstream of the weir site in 2007 compared to the overall sex composition of the 2007 run.

Coho Salmon

Age 2.1 was the dominant age class for both escapement samples and commercial ASL estimates which is consistent with other Kuskokwim Area coho salmon populations (Tables 11 and 19; Figure 5; Folletti *Unpublished*). However, the percentage of age-2.1 fish was not similar at 88.7% for escapement samples and 82.4% for commercial estimates. This resulted in a difference of 6.3% which may be attributed to the limited number of commercial samples collected in 2007. Age-1.1 coho salmon typically have higher relative abundance at the beginning of the run and taper off as the run progresses. This trend was exhibited in the escapement and commercial ASL estimates in 2007. The early termination of project operations and the small sample size from the commercial harvest in 2007 likely resulted in an inflated percentage of age-1.1 coho salmon in the commercial samples. The commercial ASL estimate indicated a near 50-50 split between males and females, which is typical for Kuskokwim Area coho salmon populations. Escapement samples indicated approximately 60% male coho salmon and 40% females. The discrepancy between the male to female ratio may be attributed to a portion of the population spawning below the weir site or the lack of ASL samples collected after the weir became inoperable on 11 September. Males and females did not exhibit mean length partitioning by age class for both weir escapement samples and commercial ASL estimates, which is common for coho salmon

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[3] Folletti, D. *Unpublished*. Salmon age, sex, and length catalog for the Kuskokwim Area, 2007 progress report tables. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

populations (Figures 6 and 7). Mean male and female lengths by age class did not show a high degree of similarity between the escapement samples and commercial estimates.

Few similarities existed between commercial ASL estimates and escapement samples which may be attributed to fish spawning below the location of the weir, the weir becoming inoperable prior to the end of the coho run, or bias associated with the small sample size from the commercial harvest. The last full coho salmon pulse was completed on 26 August and historical run timing information indicates only approximately 40% of the run had passed the weir site by that time (Figure 4; Appendix D1). On this basis, the samples collected may not represent half or more of the overall coho salmon run.

CONCLUSIONS

Since the inception of the resistance board floating weir in 2001 the project has:

1. Demonstrated the ability to successfully install and operate a weir in the Kanektok River.
2. Demonstrated the ability to achieve its annual objectives with the exception of ASL sample objectives in some years for some species.
3. Provided escapement and run timing information for Kanektok River salmon and Dolly Varden populations.
4. Provided a platform for the collection of ASL information from the salmon escapement and Dolly Varden migrating past the weir.
5. Provided a platform for the collection and continual tagging of Dolly Varden migrating past the weir.

RECOMMENDATIONS

Establishing long-term funding for the project would ensure a long-term escapement, run timing, and ASL database required to better understand the spawning populations in Kanektok River. A long-term database would lead to the establishment of Biological Escapement Goals for the spawning salmon populations, improving management of the spawning stocks for sustainable yields.

Implementing an inriver Chinook salmon radiotelemetry study would increase the accuracy in determining the total abundance of Chinook salmon spawning below the Kanektok River weir, which in turn increases the accuracy of drainage escapement estimates. Radiotelemetry could also be used to compare and contrast distribution of salmon observed from aerial surveys with radiotelemetry results in order to ground truth aerial survey distribution estimates, which may be applied to historic aerial survey information to extend the data base for the Kanektok system. Such a study could be expanded in the future to examine the number of chum and coho salmon spawning below the weir in addition to their spawning distribution within the drainage.

Continue the cooperative effort between NVK, USFWS, and ADF&G, with ADF&G maintaining its proactive role in the mentoring of NVK technicians, the development of the project, and oversight of seasonal operations. Regular consultations between ADF&G, NVK, and USFWS occurred throughout the field season, coordinating logistics, discussing results, and exchanging ideas. NVK provided 3 technicians for the 2008 season. USFWS used the weir as a platform for a Dolly Varden population study to better understand their spawning populations in Kanektok River. The project can be used in future years as a platform for the study of other anadromous and resident freshwater species in Kanektok River.

Every effort should be made to continue with annual weir installation in mid to late April to ensure the weir is operational by mid to late June. As has demonstrated periodically in the Kanektok drainage, high water level and water flow in May and June has the potential to substantially delay installation until July or later depending on the severity and duration of high water conditions. In future years, crews should install the passage chute with a debris deflecting structure in order to increase the possibility of full operation by mid June.

ACKNOWLEDGMENTS

The authors would like to thank Brian Latham and Elizabeth Smith with ADF&G and Edward Mark, Karl Jones, Thaddeus Foster, Kris Sharp, and Markus Henry with NVK for their hard work throughout the season and beyond. The authors would also like to thank Mark Lisac and James Lawon with the USFWS, TNWR for their contributions to project operations, logistics, and planning. The authors also extend thanks to student interns from AVCP for their efforts and contributions to project operations. The USFWS, Office of Subsistence Management, provided $62,078 in funding support for this project (FIS 07-305) through the Fisheries Resource Monitoring Program, under agreement number 701817J648. Coastal Villages Region Fund provided $58,662 in funding support for this project through a cooperative agreement with NVK and also provided logistical and in kind contributions to project operations and the commercial ASL sampling program throughout the 2007 season.

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TABLES AND FIGURES

Table 1.–District W-4 commercial harvest by period and exvessel value, 2007.

	Date	Permits	Chinook		Sockeye		Chum		Coho	
Period	Caught	Fished	Harvest	Pounds	Harvest	Pounds	Harvest	Pounds	Harvest	Pounds
1	6/14	88	1,308	17,354	66	463	250	1,847	0	0
2	6/19	82	2,267	25,842	349	2,184	1,275	8,979	0	0
3	6/21	80	3,356	44,147	1,533	10,223	2,530	17,831	0	0
4	6/26	97	3,749	51,204	1,940	12,652	4,260	29,795	0	0
5	6/28	87	2,373	35,800	5,091	35,049	1,126	7,961	0	0
6	7/2	94	1,781	26,908	7,624	52,821	3,406	23,977	0	0
7	7/4	85	971	15,580	8,935	59,957	2,245	15,816	0	0
8	7/6	93	896	14,647	8,228	54,668	2,852	20,531	0	0
9	7/8	49	382	5,650	7,493	49,388	1,102	7,935	0	0
10	7/10	89	722	11,400	10,548	67,244	2,516	17,733	0	0
11	7/12	89	489	7,676	13,110	81,090	2,110	15,067	0	0
12	7/14	87	370	5,740	13,579	82,005	1,579	10,857	8	57
13	7/16	82	250	3,933	9,483	56,793	1,584	11,153	40	262
14	7/18	72	145	2,287	5,545	32,693	2,310	16,286	91	630
15	7/20	69	183	2,896	5,077	29,995	6,109	41,777	117	811
16	7/24	54	96	1,530	3,608	21,044	6,333	42,337	477	3,301
17	7/26	49	64	1,012	2,579	14,615	6,903	46,462	792	5,609
18	7/31	48	31	432	821	4,561	3,462	23,153	2,207	16,030
19	8/2	51	40	674	788	4,492	3,597	23,575	2,142	15,524
20	8/4	53	22	387	354	2,025	1,628	10,522	1,714	12,709
21	8/6	50	16	264	608	3,699	1,370	9,158	2,443	18,582
22	8/8	50	14	227	301	1,881	766	5,106	2,849	21,574
23	8/10	47	13	246	326	1,890	502	3,345	3,275	25,373
24	8/13	46	9	136	225	1,279	433	2,875	3,298	25,485
25	8/15	52	5	64	234	1,432	313	2,068	2,839	22,270
26	8/17	40	7	61	187	1,168	194	1,324	2,394	18,379
27	8/20	43	4	57	144	887	142	994	2,544	20,415
28	8/22	45	1	9	151	932	73	554	2,353	18,491
29	8/24	38	6	42	167	1,022	108	727	2,267	18,197
30	8/27	37	2	13	105	635	51	340	1,103	8,586
31	8/29	30	1	6	79	471	55	384	1,065	8,618
32	8/31	22	0	0	65	402	44	316	692	5,662
Total		125	19,573	276,224	109,343	689,660	61,228	420,785	34,710	266,565
Average Weight				14.11		6.31		6.87		7.68
Average Price				0.59		0.54		0.05		0.38
Exvessel Value				$162,972		$372,416		$21,039		$101,295
Total Number of Fish			224,854							
Total Pounds			1,653,234							
Total Exvessel Value			$657,723							

Table 2.–Daily and cumulative Chinook, sockeye, chum, and coho salmon passage, Kanektok River weir, 2007.

	Chinook		Sockeye		Chum		Coho	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
06/19	0 [a]	0	9 [a]	9	2 [a]	2	0 [a]	0
06/20	0	0	24	33	8	10	0	0
06/21	0	0	17	50	2	12	0	0
06/22	1	1	8	58	3	15	0	0
06/23	0	1	33	91	10	25	0	0
06/24	16	17	123	214	30	55	0	0
06/25	8	25	112	326	37	92	0	0
06/26	7	32	140	466	41	133	0	0
06/27	4	36	245	711	30	163	0	0
06/28	14	50	305	1,016	46	209	0	0
06/29	9	59	543	1,559	108	317	0	0
06/30	53	112	1,733	3,292	224	541	0	0
07/01	32	144	2,864	6,156	489	1,030	0	0
07/02	32	176	2,588	8,744	533	1,563	0	0
07/03	49 [b]	225	3,199 [b]	11,943	770 [b]	2,333	0 [b]	0
07/04	72	297	4,997	16,940	2,016	4,349	0	0
07/05	162	459	8,252	25,192	2,328	6,677	0	0
07/06	98	557	7,266	32,458	1,373	8,050	0	0
07/07	111	668	8,465	40,923	983	9,033	0	0
07/08	143	811	8,300	49,223	2,260	11,293	0	0
07/09	257	1,068	12,645	61,868	4,863	16,156	0	0
07/10	90	1,158	11,319	73,187	3,582	19,738	0	0
07/11	216	1,374	16,093	89,280	2,992	22,730	0	0
07/12	276	1,650	14,173	103,453	5,620	28,350	0	0
07/13	518	2,168	12,201	115,654	2,841	31,191	0	0
07/14	301	2,469	9,031	124,685	1,112	32,303	1	1
07/15	296	2,765	10,727	135,412	2,032	34,335	0	1
07/16	227	2,992	12,596	148,008	3,874	38,209	0	1
07/17	420	3,412	18,321	166,329	5,077	43,286	0	1
07/18	391	3,803	13,215	179,544	5,370	48,656	2	3
07/19	914	4,717	13,869	193,413	5,816	54,472	22	25
07/20	736	5,453	12,449	205,862	5,085	59,557	13	38
07/21	601	6,054	10,330	216,192	4,153	63,710	14	52
07/22	484	6,538	9,272	225,464	2,446	66,156	6	58
07/23	417	6,955	8,703	234,167	4,997	71,153	13	71
07/24	885	7,840	7,927	242,094	3,796	74,949	21	92

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Table 2.–Page 2 of 3.

	Chinook		Sockeye		Chum		Coho	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
07/25	628	8,468	8,944	251,038	5,720	80,669	39	131
07/26	591	9,059	8,854	259,892	5,905	86,574	38	169
07/27	684	9,743	9,232	269,124	7,256	93,830	110	279
07/28	640	10,383	5,860	274,984	4,313	98,143	79	358
07/29	489	10,872	4,292	279,276	2,945	101,088	78	436
07/30	336	11,208	2,995	282,271	3,077	104,165	69	505
07/31	285	11,493	2,883	285,154	2,964	107,129	62	567
08/01	230	11,723	2,303	287,457	2,570	109,699	65	632
08/02	303	12,026	2,083	289,540	2,190	111,889	118	750
08/03	324	12,350	1,862	291,402	2,293	114,182	92	842
08/04	127	12,477	1,485	292,887	1,829	116,011	69	911
08/05	383	12,860	1,835	294,722	2,522	118,533	231	1,142
08/06	336	13,196	1,567	296,289	2,146	120,679	368	1,510
08/07	248	13,444	958	297,247	1,294	121,973	288	1,798
08/08	110	13,554	1,089	298,336	1,300	123,273	231	2,029
08/09	106	13,660	1,160	299,496	1,696	124,969	217	2,246
08/10	95	13,755	940	300,436	1,494	126,463	274	2,520
08/11	45	13,800	741	301,177	1,279	127,742	236	2,756
08/12	55	13,855	924	302,101	1,194	128,936	400	3,156
08/13	80	13,935	831	302,932	1,287	130,223	936	4,092
08/14	28	13,963	478	303,410	566	130,789	544	4,636
08/15	19	13,982	277	303,687	266	131,055	230	4,866
08/16	14	13,996	280	303,967	216	131,271	138	5,004
08/17	19	14,015	292	304,259	278	131,549	206	5,210
08/18	22	14,037	351	304,610	404	131,953	636	5,846
08/19	21	14,058	236	304,846	263	132,216	594	6,440
08/20	8	14,066	164	305,010	188	132,404	606	7,046
08/21	9 [c]	14,075	184 [c]	305,194	149 [c]	132,553	794 [c]	7,840
08/22	8 [c]	14,083	223 [c]	305,417	117 [c]	132,670	907 [c]	8,747
08/23	4	14,087	236	305,653	94	132,764	983	9,730
08/24	8	14,095	320	305,973	82	132,846	1,400	11,130
08/25	8	14,103	227	306,200	92	132,938	1,536	12,666
08/26	1	14,104	68	306,268	40	132,978	649	13,315
08/27	3	14,107	243	306,511	55	133,033	858	14,173
08/28	1	14,108	226	306,737	36	133,069	1,400	15,573
08/29	2	14,110	161	306,898	19	133,088	857	16,430

-continued-

Table 2.–Page 3 of 3.

Date	Chinook Daily	Chinook Cum.	Sockeye Daily	Sockeye Cum.	Chum Daily	Chum Cum.	Coho Daily	Coho Cum.
08/29	2	14,110	161	306,898	19	133,088	857	16,430
08/30	1	14,111	98	306,996	17	133,105	538	16,968
08/31	3	14,114	113	307,109	29	133,134	780	17,748
09/01	0	14,114	105	307,214	14	133,148	1,051	18,799
09/02	0	14,114	56	307,270	13	133,161	688	19,487
09/03	3	14,117	85	307,355	8	133,169	904	20,391
09/04	0	14,117	72	307,427	9	133,178	729	21,120
09/05	0	14,117	55	307,482	9	133,187	1,045	22,165
09/06	0	14,117	71	307,553	7	133,194	728	22,893
09/07	2	14,119	38	307,591	5	133,199	599	23,492
09/08	1	14,120	30	307,621	1	133,200	922	24,414
09/09	0	14,120	35	307,656	5	133,205	839	25,253
09/10	0	14,120	62	307,718	6	133,211	836	26,089
09/11	0	14,120	32	307,750	4	133,215	363	26,452
09/12	0 [d]	14,120	0 [d]	307,750	0 [d]	133,215	910 [d]	27,362
09/13	0 [d]	14,120	0 [d]	307,750	0 [d]	133,215	879 [d]	28,241
09/14	0 [d]	14,120	0 [d]	307,750	0 [d]	133,215	640 [d]	28,881
09/15	0 [d]	14,120	0 [d]	307,750	0 [d]	133,215	422 [d]	29,302
09/16	0 [d]	14,120	0 [d]	307,750	0 [d]	133,215	414 [d]	29,716
09/17	0 [d]	14,120	0 [d]	307,750	0 [d]	133,215	372 [d]	30,088
09/18	0 [d]	14,120	0 [d]	307,750	0 [d]	133,215	383 [d]	30,471
Total	14,120		307,750		133,215		30,471	
Observed	14,120		307,738		133,215		26,452	
Estimated	0		12		0		4,019	
% Observed	100.0		100.0		100.0		86.8	

[a] The weir was not operational, daily passage was estimated.
[b] Partial day count, daily passage was estimated.
[c] A breach occurred in the weir, daily passage was estimated.
[d] Partial daily count, no additional escapement estimate was calculated.

Table 3.–Escapement summary for the Kanektok River drainage, 2007.

