Fishery Management Report No. 10-48

Chignik Management Area Salmon and Herring Annual Management Report, 2010

by

Todd J. Anderson

and

Nathaniel W. Nichols

December 2010

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

FISHERY MANAGEMENT REPORT NO. 10-48

CHIGNIK MANAGEMENT AREA SALMON AND HERRING ANNUAL MANAGEMENT REPORT, 2010

Todd J. Anderson
and
Nathaniel W. Nichols
Alaska Department of Fish and Game, Division of Commercial Fisheries, Kodiak

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1565

December 2010

The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports 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 regional peer review.

Todd J. Anderson
and
Nathaniel W. Nichols
Alaska Department of Fish and Game, Division of Commercial Fisheries,
211 Mission Road, Kodiak, AK 99615, USA

This document should be cited as:
Anderson, T. J. and N. W. Nichols. 2010. Chignik Management Area salmon and herring annual management report, 2010. Alaska Department of Fish and Game, Fishery Management Report No. 10-48, Anchorage.

The Alaska Department of Fish and Game (ADF&G) administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act (ADA) of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility please write:
ADF&G ADA Coordinator, P.O. Box 115526, Juneau, AK 99811-5526
U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042, Arlington, VA 22203
Office of Equal Opportunity, U.S. Department of the Interior, 1849 C Street NW MS 5230, Washington DC 20240

The department's ADA Coordinator can be reached via phone at the following numbers:
(VOICE) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648, (Juneau TDD) 907-465-3646, or (FAX) 907-465-6078

For information on alternative formats and questions on this publication, please contact:
ADF&G Division of Sport Fish, Research and Technical Services, 333 Raspberry Road, Anchorage AK 99518 (907) 267-2375.

TABLE OF CONTENTS

Page

LIST OF TABLES ii

LIST OF FIGURES iii

LIST OF APPENDICES iii

ABSTRACT 1

INTRODUCTION 1

COMMERCIAL HERRING 2

Herring Management Overview 2

- Historical Data 2
- 2010 Herring Fishery 2

COMMERCIAL SALMON 2

Overview of Management Plans 2

- Chignik Salmon Management Plan 2
- Cape Igvak Salmon Management Plan 3
- Southeastern District Mainland Salmon Management Plan 3

2010 Chignik Salmon Management 3

- Chignik Bay and Central Districts Commercial Salmon Fishery 3
- Eastern District Commercial Salmon Fishery 4
- Western and Perryville Districts Commercial Salmon Fishery 4

Escapement and Harvest Data 5

- Stock Separation Techniques 5
- Escapement Goals 5
- 2010 Escapement Information 6
- Harvest Information 8
- Economic Value 10

Chignik Lagoon Test Fisheries 10

CHIGNIK AREA SUBSISTENCE SALMON FISHERIES 10

REFERENCES CITED 11

TABLES AND FIGURES 13

APPENDIX A. MEMORANDUM RECOMMENDING TARGETING THE LOWER BOUNDS OF THE CHIGNIK SOCKEYE SALMON ESCAPEMENT GOALS DURING THE 2010 SEASON 71

APPENDIX B. SUMMARY OF 2010 EMERGENCY ORDERS 77

APPENDIX C. MEMORANDUM SUMMARIZING THE DEPLOYMENT OF DIDSON IN THE CHIGNIK RIVER, 2010 81

APPENDIX D. 2010 CHIGNIK SOCKEYE SALMON POSTWEIR ESCAPEMENT ESTIMATE MEMORANDUM 87

APPENDIX E. COMMERCIAL SALMON FISHERY CATCH AND EFFORT, BY DAY 91

LIST OF TABLES

Table **Page**

1. List of Chignik Management Area herring management units. 14
2. Chignik Management Area commercial herring harvest, 1980 through 2010. 14
3. Chignik River sockeye salmon interim escapement objectives, 2010. 15
4. Estimated Chignik River Chinook, coho, pink, and chum salmon, and Dolly Varden escapement, by day, 2010. 16
5. Estimated Chignik River Chinook, coho, pink, and chum salmon, and Dolly Varden escapement, 1970 through 2010. 18
6. Estimated Chignik River sockeye salmon escapement, by day and management objective period, 2010. 19
7. Total Chignik River sockeye salmon escapement and escapement goals, based on postseason analysis, by run, 1980 through 2010. 20
8. Peak sockeye salmon aerial survey escapement estimates for Black Lake tributaries, 1960 through 2010. 21
9. Peak sockeye salmon aerial survey escapement estimates for Chignik Lake and Black River tributaries, 1960 through 2010. 23
10. Estimated pink salmon escapement and objectives in the Chignik Management Area, by district and year, 1960 through 2010. 25
11. Estimated chum salmon escapement and objectives in the Chignik Management Area, by district and year, 1970 through 2010. 27
12. Total commercial salmon harvests, including home pack and the department's test fishery harvests, from the Chignik Management Area by species and year, 1970 through 2010. 29
13. Annual Chignik Management Area Chinook salmon harvest, 1970 through 2010. 30
14. Chignik Management Area Chinook salmon harvest (including home pack and the department’s test fishery catches), by district and year, 1970 through 2010. 31
15. Chignik Management Area Chinook salmon harvest (including home pack and the department’s test fishery catches), by district and day, 2010. 32
16. Total harvest of sockeye salmon considered by regulation to be Chignik-bound in the Chignik, Cape Igvak, and Southeastern District Mainland commercial salmon fisheries, 1970 through 2010. 34
17. Total annual Chignik Management Area sockeye salmon harvest (including home pack and the department’s test fishery catches), by district, 1970 through 2010. 36
18. Chignik Management Area sockeye salmon harvest (including home pack and the department’s test fishery catches), by district and day, 2010. 37
19. Harvest of sockeye salmon considered by regulation to be Chignik-bound in the Chignik, Cape Igvak, and Southeastern District Mainland commercial salmon fisheries from June 1 to July 25, 1978 through 2010. 39
20. Chignik sockeye salmon escapement, total harvest considered Chignik-bound, and total run, 1970 through 2010. 41
21. Chignik sockeye salmon forecasts and actual runs, by run and year, 1994 through 2010, in millions of fish. 42
22. Chignik Management Area coho salmon harvest, by year, 1970 through 2010. 43
23. Chignik Management Area coho salmon harvest (including home pack and the department’s test fishery catches), by district and year, 1970 through 2010. 44
24. Chignik Management Area coho salmon harvest (including home pack and the department’s test fishery catches), by district and day, 2010. 45
25. Chignik Management Area pink salmon harvest, by year, 1970 through 2010. 47
26. Chignik Management Area pink salmon harvest (including home pack and the department’s test fishery catches), by district and year, 1970 through 2010. 48
27. Chignik Management Area pink salmon harvest (including home pack and the department’s test fishery catches), by district and day, 2010. 49
28. Chignik Management Area chum salmon harvest, by year, 1970 through 2010. 51
29. Chignik Management Area chum salmon harvest (including home pack and the department’s test fishery catches), by district and year, 1970 through 2010. 52

LIST OF TABLES (Continued)

Table **Page**

30. Chignik Management Area chum salmon harvest (including home pack and the department's test fishery catches), by district and day, 2010. 53
31. Value of the commercial salmon harvest, by species, and average value per active permit, in dollars, in the Chignik Management Area, 1970 through 2010. 55
32. Historical number of subsistence permits issued and returned and estimated subsistence salmon harvest, by species and year, 1980 through 2009. 57

LIST OF FIGURES

Figure **Page**

1. Map of the Alaska Peninsula illustrating the relative locations of the Chignik, Kodiak, and Alaska Peninsula management areas. 58
2. Map of the Chignik Management Area illustrating district and section boundaries and statistical areas. 59
3. Representation of days open to commercial salmon fishing, by district and month, 2010. 60
4. Map depicting the newly established Inner (273-93), and Outer (273-95) Castle Cape Sections of the Western District. 61
5. Map of upper Chignik Lagoon showing the location of the Pillar Rock, Mensis Point, Humes Point, Mallard Duck, and Schooner Bay marker locations. 62
6. Chignik River estimated daily and cumulative Chinook salmon escapement, 2010. 63
7. Chignik River Chinook salmon escapement as compared to the current escapement goal range, by year, 1970 to 2010. 64
8. Chignik River sockeye salmon daily and cumulative escapement, 2010 65
9. Chignik River sockeye salmon early, late, and combined run escapements 1970 through 2010, compared to the 2010 sustainable escapement goals (including a late run IRRG of 50,000). 66
10. Chignik-bound sockeye salmon early-run harvest, 1970 through 2010. 67
11. Chignik-bound sockeye salmon late-run harvest, 1970 through 2010. 68
12. Total sockeye salmon escapement and catch considered Chignik-bound including home pack, the department's test fishery harvest, and Cape Igvak and SEDM allocations, by year and run, 1970 through 2010. 69
13. Average exvessel value, in dollars, per permit and total permits fished by year 1970 through 2010. 70

LIST OF APPENDICES

Appendix **Page**

A1. Memorandum recommending targeting the lower bounds of the Chignik sockeye salmon escapement goals during the 2010 season. 72

B1. Summary of the 2010 Chignik Management Area Emergency Orders. 78

C1. Memorandum summarizing the deployment of DIDSON in the Chignik River, ...82

D1. 2010 Chignik sockeye salmon post-weir escapement estimate memorandum. 88

E1. Commercial salmon fishing effort and harvest (including home pack but not including the department's test fishery harvest), by day in the Chignik Management Area, 2010. 92