	Chinook	Sockeye	Chum	Coho
Weir Escapement	14,120	307,750	133,215	30,471
Aerial Survey Count	5,185	226,700	[b]	[b]
Percentage Upstream of Weir [a]	49.1	93.9	[b]	[b]

Escapement estimate downstream of the weir

	Chinook	Sockeye	Chum	Coho
Escapement Estimate	14,638	19,992	[b]	[b]
Aerial Survey Count	NA	NA	[b]	[b]
Percentage Downstream of Weir [a]	50.9	6.1	[b]	[b]

Total drainage escapement estimate

	Chinook	Sockeye	Chum	Coho
Drainage Escapement	28,758	327,742	[b]	[b]
Drainage Aerial Survey (Incomplete)	5,185	226,700	[b]	[b]
Aerial Survey (SEG)	3,500–8,000	14,000–34,000	>5,200	7,700–36,000

Total Run and Exploitation

	Chinook	Sockeye	Chum	Coho
District W-4 Commercial Harvest	19,573	109,343	61,228	34,710
Subsistence Harvest [c]	3,271	1,524	1,268	1,390
Sport Fishing Harvest [c]	602	176	132	1,570
Total Run Estimate [d]	53,060	439,641	[b]	[b]
Harvest Exploitation (%) [e]	44.2	25.3	[b]	[b]

[a] Proportion of escapement above the weir site compared to total escapement is derived from the average proportion above and below the weir from aerial escapement surveys conducted in 2005 and 2006.

[b] No estimate made in 2007.

[c] Harvest estimates based on the 5 year (01–06) averages

[d] Total Run estimate based on drainage escapement estimate, District W-4 commercial harvest, and 5 year averages (01–06) of Quinhagak subsistence and Kanektok River sport harvest.

[e] Exploitation rate based on District W4 commercial harvest and 5 year (01–06) of Quinhagak subsistence and Kanektok River sport harvest.

Table 4.–Daily and cumulative pink salmon, Dolly Varden, whitefish, and rainbow trout passage, Kanektok River weir, 2007.

	Pink Salmon		Dolly Varden		Whitefish		Rainbow Trout	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
06/19	0 [a]	0	1 [a]	1	3 [a]	3	0 [a]	0
06/20	0	0	1	2	1	4	0	0
06/21	0	0	0	2	0	4	2	2
06/22	0	0	0	2	0	4	0	2
06/23	0	0	0	2	0	4	0	2
06/24	0	0	3	5	0	4	3	5
06/25	0	0	0	5	0	4	1	6
06/26	0	0	1	6	0	4	2	8
06/27	0	0	0	6	0	4	0	8
06/28	0	0	1	7	2	6	0	8
06/29	0	0	0	7	0	6	0	8
06/30	0	0	2	9	2	8	1	9
07/01	0	0	4	13	6	14	2	11
07/02	1	1	10	23	0	14	0	11
07/03	2	3	7	30	2	16	3	14
07/04	9	12	12	42	2	18	7	21
07/05	7	19	34	76	2	20	5	26
07/06	9	28	34	110	3	23	7	33
07/07	9	37	59	169	2	25	1	34
07/08	24	61	143	312	8	33	7	41
07/09	42	103	266	578	13	46	17	58
07/10	64	167	257	835	12	58	4	62
07/11	49	216	277	1,112	10	68	11	73
07/12	106	322	395	1,507	0	68	5	78
07/13	52	374	179	1,686	21	89	12	90
07/14	38	412	94	1,780	0	89	4	94
07/15	49	461	132	1,912	11	100	9	103
07/16	72	533	176	2,088	3	103	16	119
07/17	137	670	460	2,548	11	114	12	131
07/18	97	767	363	2,911	20	134	10	141
07/19	164	931	615	3,526	6	140	8	149
07/20	220	1,151	475	4,001	2	142	8	157
07/21	206	1,357	771	4,772	1	143	6	163
07/22	126	1,483	385	5,157	1	144	3	166
07/23	173	1,656	461	5,618	10	154	3	169
07/24	217	1,873	473	6,091	5	159	8	177
07/25	194	2,067	566	6,657	11	170	4	181
07/26	241	2,308	774	7,431	13	183	3	184
07/27	215	2,523	1343	8,774	10	193	11	195

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Table 4.–Page 2 of 3.

Date	Pink Salmon Daily	Pink Salmon Cum.	Dolly Varden Daily	Dolly Varden Cum.	Whitefish Daily	Whitefish Cum.	Rainbow Trout Daily	Rainbow Trout Cum.
07/28	149	2,672	557	9,331	4	197	2	197
07/29	116	2,788	282	9,613	2	199	3	200
07/30	65 [b]	2,853	186 [b]	9,799	2 [b]	201	0 [b]	200
07/31	63 [b]	2,916	141 [b]	9,940	2 [b]	203	2 [b]	202
08/01	36 [b]	2,952	133 [b]	10,073	5 [b]	208	0 [b]	202
08/02	21 [b]	2,973	146 [b]	10,219	9 [b]	217	0 [b]	202
08/03	17 [b]	2,990	84 [b]	10,303	6 [b]	223	0 [b]	202
08/04	9 [b]	2,999	43 [b]	10,346	6 [b]	229	2 [b]	204
08/05	7 [b]	3,006	78 [b]	10,424	5 [b]	234	3 [b]	207
08/06	4	3,010	41	10,465	4	238	2	209
08/07	4 [b]	3,014	66 [b]	10,531	2 [b]	240	1 [b]	210
08/08	2	3,016	46	10,577	4	244	3	213
08/09	2	3,018	81	10,658	2	246	1	214
08/10	2	3,020	149	10,807	4	250	0	214
08/11	0 [c]	3,020	136 [c]	10,943	3 [c]	253	1 [c]	215
08/12	3 [c]	3,023	202 [c]	11,145	6 [c]	259	1 [c]	216
08/13	5 [c]	3,028	354 [c]	11,499	4 [c]	263	0 [c]	216
08/14	3 [c]	3,031	103 [c]	11,602	4 [c]	267	1 [c]	217
08/15	1 [c]	3,032	41 [c]	11,643	2 [c]	269	0 [c]	217
08/16	2 [a]	3,034	36 [a]	11,679	1 [a]	270	1 [a]	218
08/17	1	3,035	46	11,725	1	271	0	218
08/18	0	3,035	92	11,817	0	271	0	218
08/19	2	3,037	84	11,901	1	272	0	218
08/20	4 [a]	3,041	47 [a]	11,948	3 [a]	275	2 [a]	220
08/21	0	3,041	34	11,982	0	275	0	220
08/22	1	3,042	117	12,099	1	276	0	220
08/23	1	3,043	35	12,134	1	277	0	220
08/24	0	3,043	89	12,223	4	281	0	220
08/25	4	3,047	87	12,310	6	287	2	222
08/26	1	3,048	32	12,342	6	293	0	222
08/27	0	3,048	49	12,391	7	300	1	223
08/28	1	3,049	59	12,450	0	300	0	223
08/29	0	3,049	42	12,492	2	302	1	224
08/30	0	3,049	7	12,499	2	304	0	224
08/31	0	3,049	19	12,518	3	307	0	224
09/01	2	3,051	22	12,540	0	307	0	224
09/02	0	3,051	16	12,556	0	307	0	224
09/03	1	3,052	14	12,570	1	308	1	225
09/04	7	3,059	7	12,577	0	308	2	227
09/05	8	3,067	29	12,606	0	308	1	228

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Table 4.–Page 3 of 3.

Date	Pink Salmon		Dolly Varden		Whitefish		Rainbow Trout	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
09/06	5	3,072	26	12,632	4	312	4	232
09/07	0	3,072	13	12,645	0	312	0	232
09/08	0	3,072	32	12,677	2	314	1	233
09/09	1	3,073	54	12,731	1	315	1	234
09/10	2	3,075	35	12,766	2	317	1	235
09/11	0	3,075	8	12,774	2	319	0	235

[a] Partial day count, daily passage was not estimated.
[b] A breach occurred in the weir, daily passage was not estimated.
[c] The weir was not operational, daily passage was not estimated.

Table 5.–Age and sex composition of Chinook salmon escapement, Kanektok river weir, 2007.

Sample Dates (Stratum)	Pulse Sample Size	Aged Sample Size	Sex	Age Class 1.1 Esc	1.1 %	1.2 Esc	1.2 %	1.3 Esc	1.3 %	1.4 Esc	1.4 %	1.5 Esc	1.5 %	2.4 Esc	2.4 %	Total Esc	Total %
7/4-12	122	110	M	0	0.0	584	23.6	381	15.5	337	13.6	22	0.9	0	0.0	1,324	53.6
(6/19-7/14)			F	0	0.0	0	0.0	90	3.6	965	39.1	90	3.6	0	0.0	1,145	46.4
			Subtotal	0	0.0	584	23.6	471	19.1	1,302	52.7	112	4.5	0	0.0	2,469	100.0
7/16-25	220	181	M	131	1.7	2,055	26.0	1,137	14.3	1,705	21.5	175	2.2	0	0.0	5,203	65.7
(7/15-28)			F	0	0.0	0	0.0	481	6.1	2,143	27.1	87	1.1	0	0.0	2,711	34.3
			Subtotal	131	1.7	2,055	26.0	1,618	20.4	3,848	48.6	262	3.3	0	0.0	7,914	100.0
7/27-29	185	140	M	0	0.0	1,949	52.2	454	12.1	267	7.1	0	0.0	0	0.0	2,670	71.4
(7/26-8/2)			F	0	0.0	53	1.4	160	4.3	827	22.2	0	0.0	27	0.7	1,067	28.6
			Subtotal	0	0.0	2,002	53.6	614	16.4	1,094	29.3	0	0.0	27	0.7	3,737	100.0
Season	527	431	M	131	0.9	4,588	32.5	1,972	14.0	2,309	16.4	197	1.4	0	0.0	9,197	65.1
			F	0	0.0	53	0.4	731	5.2	3,935	27.9	177	1.3	27	0.2	4,923	34.9
			Total	131	0.9	4,641	32.9	2,703	19.1	6,244	44.2	374	2.6	27	0.2	14,120	100.0
		1,306	M	831	1.3	25,177	39.4	10,968	17.2	6,940	10.9	326	0.51	0	0	44,241	69.2
Grand			F	0	0	1,929	3.02	2,298	3.6	14,687	23	713	1.12	27	0.04	19,655	30.8
Total[a]			Total	831	1.3	27,106	42.4	13,266	20.8	20,627	32.3	1,039	1.63	27	0.04	63,896	100

Note: The number of fish in each stratum age and sex category are derived from the sample percentages, discrepancies are attributed to rounding errors.

[a] The number of fish in the "Grand Total" are the sum of historical "Season" totals, percentages are derived from those sums and includes the years 1997, 2002–2005, and 2007.

Table 6.–Mean length (mm) of Chinook salmon escapement, Kanektok River weir, 2007.

Sample Dates (Stratum Dates)	Sex		Age Class 1.1	1.2	1.3	1.4	1.5	2.4
7/4-12 (6/19-7/14)	M	Mean Length		540	684	839	945	
		Std. Error		9	15	26	-	
		Range		455- 628	596- 808	540- 956	945- 945	
		Sample Size	0	26	17	15	1	0
	F	Mean Length			709	841	844	
		Std. Error			57	10	22	
		Range			549- 795	700- 971	780- 871	
		Sample Size	0	0	4	43	4	0
7/16-25 (7/15-28)	M	Mean Length	409	531	681	874	874	
		Std. Error	34	6	16	15	28	
		Range	370- 476	466- 621	511- 851	686-1101	798- 921	
		Sample Size	3	47	26	39	4	0
	F	Mean Length			740	830	859	
		Std. Error			17	8	13	
		Range			625- 812	631- 980	846- 871	
		Sample Size	0	0	11	49	2	0
7/31-8/21 (7/29-9/11)	M	Mean Length		522	697	831		
		Std. Error		5	9	25		
		Range		411- 642	629- 758	699- 966		
		Sample Size	0	73	17	10	0	0
	F	Mean Length		581	712	839		800
		Std. Error		36	30	11		-
		Range		545- 616	602- 799	717- 941		800- 800
		Sample Size	0	2	6	31	0	1
Season	M	Mean Length	409	528	685	864	882	
		Range	370- 476	411- 642	511- 851	540-1,101	798- 945	
		Sample Size	3	146	60	64	5	0
	F	Mean Length		581	730	835	851	800
		Range		545- 616	549- 812	631- 980	780- 871	800- 800
		Sample Size	0	2	21	123	6	1
Grand Total [a]	M	Mean Length	409	536	688	831	841	
		Range	370- 470	411- 593	505- 815	578- 990	759- 945	
		Sample Size	14	502	256	151	8	0
	F	Mean Length		600	757	844	874	800
		Range		480- 640	714- 798	631- 990	770- 980	800- 800
		Sample Size	0	13	51	287	22	1

[a] The number of fish in the "Grand Total" are the sum of historical "Season" totals, percentages are derived from those sums and include 1997, 2002–2004, and 2007.

Table 7.–Age and sex composition of sockeye salmon escapement, Kanektok River weir, 2007.

Sample Dates (Stratum)	Pulse Sample Size	Aged Sample Size	Sex	Age Class 0.2 Esc	0.2 %	0.3 Esc	0.3 %	1.2 Esc	1.2 %	1.3 Esc	1.3 %	2.2 Esc	2.2 %	1.4 Esc	1.4 %	2.3 Esc	2.3 %	Total Esc	Total %
7/4-8	200	147	M	0	0.0	842	1.3	8,838	14.3	30,724	49.7	0	0.0	1,262	2.0	842	1.4	42,508	68.7
(6/19-7/9)			F	0	0.0	421	0.7	6,313	10.2	12,205	19.7	0	0.0	421	0.7	0	0.0	19,360	31.3
			Subtotal	0	0.0	1,263	2.0	15,151	24.5	42,929	69.4	0	0.0	1,683	2.7	842	1.4	61,868	100.0
7/10-12	210	154	M	0	0.0	1,631	2.6	9,382	15.0	19,172	30.5	0	0.0	1,224	1.9	408	0.7	31,817	50.6
(7/10-14)			F	0	0.0	816	1.3	13,461	21.4	15,908	25.3	0	0.0	408	0.7	408	0.6	31,001	49.4
			Subtotal	0	0.0	2,447	3.9	22,843	36.4	35,080	55.8	0	0.0	1,632	2.6	816	1.3	62,818	100.0
7/16-18	212	151	M	0	0.0	1,075	1.3	27,955	34.4	24,729	30.4	0	0.0	2,150	2.6	0	0.0	55,909	68.9
(7/15-20)			F	0	0.0	1,075	1.3	17,741	21.9	5,914	7.3	0	0.0	538	0.7	0	0.0	25,268	31.1
			Subtotal	0	0.0	2,150	2.6	45,696	56.3	30,643	37.7	0	0.0	2,688	3.3	0	0.0	81,177	100.0
7/23-25	130	105	M	0	0.0	2,410	3.8	21,087	33.3	21,087	33.3	0	0.0	0	0.0	0	0.0	44,584	70.5
(7/21-27)			F	602	1.0	0	0.0	12,050	19.1	5,423	8.6	0	0.0	602	1.0	0	0.0	18,677	29.5
			Subtotal	602	1.0	2,410	3.8	33,137	52.4	26,510	41.9	0	0.0	602	1.0	0	0.0	63,261	100.0
7/30-8/1	129	100	M	223	1.0	223	1.0	8,911	40.0	3,342	15.0	0	0.0	0	0.0	223	1.0	12,922	58.0
(7/28-8/3)			F	0	0.0	223	1.0	4,901	22.0	4,233	19.0	0	0.0	0	0.0	0	0.0	9,357	42.0
			Subtotal	223	1.0	446	2.0	13,812	62.0	7,575	34.0	0	0.0	0	0.0	223	1.0	22,279	100.0
8/6-22	209	136	M	120	0.7	120	0.7	4,207	25.7	4,207	25.8	120	0.7	240	1.5	241	1.5	9,255	56.6
(8/4-9/11)			F	481	3.0	0	0.0	4,568	28.0	1,803	11.0	0	0.0	0	0.0	240	1.4	7,092	43.4
			Subtotal	601	3.7	120	0.7	8,775	53.7	6,010	36.8	120	0.7	240	1.5	481	2.9	16,347	100.0
Season	1,090	793	M	343	0.1	6,301	2.0	80,380	26.1	103,261	33.6	120	0.0	4,876	1.6	1,714	0.6	196,995	64.0
			F	1,083	0.4	2,535	0.8	59,034	19.2	45,486	14.8	0	0.0	1,969	0.6	648	0.2	110,755	36.0
			Total	1,426	0.5	8,836	2.9	139,414	45.3	148,747	48.3	120	0.0	6,845	2.2	2,362	0.8	307,750	100.0

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Table 7.–Page 2 of 2.