ABSTRACT

This report is a summary of the 2010 commercial Pacific herring *Clupea pallasii* and Pacific salmon *Oncorhynchus* spp. fisheries within the Chignik Management Area (CMA; Area L). The CMA encompasses all coastal waters and inland drainages of the northwest Gulf of Alaska between Kilokak Rocks and Kupreanof Point. There was no commercial herring fishery in the CMA during 2010. All five species of North American Pacific salmon were commercially harvested in the CMA during 2010: Chinook *O. tshawytscha*, sockeye *O. nerka*, coho *O. kisutch*, pink *O. gorbuscha*, and chum *O. keta* salmon. In 2010, the Chinook salmon escapement of 3,679 fish to the Chignik River exceeded the escapement goal range of 1,300 to 2,700 fish. The 2010 Chignik River early-run sockeye salmon escapement of 432,535 fish exceeded the early-run escapement goal range of 350,000 to 400,000 fish. The late-run sockeye salmon escapement of 311,291 fish was within the late-run escapement goal range of 250,000 to 400,000 fish. The early run was above the recent 5- and 10-year averages, but below the recent 20-year escapement average. The late run was below the recent 5-, 10-, and 20-year escapement averages. The 2010 total CMA sockeye salmon harvest of 1,379,785 fish was above the recent 5-, 10-, and 20-year average harvests. The CMA total coho harvest of 159,198 fish was above recent 5-, 10-, and 20-year average harvests. The area wide chum salmon escapement of 177,220 fish exceeded the lower bound of the sustainable escapement goal of 57,400 fish. In 2010, 581,329 chum salmon were harvested which was the largest chum salmon harvest since 1954. The 2010 area wide pink salmon escapement of 330,570 fish was below the 5-, 10-, and 20-year escapement averages but within the even-year sustainable escapement goal range of 200,000 to 500,000 fish. The CMA harvest of 489,781 pink salmon was below the 5-, 10-, and 20-year average harvests. A total of 65 CMA permit holders made deliveries in 2010. The majority of the fishing effort in the 2010 season occurred in the Chignik Bay District. The exvessel value for the 2010 salmon harvest in the CMA totaled approximately $14.3 million.

Key words: Chignik Management Area (CMA), Chignik River, *Oncorhynchus*, *Clupea pallasii*, salmon, herring, Alaska Board of Fisheries (BOF), 2010 commercial fisheries management, Annual Management Report, Fisheries Management Plan (FMP), harvest statistics, escapement statistics.

INTRODUCTION

The Alaska Department of Fish and Game (department) manages all Pacific herring *Clupea pallasii* and commercial salmon *Oncorhynchus* spp. fisheries within the Chignik Management Area (CMA; Area L). The CMA encompasses all coastal waters and inland drainages of the northwest Gulf of Alaska between Kilokak Rocks and Kupreanof Point (Figure 1). For management purposes, these waters are divided into five fishing districts: Eastern, Central, Chignik Bay, Western, and Perryville districts. Each district is further broken down into sections and statistical reporting areas (Figure 2).

Five species of North American Pacific salmon are commercially harvested in the CMA: Chinook *O. tschawytscha*, sockeye *O. nerka*, coho *O. kisutch*, pink *O. gorbuscha*, and chum *O. keta* salmon. Of these, sockeye salmon are the primary species targeted and the most important commercial and subsistence salmon species in the CMA. The department manages all CMA commercial salmon resources by emergency order based on inseason evaluation of local stock abundance and escapement objectives. The majority of fishing effort is concentrated on salmon returning to the Chignik River watershed. Commercial salmon fishing is the economic mainstay for five villages: Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, and Ivanof Bay (Figure 1).

This report provides a summary of commercial herring and salmon management plans, fishing activity, escapements, and harvests in the CMA. This report also provides a chronology of significant regulatory changes that influenced the 2010 commercial salmon season. Most tables in this report have been verified against the Westward Region electronic fish ticket (1970 to present) and historical escapement databases (1960 to present). The salmon harvest estimates

reported in this document were summarized from the fish ticket database on October 21, 2010. Data published in this report supersede any data previously published.

COMMERCIAL HERRING

HERRING MANAGEMENT OVERVIEW

Herring may be harvested in the CMA from April 15 through June 30 (sac roe season) and from August 15 through February 28 (food and bait season), although specific commercial herring fishing periods and areas are allowed only by emergency order (5 AAC 27.560). Herring may be taken only by purse seines not more than 1,000 meshes in depth and 100 fathoms in length (5 AAC 27.575).

There are several distinct locations within the CMA where herring are managed as separate stocks (Table 1). Each individual location is managed on a maximum exploitation rate of 20%, given that a threshold biomass is available for harvest. Threshold biomass levels are determined prior to the fishing season after aerial survey estimates are conducted and potential effort levels are determined.

Historical Data

Commercial herring harvests in the CMA were not recorded in the CMA until 1980 (Nicholson et al. 1980). In years when fisheries occurred, herring harvests ranged from 6 tons in 1996 to 587 tons in 1980 (Table 2). Due to lack of industry interest, the CMA has not had a herring fishery in recent years. The last herring biomass survey and commercial fishery occurred in 1996 (Table 2; Stichert 2007).

2010 Herring Fishery

There was no 2010 herring fishery in the CMA; no guideline harvest levels were set due to the lack of industry interest.

COMMERCIAL SALMON

OVERVIEW OF MANAGEMENT PLANS

Several management plans have been used to manage the CMA commercial salmon fishery in the last decade. The 2010 CMA commercial salmon fishery was managed based on the *Chignik Salmon Management Plan* (5 AAC 15.357). Sockeye salmon bound for the Chignik River watershed were also allocated under two additional management plans: the *Cape Igvak Salmon Management Plan* (5 AAC 18.360) in the Kodiak Management Area (Area K), and the *Southeastern District Mainland (SEDM) Salmon Management Plan* (5 AAC 09.360) in the Alaska Peninsula Management Area (Area M; Figure 1).

Chignik Salmon Management Plan

The *Chignik Salmon Management Plan* (5 AAC 15.357) was originally adopted in 1999. The goal of this plan was to allow traditional salmon fisheries in the CMA while achieving the established escapement goals for both early-run (Black Lake), and late-run (Chignik Lake) sockeye salmon. Purse seines and hand purse seines are the only legal commercial salmon fishing gear within the CMA. Legal seine gear ranged from 100 to 125 fathoms in length in the

Chignik Bay District and from 100 to 225 fathoms in length in all other districts (5 AAC 15.332). To assist management efforts, the management plan is organized into districts or groups of districts: the Chignik Bay and Central districts, the Eastern District, and the Western and Perryville districts (Figure 2).

Cape Igvak Salmon Management Plan

From June 1 through July 25, 90% of the sockeye salmon harvested within the Cape Igvak Section are allocatively considered to be Chignik-bound (5 AAC 18.360(d)). The Cape Igvak Section is the westernmost section of Area K, located directly northeast of the CMA (Figure 1). If the harvestable surplus of sockeye salmon in the CMA is above or expected to be above certain thresholds (5 AAC 18.360 (a-c)), then 15 percent of the total Chignik sockeye salmon harvest (total includes sockeye salmon caught at Cape Igvak and within certain portions of SEDM) is allocated to Area K fishermen. After July 25, there are no allocative ties between the CMA and Area K.

Southeastern District Mainland Salmon Management Plan

From June 1 through July 25, 80 percent of the sockeye salmon harvested within certain SEDM sections during specific times are allocatively considered to be Chignik-bound (5 AAC 09.360). The SEDM is composed of a group of sections at the eastern end of Area M, located directly southwest of the CMA (Figure 1). If the harvestable surplus of sockeye salmon in the CMA is above or expected to be above certain thresholds (5 AAC 09.360 (a-g)), then 7.6 percent of the total estimated CMA sockeye salmon harvest is allocated to SEDM fisherman. After July 25, there are no allocative ties between the CMA and Area M.

2010 CHIGNIK SALMON MANAGEMENT

The department targeted the lower bounds of the sockeye salmon escapement goals during the 2010 season (Table 3; Appendix A) based on limnology data from 2000 through 2007 that suggested the forage base for sockeye salmon was depressed in Chignik Lake (Bouwens and Finkle 2003a, b; Finkle 2005; Finkle 2006a, b; Finkle and Bouwens 2001). The department first adopted this practice in 2002 to improve juvenile sockeye salmon production by relieving grazing pressure on zooplankton in Chignik Lake (Bowens and Finkle 2003b).

The first commercial fishing period began on June 16, and the last commercial fishing period ended on September 7. The commercial salmon fishery was open for a total of 73 days during 2010 (Figure 3). A total of 65 CMA commercial salmon permit holders (excluding the department test fish permit) participated in the 2010 commercial salmon season. This was the highest number of active permits in the CMA subsequent to the Chignik Cooperative fishery that occurred from 2002 to 2005.

Salmon were delivered at three locations in 2010: Trident Seafoods located in Chignik Bay, Trident Seafoods in Sand Point, and International Seafoods of Alaska in Kodiak. Due to the 2008 fire that destroyed the Chignik Trident Cannery, Trident Seafoods used floating processors in Chignik Bay. Processors filleted or headed and gutted the majority of Chignik salmon.

Chignik Bay and Central Districts Commercial Salmon Fishery

After the department conducted test fisheries in Chignik Lagoon and assessed sockeye salmon run strength at the Chignik weir, the 2010 commercial salmon fishery began in the Chignik Bay

and Central districts on June 16. Due to sockeye salmon harvest rates and strong escapement levels during the first fishing period, the Chignik Bay and Central districts were extended through June 27. The CMA then closed for 96 to achieve interim sockeye salmon escapement objectives (Table 3 and 6; Figure 3). The second fishing period began on July 2, and was extended for 151 hours (Figure 3). Prior to the third fishing period, the Central and Chignik Bay districts were closed for 50 hours to achieve interim sockeye salmon escapement objectives for July 10 (32,600–56,000; Table 3).

After reopening on July 11, the Chignik Bay and Central districts remained open to commercial salmon fishing until July 18, after which a 76 hour closure was necessary to achieve interim sockeye salmon escapement objectives for July 23 (122,200–209,500; Table 3).

On July 21, the Chignik Bay and Central districts reopened to commercial salmon fishing and were extended until July 25, followed by a 4-day closure to ensure that late-run sockeye salmon escapement objectives would be met (250,000–400,000; Table 3).

Sockeye salmon escapement into the Chignik River watershed remained relatively consistent throughout the remaining commercial salmon season. As a result, the Chignik Bay and Central districts remained open from July 29 until the end of the commercial salmon season on September 7. In total, the Chignik Bay and Central districts were open for 73 days during 2010.

The Chignik Lagoon markers alternated between Humes Point and Mensis Point during the 2010 salmon season (Figure 5). Generally, the Humes Point markers were used for the first 24 to 48 hours of a commercial fishing period to allow salmon above these markers to escape the fishery. The Humes Point markers were also used when sockeye salmon escapement was at or just above the lower bound of the interim escapement objectives. This increased escapement into the Chignik River and also allowed the department to assess the magnitude of salmon entering the lagoon by concentrating the effort in the lower lagoon. During periods when sockeye salmon abundance exceeded the upper bounds of the interim escapement objectives the closed waters in Chignik Lagoon were reduced to Mensis Point to control escapement and provide for additional harvest opportunities. A summary of emergency orders outlining the commercial salmon fisheries in the Chignik Bay and Central districts is located in Appendix B.

Eastern District Commercial Salmon Fishery

The Eastern District, by regulation (5 AAC 15.357 (c)(1)), opened concurrently with the Chignik Bay and Central districts during June (Figures 2 and 4). In 2010, the Eastern District was also opened concurrently with the Chignik Bay and Central districts throughout much of July. After a 12-day closure in early August to ensure local pink salmon escapement, the Eastern District remained open until the end of the fishing season.

Inseason aerial surveys indicated that pink salmon escapement in 2010 was relatively low compared to historical averages and chum salmon escapement was similar to recent averages.

In total, the Eastern District was open to commercial salmon fishing for 61 days during 2010 (Figure 3). A summary of emergency orders outlining the commercial salmon fisheries in the Eastern District is found in Appendix B.

Western and Perryville Districts Commercial Salmon Fishery

The Inner Castle Cape Subsection of the Western District, by regulation (5 AAC 15.357 (b)), opened concurrently with the Chignik Bay and Central districts in June (Figures 2, 3, and 4).

Also by regulation (5 AAC 15.357 (e)), the Western District, excluding the Inner Castle Cape Subsection, opened to commercial salmon fishing for two 48-hour periods with a mandatory 48-hour closure between fishing periods through July 5. Both of these fishing periods were opened concurrently with the Chignik Bay and Central districts in June.

Excluding the Inner Castle Cape Section of the Western District, and the two 48-hour fishing periods, the Western and Perryville districts are closed to commercial salmon fishing through July 5 (5 AAC 15.357 (d)). Beginning July 6, these districts can be opened on a catch-per-unit-effort basis targeting migrating pink and chum salmon. Once fish enter local streams, management shifts to an escapement-based strategy.

Due to adequate Chignik late-run sockeye salmon escapement, the Western and Perryville districts were opened to commercial salmon fishing on July 11 and extended through July 19. After a 76 hour closure the Western and Perryville districts reopened to commercial salmon July 21 through 25. On July 29, the Western and Perryville districts reopened to commercial salmon fishing until the districts closed on August 2 to ensure adequate local pink salmon escapement.

After 5-day (132 hours) and 3-day (66 hours) closures in early August, the districts remained open for the remainder of the salmon season (Figure 3). In total, the Western District was open to commercial salmon fishing for 49 days, and the Perryville District for 45 days during 2010 (Figure 3). Despite ample fishing opportunities in the Perryville District, there were only 16 commercial salmon deliveries from the district in 2010. A summary of emergency orders outlining the commercial salmon fisheries in the Western and Perryville districts is found in Appendix B.

ESCAPEMENT AND HARVEST DATA

Stock Separation Techniques

Two distinct sockeye salmon runs (an early- and late-run) enter the Chignik River watershed and temporally overlap during late June and early July (Templin et al. 1999). Prior to 2004, scale pattern analysis (SPA) was used to differentiate stock composition during this time, and the fishery was managed inseason based on the results of this analysis (Witteveen and Botz 2004). The Chignik SPA program was discontinued prior to the 2004 season due to funding limitations. However, examination of SPA data revealed that, on average, the number of early-run sockeye salmon that passed the Chignik River weir after July 4 was approximately equal to the number of late-run sockeye salmon that passed the weir prior to July 4. The 2010 fishery was managed based on this date, so that through July 4, fishing periods were based on achieving interim early-run escapement objectives, and beginning July 5, fishing periods were based on achieving interim late-run escapement objectives (Table 3).

Escapement Goals

The most recent full review of CMA escapement goals was conducted in 2007 just prior to the 2008 CMA board meeting. The department is currently reviewing CMA escapement goals and will present the results at the January 2011 CMA board meeting.

In 2007, an interdivisional escapement goal review team recommended no change to the Chignik River Chinook salmon biological escapement goal (BEG) range of 1,300–2,700 fish.

The team additionally recommended no change for the early-run sustainable escapement goal (SEG) range of 350,000–400,000 fish (Table 3). However, the team recommended changing the upper end of the late-run SEG from 250,000 fish to a new upper end goal of 400,000 fish. In addition to the upper goal change, to address concerns from subsistence fisherman, an inriver run goal (IRRG) of 50,000 sockeye salmon (25,000 sockeye salmon in August and 25,000 in September) was added to the lower bound of the late-run SEG to yield a total late-run escapement objective range of 250,0000–400,000 sockeye salmon (Witteveen et al. 2007).

The team also recommended revising the even- and odd-year pink salmon aggregate BEGs to an aggregate SEG (Witteveen et al. 2007). The team recommended changing the even-year BEG to an SEG range of 200,000–600,000 pink salmon, and the odd-year BEG to an SEG range of 500,000–800,000 pink salmon.

The team similarly recommended changing the areawide aggregate chum salmon lower bound SEG from 50,400 to 57,400. The directors of the divisions of Commercial Fisheries and Sport Fish approved the team's escapement goal recommendations, which were implemented for the 2008 season.

2010 Escapement Information

In 2010, salmon escapements to the Chignik River were enumerated through use of a weir. There were two gates in the weir, which were generally always open to allow for unrestricted fish passage. Underwater video equipment was used to count fish passing through the weir gates. At night, lights allowed fish to be counted. The number of fish passing the weir, by species, were counted for the first 10 minutes of each hour, then multiplied by six to obtain hourly escapement estimates. Hourly estimates were then summed to provide an estimate of daily fish passage. Video footage from each 10-minute escapement count was recorded and archived.

In addition to weir counts, salmon were enumerated using a dual-frequency identification sonar (DIDSON) unit from late May to mid June. A DIDSON unit was deployed in the Chignik River due to low water conditions that threatened the timely installation of the weir. The weir was completed on schedule, but soon after it was completed, the potential for a weir washout became evident as the extremely large snowpack began to melt. DIDSON was operated continuously from June 3 to June 13 to test the feasibility of its use in the event that the weir structure was compromised by high water. Initial findings of the use of DIDSON in the Chignik River can be found in Appendix C. The Chignik weir was not compromised by high water in 2010.

The majority of the Chignik River Chinook, sockeye, pink, and chum salmon escapements were counted through the weir. Since Dolly Varden *Salvelinus malma* were not commercially harvested or actively managed in the CMA, their escapements are noted in the tables of this document for historical comparisons, but not discussed in detail in the escapement section below. The first count of the 2010 season was on May 27, and the last full count of the season was on September 2, after which the weir was removed (Table 4). A post-weir sockeye salmon escapement estimate was produced using time series analysis and the results were grouped into two reporting periods: September 3 to 15 and September 16 to 30 (Appendix D). The 2010 coho salmon counts were still increasing when the weir was removed, precluding a postweir analysis. Therefore, the 2010 Chignik River coho salmon escapement total is considered incomplete.

Aerial surveys were flown over the spawning grounds of the Chignik River watershed to assess sockeye salmon spawning escapement levels and distribution. Escapements to other CMA streams were also estimated via aerial surveys.

Chinook Salmon

The Chignik River is the only stream with substantial Chinook salmon production within the CMA. Chinook salmon began entering the Chignik River during mid June. The run peaked by mid July, and was over by late August (Table 4; Figure 6). The 2010 Chignik River Chinook salmon escapement of 3,679 fish was above recent 5-year average escapements, but only slightly below recent 10- and 20-year average escapements (Table 5). The 2010 Chignik River Chinook salmon escapement exceeded the Chignik River Chinook BEG range of 1,300 to 2,700 fish (Figure 7; Witteveen et al. 2007). On July 30, the Division of Sport Fish liberalized Chinook salmon bag and possession limits to 5 fish per day over 20 inches and no annual harvest limit. Harvest estimates are not final, but it is not believed that these liberalized limits reduced the spawning escapement below the upper end of the BEG before the Chinook salmon sport fishery closed as scheduled on August 9.

Sockeye Salmon

Chignik River watershed sockeye salmon are managed based on interim escapement objectives, by run (Table 3, Witteveen et al. 2007). The Chignik River sockeye salmon early run peaked in mid to late June and the late run peaked during mid-July (Table 6; Figure 8). The 2010 estimated total Chignik River watershed sockeye salmon escapement was 743,826 fish, which was above the 5- and 10-year average escapement, but below the 20-year average escapement (Table 7). The early-run escapement was estimated at 432,535 sockeye salmon, which exceeded the early-run SEG range of 350,000 to 400,000 fish (Table 7; Figure 9). The late-run escapement was estimated at 311,291 sockeye salmon, which was within the late-run escapement objective range of 250,000 to 400,000 fish (Table 7; Figure 9). Since the weir was removed before the late run was complete, a postweir sockeye salmon escapement estimate was produced using time series analysis. These results were reported grouped into periods from September 3 to 15 (20,539 fish) and September 16 to 30 (6,491 fish) and included in the late-run total estimate of total escapement (Table 6; Appendix D).