Sample Dates (Stratum)	Pulse Sample Size	Aged Sample Size	Sex	Age Class 0.2 Esc	0.2 %	0.3 Esc	0.3 %	1.2 Esc	1.2 %	1.3 Esc	1.3 %	2.2 Esc	2.2 %	1.4 Esc	1.4 %	2.3 Esc	2.3 %	Total Esc	Total %
Grand		3,069	M	541	0.1	10,747	1.6	142,973	20.6	214,764	31.0	2,498	0.4	9,509	1.4	7,229	1.0	390,092	56.3
Total [a]			F	1,290	0.2	4,012	0.6	136,231	19.7	142,826	20.6	2,304	0.3	6,331	0.9	6,765	1.0	302,700	43.7
			Total	1,831	0.3	14,759	2.1	279,204	40.3	357,590	51.6	4,802	0.7	15,840	2.3	13,994	2.0	692,792	100.0

Note: The number of fish in each stratum age and sex category are derived from the sample percentages; discrepancies are attributed to rounding errors. Minor age classes that were not encountered in 2007 were not displayed in the “Grand Total” for 2007.

[a] The number of fish in the "Grand total" are the sum of historical "Season" totals; percentages are derived from those sums. Years included are 1997, 2002–2005, and 2007.

Table 8.–Mean length (mm) of sockeye salmon escapement, Kanektok River weir, 2007.

Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	1.2	1.3	2.2	1.4	2.3
7/4-8 (6/19-7/9)	M	Mean Length		584	524	587		561	574
		Std. Error		9	7	3		16	19
		Range		575- 593	440- 560	531- 660		535- 591	555- 593
		Sample Size	0	2	21	73	0	3	2
	F	Mean Length		520	497	544		520	
		Std. Error		-	5	7		-	
		Range		520- 520	473- 535	455- 616		520- 520	
		Sample Size	0	1	15	29	0	1	0
7/10-12 (7/10-14)	M	Mean Length		575	542	578		572	544
		Std. Error		12	6	4		17	-
		Range		552- 603	499- 600	513- 649		545- 604	544- 544
		Sample Size	0	4	23	47	0	3	1
	F	Mean Length		507	501	542		526	534
		Std. Error		4	4	3		-	-
		Range		503- 510	450- 563	506- 575		526- 526	534- 534
		Sample Size	0	2	33	39	0	1	1
7/16-18 (7/15-20)	M	Mean Length		546	528	576		600	
		Std. Error		16	4	5		9	
		Range		530- 561	439- 592	445- 632		588- 625	
		Sample Size	0	2	52	46	0	4	0
	F	Mean Length		554	503	541		597	
		Std. Error		21	4	8		-	
		Range		533- 574	424- 560	503- 598		597- 597	
		Sample Size	0	2	33	11	0	1	0
7/23-25 (7/21-27)	M	Mean Length		596	518	563			
		Std. Error		11	3	4			
		Range		579- 626	472- 565	478- 602			
		Sample Size	0	4	35	35	0	0	0
7/23-25 (7/21-27)	F	Mean Length	544		495	532		552	
		Std. Error	-		4	6		-	
		Range	544- 544		462- 523	504- 564		552- 552	
		Sample Size	1	0	20	9	0	1	0
7/30-8/1 (7/28-8/3)	M	Mean Length	553	602	532	569			572
		Std. Error	-	-	4	8			-
		Range	553- 553	602- 602	486- 595	499- 610			572- 572
		Sample Size	1	1	40	15	0	0	1
7/30-8/1 (7/28-8/3)	F	Mean Length		544	504	549			
		Std. Error		-	4	4			
		Range		544- 544	470- 535	510- 580			
		Sample Size	0	1	22	19	0	0	0

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Table 8.–Page 2 of 3.

Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	1.2	1.3	2.2	1.4	2.3
8/6-22 (8/4-9/11)	M	Mean Length	573	585	534	568	521	546	576
		Std. Error	-	-	4	4	-	45	16
		Range	573- 573	585- 585	494- 580	522- 622	521- 521	501- 590	560- 591
		Sample Size	1	1	35	35	1	2	2
	F	Mean Length	524		515	532			523
		Std. Error	10		5	6			29
		Range	505- 552		455- 580	486- 580			494- 551
		Sample Size	4	0	38	15	0	0	2
Season	M	Mean Length	560	580	527	577	521	580	567
		Range	553- 573	530- 626	439- 600	445- 660	521- 521	501- 625	544- 593
		Sample Size	2	14	206	251	1	12	6
	F	Mean Length	535	532	501	541		552	530
		Range	505- 552	503- 574	424- 580	455- 616		520- 597	494- 551
		Sample Size	5	6	161	122	0	4	3
Grand Total [a]	M	Mean Length	575	592	527	580	537	587	559
		Range	553- 589	487- 666	398- 600	445- 660	536- 540	501- 645	515- 630
		Sample Size	3	44	626	782	14	38	43
			0	0	0	0	0	0	0
	F	Mean Length	504	537	500	545	496	567	537
		Range	473- 552	500- 582	424- 606	455- 616	477- 517	520- 600	494- 590
		Sample Size	6	19	756	617	16	31	41

[a] "Grand Total" mean lengths are simple averages of historical "Season" mean lengths. Years included 1997, 2002–2004, and 2007.

Table 9.–Age and sex composition of chum salmon escapement, Kanektok River weir, 2007.

Sample Dates (Stratum)	Pulse Sample Size	Aged Sample Size	Sex	0.2 Esc	0.2 %	0.3 Esc	0.3 %	0.4 Esc	0.4 %	0.5 Esc	0.5 %	Total Esc	Total %
7/4-6	200	174	M	0	0.0	2,596	23.0	3,570	31.6	260	2.3	6,426	56.9
(6/19-7/8)			F	0	0.0	1,817	16.1	3,050	27.0	0	0.0	4,867	43.1
			Subtotal	0	0.0	4,413	39.1	6,620	58.6	260	2.3	11,293	100.0
7/10-12	210	182	M	0	0.0	3,579	17.0	4,964	23.6	462	2.2	9,005	42.9
(7/9-14)			F	0	0.0	7,388	35.2	4,617	22.0	0	0.0	12,005	57.1
			Subtotal	0	0.0	10,967	52.2	9,581	45.6	462	2.2	21,010	100.0
7/16,18	210	134	M	0	0.0	8,339	30.6	4,881	17.9	610	2.2	13,830	50.7
(7/15-20)			F	0	0.0	8,135	29.8	5,288	19.4	0	0.0	13,423	49.3
			Subtotal	0	0.0	16,474	60.4	10,169	37.3	610	2.2	27,253	100.0
7/23	213	180	M	0	0.0	11,557	42.8	3,752	13.9	451	1.7	15,760	58.3
(7/21-26)			F	0	0.0	6,304	23.3	4,503	16.7	450	1.6	11,257	41.7
			Subtotal	0	0.0	17,861	66.1	8,255	30.6	901	3.3	27,017	100.0
7/30-31	210	177	M	0	0.0	10,918	39.6	2,652	9.6	156	0.6	13,726	49.7
(7/27-8/3)			F	156	0.6	8,423	30.5	5,147	18.6	156	0.5	13,882	50.3
			Subtotal	156	0.6	19,341	70.1	7,799	28.2	312	1.1	27,608	100.0
8/6,8	250	211	M	0	0.0	5,141	37.9	1,864	13.7	0	0.0	7,005	51.7
(8/4-11)			F	0	0.0	5,206	38.4	1,349	10.0	0	0.0	6,555	48.3
			Subtotal	0	0.0	10,347	76.3	3,213	23.7	0	0.0	13,560	100.0
8/15,21-22	74	63	M	0	0.0	2,780	50.8	174	3.2	0	0.0	2,954	54.0
(8/12-9/11)			F	0	0.0	2,085	38.1	347	6.3	87	1.6	2,519	46.0
			Subtotal	0	0.0	4,865	88.9	521	9.5	87	1.6	5,473	100.0
Season	1,367	1,121	M	0	0.0	38,531	52.3	13,730	18.6	607	0.8	52,868	63.5
			F	156	0.2	38,492	52.3	21,515	29.2	1,303	1.8	61,466	36.5
			Total	156	0.2	52,414	71.2	19,788	26.9	1,300	1.8	73,658	100.0
			M	1,578	0.6	82,766	32.7	58,535	23.1	2,052	0.8	144,931	57.2
Grand		4,424	F	3,053	1.2	87,926	34.7	55,839	22.1	2,114	0.8	148,931	58.8
Total [a]			Total	4,631	1.8	146,083	57.7	98,917	39.1	3,556	1.4	253,186	100.0

[a] "Grand Total" mean lengths are simple averages of historical "Season" mean lengths. Years included are 1997, 2002–2004, and 2007.

Table 10.–Mean length (mm) of chum salmon escapement, Kanektok River weir, 2007.

Sample Dates			Age Class			
(Stratum Dates)	Sex		0.2	0.3	0.4	0.5
7/4-6	M	Mean Length		598	610	608
(6/19-7/8)		Std. Error		4	5	22
		Range		516- 642	533- 680	548- 642
		Sample Size	0	40	55	4
	F	Mean Length		560	574	
		Std. Error		5	5	
		Range		516- 641	501- 660	
		Sample Size	0	28	47	0
7/10-12	M	Mean Length		576	588	593
(7/9-14)		Std. Error		4	6	12
		Range		520- 623	503- 669	566- 615
		Sample Size	0	31	43	4
	F	Mean Length		549	555	
		Std. Error		3	5	
		Range		471- 608	500- 615	
		Sample Size	0	64	40	0
7/16,18	M	Mean Length		573	597	597
(7/15-20)		Std. Error		5	7	16
		Range		506- 643	535- 692	567- 622
		Sample Size	0	41	24	3
	F	Mean Length		552	557	
		Std. Error		4	5	
		Range		516- 663	503- 596	
		Sample Size	0	40	26	0
7/23	M	Mean Length		576	569	560
(7/21-26)		Std. Error		4	7	27
		Range		506- 645	517- 676	508- 595
		Sample Size	0	77	25	3
	F	Mean Length		541	551	542
		Std. Error		5	5	24
		Range		474- 606	504- 597	494- 572
		Sample Size	0	42	30	3
7/30-31	M	Mean Length		582	594	602
(7/27-8/3)		Std. Error		3	7	-
		Range		504- 663	542- 640	602- 602
		Sample Size	0	70	17	1

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Table 10.–Page 2 of 2.

Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
7/30-31	F	Mean Length	550	546	558	620
(7/27-8/3)		Std. Error	-	2	4	-
(cont.)		Range	550- 550	500- 586	495- 597	620- 620
		Sample Size	1	54	33	1
8/6,8	M	Mean Length		562	571	
(8/4-11)		Std. Error		3	6	
		Range		481- 620	506- 621	
		Sample Size	0	80	29	0
	F	Mean Length		544	542	
		Std. Error		3	7	
		Range		492- 591	480- 610	
		Sample Size	0	81	21	0
8/15,21-22	M	Mean Length		564	521	
(8/12-9/11)		Std. Error		4	20	
		Range		495- 600	501- 541	
		Sample Size	0	32	2	0
	F	Mean Length		542	540	530
		Std. Error		5	9	-
		Range		490- 575	520- 563	530- 530
		Sample Size	0	24	4	1
Season	M	Mean Length		576	589	589
		Range		481- 663	501- 692	508- 642
		Sample Size	0	371	195	15
	F	Mean Length	550	547	557	558
		Range	550- 550	471- 663	480- 660	494- 620
		Sample Size	1	333	201	5
Grand Total [a]	M	Mean Length	552	580	602	610
		Range	485- 580	505- 670	515- 700	562- 680
		Sample Size	31	1196	1002	42
	F	Mean Length	533	551	567	574
		Range	485- 623	475- 640	490- 685	575- 610
		Sample Size	57	1252	822	22

[a] The numbers of fish in the "Grand total" are the sum of historical "Season" totals; percentages are derived from those sums. Years included are 1997, 2002–2004, and 2007.

Table 11.–Age and sex composition of coho salmon escapement, Kanektok River weir, 2007.

Sample Dates (Stratum)	Pulse Sample Size	Aged Sample Size	Sex	Age Class 1.1 Esc	1.1 %	2.1 Esc	2.1 %	3.1 Esc	3.1 %	Total Esc	Total %
7/24-8/14	133	98	M	585	11.2	2,977	57.2	160	3.1	3,722	71.4
(6/19-8/17)			F	106	2.1	1,329	25.5	53	1.0	1,488	28.6
			Subtotal	691	13.3	4,306	82.7	213	4.1	5,210	100.0
8/21-22	170	122	M	1,129	13.9	3,787	46.7	66	0.8	4,982	61.5
(8/18-26)			F	266	3.3	2,724	33.6	133	1.7	3,123	38.5
			Subtotal	1,395	17.2	6,511	80.3	199	2.5	8,105	100.0
8/30-31	170	128	M	671	8.6	3,659	46.9	244	3.2	4,574	58.6
(8/27-9/4)			F	244	3.1	2,744	35.1	244	3.1	3,232	41.4
			Subtotal	915	11.7	6,403	82.0	488	6.3	7,806	100.0
9/7-8	170	122	M	843	9.0	3,602	38.5	383	4.1	4,828	51.6
(9/5-18)			F	307	3.3	4,139	44.3	77	0.8	4,523	48.4
			Subtotal	1,150	12.3	7,741	82.8	460	4.9	9,351	100.0
Season	643	470	M	3,228	10.6	14,025	46.0	853	2.8	18,106	59.4
			F	923	3.0	10,936	35.9	507	1.7	12,366	40.6
			Total	4,151	13.6	24,961	81.9	1,360	4.5	30,472	100.0
Grand		1,794	M	5,833	2.3	111,323	44.3	8,566	3.4	125,721	50.0
Total [a]			F	2,856	1.1	111,507	44.4	11,197	4.5	125,560	50.0
			Total	8,689	3.5	222,830	88.7	19,763	7.9	251,281	100.0

Note: The number of fish in each stratum age and sex category are derived from the sample percentages, discrepancies are attributed to rounding errors.

[a] The number of fish in the "Grand Total" are the sum of historical "Season" totals. Percentages are derived from those sums and based on the years 1997, 2002-2005, and 2007.

Table 12.–Mean length (mm) of coho salmon escapement, Kanektok River weir, 2007.

Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
7/24-8/14 (6/19-8/17)	M	Mean Length	542	561	577
		Std. Error	17	7	7
		Range	446- 620	427- 644	567- 590
		Sample Size	11	56	3
	F	Mean Length	552	567	530
		Std. Error	48	6	-
		Range	504- 600	490- 608	530- 530
		Sample Size	2	25	1
8/21-22 (8/18-26)	M	Mean Length	543	555	495
		Std. Error	9	5	-
		Range	462- 585	466- 620	495- 495
		Sample Size	17	57	1
	F	Mean Length	573	558	575
		Std. Error	9	5	5
		Range	555- 591	480- 610	570- 580
		Sample Size	4	41	2
8/30-31 (8/27-9/4)	M	Mean Length	564	579	541
		Std. Error	14	6	25
		Range	463- 605	451- 660	492- 600
		Sample Size	11	60	4
	F	Mean Length	590	581	579
		Std. Error	7	5	20
		Range	580- 611	473- 630	522- 615
		Sample Size	4	45	4
9/7-8 (9/5-18)	M	Mean Length	540	558	574
		Std. Error	14	6	14
		Range	485- 617	467- 636	523- 606
		Sample Size	11	47	5
	F	Mean Length	602	563	605
		Std. Error	7	4	-
		Range	592- 622	513- 615	605- 605
		Sample Size	4	54	1

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Table 12.–Page 2 of 2.

Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
Season	M	Mean Length	547	563	559
		Range	446- 620	427- 660	492- 606
		Sample Size	50	220	13
	F	Mean Length	585	567	577
		Range	504- 622	473- 630	522- 615
		Sample Size	14	165	8
Grand Total [a]	M	Mean Length	574	573	579
		Range	465- 657	395- 678	440- 665
		Sample Size	74	820	57
	F	Mean Length	542	578	576
		Range	430- 620	475- 670	545- 649
		Sample Size	29	744	70

[a] The numbers of fish in the "Grand total" are the sum of historical "Season" totals; percentages are derived from those sums. Years included are 1997, 2002–2005, and 2007.

Table 13.–Mean length (mm) of coho salmon escapement, Kanektok River weir, 2007.