Peak aerial survey counts of spawning sockeye salmon in Black Lake tributaries were below the 5-, 10-, and 20-year averages (Table 8). Total peak aerial survey counts of spawning sockeye salmon in the Chignik Lake tributaries were below the 5-, 10-, and 20-year averages (Table 9).

Sockeye salmon escapements were documented, via aerial survey, in low numbers (generally fewer than 1,000 fish) in several other CMA streams. Due to small run sizes and limited effort, escapement goals for these streams have not been established (Witteveen et al. 2007).

Coho Salmon

Coho salmon enter CMA drainages in mid August and generally continue through November. The 2010 Chignik River coho salmon escapement estimate through September 2 was 5,152 (Table 4), which was lower than the recent 5- and 10-year average escapements (Table 5). Coho salmon escapements were monitored, via aerial survey, in low numbers (generally fewer than 2,000 fish) in several other CMA streams.

Due to late season run timing and limited directed effort, escapement goals for coho salmon have not been established in the CMA (Witteveen et al. 2007).

Pink Salmon

In 2010, pink salmon began entering the Chignik River during mid July and peaked in mid August with a total escapement of 3,670 salmon (Table 4). The 2010 pink salmon escapement into the Chignik River was below the 5- and 10-year average escapements (Table 5).

Escapements into other CMA streams were monitored via aerial surveys. Aerial survey escapement estimates for all streams were summed and compared to the areawide even-year aggregate SEG for pink salmon. The 2010 overall combined escapement for the CMA was approximately 330,570 pink salmon, which was within the areawide aggregate even-year SEG range of 200,000 to 500,000 fish, but below the 5-, 10-, and 20-year average escapement estimates (Table 10).

Chum Salmon

A limited number of chum salmon return to the Chignik River, mainly in August (Table 4). The 2010 Chignik River chum salmon escapement was 95 fish, which was below recent 5- and 10-year average escapements (Table 5).

Escapements into other CMA streams were monitored via aerial surveys and compared to the areawide aggregate SEG for chum salmon (Witteveen et al. 2007). The total 2010 CMA chum salmon escapement of 177,220 fish was below the 5-, 10-, and 20-year estimated escapement averages, but above the lower bound SEG of 57,400 fish (Table 11).

Harvest Information

Commercial salmon harvest information for 2010 was organized into 4 categories. The first category included salmon that were commercially harvested but retained for private use (home pack). The second category included salmon that were harvested and sold as part of the department test fishery program. The third category included sockeye salmon commercially harvested within the CMA. The final category included sockeye salmon commercially harvested under the Cape Igvak and SEDM management plans; for allocative purposes, the Board of Fisheries has determined that specific portions of these harvests were considered bound for the Chignik River.

Salmon harvested under subsistence regulations or the department's Chignik Lagoon test fishery were not included in any of the current harvest allocations. Home pack fish were not included in the Cape Igvak and SEDM allocations. All harvest information in this report was calculated from the department fish ticket database and supersedes any previously published data. A complete summary of 2010 commercial salmon harvest and effort is found in Appendix E.

Chinook Salmon

A total of 10,380 Chinook salmon were harvested from the CMA in 2010, which was more than twice the recent 5-, 10-, and 20-year average Chinook salmon harvests (Table 12). Chinook salmon were not harvested during the department's test fishery program; 118 fish were retained as home pack (Table 13). Most of the CMA Chinook salmon harvest in 2010 came from the Western District (5,476 fish), but a substantial portion of the total harvest also occurred in the Chignik Bay and Central districts (1,564 and 2,420 fish respectively; Table 14). In 2010, Chinook salmon were primarily harvested from late June through the first week of August (Table 15).

Sockeye Salmon

A total of 1,379,785 sockeye salmon were harvested in the CMA during 2010, which was above the 5-, 10-, and 20-year average sockeye salmon harvests (Tables 12 and 16). The department's test fishery program harvested 6,545 of these salmon and a total of 973 fish were reported as retained for home pack (Table 16). The vast majority of the CMA sockeye salmon harvest in 2010 occurred in the Chignik Bay District (Table 17), and most sockeye salmon were harvested from mid June through the end of July (Table 18).

An additional 270,460 sockeye salmon allocatively considered Chignik-bound were harvested from June 1 to July 25 as part of the SEDM and Cape Igvak fisheries during 2010 (Table 16). The Chignik-bound component of the SEDM harvest was 85,267 fish and totaled 7.6 percent of the total Chignik-bound harvest (allocation 7.6 percent; Tables 16 and 19). The Chignik-bound portion of the Cape Igvak harvest was 185,193 fish and totaled 13.3 percent of the total Chignik-bound harvest (allocation 15.0 percent; Tables 16 and 19).

The 2010 Chignik River early-run harvest of 833,713 sockeye salmon was above the 5- and 10-year average harvests but below the 20-year average harvest (Table 20; Figure 10). The 2010 late-run harvest of 816,532 sockeye salmon was above 5-, 10-, and 20-year average harvests (Table 20; Figure 11). The 2010 total Chignik-bound commercial sockeye salmon harvest was 1,650,245 fish for a total run estimate (harvest + escapement) of 2,394,071 sockeye salmon (Table 20; Figure 12).

In 2010, both the early and late-run sockeye salmon runs were above the projected forecast. The early run was above by 10% and the late run was above the projected forecast by approximately 7% (Table 21).

Coho Salmon

A total of 159,198 coho salmon were harvested in the CMA during 2010, which was above the 5-, 10-, and 20-year average harvests (Tables 12 and 22). All coho salmon were sold to processors by fishermen (Table 22). The majority of the 2010 coho salmon harvest occurred in the Central and Western districts during July and August (Tables 23 and 24).

Pink Salmon

A total of 489,781 pink salmon were harvested during 2010, which was below the 5-, 10-, and 20-year average harvests (Tables 12 and 25). Nearly all commercially harvested pink salmon were sold to processors by fishermen (Table 25). The majority of pink salmon harvest occurred in the Western and Central districts (Table 26). Most pink salmon were harvested from mid July and mid August (Tables 27).

Chum Salmon

A total of 581,329 chum salmon were harvested from the CMA during the 2010 season, which was more than twice the 5-, 10-, and 20-year average harvests (Tables 12 and 28) and the highest harvest since accurate harvest records began in 1954. All chum salmon were sold to processors by fishermen (Table 28). The majority of the 2010 chum salmon harvest occurred in the Central, Eastern, and Western districts during late July and August (Tables 29 and 30).

Economic Value

From 2006 to 2009 only about half of the CMA's 91 purse seine permits were active. In 2010, 65 CMA permit holders (71% of CMA permits) made deliveries (Table 31). The exvessel value of the 2010 CMA salmon harvest was about $14.34 million, or approximately $220,559 per permit holder, which was above the prior 5-, 10-, and 20-year average exvessel values (Table 31; Figure 12). The vast majority (79%) of exvessel revenue was from the sale of sockeye salmon ($173,415 per active permit holder). The 2010 chum salmon harvest contributed a much larger proportion (12%) of the fishery value ($27,304 per permit holder) than in previous years, while, coho, pink, and Chinook salmon provided $8,711, $8,707, and $2,463, respectively, per active permit holder (Table 31).

CHIGNIK LAGOON TEST FISHERIES

The department conducts test fisheries in Chignik Lagoon for multiple purposes. Early-season test fisheries are used to determine buildup of salmon prior to the first commercial fishery, to collect sockeye salmon scale samples to determine age composition, and to generate revenue to pay for the vessels chartered to conduct the test fisheries. Subsequent test fisheries are conducted to assess salmon abundance in Chignik Lagoon during fishery closures, and offset the costs of operations at the Chignik weir (Anderson 2010).

The department conducted 3 test fisheries during 2010 for a total harvest of 6,545 salmon (Table 16). The first test fishery occurred on June 11, when 762 sockeye salmon were harvested. The second test fishery was conducted on June 13, when 898 sockeye salmon were harvested. The third test fishery was conducted on June 15, when 4,885 sockeye salmon were harvested.

CHIGNIK AREA SUBSISTENCE SALMON FISHERIES

In 2009, the department issued 95 subsistence fishing permits in the CMA. Based on the 82 permits returned to the ADF&G Division of Subsistence, the estimated subsistence harvest totaled 6,785 sockeye salmon. This harvest was lower than the previous 5- and 10-year average harvests (Table 32). Sockeye salmon comprised the majority of the 2009 subsistence harvest.

The 2010 Chignik Management Area subsistence harvest will not be available until after subsistence permits are returned and tabulated by the Division of Subsistence in spring 2011.

REFERENCES CITED

Anderson, T. J. 2010. Chignik Lagoon sockeye salmon test fishery operational plan, 2010. [*In*] Salmon operational plans for the Chignik area, 2010. Alaska Department of Fish and Game, Regional Information Report 4K10-01, Kodiak.

Bouwens, K. A. and H. Finkle. 2003a. Chignik watershed ecological assessment project season report, 2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K03-10, Kodiak.

Bouwens, K .A. and H. Finkle. 2003b. Chignik watershed ecological assessment project season report, 2002. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K03-58, Kodiak.

Finkle, H. 2005. Chignik watershed ecological assessment project season report, 2003. Alaska Department of Fish and Game, Fishery Management Report No. 05-20, Anchorage.

Finkle, H. 2006a. Chignik watershed ecological assessment project season report, 2004. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Management Report No. 06-16, Anchorage.

Finkle, H. 2006b. Chignik watershed ecological assessment project season report, 2005. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Management Report No. 06-54, Anchorage.

Finkle, H. and K. A. Bouwens. 2001. Chignik watershed ecological assessment project season report, 2000. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K01-51, Kodiak.

Johnson, B. A. and B. Barrett. 1988. Estimation of salmon escapement based on stream survey data: a geometric approach. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K88-35, Kodiak.

Nicholson, L., H. O'Neill, and L. Wright. 1980. 1980 Annual management report Chignik Management Area. Alaska Department of Fish and Game, Commercial Fisheries Division, Kodiak.

Stichert, M. A. 2007. 2005 Chignik Management Area annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 07-15, Anchorage.

Templin, W., L. Seeb, P. Crane, and J. Seeb. 1999. Genetic analysis of sockeye salmon populations from the Chignik watershed Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 5J99-08, Juneau.

Witteveen, M. J. and J. C. Botz. 2004. Chignik Lakes scale pattern analysis, run assignment, and sockeye salmon catch sampling results, 2004. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K04-30, Kodiak.

Witteveen, M. J., H. Finkle, P. A. Nelson, J. J. Hasbrouck, and I. Vining. 2005. Review of salmon escapement goals in the Chignik Management Area. Alaska Department of Fish and Game, Fishery Manuscript No. 05-06, Anchorage.

Witteveen, M. J., H. Finkle, J. J. Hasbrouck, and I. Vining. 2007. Review of salmon escapement goals in the Chignik Management Area 2007. Alaska Department of Fish and Game, Fishery Manuscript No. 07-09, Anchorage.

TABLES AND FIGURES

Table 1.–List of Chignik Management Area herring management units.

Area	Stat. Area(s)
Chignik Lagoon and Bay	271-10 to 272-40
Kujulik	272-50
Big River	272-60 to 272-70
Cape Kumlik	272-62 to 272-64
Yantarni	272-72 to 272-80
Chiginagak	272-90
Agripina	272-92 to 272-96
Mitrofania	273-70 to 273-74
Dorner Bay	273-82 to 273-84
Castle Cape	273-90 to 273-94
Perryville	275-60
Humpback Bay	275-50
Ivanof Bay	275-40

Table 2.–Chignik Management Area commercial herring harvest, 1980 through 2010.

Year	Harvest (tons)
1980	587
1981	441
1982	190
1983	88
1984	66
1985	0
1986	11
1987	75
1988	59
1989	66
1990	0
1991	0
1992	0
1993	0
1994	0
1995	77
1996	6
1997	0
1998	0
1999	0
2000	0
2001	0
2002	0
2003	0
2004	0
2005	0
2006	0
2007	0
2008	0
2009	0
2010	0

Table 3.–Chignik River sockeye salmon interim escapement objectives, 2010.

Date	Escapement Lower		Escapement Upper	Date	Escapement Lower		Escapement Upper
June 2	1,200	–	1,400	August 3	172,500	–	295,700
June 4	4,000	–	4,500	August 6	178,700	–	306,300
June 6	9,800	–	11,200	August 9	184,600	–	316,300
June 8	17,900	–	20,400	August 12	190,600	–	326,600
June 10	29,500	–	33,700	August 15	196,200	–	336,200
June 12	51,200	–	58,500	August 18	201,900	–	346,000
June 14	83,000	–	94,800	August 21	207,400	–	355,400
June 16	116,000	–	132,600	August 24	213,300	–	365,600
June 18	145,300	–	166,100	August 27	218,800	–	374,900
June 20	170,900	–	195,400	August 31	225,000	–	385,700
June 22	202,100	–	231,000				
June 25	248,900	–	284,600	September 3	228,000	–	391,100
June 28	282,900	–	323,300	September 5	231,000	–	393,000
July 1	323,600	–	369,900	September 7	235,000	–	395,000
July 4	350,000	–	400,000 [a]	September 9	239,000	–	396,800
				September 11	243,000	–	398,100
July 6	7,000	–	11,900	September 13	247,000	–	399,000
July 8	19,900	–	34,100	September 15	250,000	–	400,000
July 10	32,600	–	56,000				
July 12	44,400	–	76,100		**Escapement Objectives**		
July 14	58,900	–	101,000				
July 16	76,400	–	131,000	**Through July 4:**	**350,000**	**–**	**400,000**
July 19	96,600	–	165,700				
July 23	122,200	–	209,500	**July 5 - September 15:**	**250,000**	**–**	**400,000** [b]
July 26	141,800	–	243,100				
July 29	158,200	–	271,100				
July 31	165,500	–	283,700				

[a] July 4 is historically the date on which the cumulative inseason escapement most closely approximated the early-run escapement as estimated by postseason scale pattern analysis.

[b] The late-run escapement objective (July 5–September 15) includes the late-run sockeye salmon sustainable escapement goal (SEG; 200,000–400,000), plus an additional 50,000 sockeye salmon inriver run goal (25,000 in August and 25,000 in September) to meet late season subsistence needs.

Table 4.–Estimated Chignik River Chinook, coho, pink, and chum salmon, and Dolly Varden escapement, by day, 2010.

	Chinook		Coho		Pink		Chum		Dolly Varden	
Date	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative
5/27	0	0	0	0	0	0	0	0	0	0
5/28	0	0	0	0	0	0	0	0	21	21
5/29	0	0	0	0	0	0	0	0	12	33
5/30	0	0	0	0	0	0	0	0	12	45
5/31	0	0	0	0	0	0	0	0	0	45
6/1	0	0	0	0	0	0	0	0	6	51
6/2	0	0	0	0	0	0	0	0	6	57
6/3	0	0	0	0	0	0	0	0	0	57
6/4	0	0	0	0	0	0	0	0	0	57
6/5	0	0	0	0	0	0	0	0	0	57
6/6	0	0	0	0	0	0	0	0	0	57
6/7	0	0	0	0	0	0	0	0	2	59
6/8	0	0	0	0	0	0	0	0	0	59
6/9	0	0	0	0	0	0	0	0	2	61
6/10	0	0	0	0	0	0	0	0	42	103
6/11	0	0	0	0	0	0	0	0	0	103
6/12	0	0	0	0	0	0	0	0	1	104
6/13	0	0	0	0	0	0	0	0	1	105
6/14	0	0	0	0	0	0	0	0	0	105
6/15	0	0	0	0	0	0	0	0	0	105
6/16	0	0	0	0	0	0	0	0	0	105
6/17	6	6	0	0	0	0	0	0	0	105
6/18	0	6	0	0	0	0	0	0	0	105
6/19	0	6	0	0	0	0	0	0	0	105
6/20	0	6	0	0	0	0	0	0	0	105
6/21	12	18	0	0	0	0	0	0	3	108
6/22	6	24	0	0	0	0	0	0	0	108
6/23	6	30	0	0	0	0	0	0	1	109
6/24	0	30	0	0	0	0	0	0	0	109
6/25	0	30	0	0	0	0	0	0	0	109
6/26	1	31	0	0	0	0	0	0	1	110
6/27	0	31	0	0	0	0	0	0	0	110
6/28	24	55	0	0	0	0	0	0	54	164
6/29	6	61	0	0	0	0	0	0	48	212
6/30	0	61	0	0	0	0	0	0	6	218
7/1	12	73	0	0	6	6	0	0	36	254
7/2	84	157	0	0	0	6	0	0	30	284
7/3	48	205	0	0	0	6	0	0	6	290
7/4	42	247	0	0	0	6	0	0	144	434
7/5	72	319	0	0	0	6	0	0	258	692
7/6	36	355	0	0	0	6	0	0	234	926
7/7	108	463	0	0	0	6	0	0	372	1,298
7/8	36	499	0	0	0	6	0	0	91	1,389
7/9	96	595	0	0	6	12	0	0	192	1,581
7/10	204	799	0	0	30	42	0	0	3,384	4,965
7/11	96	895	0	0	0	42	0	0	1,422	6,387
7/12	330	1,225	0	0	24	66	0	0	1,060	7,447
7/13	174	1,399	0	0	6	72	0	0	102	7,549
7/14	138	1,537	0	0	0	72	0	0	564	8,113
7/15	198	1,735	0	0	6	78	0	0	288	8,401

-continued-

Table 4.–Page 2 of 2.