Sample Dates (Stratum)	Pulse Sample Size	Aged Sample Size	Sex	Age Class 1.1 Catch	%	1.2 Catch	%	1.3 Catch	%	1.4 Catch	%	2.3 Catch	%	1.5 Catch	%	2.4 Catch	%	Total Catch	%
6/14	52	47	M	0	0.0	306	23.4	334	25.6	334	25.6	0	0.0	28	2.1	0	0.0	1,002	76.6
(6/14)			F	0	0.0	0	0.0	28	2.1	223	17.0	0	0.0	55	4.3	0	0.0	306	23.4
			Subtotal	0	0.0	306	23.4	362	27.7	557	42.6	0	0.0	83	6.4	0	0.0	1,308	100.0
6/19	210	148	M	38	0.7	2,660	47.3	722	12.8	1,064	18.9	0	0.0	38	0.7	0	0.0	4,522	80.4
(6/19,21)			F	0	0.0	76	1.3	152	2.7	836	14.9	0	0.0	38	0.7	0	0.0	1,102	19.6
			Subtotal	38	0.7	2,736	48.6	874	15.5	1,900	33.8	0	0.0	76	1.4	0	0.0	5,624	100.0
6/26	205	137	M	45	0.7	2,413	39.4	1,162	19.0	1,117	18.2	45	0.7	0	0.0	0	0.0	4,782	78.1
(6/26,28)			F	0	0.0	0	0.0	268	4.4	983	16.1	0	0.0	45	0.7	45	0.7	1,341	21.9
			Subtotal	45	0.7	2,413	39.4	1,430	23.4	2,100	34.3	45	0.7	45	0.7	45	0.7	6,123	100.0
7/2	210	167	M	0	0.0	1,092	29.9	634	17.4	633	17.4	0	0.0	44	1.2	22	0.6	2,425	66.5
(7/2,4,6)			F	0	0.0	22	0.6	109	3.0	1,027	28.1	0	0.0	22	0.6	44	1.2	1,224	33.5
			Subtotal	0	0.0	1,114	30.5	743	20.4	1,660	45.5	0	0.0	66	1.8	66	1.8	3,649	100.0
7/10	140	116	M	0	0.0	470	16.4	743	25.9	371	12.9	0	0.0	0	0.0	0	0.0	1,584	55.2
(7/8-8/29)			F	0	0.0	0	0.0	396	13.8	842	29.3	0	0.0	50	1.7	0	0.0	1,288	44.8
			Subtotal	0	0.0	470	16.4	1,139	39.7	1,213	42.2	0	0.0	50	1.7	0	0.0	2,872	100.0
Season	817	615	M	83	0.4	6,941	35.5	3,595	18.4	3,519	18.0	45	0.2	110	0.6	22	0.1	14,315	73.1
			F	0	0.0	98	0.5	953	4.9	3,911	20.0	0	0.0	210	1.1	89	0.5	5,261	26.9
			Total	83	0.4	7,039	36.0	4,548	23.2	7,430	38.0	45	0.2	320	1.6	111	0.6	19,576	100.0
Grand		16,104	M	4,748	0.7	151,972	22.3	151,114	22.2	126,062	18.5	527	0.1	10,927	1.6	499	0.1	446,283	65.5
Total [a]			F	524	0.1	19,332	2.8	39,286	5.8	157,115	23.1	296	0.0	17,703	2.6	235	0.0	234,672	34.5
			Total	5,272	0.8	171,304	25.2	190,400	28.0	283,177	41.6	823	0.1	28,630	4.2	734	0.1	680,955	100.0

[a] "Grand Total" mean lengths are simple averages of historical "Season" mean lengths. Years included are 1997, 2002–2005, and 2007. Minor age classes that were not included in the samples were not included in the “Grand Total” for 2007.

Table 14.–Mean length (mm) of Chinook salmon from the District W-4 commercial fishery, 2007.

Sample Dates (Stratum Dates)	Sex		Age Class 1.1	1.2	1.3	1.4	2.3	1.5	2.4
6/14	M	Mean Length		515	665	781		862	
(6/14)		Std. Error		10	23	25		-	
		Range		461- 561	541- 828	630- 889		862- 862	
		Sample Size	0	11	12	12	0	1	0
	F	Mean Length			729	836		858	
		Std. Error			-	13		7	
		Range			729- 729	786- 884		851- 864	
		Sample Size	0	0	1	8	0	2	0
6/19	M	Mean Length	380	521	640	796		920	
(6/19,21)		Std. Error	-	4	11	20		-	
		Range	380- 380	440- 625	504- 688	600-1040		920- 920	
		Sample Size	1	70	19	28	0	1	0
	F	Mean Length		493	775	852		841	
		Std. Error		13	37	17		-	
		Range		480- 506	710- 880	625- 960		841- 841	
		Sample Size	0	2	4	22	0	1	0
6/26	M	Mean Length	450	529	681	817	755		
(6/26,28)		Std. Error	-	6	11	16	-		
		Range	450- 450	420- 644	582- 807	652- 940	755- 755		
		Sample Size	1	54	26	25	1	0	0
	F	Mean Length			691	822		873	847
		Std. Error			20	13		-	-
		Range			614- 735	715- 920		873- 873	847- 847
		Sample Size	0	0	6	22	0	1	1
7/2	M	Mean Length		529	667	790		907	706
(7/2,4,6)		Std. Error		6	11	15		3	-
		Range		446- 611	570- 804	596- 920		904- 910	706- 706
		Sample Size	0	50	29	29	0	2	1
	F	Mean Length		530	732	819		773	848
		Std. Error		-	17	8		-	28
		Range		530- 530	686- 790	667- 910		773- 773	820- 875
		Sample Size	0	1	5	47	0	1	2

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Table 14.–Page 2 of 2.

Sample Dates (Stratum Dates)	Sex		Age Class 1.1	1.2	1.3	1.4	2.3	1.5	2.4
7/10	M	Mean Length		534	695	816			
(7/8-8/29)		Std. Error		8	11	19			
		Range		475- 620	533- 845	718- 950			
		Sample Size	0	19	30	15	0	0	0
	F	Mean Length			770	824		874	
		Std. Error			6	12		7	
		Range			733- 805	560- 970		867- 880	
		Sample Size	0	0	16	34	0	2	0
Season	M	Mean Length	418	526	672	802	755	900	706
		Range	380- 450	420- 644	504- 845	596-1,040	755- 755	862- 920	706- 706
		Sample Size	2	204	116	109	1	4	1
	F	Mean Length		501	743	829		853	847
		Range		480- 530	614- 880	560- 970		773- 880	820- 875
		Sample Size	0	3	32	133	0	7	3
Grand Total [a]	M	Mean Length	404	542	693	836	721	905	843
		Range	325- 464	450- 774	539- 876	570-1,030	690- 755	865-1,000	790- 962
		Sample Size	10	574	507	212	2	9	7
	F	Mean Length		619	761	851		908	858
		Range		505- 650	568- 995	620- 1,012		819- 1,042	813- 878
		Sample Size	0	14	211	449	0	16	2

[a] The number of fish in the "Grand total" are the sum of historical "Season" totals; percentages are derived from those sums. Years included are 1991-1995 and 1997–2007.

Table 15.–Age and sex composition of sockeye salmon from the District W-4 commercial fishery, 2007.

Sample Dates (Stratum)	Pulse Sample Size	Aged Sample Size	Sex	Age Class 0.2 Catch	%	0.3 Catch	%	1.2 Catch	%	1.3 Catch	%	2.2 Catch	%	1.4 Catch	%	2.3 Catch	%	Total Catch	%
6/21	210	174	M	11	0.6	45	2.3	235	12.0	817	41.9	0	0.0	22	1.2	89	4.6	1,219	62.6
(6/14,19,21)			F	0	0.0	45	2.3	56	2.9	549	28.2	0	0.0	34	1.7	45	2.3	729	37.4
			Subtotal	11	0.6	90	4.6	291	14.9	1,366	70.1	0	0.0	56	2.9	134	6.9	1,948	100.0
6/28	210	170	M	0	0.0	517	3.5	1,983	13.5	4,914	33.5	0	0.0	517	3.5	0	0.0	7,931	54.1
(6/26,28,7/2)			F	0	0.0	776	5.3	862	5.9	4,482	30.6	0	0.0	345	2.4	259	1.8	6,724	45.9
			Subtotal	0	0.0	1,293	8.8	2,845	19.4	9,396	64.1	0	0.0	862	5.9	259	1.8	14,655	100.0
7/6	210	170	M	0	0.0	725	3.0	4,496	18.2	7,542	30.6	0	0.0	435	1.7	145	0.6	13,343	54.1
(7/4,6,8)			F	0	0.0	725	2.9	2,901	11.8	7,107	28.8	0	0.0	290	1.2	290	1.2	11,313	45.9
			Subtotal	0	0.0	1,450	5.9	7,397	30.0	14,649	59.4	0	0.0	725	2.9	435	1.8	24,656	100.0
7/12	210	174	M	0	0.0	0	0.0	12,841	34.5	8,560	23.0	0	0.0	428	1.2	428	1.1	22,257	59.8
(7/10,12,14)			F	0	0.0	1,284	3.4	5,778	15.5	7,276	19.5	0	0.0	428	1.1	214	0.6	14,980	40.2
			Subtotal	0	0.0	1,284	3.4	18,619	50.0	15,836	42.5	0	0.0	856	2.3	642	1.7	37,237	100.0
7/18	210	176	M	0	0.0	228	1.1	7,768	38.6	2,513	12.5	0	0.0	0	0.0	114	0.6	10,623	52.8
(7/16,18,20)			F	0	0.0	343	1.7	6,283	31.3	2,513	12.5	114	0.6	114	0.6	114	0.5	9,481	47.2
			Subtotal	0	0.0	571	2.8	14,051	69.9	5,026	25.0	114	0.6	114	0.6	228	1.1	20,104	100.0
7/26	210	141	M	0	0.0	0	0.0	3,123	29.1	2,057	19.2	0	0.0	0	0.0	0	0.0	5,180	48.2
(7/24-8/31)			F	0	0.0	152	1.4	3,657	34.0	1,752	16.3	0	0.0	0	0.0	0	0.0	5,561	51.8
			Subtotal	0	0.0	152	1.4	6,780	63.1	3,809	35.5	0	0.0	0	0.0	0	0.0	10,741	100.0
Season	1,260	1,005	M	11	0.0	1,515	1.4	30,446	27.8	26,403	24.1	0	0.0	1,402	1.3	776	0.7	60,553	55.4
			F	0	0.0	3,325	3.0	19,537	17.9	23,679	21.7	114	0.1	1,211	1.1	922	0.8	48,788	44.6
			Total	11	0.0	4,840	4.4	49,983	45.7	50,082	45.8	114	0.1	2,613	2.4	1,698	1.6	109,341	100.0
Grand		9,711	M	1,948	0.2	19,164	2.0	159,367	16.3	313,755	32.2	6,458	0.7	12,952	1.3	8,920	0.9	525,448	53.9
Total [a]			F	383	0.0	20,719	2.1	121,437	12.5	280,117	28.7	5,171	0.5	10,181	1.0	9,444	1.0	449,830	46.1
			Total	2,336	0.2	39,883	4.1	280,804	28.8	593,868	60.9	11,626	1.2	23,132	2.4	18,365	1.9	975,309	100.0

[a] "Grand Total" mean lengths are simple averages of historical "Season" mean lengths. Minor age classes not present in 2007 were not included in the “Grand Total”.

Table 16.–Mean length (mm) of sockeye salmon from the District W-4 commercial fishery, 2007.

Sample Dates (Stratum Dates)	Sex		0.2	0.3	1.2	1.3	2.2	1.4	2.3
6/21	M	Mean Length	440	538	507	553		572	551
(6/14,19,21)		Std. Error	-	7	10	4		4	11
		Range	440- 440	517- 550	425- 591	425- 607		568- 575	491- 582
		Sample Size	1	4	21	73	0	2	8
	F	Mean Length		535	504	528		546	542
		Std. Error		6	7	3		13	12
		Range		522- 548	489- 530	476- 580		527- 571	510- 570
		Sample Size	0	4	5	49	0	3	4
6/28	M	Mean Length		528	520	556		580	
(6/26,28,7/2)		Std. Error		8	7	4		11	
		Range		505- 551	457- 585	500- 668		539- 614	
		Sample Size	0	6	23	57	0	6	0
	F	Mean Length		518	499	524		551	525
		Std. Error		5	7	3		10	7
		Range		495- 539	455- 530	465- 558		520- 562	513- 536
		Sample Size	0	9	10	52	0	4	3
7/6	M	Mean Length		544	533	554		585	568
(7/4,6,8)		Std. Error		18	6	4		22	-
		Range		501- 587	435- 589	490- 609		560- 629	568- 568
		Sample Size	0	5	31	52	0	3	1
	F	Mean Length		538	506	530		565	556
		Std. Error		16	6	4		11	6
		Range		500- 589	450- 550	443- 579		554- 575	550- 562
		Sample Size	0	5	20	49	0	2	2
7/12	M	Mean Length			506	543		561	561
(7/10,12,14)		Std. Error			3	6		1	16
		Range			422- 583	411- 581		560- 562	545- 577
		Sample Size	0	0	60	40	0	2	2
	F	Mean Length		518	489	524		524	480
		Std. Error		9	4	3		36	-
		Range		490- 550	420- 531	485- 565		488- 560	480- 480
		Sample Size	0	6	27	34	0	2	1

-continued-

Table 16.–Page 2 of 2.

Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	1.2	1.3	2.2	1.4	2.3
7/18	M	Mean Length		543	501	541			510
(7/16,18,20)		Std. Error		8	4	8			-
		Range		535- 550	333- 538	438- 594			510- 510
		Sample Size	0	2	68	22	0	0	1
	F	Mean Length		530	490	517	485	525	537
		Std. Error		10	3	6	-	-	-
		Range		519- 550	436- 585	457- 567	485- 485	525- 525	537- 537
		Sample Size	0	3	55	22	1	1	1
7/26	M	Mean Length			512	537			
(7/24-8/31)		Std. Error			5	11			
		Range			423- 580	390- 593			
		Sample Size	0	0.0	41.0	27.0	0.0	0.0	0
	F	Mean Length		556.0	498.0	523.0			
		Std. Error		8.0	3.0	9.0			
		Range		548- 564	450- 582	413- 590			
		Sample Size	0	2.0	48.0	23.0	0.0	0.0	0
Season	M	Mean Length	440	538	510	548		576	554
		Range	440- 440	501- 587	333- 591	390- 668		539- 629	491- 582
		Sample Size	1	17	244	271	0	13	12
	F	Mean Length		525	494	525	485	542	527
		Range		490- 589	420- 585	413- 590	485- 485	488- 575	480- 570
		Sample Size	0	29	165	229	1	12	11
Grand Total [a]	M	Mean Length	461	571	521	575	537	590	569
		Range	410- 507	511- 656	321- 596	305- 700	482- 602	484- 688	497- 664
		Sample Size	12	81	1,305	2,800	71	121	142
	F	Mean Length	499	545	503	545	506	562	548
		Range	480- 502	474- 623	407- 590	323- 625	463- 563	504- 631	483- 610
		Sample Size	4	113	1,090	2,525	63	118	118

[a] The number of fish in the "Grand total" are the sum of historical "Season" totals; percentages are derived from those sums. Years included are 1991–1995 and 1997–2007.

Table 17.–Age and sex composition of chum salmon from the District W-4 commercial fishery, 2007.

Sample Dates (Stratum)	Pulse Sample Size	Aged Sample Size	Sex	0.2 Catch	0.2 %	0.3 Catch	0.3 %	0.4 Catch	0.4 %	0.5 Catch	0.5 %	Total Catch	Total %
6/19	101	47	M	0	0.0	519	34.0	422	27.6	65	4.3	1,006	66.0
(6/14,19)			F	0	0.0	292	19.2	194	12.8	32	2.1	518	34.0
			Subtotal	0	0.0	811	53.2	616	40.4	97	6.4	1,524	100.0
6/21	210	188	M	0	0.0	928	36.7	646	25.6	108	4.3	1,682	66.5
(6/21)			F	0	0.0	377	14.9	431	17.0	40	1.6	848	33.5
			Subtotal	0	0.0	1,305	51.6	1,077	42.6	148	5.9	2,530	100.0
6/28		172	M	0	0.0	2,862	32.6	1,431	16.3	102	1.2	4,395	50.0
(6/26,28,7/2)	210		F	0	0.0	2,607	29.6	1,687	19.2	102	1.1	4,396	50.0
			Subtotal	0	0.0	5,469	62.2	3,118	35.5	204	2.3	8,791	100.0
7/6	210	193	M	0	0.0	2,698	43.5	1,221	19.7	97	1.6	4,016	64.8
(7/4,6,8)			F	0	0.0	1,542	24.9	578	9.3	64	1.0	2,184	35.2
			Subtotal	0	0.0	4,240	68.4	1,799	29.0	161	2.6	6,200	100.0
7/12	210	195	M	0	0.0	2,673	43.1	668	10.7	32	0.5	3,373	54.4
(7/10,12,14)			F	0	0.0	2,386	38.4	446	7.2	0	0.0	2,832	45.6
			Subtotal	0	0.0	5,059	81.5	1,114	17.9	32	0.5	6,205	100.0
7/18	210	191	M	0	0.0	6,072	37.2	684	4.2	0	0.0	6,756	41.4
(7/16,18,20,24)			F	0	0.0	8,211	50.2	1,198	7.3	171	1.0	9,580	58.6
			Subtotal	0	0.0	14,283	87.4	1,882	11.5	171	1.0	16,336	100.0
7/26	170	148	M	0	0.0	5,441	27.7	531	2.7	0	0.0	5,972	30.4
(7/26-8/31)			F	0	0.0	11,811	60.1	1,592	8.1	265	1.4	13,668	69.6
			Subtotal	0	0.0	17,252	87.8	2,123	10.8	265	1.4	19,640	100.0
Season	1,321	1,134	M	0	0.0	21,193	34.6	5,603	9.2	404	0.7	27,200	44.4
			F	0	0.0	27,226	44.5	6,126	10.0	674	1.1	34,026	55.6
			Total	0	0.0	48,419	79.1	11,729	19.2	1,078	1.8	61,226	100.0
Grand		14,271	M	6,182	0.7	220,662	26.5	145,227	17.4	4,650	0.6	376,723	45.2
Total [a]			F	7,614	0.9	277,568	33.3	165,254	19.8	6,346	0.8	456,779	54.8
			Total	13,796	1.7	498,231	59.8	310,480	37.3	10,996	1.3	833,489	100.0

Note: The number of fish in each stratum age and sex category are derived from the sample percentages; discrepancies are attributed to rounding errors. The number of fish in "Season" summaries are the strata sums; "Season" percentages are derived from the sums.

[a] "Grand Total" mean lengths are simple averages of historical "Season" mean lengths. Years included are 1991–1995 and 1997–2007.

Table 18.–Mean length (mm) of chum salmon from the District W-4 commercial fishery, 2007.

Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
6/19	M	Mean Length		576	577	581
(6/14,19)		Std. Error		6	9	7
		Range		546- 631	526- 624	574- 588
		Sample Size	0	16	13	2
	F	Mean Length		565	563	582
		Std. Error		9	8	-
		Range		511- 590	525- 576	582- 582
		Sample Size	0	9	6	1
6/21	M	Mean Length		552	556	580
(6/21)		Std. Error		5	4	9
		Range		425- 775	439- 629	550- 607
		Sample Size	0	69	48	8
	F	Mean Length		540	546	579
		Std. Error		4	4	7
		Range		502- 576	494- 600	565- 589
		Sample Size	0	28	32	3
6/28	M	Mean Length		560	568	610
(6/26,28,7/2)		Std. Error		4	6	30
		Range		500- 634	483- 623	580- 639
		Sample Size	0	56	28	2
	F	Mean Length		542	551	578
		Std. Error		3	5	8
		Range		479- 600	505- 636	570- 585
		Sample Size	0	51	33	2
7/6	M	Mean Length		562	575	566
(7/4,6,8)		Std. Error		3	5	13
		Range		508- 633	516- 633	547- 590
		Sample Size	0	84	38	3
	F	Mean Length		545	552	575
		Std. Error		4	4	45
		Range		488- 585	512- 582	530- 619
		Sample Size	0	48	18	2

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Table 18.–Page 2 of 3.

Sample Dates (stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
7/12	M	Mean Length		553	563	521
(7/10,12,14)		Std. Error		3	7	-
		Range		415- 606	506- 633	521- 521
		Sample Size	0	84	21	1
7/12	F	Mean Length		538	538	
(7/10,12,14)		Std. Error		3	6	
(cont.)		Range		430- 610	507- 574	
		Sample Size	0	75	14	0
7/18	M	Mean Length		554	558	
(7/16,18,20,24)		Std. Error		3	8	
		Range		480- 613	520- 605	
		Sample Size	0	71	8	0
	F	Mean Length		533	531	552
		Std. Error		3	7	4
		Range		427- 600	480- 579	548- 556
		Sample Size	0	96	14	2
7/26	M	Mean Length		553	560	
(7/26-8/31)		Std. Error		4	18	
		Range		490- 630	532- 612	
		Sample Size	0	41	4	0
	F	Mean Length		535	536	521
		Std. Error		2	8	14
		Range		486- 590	470- 570	506- 535
		Sample Size	0	89	12	2
Season	M	Mean Length		556	566	580
		Range		415- 775	439- 633	521- 639
		Sample Size	0	421	160	16
	F	Mean Length		536	542	549
		Range		427- 610	470- 636	506- 619
		Sample Size	0	396	129	12

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Table 18.–Page 3 of 3.

Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
Grand Total [a]	M	Mean Length	534	582	603	606
		Range	454- 675	462- 710	492- 735	530- 694
		Sample Size	117	3883	2532	85
	F	Mean Length	530	559	576	584
		Range	486- 578	325- 683	492- 695	516-651
		Sample Size	149	4,674	2,742	85

[a] The number of fish in the "Grand total" are the sum of historical "Season" totals; percentages are derived from those sums. Years included are 1991–1995 and 1997–2007.

Table 19.–Age and sex of coho salmon from the District W-4 commercial fishery, 2007.

Sample Dates (Stratum)	Pulse Sample Size	Aged Sample Size	Sex	Age Class 1.1 Catch	1.1 %	2.1 Catch	2.1 %	3.1 Catch	3.1 %	Total Catch	Total %
8/10	170	103	M	1,700	8.7	8,121	41.8	189	1.0	10,010	51.5
(7/14-8/13)			F	1,322	6.8	8,121	41.7	0	0.0	9,443	48.5
			Subtotal	3,022	15.5	16,242	83.5	189	1.0	19,453	100.0
8/17	170	121	M	1,135	7.5	6,052	39.7	126	0.9	7,313	47.9
(8/15-31)			F	1,513	9.9	6,305	41.3	126	0.8	7,944	52.1
			Subtotal	2,648	17.4	12,357	81.0	252	1.7	15,257	100.0
Season	340	224	M	2,835	8.2	14,173	40.8	315	0.9	17,323	49.9
			F	2,835	8.2	14,426	41.6	126	0.4	17,387	50.1
			Total	5,670	16.3	28,599	82.4	441	1.3	34,710	100.0
Grand		7,376	M	33,831	4.2	351,612	43.2	16,818	2.1	435,274	53.5
Total [a]			F	28,915	3.6	300,924	37.0	15,451	1.9	377,997	46.5
			Total	62,745	7.7	652,536	80.2	32,268	4.0	813,282	100.0

Note: The number of fish in each stratum age and sex category are derived from the sample percentages; discrepancies are attributed to rounding errors. The number of fish in "Season" summaries are the strata sums; "Season" percentages are derived from the sums.

[a] "Grand Total" mean lengths are simple averages of historical "Season" mean lengths. Years included are 1991-1995 and 1997–2005.

Table 20.–Mean length (mm) of coho salmon from the District W-4 commercial fishery, 2007.

Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
8/10	M	Mean Length	560	558	586
(7/14-8/13)		Std. Error	15	5	-
		Range	470- 616	450- 629	586- 586
		Sample Size	9	43	1
	F	Mean Length	557	540	
		Std. Error	8	6	
		Range	525- 586	420- 594	
		Sample Size	7	43	0
8/17	M	Mean Length	569	556	515
(8/15-31)		Std. Error	9	6	-
		Range	537- 622	458- 620	515- 515
		Sample Size	9	48	1
	F	Mean Length	560	561	480
		Std. Error	13	4	-
		Range	502- 664	500- 615	480- 480
		Sample Size	12	50	1
Season	M	Mean Length	564	557	558
		Range	470- 622	450- 629	515- 586
		Sample Size	18	91	2
	F	Mean Length	559	549	480
		Range	502- 664	420- 615	480- 480
		Sample Size	19	93	1

Table 20.–Page 2 of 2.

Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
Grand Total [a]	M	Mean Length	558	580	583
		Range	472- 653	419- 704	489- 660
		Sample Size	166	1,689	78
	F	Mean Length	582	584	576
		Range	441- 661	412- 676	528- 594
		Sample Size	115	1,429	67

[a] The number of fish in the "Grand total" are the sum of historical "Season" totals; percentages are derived from those sums. Years included are 1991–1995 and 1997–2007.

Table 21.–Daily weather and hydrological observations from the Kanektok River weir site, 2007.

Date	Wind (Dir/ Speed)	Air Temp. (C)	Water Temp. (C)	Cloud Cover % / altitude	Water level (cm)	Precip (in)
18-Jun	1.5/5	6.5	6	100/400	41	0.05
19-Jun	Calm	9	8	0	40	0.01
20-Jun	1.5/S	9	7	100/?	38	0.00
21-Jun	4/S	8	8	100	38	0.00
22-Jun	1/S	6	6	100/200	38	0.01
23-Jun	4/N	10	6	100/700	42	5.02
24-Jun	3/SE	9	8	100/700	42	0.90
25-Jun	2.5/NE	10.5	8	75/Var.	47	0.70
26-Jun			NO OBS.			
27-Jun	SE/5	11.5	7	100/1000	40	0.00
28-Jun	4/NE	9.5	8	100/800	39	0.10
29-Jun	0	8	6.5	FOG	38	0.01
30-Jun	2.5	8	6.5	100/300	39	0.20
1-Jul	2.5/SE	11	6.5	97/1000	38	0.04
2-Jul	.5/NE	10	7	100/800	35	0.00
3-Jul	Calm	11	7	FOG	36	0.00
4-Jul	Calm	13	9	FOG	34	0.00
5-Jul	Calm	12	9	100/500	41	0.42
6-Jul	3/NW	9	8.5	100/600	37	0.08
7-Jul	NW/3	12	7.5	100/700	38	0.10
8-Jul	Calm	9.5	8	0	35	0.00
9-Jul	SE/5	11	10	100/1300	33	0.05
10-Jul	Calm	12	11.5	100/1000	34	0.00
11-Jul	N/2	9	9	0	32	0.00
12-Jul			NO OBS.			
13-Jul	Calm	8.5	8	100/200	54	8.00
14-Jul	Calm	8	7.5	100/300	47	0.00
15-Jul	Calm	10	7	100/300	45	0.00
16-Jul	Calm	7.5	7	100/400	43	0.00
17-Jul	5/E	5	8	0	41	0.00
18-Jul	5/E	7	8	Vair.	38	0.00
19-Jul	5/S	10	8	FOG	38	2.00
20-Jul	5/S	9	10	100/?	35	0.00
21-Jul	7/N	9	10	100/600		0.00
22-Jul	6.5/SE	10	8.5	VAIR.	34	0.19
23-Jul	2/SE	10	9.5	100/800	33	0.12
24-Jul	1/NE	8	10	100/1000	34	0.31
25-Jul	Calm	7.5	10	100/300	32	0.02
26-Jul			NO OBS.			
27-Jul	4/W	10	16.5	FOG	27	0.00

-continued-

Table 21.–Page 2 of 3.

Date	Wind (Dir/ Speed)	Air Temp. (C)	Water Temp. (C)	Cloud Cover % / altitude	Water level (cm)	Precip (in)
28-Jul	1.5/NW	12	16.5	Vair.	25	0.00
29-Jul	3/W	10.5	16.5	100/500	24	0.00
30-Jul	Calm	10	16.5	100/800	23	0.00
31-Jul	5.5	9.4	16.5	100/800	22	0.00
1-Aug	9/E	11.5	17	100/1100	21	Trace
2-Aug	9/N	12	17	90/Vair.	20	0.00
3-Aug	5/NE	13	17	100/Vair.	23	1.00
4-Aug	4/SE	11.5	18	100/900	23	0.21
5-Aug	7.5/SE	11.5	16	100/1100	30	0.40
6-Aug	Calm	9	16	95/1200	34	0.30
7-Aug	Calm	10	16	100/600	36	0.05
8-Aug	3/N	0.1	15.5	0	36	0.00
9-Aug	Calm	3.3	16	Vair.	34	0.00
10-Aug			NO OBS.			
11-Aug	SE/10	14.5	16	Vair.	30	0.00
12-Aug	E/6.0	17	17	80/Vair.	30	0.06
13-Aug	SE/10	15	16	60/Vair.	29	0.00
14-Aug	S/5	9	16	100/300	28	0.10
15-Aug	Calm	3	15	Fog	29	0.05
16-Aug	E/3	1	15	10/3,000	26	Trace
17-Aug	E/7	12	16	25/3500	24	0.00
18-Aug			NO OBS.			
19-Aug	1.5/NE	14.5	17	97/3000	22	0.03
20-Aug	Calm	9.5	16	100/2,800	20	0.02
21-Aug	3.5/SE	7.5	16	70/Vair.	21	0.02
22-Aug	Calm	8.6	16	100/1500	20	0.05
23-Aug	Calm	7	16	Fog	20	0.12
24-Aug	2.5/NE	11.5	16	Fog	21	4.50
25-Aug	4/E	10	16	85/1000	22	0.12
26-Aug	Calm	15	15	5%	19	0.15
27-Aug	4/N	8	10	90/4,000	18	0.00
28-Aug	Calm	9	10	Fog	18	0.01
29-Aug	2/N	7	9	Fog	17	0.00
30-Aug	2.5/NE	8	9	Fog	16	0.20
31-Aug	2/N	7	9	Fog	15	0.00
1-Sep	Calm	10	10	Fog	15	0.00
2-Sep	E/2.5	7	8.5	100/2900	14	0.00
3-Sep	NE/8	12	10	100/3,000	14	Trace
4-Sep	NW/2.5	8.5	10	20/1800	14	0.01
5-Sep	SE/	9.5	9	90/2600	14	0.07

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Table 20.–Page 3 of 3.

Date	Wind (Dir/ Speed)	Air Temp. (C)	Water Temp. (C)	Cloud Cover % / altitude	Water level (cm)	Precip (in)
6-Sep	E/6.0	10	9	85/Vair.	14	0.00
7-Sep	E/5	11	9	100/2000	14	0.02
8-Sep	SE/4	10.5	10	100/1800	14	0.03
9-Sep	SE/7	10.4	10.5	95/2500	22	0.20
10-Sep	SE/7	11	9	100/2500	27	0.02
11-Sep	SE/13	11	10	100/Vair.	26	0.06
12-Sep	SE/10	10	9	90/2000	63	1.10

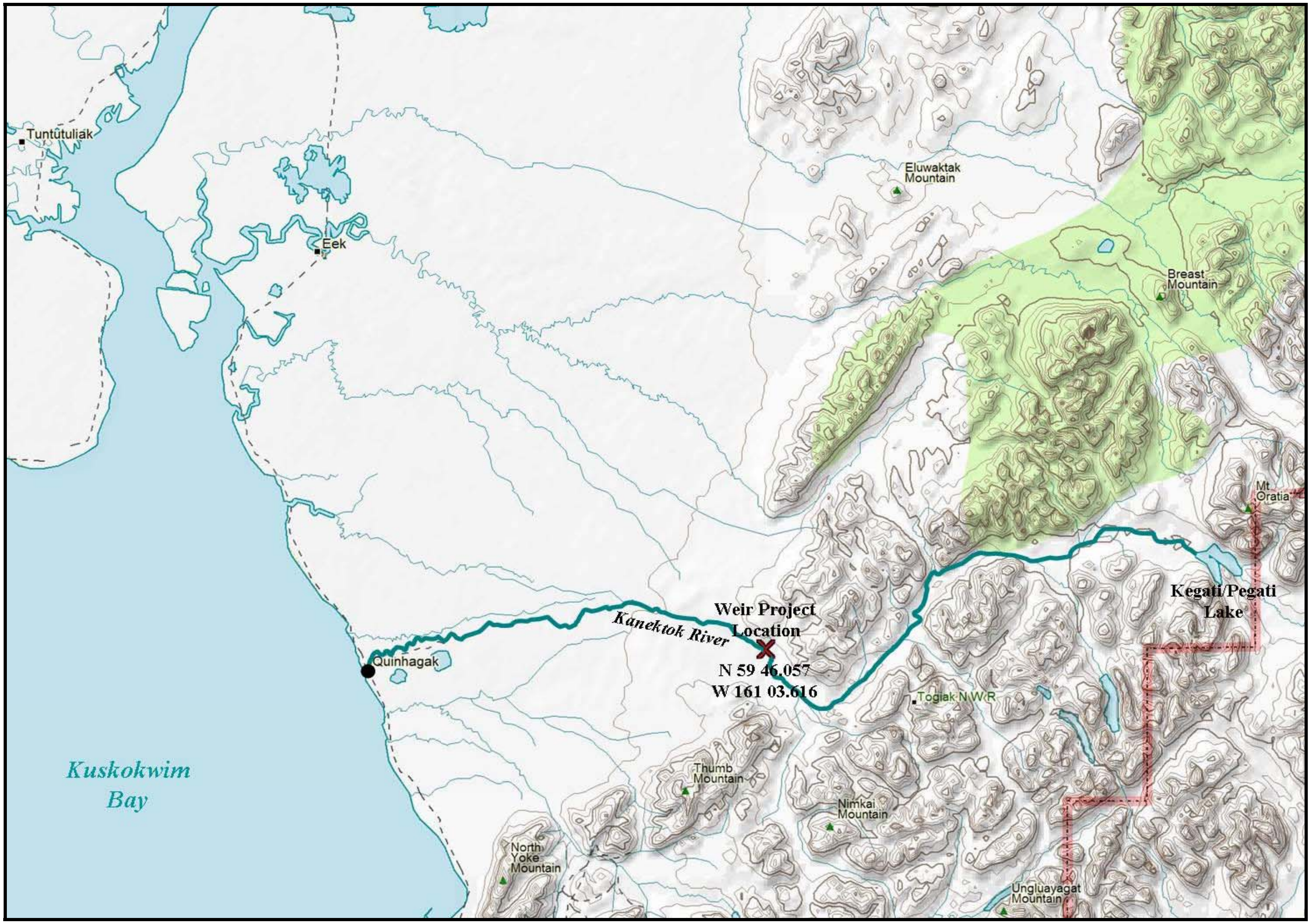


Figure 1.–Kanektok River, Kuskokwim Bay, Alaska.