	Chinook		Coho		Pink		Chum		Dolly Varden	
Date	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative
7/16	24	1,759	0	0	18	96	0	0	330	8,731
7/17	82	1,841	0	0	6	102	0	0	109	8,840
7/18	103	1,944	0	0	0	102	0	0	39	8,879
7/19	58	2,002	0	0	0	102	0	0	8	8,887
7/20	168	2,170	0	0	42	144	12	12	1,110	9,997
7/21	234	2,404	0	0	54	198	0	12	1,592	11,589
7/22	205	2,609	0	0	12	210	6	18	669	12,258
7/23	78	2,687	0	0	0	210	1	19	449	12,707
7/24	72	2,759	0	0	48	258	0	19	145	12,852
7/25	174	2,933	0	0	78	336	0	19	1,650	14,502
7/26	132	3,065	0	0	30	366	1	20	898	15,400
7/27	76	3,141	0	0	67	433	6	26	156	15,556
7/28	66	3,207	0	0	54	487	7	33	438	15,994
7/29	36	3,243	0	0	30	517	0	33	214	16,208
7/30	85	3,328	0	0	108	625	0	33	270	16,478
7/31	30	3,358	0	0	24	649	0	33	147	16,625
8/1	24	3,382	0	0	24	673	0	33	49	16,674
8/2	24	3,406	0	0	12	685	0	33	43	16,717
8/3	6	3,412	0	0	25	710	0	33	142	16,859
8/4	30	3,442	0	0	24	734	0	33	124	16,983
8/5	12	3,454	0	0	42	776	0	33	31	17,014
8/6	0	3,454	0	0	12	788	12	45	37	17,051
8/7	25	3,479	0	0	77	865	0	45	115	17,166
8/8	18	3,497	0	0	134	999	1	46	31	17,197
8/9	18	3,515	0	0	211	1,210	0	46	91	17,288
8/10	18	3,533	6	6	132	1,342	6	52	84	17,372
8/11	6	3,539	12	18	135	1,477	0	52	42	17,414
8/12	0	3,539	30	48	168	1,645	12	64	48	17,462
8/13	0	3,539	12	60	9	1,654	0	64	6	17,468
8/14	12	3,551	12	72	346	2,000	1	65	6	17,474
8/15	18	3,569	30	102	471	2,471	12	77	14	17,488
8/16	12	3,581	66	168	264	2,735	6	83	54	17,542
8/17	18	3,599	54	222	96	2,831	6	89	24	17,566
8/18	24	3,623	6	228	103	2,934	0	89	12	17,578
8/19	6	3,629	18	246	78	3,012	0	89	0	17,578
8/20	0	3,629	6	252	12	3,024	0	89	0	17,578
8/21	0	3,629	6	258	12	3,036	0	89	0	17,578
8/22	0	3,629	53	311	12	3,048	0	89	0	17,578
8/23	0	3,629	90	401	24	3,072	0	89	0	17,578
8/24	18	3,647	86	487	42	3,114	0	89	0	17,578
8/25	2	3,649	159	646	158	3,272	0	89	0	17,578
8/26	12	3,661	229	875	72	3,344	0	89	0	17,578
8/27	0	3,661	308	1,183	144	3,488	0	89	0	17,578
8/28	0	3,661	311	1,494	36	3,524	0	89	0	17,578
8/29	0	3,661	209	1,703	78	3,602	0	89	0	17,578
8/30	18	3,679	420	2,123	20	3,622	0	89	0	17,578
8/31	0	3,679	578	2,701	48	3,670	0	89	0	17,578
9/1	0	3,679	780	3,481	0	3,670	6	95	0	17,578
9/2	0	3,679	1,671	5,152	0	3,670	0	95	0	17,578

Table 5.–Estimated Chignik River Chinook, coho, pink, and chum salmon, and Dolly Varden escapement, 1970 through 2010.

	Escapement [a]				
Year	Chinook [b]	Coho [c]	Pink [c]	Chum [c]	Dolly Varden [c]
1970	2,500	ND	ND	ND	ND
1971	2,000	ND	ND	ND	ND
1972	1,500	ND	ND	ND	ND
1973	822	ND	ND	ND	ND
1974	672	ND	ND	ND	ND
1975	877	ND	ND	ND	ND
1976	700	ND	ND	ND	ND
1977	798	ND	ND	ND	ND
1978	1,197	ND	ND	ND	ND
1979	1,050	ND	ND	ND	ND
1980	876	ND	ND	ND	ND
1981	1,603	ND	ND	ND	ND
1982	2,412	ND	ND	ND	ND
1983	1,943	ND	ND	ND	ND
1984	5,806	ND	ND	ND	ND
1985	3,144	ND	ND	ND	ND
1986	3,612	ND	ND	ND	ND
1987	2,624	ND	ND	ND	ND
1988	4,868	ND	ND	ND	ND
1989	3,316	ND	ND	ND	ND
1990	4,364	ND	ND	ND	ND
1991	4,531	ND	ND	ND	ND
1992	3,806	ND	ND	ND	ND
1993	1,946	ND	ND	ND	ND
1994	2,963	ND	ND	ND	ND
1995	4,288	ND	ND	ND	ND
1996	3,488	16,843	6,030	136	54,726
1997	3,824	10,810	4,880	483	26,657
1998	3,075	14,124	11,490	156	15,235
1999	3,728	2,414	2,524	48	15,025
2000	4,285	7,062	4,284	48	ND
2001	3,028	103	1,464	66	6,416
2002	3,541	9,262	3,417	67	8,179
2003	6,412	7,635	1,897	68	36,397
2004	7,840	18,810	2,243	276	20,086
2005	6,486	18,206	13,637	408	13,940
2006	3,535	37,113	18,401	99	2,031
2007	2,000	10,299	20,464	118	6,993
2008	1,730	13,958	22,341	124	14,776
2009	1,680	7,670	12,873	109	8,618
2010	3,679	5,152	3,670	95	17,578
Averages					
1991-10	3,793	-	-	-	-
2001-10	3,993	12,821	10,041	143	13,501
2006-10	2,525	14,838	15,550	109	9,999
2008-10	2,363	8,927	12,961	109	13,657

[a] A video monitoring system was installed at the Chignik weir in 1994.

[b] No escapement adjustments are made for Chinook salmon that spawn below the weir, or those removed by the sport fishery. Only Chinook salmon larger than approximately 650 mm were enumerated for escapement estimates from 1970 to 1993.

[c] No reliable escapement estimates were generated for pink, chum, or coho salmon or Dolly Varden from 1970 to 1996. No post-weir estimates are reported here for these species.

Table 6.–Estimated Chignik River sockeye salmon escapement, by day and management objective period, 2010.

Early Run			Late Run					
Through July 4			July 5-July 31			August		
Date	Daily	Total	Date	Daily	Total	Date	Daily	Total
5/27	0	0	7/5	9,821	9,821	8/1	2,349	2,349
5/28	6	6	7/6	2,229	12,050	8/2	1,343	3,692
5/29	60	66	7/7	4,679	16,729	8/3	1,314	5,006
5/30	10	76	7/8	2,696	19,425	8/4	2,616	7,622
5/31	36	112	7/9	1,573	20,998	8/5	2,785	10,407
6/1	221	333	7/10	20,653	41,651	8/6	493	10,900
6/2	166	499	7/11	21,677	63,328	8/7	2,304	13,204
6/3	114	613	7/12	16,611	79,939	8/8	1,576	14,780
6/4	340	953	7/13	5,941	85,880	8/9	3,498	18,278
6/5	874	1,827	7/14	5,120	91,000	8/10	4,683	22,961
6/6	1,173	3,000	7/15	2,954	93,954	8/11	1,667	24,628
6/7	1,879	4,879	7/16	2,160	96,114	8/12	2,373	27,001
6/8	3,024	7,903	7/17	500	96,614	8/13	649	27,650
6/9	4,874	12,777	7/18	1,131	97,745	8/14	3,038	30,688
6/10	8,748	21,525	7/19	697	98,442	8/15	6,627	37,315
6/11	13,520	35,045	7/20	21,130	119,572	8/16	2,622	39,937
6/12	11,934	46,979	7/21	17,315	136,887	8/17	3,501	43,438
6/13	9,657	56,636	7/22	8,688	145,575	8/18	2,955	46,393
6/14	23,319	79,955	7/23	2,896	148,471	8/19	4,265	50,658
6/15	33,657	113,612	7/24	3,766	152,237	8/20	2,632	53,290
6/16	20,215	133,827	7/25	4,769	157,006	8/21	2,142	55,432
6/17	29,709	163,536	7/26	6,068	163,074	8/22	2,953	58,385
6/18	18,361	181,897	7/27	8,055	171,129	8/23	2,767	61,152
6/19	18,345	200,242	7/28	10,638	181,767	8/24	2,510	63,662
6/20	24,043	224,285	7/29	8,066	189,833	8/25	2,658	66,320
6/21	6,474	230,759	7/30	6,751	196,584	8/26	1,707	68,027
6/22	6,398	237,157	7/31	4,129	200,713	8/27	2,941	70,968
6/23	8,254	245,411	**July 5-31 total:**		**200,713**	8/28	2,104	73,072
6/24	3,684	249,095				8/29	2,000	75,072
6/25	6,917	256,012				8/30	2,730	77,802
6/26	6,371	262,383				8/31	2,146	79,948
6/27	13,824	276,207				**August total:**		**79,948**
6/28	10,007	286,214						
6/29	12,384	298,598				**September**		
6/30	11,010	309,608				**Date**		**Total**
7/1	53,153	362,761				9/1	1,369	1,369
7/2	45,112	407,873				9/2[a]	2,231	3,600
7/3	20,027	427,900				9/3-9/15 estimate	20,539	24,139
7/4	4,635	432,535				9/16-9/30 estimate	6,491	30,630
May 27-July 4 total:		**432,535**						**30,630**
					Early run total:			**432,535**
					Late run total:			**311,291**
					Season total:			**743,826**

[a] The weir was removed after the completion of the 9/2 count.

Table 7.–Total Chignik River sockeye salmon escapement and escapement goals, based on postseason analysis, by run, 1980 through 2010.

Year	Early Run	Late Run	Total
1980	311,332	352,729	664,061
1981	438,540	392,909	831,449
1982	616,117	221,601	837,718
1983	426,177	409,458	835,635
1984	597,712	267,862	865,574
1985	376,576	369,262	745,838
1986	566,088	207,231	773,319
1987	589,291	214,452	803,743
1988	420,577	255,180	675,757
1989	384,004	557,171	941,175
1990	434,543	335,867	770,410
1991	672,871	367,227	1,040,098
1992	360,681	405,922	766,603
1993	364,261	333,116	697,377
1994	769,462	197,447	966,909
1995	366,163	373,757	739,920
1996	464,461	284,676	749,137
1997	396,667	378,951	775,618
1998	410,659	290,469	701,128
1999	457,429	258,537	715,966
2000	536,141	269,084	805,225
2001	744,013	392,905	1,136,918
2002	380,701	343,616	724,317
2003	350,004	334,119	684,123
2004	363,800	214,459	578,259
2005	355,091	225,366	580,457
2006	366,497	368,996	735,493
2007	361,091	293,883	654,974
2008	377,579	328,479	706,058
2009	391,476	328,586	720,062
2010	432,535	311,291	743,826
Year	Early Run	Late Run	Total
SEG	350,000-400,000	250,000-400,000	600,000-800,000
Averages			
1991-10	446,079	315,044	761,123
2001-10	412,279	314,170	726,449
2006-10	385,836	326,247	712,083
2008-10	400,530	322,785	723,315

Table 8.–Peak sockeye salmon aerial survey escapement estimates for Black Lake tributaries, 1960 through 2010.