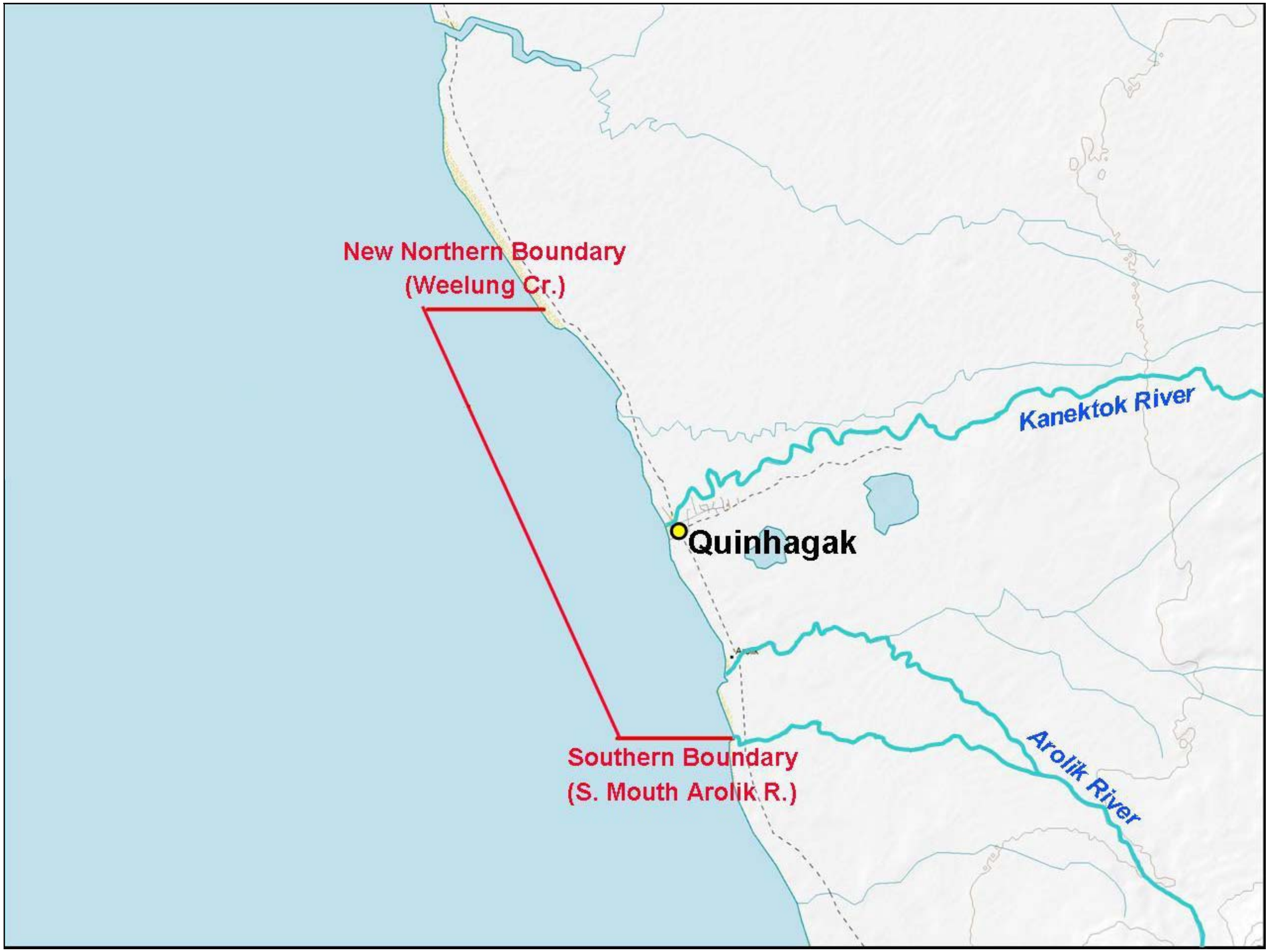


Figure 2.–Commercial Fishing District W-4, Kuskokwim Bay, Alaska, 2005.

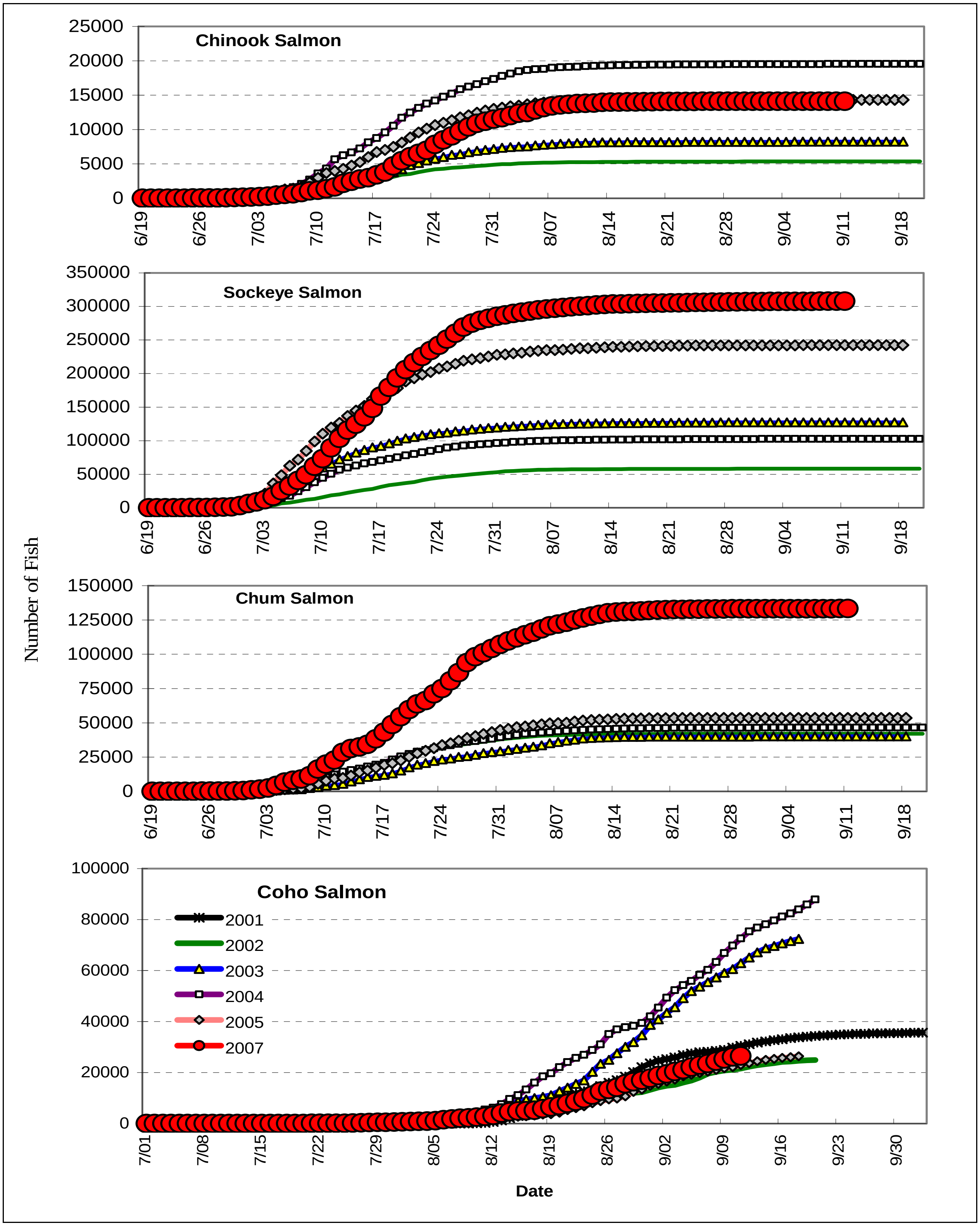


Figure 3.–Historical escapement of Chinook, sockeye, chum, and coho salmon, Kanektok River weir.

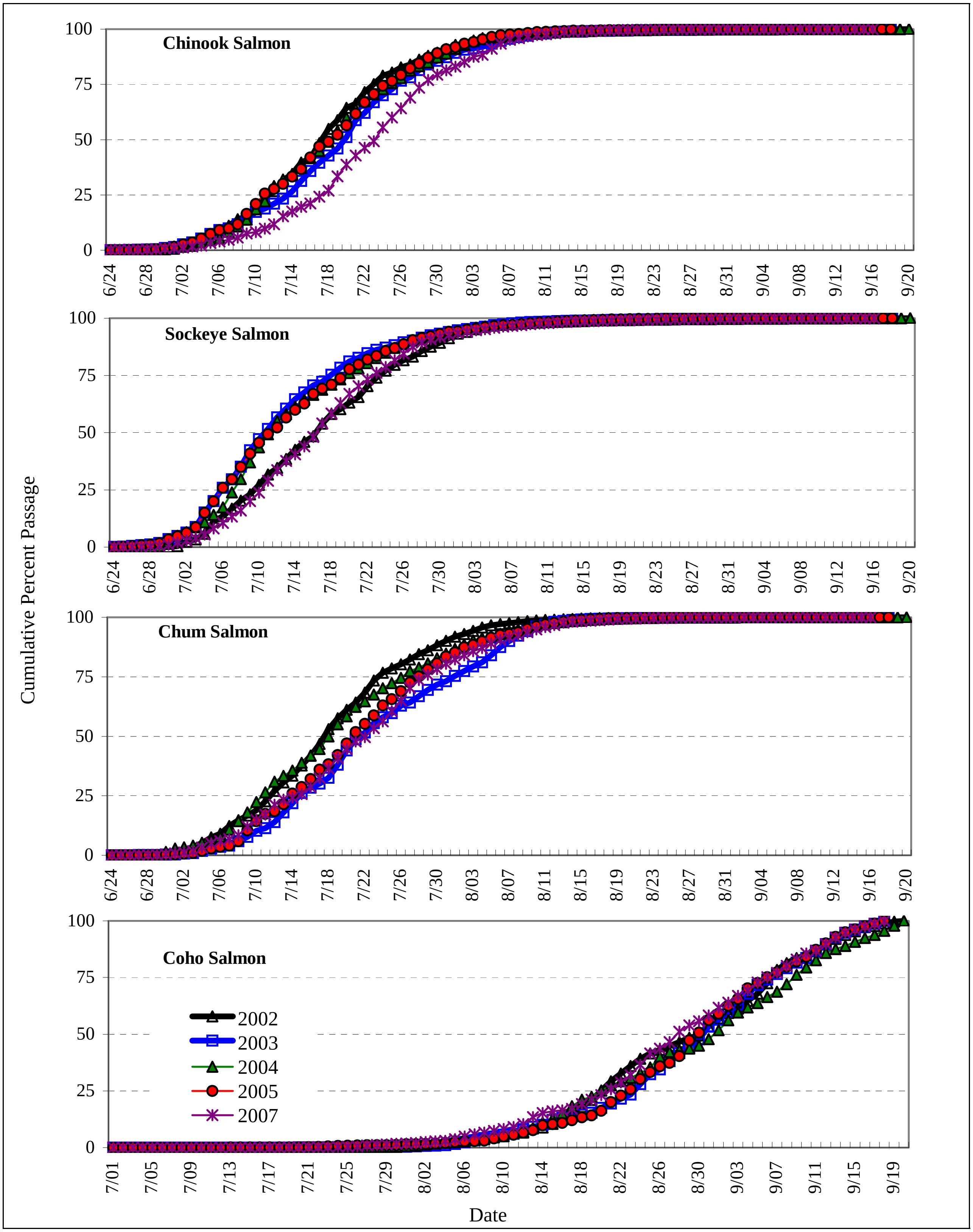
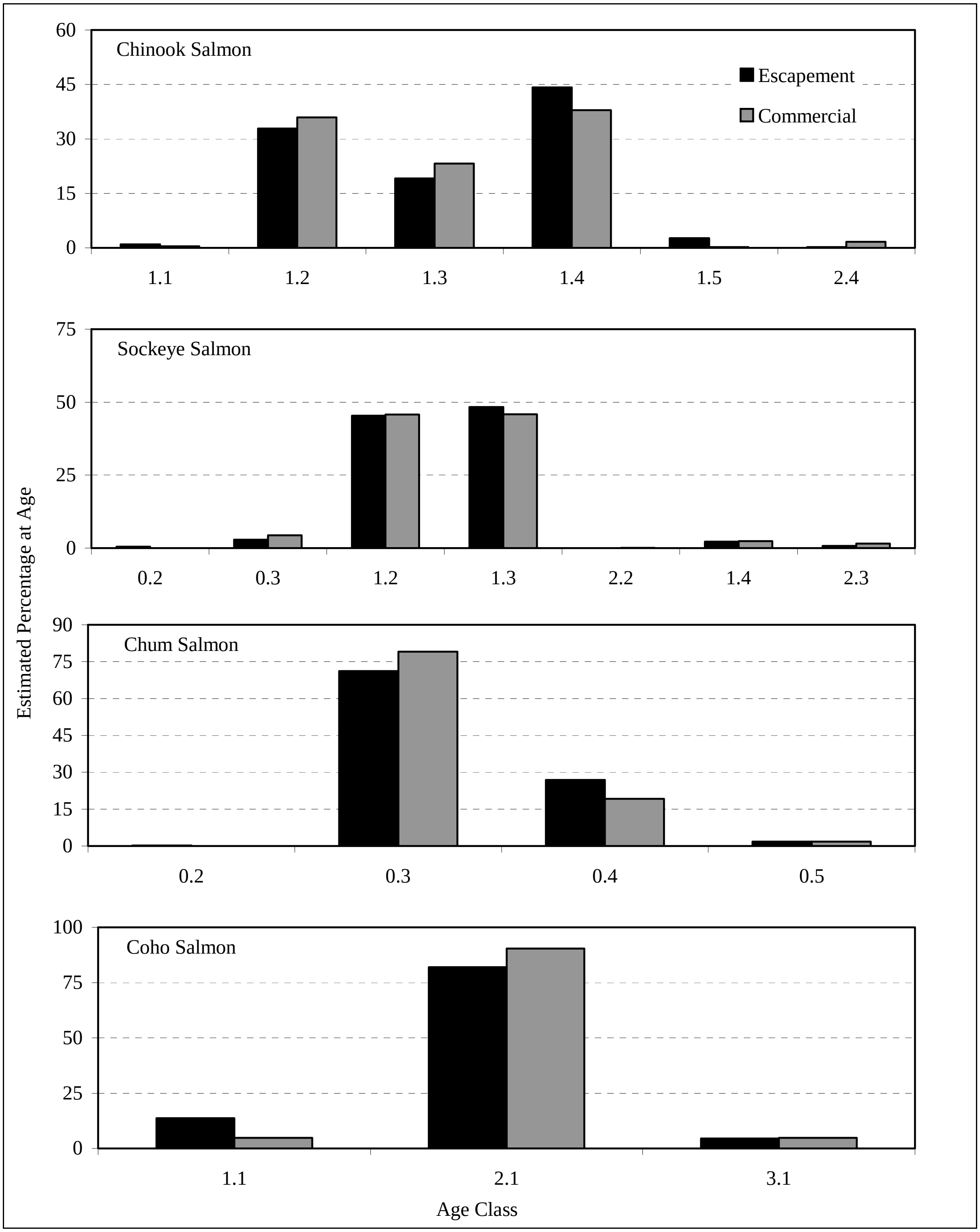
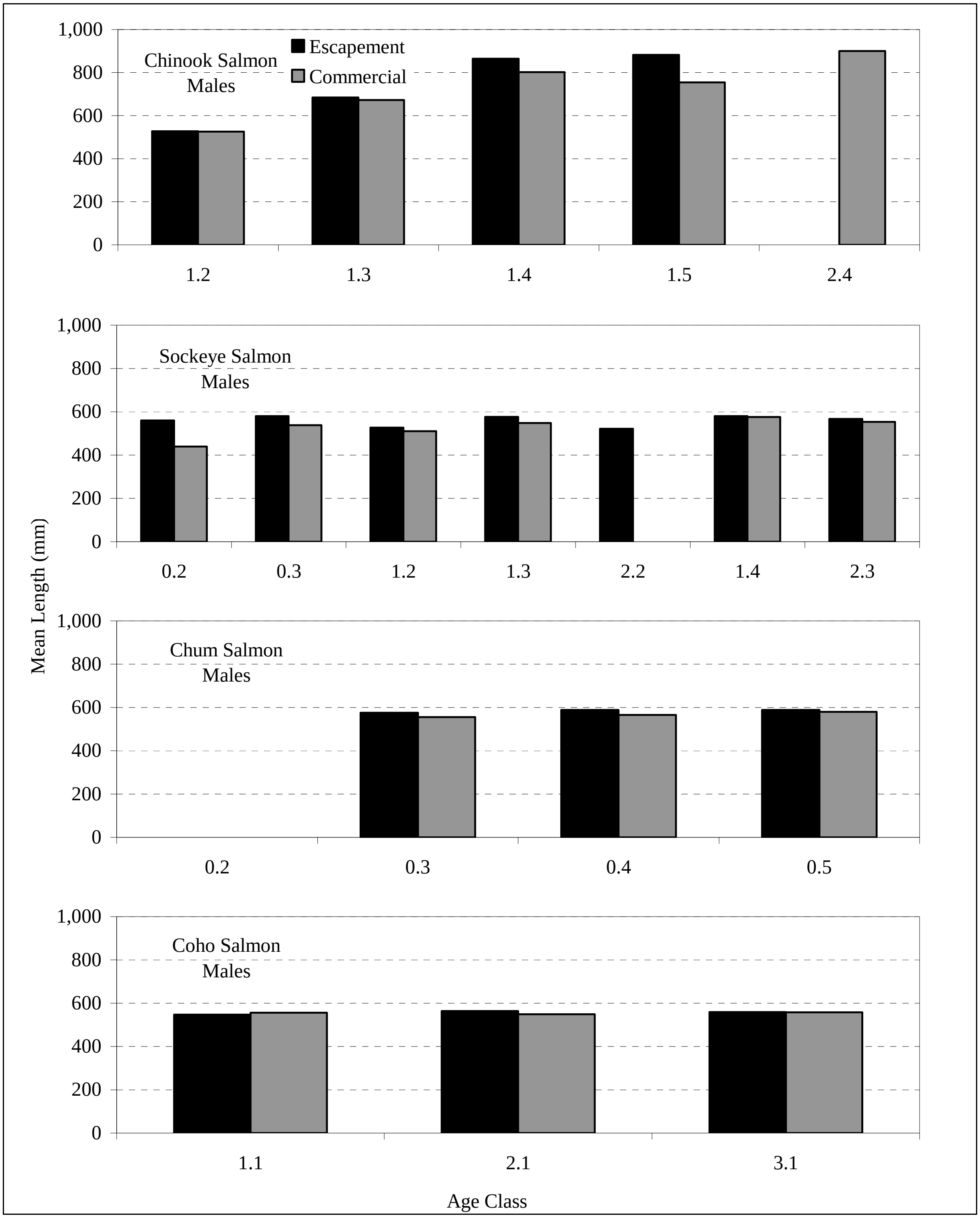