Year	Fan Creek	Milk Creek	Boulevard Creek	Alec River	Conglomerate Creek	Broad Creek	Total
1960	38,500	8,000	40,000	30,000	3,000	30,000	149,500
1961	27,000	5,000	28,700	25,000	800	17,000	103,500
1962	18,000	7,000	13,000	60,000	200	15,000	113,200
1963	39,000	ND	36,000	85,000	1,000	61,000	222,000
1964	19,500	3,050	23,850	17,900	9,300	9,500	83,100
1967	20,000	1,000	9,000	156,000	10,000	10,000	206,000
1968	32,000	2,400	20,000	60,000	2,000	4,100	120,500
1969	103,000	2,100	33,000	50,000	4,000	5,000	197,100
1970	146,000	9,000	55,500	198,000	5,000	ND	413,500
1971	105,000	14,000	85,000	158,000	0	ND	362,000
1972	18,000	3,500	19,000	74,000	400	ND	114,900
1973	115,000	4,000	76,000	74,000	5,000	ND	274,000
1974	90,000	5,000	50,000	93,000	5,000	ND	243,000
1975	40,000	4,500	25,000	87,000	0	ND	156,500
1976	78,000	8,900	100,000	119,000	2,000	ND	307,900
1977	88,000	20,000	127,000	133,000	1,000	ND	369,000
1978	114,000	3,300	74,000	83,300	500	ND	275,100
1979	37,000	11,800	32,000	105,100	400	26,100	212,400
1980	127,000	16,000	75,000	70,500	1,500	68,000	358,000
1981	93,000	4,700	59,000	76,500	20,000	27,000	280,200
1982	50,000	5,500	60,000	43,000	20,000	32,000	210,500
1983	ND	ND	ND	ND	ND	ND	-
1984	50,000	22,200	70,000	30,500	31,000	36,000	239,700
1985	28,000	5,500	36,000	65,000	5,500	17,000	157,000
1986	60,000	15,300	47,000	76,000	39,000	27,000	264,300
1987	52,000	12,200	133,000	88,400	45,900	32,500	364,000
1988	54,000	71,000	83,700	106,500	2,300	26,500	344,000
1989	19,300	21,000	64,000	133,000	1,000	7,500	245,800
1990	32,600	7,400	35,900	49,800	2,200	18,000	145,900
1991	14,600	19,500	48,000	ND	2,000	13,000	97,100
1992	ND	ND	ND	392,000	ND	ND	392,000
1993	40,900	12,600	97,600	8,000	77,000	18,200	254,300
1994	70,000	25,000	125,000	350,000	20,000	51,000	641,000
1995	23,000	10,000	60,000	200,000	40,000	60,000	393,000
1996	40,000	24,000	51,000	100,000	50,000	45,000	310,000
1997	60,000	5,000	48,000	166,000	8,000	20,000	307,000
1998	90,000	14,000	100,000	50,000	9,000	62,000	325,000
1999	70,000	8,100	50,000	226,000	1,000	22,000	377,100
2000	41,000	29,000	126,000	210,000	26,000	93,000	525,000

-continued-

Table 8.–Page 2 of 2.

Year	Fan Creek	Milk Creek	Boulevard Creek	Alec River	Conglomerate Creek	Broad Creek	Total
2001	77,000	19,000	265,000	207,000	4,000	89,000	661,000
2002	43,000	ND	20,000	21,000	11,000	7,000	102,000
2003	17,600	400	2,500	188,000	ND	1,000	209,500
2004	4,290	1,490	15,560	137,700	200	ND	159,240
2005	4,300	ND	ND	ND	7,700	ND	12,000
2006	16,000	500	15,500	46,700	2,500	19,800	101,000
2007	40,200	8,800	23,600	199,000	4,000	1,000	276,600
2008	44,000	7,600	34,800	208,000	6,600	3,200	304,200
2009	34,500	11,500	40,500	182,500	5,000	2,100	276,100
2010	10,000	1,700	24,000	100,000	2,100	7,000	144,800
Averages							
1991-10	38,968	11,658	63,726	166,217	15,339	30,253	293,397
2001-10	29,089	6,374	49,051	143,322	4,789	16,263	224,644
2006-10	28,940	6,020	27,680	147,240	4,040	6,620	220,540
2008-10	29,500	6,933	33,100	163,500	4,567	4,100	241,700

Table 9.–Peak sockeye salmon aerial survey escapement estimates for Chignik Lake and Black River tributaries, 1960 through 2010.

	Black River				Chignik Lake			
Year	Bearskin Creek	West Fork	Chiaktuak Creek	Total	Clark River	Home Creek	Hatchery Beach	Total
1960	11,600	23,000	19,000	53,600	ND	ND	ND	-
1961	2,500	17,100	20,700	40,300	ND	ND	ND	-
1962	3,000	13,000	24,000	40,000	ND	ND	ND	-
1963	900	5,000	9,000	14,900	ND	ND	ND	-
1964	500	4,500	7,000	12,000	ND	ND	ND	-
1967	10,000	25,000	31,000	66,000	ND	ND	ND	-
1968	1,200	10,500	10,000	21,700	ND	ND	ND	-
1969	50	800	1,500	2,350	ND	ND	ND	-
1970	450	4,000	4,000	8,450	ND	ND	ND	-
1971	3,500	5,500	47,000	56,000	ND	ND	ND	-
1972	1,400	4,300	23,000	28,700	ND	ND	ND	-
1973	13	4,100	1,500	5,613	ND	ND	ND	-
1974	450	8,000	7,000	15,450	ND	ND	ND	-
1975	65	2,500	2,500	5,065	ND	ND	ND	-
1976	2,650	23,700	7,700	34,050	ND	ND	ND	-
1977	200	13,600	6,900	20,700	ND	ND	ND	-
1978	410	9,600	8,500	18,510	ND	ND	ND	-
1979	918	7,610	29,000	37,528	ND	ND	ND	-
1980	3,600	33,000	40,400	77,000	ND	ND	ND	-
1981	950	1,500	18,700	21,150	ND	ND	ND	-
1982	1,066	10,791	5,000	16,857	ND	ND	ND	-
1983	ND	ND	6,000	6,000	ND	ND	ND	-
1984	ND	ND	8,200	8,200	ND	ND	ND	-
1985	350	450	1,200	2,000	ND	ND	ND	-
1986	ND	ND	8,300	8,300	ND	ND	ND	-
1987	ND	ND	1,000	1,000	ND	ND	ND	-
1988	ND	ND	4,600	4,600	ND	ND	ND	-
1989	ND	ND	2,100	2,100	ND	ND	ND	-
1990	300	0	50	350	ND	ND	ND	-
1991	ND	ND	ND	-	ND	ND	ND	-
1992	ND	ND	ND	-	ND	ND	ND	-
1993	ND	ND	16,000	16,000	ND	ND	ND	-
1994	5,000	ND	31,000	36,000	18,000	9,200	ND	27,200
1995	7,100	18,000	31,000	56,100	13,000	6,000	150,000	169,000
1996	1,800	22,000	22,000	45,800	13,000	5,500	70,000	88,500
1997	9,000	9,000	23,500	41,500	25,000	8,000	35,000	68,000
1998	4,700	71,000	27,500	103,200	21,000	6,000	62,000	89,000
1999	8,300	17,500	13,000	38,800	8,500	1,620	15,000	25,120
2000	2,600	3,700	10,600	16,900	18,000	19,700	2,000	39,700

-continued-

Table 9.–Page 2 of 2.

	Black River				Chignik Lake			
Year	Bearskin Creek	West Fork	Chiaktuak Creek	Total	Clark River	Home Creek	Hatchery Beach	Total
2001	ND	ND	9,500	9,500	23,000	11,000	25,000	59,000
2002	ND	15,000	2,300	17,300	ND	ND	ND	-
2003	ND	ND	2,000	2,000	ND	ND	ND	-
2004	100	600	750	1,450	2,500	2,000	ND	4,500
2005	900	900	5,100	6,900	ND	ND	ND	-
2006	1,400	3,500	6,200	11,100	13,500	3,000	3,000	19,500
2007	400	14,500	30,300	45,200	59,000	9,800	65,000	133,800
2008	13,500	18,000	39,600	71,100	39,500	12,300	106,000	157,800
2009	600	11,100	21,800	33,500	13,000	3,500	ND	16,500
2010	1,700	3,500	5,800	11,000	7,600	0	31,000	38,600
Averages								
1991-10	4,079	14,879	16,553	31,297	19,614	6,973	51,273	66,873
2001-10	2,657	8,388	12,335	20,905	22,586	5,943	46,000	61,386
2006-10	3,520	10,120	20,740	34,380	26,520	5,720	51,250	73,240
2008-10	5,267	10,867	22,400	38,533	20,033	5,267	68,500	70,967

Table 10.–Estimated pink salmon escapement and objectives in the Chignik Management Area, by district and year, 1960 through 2010.