Figure 4.–Historical run timing of Chinook, sockeye, chum, and coho salmon, Kanektok River weir.



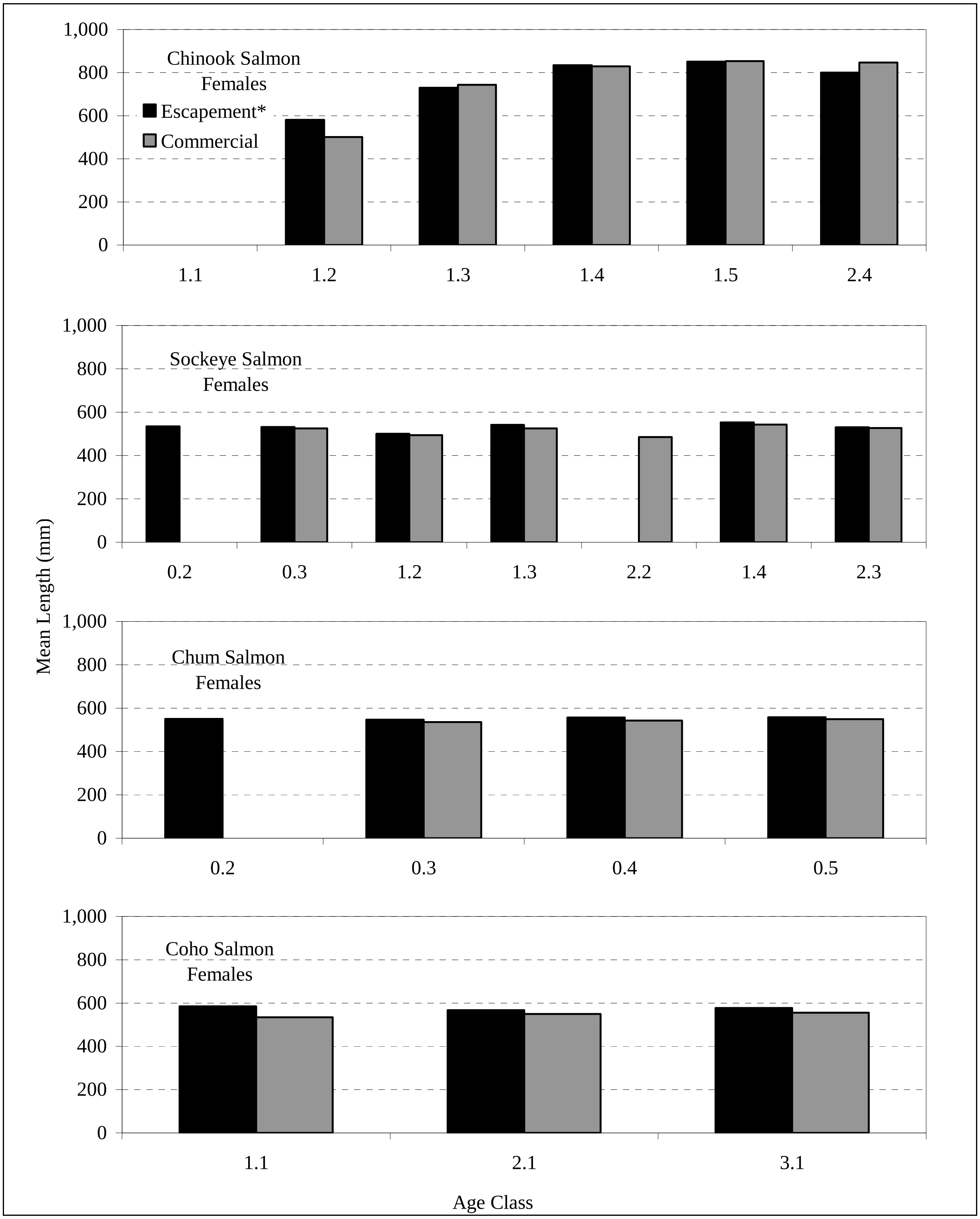
Note: Percentages do not represent estimated escapement as they are based on escapement observed and samples collected during weir operations only.

Figure 5.–Age class percentages for Chinook, sockeye, chum, and coho salmon from observed Kanektok River weir escapement and District W-4 commercial fishery, 2007.



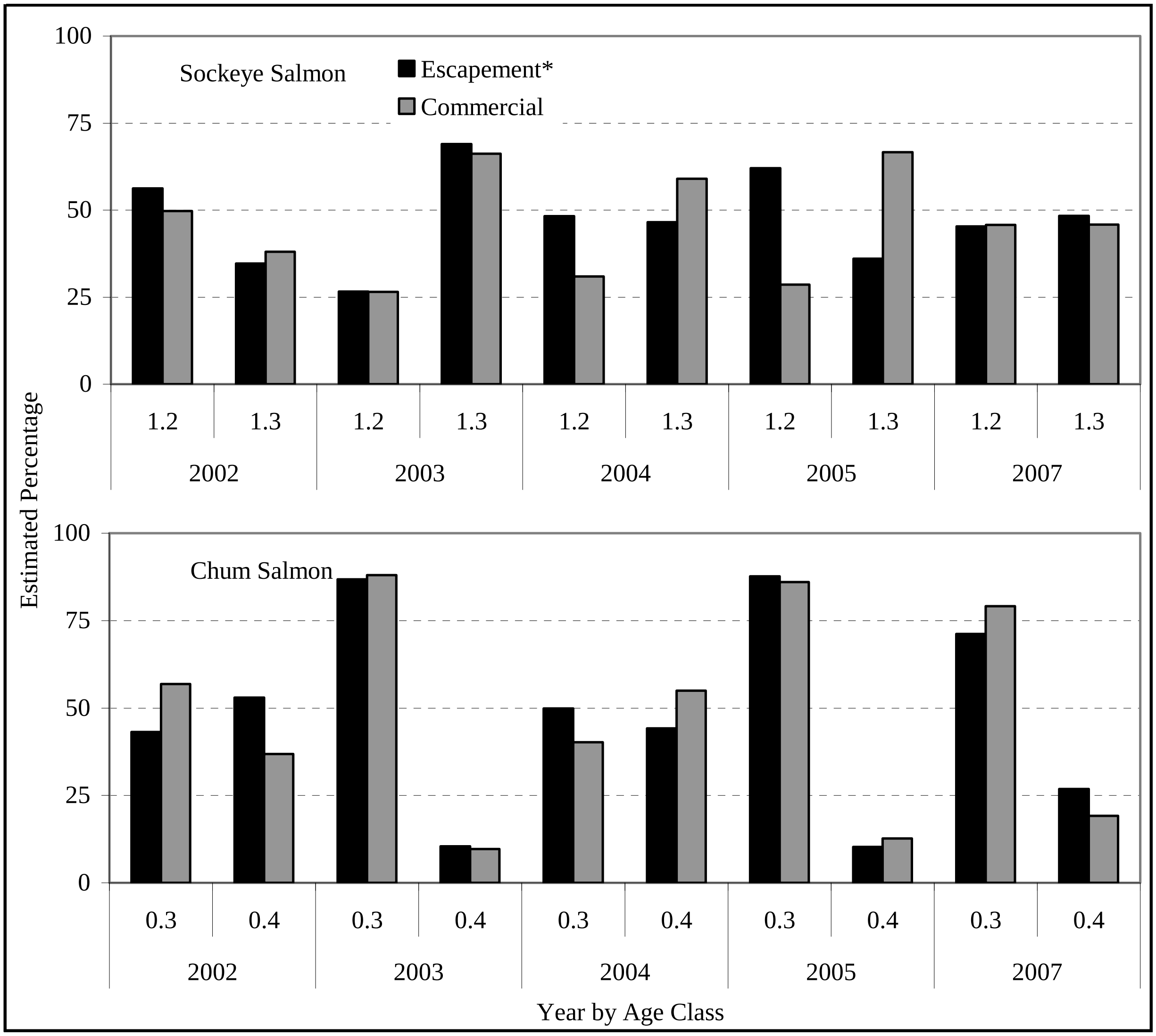
Note: Mean lengths do not represent estimated escapement as they are based on escapement observed and samples collected during weir operations only.

Figure 6.–Mean length by age class for male Chinook, sockeye, chum, and coho salmon from observed Kanektok River weir escapement and District W-4 commercial fishery, 2007.



Note: Mean lengths do not represent estimated escapement as they are based on escapement observed and samples collected during weir operations only.

Figure 7.–Mean length by age class for female Chinook, sockeye, chum, and coho salmon from observed Kanektok River weir escapement and District W-4 commercial fishery, 2007.



Note: 2005 escapement ASL data does not represent estimated escapement as it is based on escapement observed and samples collected during weir operations only.

Figure 8.–Percentage of age-1.2 and -1.3 sockeye salmon and age-0.3 and -0.4 chum salmon from Kanektok River weir escapement and District W-4 commercial ASL estimates, 2002–2007.

APPENDIX A.

Appendix A1.–Historical commercial, subsistence, and sport fishing harvests of Chinook, sockeye, coho and chum salmon, Quinhagak area, 1960–2007.

	Chinook			Sockeye			Chum			Coho		
Year	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport
1960	0			5,649			0			3,000		
1961	4,328			2,308			18,864			46		
1962	5,526			10,313			45,707			0		
1963	6,555			0			0			0		
1964	4,081			13,422			707			379		
1965	2,976			1,886			4,242			0		
1966	278			1,030			2,610			0		
1967	0	1,349		652			8,087			1,926		
1968	8,879	2,756		5,884			19,497			21,511		
1969	16,802			3,784			38,206			15,077		
1970	18,269			5,393			46,556			16,850		
1971	4,185			3,118			30,208			2,982		
1972	15,880			3,286			17,247			376		
1973	14,993			2,783			19,680			16,515		
1974	8,704			19,510			15,298			10,979		
1975	3,928			8,584			35,233			10,742		
1976	14,110			6,090			43,659			13,777		
1977	19,090	2,012		5,519			43,707			9,028		
1978	12,335	2,328		7,589			24,798			20,114		
1979	11,144	1,420		18,828			25,995			47,525		
1980	10,387	1,940		13,221			65,984			62,610		
1981	24,524	2,562		17,292			53,334			47,551		
1982	22,106	2,402		25,685			34,346			73,652		
1983	46,385	2,542	1,511	10,263			23,090		315	32,442		367
1984	33,663	3,109	922	17,255		143	50,422		376	132,151		1,895
1985	30,401	2,341	672	7,876	106	12	20,418	901	149	29,992	67	622
1986	22,835	2,682	938	21,484	423	200	29,700	808	777	57,544	41	2,010
1987	26,022	3,663	508	6,489	1,067	153	8,557	1,084	111	50,070	125	2,300
1988	13,883	3,690	1,910	21,556	1,261	109	29,220	1,065	618	68,605	4,317	1,837
1989	20,820	3,542	884	20,582	633	101	39,395	1,568	537	44,607	3,787	1,096

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Appendix A1.–Page 2 of 2.

Year	Chinook			Sockeye			Chum			Coho		
	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport
1990	27,644	6,013	503	83,681	1,951	462	47,717	3,234	202	26,926	4,174	644
1991	9,480	3,693	316	53,657	1,772	88	54,493	1,593	80	42,571	3,232	358
1992	17,197	3,447	656	60,929	1,264	66	73,383	1,833	251	86,404	2,958	275
1993	15,784	3,368	1,006	80,934	1,082	331	40,943	1,008	183	55,817	2,152	734
1994	8,564	3,995	751	72,314	1,000	313	61,301	1,452	156	83,912	2,739	675
1995	38,584	2,746	739	68,194	573	148	81,462	686	213	66,203	2,561	970
1996	14,165	3,075	689	57,665	1,467	335	83,005	930	200	118,718	1,467	875
1997	35,510	3,433	1,632	69,562	1,264	607	38,445	600	212	32,862	1,264	1,220
1998	23,158	4,041	1,475	41,382	1,702	942	45,095	1,448	213	80,183	1,702	751
1999	18,426	3,167	854	41,315	2,021	496	38,091	1,810	293	6,184	2,021	1,091
2000	21,229	3,106	833	68,557	1,088	684	30,553	912	231	30,529	1,088	799
2001	12,775	2,923	947	33,807	1,525	83	17,209	747	43	18,531	1,525	2,448
2002	11,480	2,475	779	17,802	1,099	73	29,252	1,839	446	26,695	1,099	1,784
2003	14,444	3,898	323	33,941	1,622	107	27,868	1,129	14	49,833	2,047	1,076
2004	25,465	3726	288	34,627	1086	112	25,820	1112	33	82,398	1209	1362
2005	14,195	3,083	520	68,801	1,633	156	13,529	915	108	51,780	1,443	1,006
2006	19,184	3,521	754	106,308	2,177	523	39,151	1,865	145	26,831	1,019	1,742
2007	19,573	[a]	[a]	109,343	[a]	[a]	61,228	[a]	[a]	34,710	[a]	[a]
10-Year Average[b]	19,587	3,337	841	51,610	1,522	378	30,501	1,238	174	40,583	1,442	1,328
Historical Average[c]	15,965	3,131	850	27,251	1,264	271	32,810	1,297	246	35,669	1,911	1,164

Note: Commercial harvest from District W-4 (Quinhagak), subsistence harvest by the community of Quinhagak, subsistence harvest estimates prior to 1988 are based on a different formula and are not comparable with estimates from 1988 to present.

[a] Not available at time of publication.

[b] 10 year average from 1997–2006.

[c] Historical average of subsistence harvest from 1988–2006.

APPENDIX B.

Appendix B1.–Historical escapement, Kanektok River escapement projects, 1996–2005.

Year	Method	Dates of Operation	Chinook	Sockeye	Chum	Pink [a]	Coho
1996	Counting Tower [b]	2–13, 20–25 July	6,827 [e]	71,637 [e]	70,617 [e]	[e]	
1997	Counting Tower [b]	11 June–21 August	16,731	96,348	51,180	7,872	23,172
1998	Counting Tower [b]	23 July–17 August	[e]	[e]	[e]	[e]	
1999	Tower/Weir [b]	Not Operational					
2000	Resistance Board Weir [c]	Not Operational					
2001	Resistance Board Weir [d]	10 August–3 October	132 [e]	735 [e]	1,058 [e]	19 [e]	35,677
2002	Resistance Board Weir [d]	1 July–20 September	5,343	58,367	42,014	87,036	24,883
2003	Resistance Board Weir [d]	24 June–18 September	8,221	127,471	40,071	2,443	72,448
2004	Resistance Board Weir [d]	29 June–20 September	19,528	102,867	46,444	98,060	87,828
2005	Resistance Board Weir [d]	8 July-8 September	14,331	242,208	53,580	3,530	26,343
2006	Resistance Board Weir [d]	Not Operational					
2007	Resistance Board Weir [d]	19 June- 11 September	14,120	307,750	133,215	3,075	30,471

[a] Picket spacing of the weir panels allows pink salmon to freely pass through the weir unobserved.

[b] Project located approximately 15 river miles from the mouth of the Kanektok River.

[c] Project located approximately 20 river miles from the mouth of the Kanektok River.

[d] Project located approximately 42 river miles from the mouth of the Kanektok River.

[e] No counts or incomplete counts as the project was not operational during a large portion of species migration.

APPENDIX C.

Appendix C1.–Aerial survey escapement indices of the Kanektok River drainage by species, 1965–2005.

Year	Chinook	Sockeye	Chum	Coho
1962	935	43,108	[a]	[a]
1965	[a]	[a]	[a]	[a]
1966	3,718	[a]	28,800	[a]
1967	[a]	[a]	[a]	[a]
1968	4,170	8,000	14,000	[a]
1969		[a]	[a]	[a]
1970	3,112	11,375	[a]	[a]
1971	[a]	[a]	[a]	[a]
1972	[a]	[a]	[a]	[a]
1973	814	[a]	[a]	[a]
1974	[a]	[a]	[a]	[a]
1975	[a]	6,018	[a]	[a]
1976	[a]	22,936	8,697	[a]
1977	5,787	7,244	32,157	[a]
1978	19,180	44,215	229,290 [b]	[a]
1979	[a]	[a]	[a]	[a]
1980	[a]	[a]	[a]	[a]
1981	[a]	[a]	[a]	69,325
1982	15,900	49,175	71,840	[a]
1983	8,142	55,940	[a]	[a]
1984	8,890	2,340	9,360	[a]
1985	12,182	30,840	53,060	46,830
1986	13,465	16,270	14,385	[a]
1987	3,643	14,940	16,790	[a]
1988	4,223	51,753	9,420	20,056
1989	11,180	30,440	20,583	[a]
1990	7,914	14,735	6,270	[a]
1991	[a]	[a]	2,475	[a]
1992	2,100	44,436	19,052 [c]	4,330
1993	3,856	14,955	25,675	[a]
1994	4,670	23,128	1,285	[a]
1995	7,386	30,090	10,000	[a]
1996	[a]	[a]	[a]	[a]
1997	[a]	[a]	[a]	[a]
1998	6,107	22,020	7,040	23,656
1999	[a]	[a]	[a]	5,192
2000	1,118	11,670	10,000	10,120
2001	6,483	38,610	11,440	[a]
2002	[a]	[a]	[a]	[a]
2003	6,206	21,335	2,700	[a]
2004	28,375	78,380	[a]	[a]
2005	14,202	110,730	[a]	[a]
2006	8,433	382,800	[a]	[a]
2007	[a]	[a]	[a]	[a]
SEG[d]	3,500–8,000	14,000–34,000	>5,200	7,700–36,000

Note: Aerial surveys are those rated as fair to good obtained between 20 July and 5 August for Chinook and sockeye salmon, 20 and 31 July for chum salmon, and 20 August and 5 September for coho salmon.

[a] Survey either not flown or did not meet acceptable survey criteria.

[b] Chum salmon count excluded from escapement objective because of exceptional magnitude.

[c] Some chum salmon may have been incorrectly speciated as sockeye salmon.

[d] Current Kanektok River drainage aerial survey Sustainable Escapement Goals (ADF&G 2004).

APPENDIX D.

Appendix D1.–Historical Chinook, sockeye, chum, and coho salmon cumulative percent passage, Kanektok River weir.

	Chinook Salmon					Sockeye Salmon					Chum Salmon					Coho Salmon					
Date	2002	2003	2004	2005[a]	2007	2002	2003	2004	2005[a]	2007	2002	2003	2004	2005[a]	2007	2001	2002	2003	2004	2005[a]	2007
06/24	0	0			0	0	0			0	0	0			0	0	0	0			0
06/25	0	0		0	0	0	0		0	0	0	0		0	0	0	0	0		0	0
06/26	0	0		0	0	0	1		0	0	0	0		0	0	0	0	0		0	0
06/27	0	0		0	0	0	1		1	0	0	0		0	0	0	0	0		0	0
06/28	0	0		0	0	0	1		1	0	0	0		0	0	0	0	0		0	0
06/29	0	0	0	0	0	0	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0
06/30	0	1	1	1	1	0	3	2	3	1	0	0	1	0	0	0	0	0	0	0	0
07/01	1	1	2	1	1	0	5	5	5	2	0	0	3	0	1	0	0	0	0	0	0
07/02	2	2	2	3	1	2	6	7	6	3	2	1	3	1	1	0	0	0	0	0	0
07/03	2	3	3	4	2	3	9	9	9	4	4	1	4	1	2	0	0	0	0	0	0
07/04	4	5	3	5	2	6	15	11	15	6	5	2	5	2	3	0	0	0	0	0	0
07/05	7	7	5	7	3	11	20	14	20	8	8	3	7	3	5	0	0	0	0	0	0
07/06	9	9	5	9	4	14	26	17	26	11	9	4	8	4	6	0	0	0	0	0	0
07/07	11	10	8	10	5	17	30	24	30	13	12	4	11	4	7	0	0	0	0	0	0
07/08	14	12	11	12	6	20	35	30	35	16	15	6	14	6	8	0	0	0	0	0	0
07/09	15	14	14	16	8	23	42	37	41	20	17	8	18	10	12	0	0	0	0	0	0
07/10	20	17	18	21	8	27	47	44	46	24	19	10	22	14	15	0	0	0	0	0	0
07/11	24	19	22	26	10	32	52	49	49	29	23	11	26	17	17	0	0	0	0	0	0
07/12	27	21	29	28	12	35	57	55	52	34	27	14	31	18	21	0	0	0	0	0	0
07/13	32	23	32	30	15	38	60	58	57	38	31	18	33	21	23	0	0	0	0	0	0
07/14	34	27	34	33	17	42	65	61	60	41	33	22	36	26	24	0	0	0	0	0	0
07/15	40	31	37	37	20	46	68	64	63	44	38	26	39	29	26	0	0	0	0	0	0
07/16	42	36	42	42	21	48	71	66	67	48	42	28	42	32	29	0	0	0	0	0	0
07/17	48	39	45	47	24	54	72	69	69	54	47	30	45	36	32	0	0	0	0	0	0
07/18	55	43	49	49	27	58	75	71	71	58	53	33	50	38	37	0	0	0	0	0	0
07/19	59	46	54	52	33	60	78	73	74	63	58	38	55	42	41	0	0	0	0	0	0
07/20	64	51	60	57	39	63	81	76	78	67	61	44	58	47	45	0	0	0	0	0	0
07/21	66	59	64	62	43	65	83	78	80	70	64	49	62	52	48	0	0	0	0	0	0
07/22	72	62	67	67	46	70	85	80	82	73	68	52	65	55	50	0	0	0	0	0	0
07/23	75	67	71	71	49	74	86	83	84	76	73	56	68	59	53	0	0	0	0	0	0
07/24	79	70	73	74	56	77	87	85	86	79	77	58	70	63	56	0	0	0	0	1	0
07/25	80	73	76	77	60	80	88	87	87	82	79	60	72	66	61	0	0	0	0	1	0
07/26	83	77	78	79	64	82	89	89	89	84	80	63	75	69	65	0	0	0	0	1	1
07/27	84	78	81	82	69	83	90	90	90	87	82	64	77	73	70	0	0	0	0	1	1
07/28	86	82	83	84	74	86	91	91	91	89	85	67	79	75	74	0	0	0	0	1	1
07/29	88	84	85	87	77	87	92	92	92	91	86	69	81	78	76	0	0	0	0	1	1

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Date	Chinook Salmon					Sockeye Salmon					Chum Salmon					Coho Salmon					
	2002	2003	2004	2005[a]	2007	2002	2003	2004	2005[a]	2007	2002	2003	2004	2005[a]	2007	2001	2002	2003	2004	2005[a]	2007
07/30	89	86	87	89	79	89	93	93	93	92	88	72	83	81	78	0	0	0	0	1	2
07/31	91	87	89	91	81	91	94	94	94	93	90	73	85	84	80	0	0	0	1	1	2
08/01	93	89	91	92	83	93	95	94	94	93	92	75	87	85	82	0	1	1	1	1	2
08/02	93	91	93	93	85	94	95	95	95	94	93	77	89	87	84	0	1	1	1	2	2
08/03	95	91	95	94	87	95	96	96	95	95	94	79	90	88	86	0	2	1	2	2	3
08/04	96	92	95	95	88	96	96	96	96	95	96	81	91	90	87	0	3	1	2	2	3
08/05	96	93	96	97	91	97	97	97	97	96	97	84	92	91	89	0	4	2	2	2	4
08/06	97	95	96	97	93	97	97	97	97	96	97	87	93	93	91	0	4	2	3	3	5
08/07	97	96	97	98	95	98	98	97	97	97	98	90	94	93	92	0	5	3	3	3	6
08/08	98	96	98	98	96	98	98	98	97	97	98	92	95	94	93	0	5	4	4	3	7
08/09	98	97	98	98	97	98	98	98	98	97	98	94	96	95	94	0	5	5	5	4	7
08/10	98	98	98	99	97	98	98	98	98	98	99	96	96	96	95	0	6	6	5	5	8
08/11	98	98	98	99	98	98	99	98	98	98	99	97	97	97	96	1	6	6	6	6	9
08/12	98	98	99	99	98	99	99	98	98	98	99	98	98	98	97	2	7	8	7	7	10
08/13	99	99	99	99	99	99	99	99	99	98	99	98	98	98	98	3	8	9	9	8	13
08/14	99	99	99	99	99	99	99	99	99	99	99	99	98	99	98	6	9	10	11	10	15
08/15	99	99	99	99	99	99	99	99	99	99	99	99	99	99	98	8	10	12	13	10	16
08/16	99	99	99	99	99	99	99	99	99	99	100	99	99	99	99	14	12	13	15	11	16
08/17	99	99	99	99	99	99	99	99	99	99	100	99	99	99	99	16	16	14	18	12	17
08/18	99	99	99	100	99	99	99	99	99	99	100	100	99	100	99	18	18	14	21	13	19
08/19	100	99	99	100	100	100	99	99	99	99	100	100	99	100	99	20	21	15	22	14	21
08/20	100	99	100	100	100	100	99	99	100	99	100	100	99	100	99	27	25	18	25	16	23
08/21	100	99	100	100	100	100	99	99	100	99	100	100	100	100	100	30	29	19	27	20	26
08/22	100	99	100	100	100	100	99	99	100	99	100	100	100	100	100	33	33	22	29	23	29
08/23	100	100	100	100	100	100	100	99	100	99	100	100	100	100	100	35	36	23	31	26	32
08/24	100	100	100	100	100	100	100	99	100	99	100	100	100	100	100	38	39	28	33	30	37
08/25	100	100	100	100	100	100	100	99	100	99	100	100	100	100	100	41	42	32	35	33	42
08/26	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	45	43	34	40	36	44
08/27	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	48	45	38	42	37	47
08/28	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	52	46	42	43	40	51
08/29	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	57	48	44	44	47	54
08/30	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	62	49	48	45	51	56
08/31	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	66	53	53	48	56	58
09/01	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	69	57	56	52	59	62
09/02	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	71	59	60	56	63	64
09/03	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	73	61	63	60	66	67

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	Chinook Salmon					Sockeye Salmon					Chum Salmon					Coho Salmon					
Date	2002	2003	2004	2005[a]	2007	2002	2003	2004	2005[a]	2007	2002	2003	2004	2005[a]	2007	2001	2002	2003	2004	2005[a]	2007
09/04	100	100	100	100	100	100	100	100	100	100	100	100	100	100		75	65	68	62	70	69
09/05	100	100	100	100	100	100	100	100	100	100	100	100	100	100		77	68	72	64	73	73
09/06	100	100	100	100	100	100	100	100	100	100	100	100	100	100		78	72	74	66	75	75
09/07	100	100	100	100	100	100	100	100	100	100	100	100	100	100		79	78	77	69	77	77
09/08	100	100	100	100	100	100	100	100	100	100	100	100	100	100		80	81	79	72	80	80
09/09	100	100	100	100	100	100	100	100	100	100	100	100	100	100		81	84	82	76	82	83
09/10	100	100	100	100	100	100	100	100	100	100	100	100	100	100		84	85	84	79	84	86
09/11	100	100	100	100	100	100	100	100	100	100	100	100	100	100		85	87	87	83	87	87
09/12	100	100	100	100	100	100	100	100	100	100	100	100	100	100		87	90	90	86	90	90
09/13	100	100	100	100	100	100	100	100	100	100	100	100	100	100		89	92	93	87	93	93
09/14	100	100	100	100	100	100	100	100	100	100	100	100	100	100		90	94	95	89	95	95
09/15	100	100	100	100	100	100	100	100	100	100	100	100	100	100		92	95	96	91	96	96
09/16	100	100	100	100	100	100	100	100	100	100	100	100	100	100		93	97	98	92	98	98
09/17	100	100	100	100	100	100	100	100	100	100	100	100	100	100		94	98	99	94	99	99
09/18	100	100	100	100	100	100	100	100	100	100	100	100	100	100		95	99	100	96	100	100

Note: Boxes represent the central 50% of the run and median date of passage. Shaded areas represent the central 80% of the run.

[a] Cumulative percent passage is inclusive of estimated passage for periods when a breach occurred in the weir and when the weir was inoperable.