	District[b]					
Year[a]	Chignik Bay	Central	Eastern	Western	Perryville	Total
1960	ND	28,000	130,000	48,600	123,800	330,400
1961	ND	4,650	9,500	60,100	34,750	109,000
1962	30,000	83,900	401,700	242,000	155,500	913,100
1963	20,700	92,600	126,200	305,000	162,000	706,500
1964	20,000	131,100	605,700	165,000	72,000	993,800
1965	11,000	65,800	64,800	152,000	82,000	375,600
1966	71,300	62,600	302,200	179,300	90,000	705,400
1967	5,700	18,500	56,100	104,400	155,300	340,000
1968	81,400	66,100	390,300	151,300	128,700	817,800
1969	11,700	69,600	46,000	422,000	218,600	767,900
1970	43,600	60,700	201,700	202,000	72,600	580,600
1971	5,500	74,800	23,000	268,800	45,000	417,100
1972	5,800	3,100	15,900	8,600	7,800	41,200
1973	2,200	50,200	12,800	62,400	31,500	159,100
1974	4,000	9,800	76,200	77,400	60,200	227,600
1975	1,200	26,400	23,500	141,700	45,300	238,100
1976	12,300	66,000	228,800	114,200	89,300	510,600
1977	3,000	199,900	76,000	355,500	115,400	749,800
1978	10,700	101,200	309,300	333,400	157,500	912,100
1979	1,200	297,000	194,300	185,000	181,300	858,800
1980	3,000	99,400	425,500	139,500	74,800	742,200
1981	1,400	76,500	154,700	249,300	116,000	597,900
1982	2,400	26,100	301,500	45,900	13,400	389,300
1983	1,000	11,000	46,300	36,000	64,500	158,800
1984	123,200	94,000	486,500	188,000	109,800	1,001,500
1985	ND	7,400	212,100	67,500	235,200	522,200
1986	ND	121,900	580,700	43,800	180,500	926,900
1987	ND	65,700	215,600	38,300	65,700	385,300
1988	22,400	216,400	1,005,400	232,400	181,300	1,657,900
1989	13,500	215,000	881,000	57,900	267,400	1,434,800
1990	6,000	131,900	811,400	44,300	88,400	1,082,000
1991	12,200	201,100	125,000	96,800	343,500	778,600
1992	55,800	223,800	1,318,100	38,800	190,400	1,826,900
1993	2,000	160,900	524,700	45,800	448,400	1,181,800
1994	75,800	178,900	863,300	111,600	153,900	1,383,500
1995	180,500	715,500	1,399,300	554,700	582,100	3,432,100
1996	43,100	237,100	1,059,600	220,800	395,700	1,956,300
1997	59,400	594,600	1,287,700	306,300	221,500	2,469,500
1998	24,400	210,900	1,273,200	150,400	222,800	1,881,700
1999	37,300	374,300	615,100	137,900	179,700	1,344,300

-continued-

Table 10.–Page 2 of 2.

	District[b]					
Year[a]	Chignik Bay	Central	Eastern	Western	Perryville	Total
2000	27,400	146,100	810,700	130,100	98,700	1,213,000
2001	19,700	460,400	1,470,200	263,000	150,200	2,363,500
2002	16,917	85,755	777,710	85,501	62,170	1,028,053
2003	143,897	576,510	1,408,060	117,650	99,500	2,345,617
2004	27,300	257,000	601,900	94,340	134,320	1,114,860
2005	160,000	473,400	512,350	257,500	188,600	1,591,850
2006	27,401	36,175	195,950	31,800	83,500	374,826
2007	62,464	291,800	565,800	113,000	184,000	1,217,064
2008	69,841	117,650	402,880	99,460	173,200	863,031
2009	28,973	130,700	462,840	130,100	116,450	869,063
2010	8,020	52,650	228,500	22,000	19,400	330,570
Even Year SEG						200,000 to 600,000
Averages						
1991-10	54,121	276,262	795,145	150,378	202,402	1,478,307
2001-10	56,451	248,204	662,619	121,435	121,134	1,209,843
2006-10	39,340	125,795	371,194	79,272	115,310	730,911
2008-10	35,611	100,333	364,740	83,853	103,017	687,555
Even Year Averages						
1990-08	37,396	162,528	811,474	100,710	160,309	1,272,417
2000-08	33,772	128,536	557,828	88,240	110,378	918,754
2004-08	41,514	136,942	400,243	75,200	130,340	784,239

[a] From 1984 to 2003 aerial survey escapement estimates were computed by area-under-the-curve methods using a 15.0-day average stream life (Johnson and Barrett 1988). Starting in 2004, estimates were computed using peak counts (Witteveen et al. 2005).

[b] All estimates were via aerial survey, with the exception of Chignik River, which was included in the Chignik Bay District estimate.

Table 11.–Estimated chum salmon escapement and objectives in the Chignik Management Area, by district and year, 1970 through 2010.

	District[a]					
Year[b]	Chignik Bay	Central	Eastern	Western	Perryville	Total
1970	21,000	23,400	126,000	49,700	13,000	233,100
1971	7,100	29,100	219,200	184,100	30,000	469,500
1972	3,300	14,200	107,400	59,000	11,500	195,400
1973	700	12,200	59,100	35,600	9,300	116,900
1974	2,100	18,100	76,300	39,400	12,500	148,400
1975	2,100	18,800	41,300	43,400	20,500	126,100
1976	2,400	17,800	122,300	55,000	8,900	206,400
1977	2,000	9,300	54,500	70,400	15,400	151,600
1978	2,100	13,800	55,800	27,300	5,300	104,300
1979	1,600	44,800	79,500	42,500	12,800	181,200
1980	300	34,200	107,000	56,500	29,100	227,100
1981	500	26,100	126,000	70,300	19,300	242,200
1982	1,400	49,400	145,400	35,400	23,600	255,200
1983	100	17,000	50,200	20,100	8,200	95,600
1984	300	35,400	214,700	73,800	46,000	370,200
1985	0	9,600	4,900	34,600	12,900	62,000
1986	0	31,000	8,500	5,300	7,700	52,500
1987	100	17,500	38,300	19,700	9,800	85,400
1988	15,300	55,800	221,900	27,400	41,400	361,800
1989	4,200	34,700	74,300	7,400	15,900	136,500
1990	1,500	28,000	139,700	28,800	55,800	253,800
1991	0	18,000	70,400	38,100	343,200	469,700
1992	100	173,100	306,900	53,300	40,300	573,700
1993	300	39,400	135,200	14,000	66,800	255,700
1994	1,500	102,600	129,200	23,000	126,000	382,300
1995	10,300	44,500	112,800	45,700	134,600	347,900
1996	16,400	45,100	130,500	44,500	132,000	368,500
1997	18,500	65,700	290,000	60,500	152,800	587,500
1998	4,500	32,000	97,700	30,600	214,500	379,300
1999	2,300	32,400	167,100	16,300	117,300	335,400
2000	100	22,700	216,000	12,700	51,900	303,400
2001	4,100	36,500	406,900	35,500	67,800	550,800
2002	67	11,615	174,850	17,082	32,020	235,634
2003	899	43,191	152,854	39,050	64,331	300,325
2004	376	30,310	277,240	3,100	38,492	349,518
2005	30,000	159,100	36,350	22,000	61,250	308,700
2006	1,099	3,450	53,940	6,000	29,000	93,489
2007	6,118	25,200	58,000	26,500	122,280	238,098
2008	17,624	17,850	57,120	21,240	83,425	197,259

-continued-

Table 11.–Page 2 of 2.

	District[a]					
Year[b]	Chignik Bay	Central	Eastern	Western	Perryville	Total
2009	10,809	20,550	138,900	9,200	35,500	214,959
2010	1,095	17,000	60,525	19,400	79,200	177,220
Area Management Goal						57,400
Averages						
1991-10	6,309	47,013	153,624	26,889	99,635	333,470
2001-10	7,219	36,477	141,668	19,907	61,330	266,600
2006-10	7,349	16,810	73,697	16,468	69,881	184,205
2008-10	9,843	18,467	85,515	16,613	66,042	196,479

[a] From 1984 to 2003 aerial survey escapement estimates were computed by area-under-the-curve methods using a 15.0-day average stream life (Johnson and Barrett 1988). Starting in 2004, estimates were computed using peak counts (Witteveen et al. 2005).

[b] All estimates were via aerial survey, with the exception of Chignik River, which was included in the Chignik Bay District estimate.

Table 12.–Total commercial salmon harvests, including home pack and the department's test fishery harvests, from the Chignik Management Area by species and year, 1970 through 2010.

	Permits Making		Chignik Management Area Harvest					
Year	Deliveries	Landings	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	80	2,343	1,226	1,325,734	15,348	1,157,172	437,252	2,936,732
1971	77	2,383	2,010	1,016,136	14,557	612,290	353,952	1,998,945
1972	80	1,626	464	378,218	19,615	72,161	78,298	548,756
1973	80	2,187	525	870,354	22,322	25,472	8,717	927,390
1974	94	2,286	255	662,905	12,245	69,515	34,312	779,232
1975	86	1,844	549	399,593	53,283	66,165	25,161	544,751
1976	77	2,407	2,290	1,163,728	35,167	395,287	81,403	1,677,875
1977	88	2,426	710	1,972,207	17,430	604,806	110,452	2,705,605
1978	95	3,005	1,603	1,576,283	20,212	985,114	120,889	2,704,101
1979	103	3,009	1,253	1,049,691	99,129	1,905,198	188,907	3,244,178
1980	104	3,134	2,344	859,966	119,573	1,093,184	252,521	2,327,588
1981	105	4,222	2,694	1,839,469	78,805	1,162,613	580,332	3,663,913
1982	103	3,606	5,236	1,521,686	300,273	873,384	390,096	3,090,675
1983	102	4,357	5,488	1,824,175	61,927	321,178	159,412	2,372,180
1984	100	3,927	4,318	2,660,619	110,128	444,804	63,303	3,283,172
1985	107	3,392	1,887	921,502	191,162	160,128	22,805	1,297,484
1986	102	4,178	3,037	1,645,834	116,633	647,125	176,640	2,589,269
1987	104	3,856	2,651	1,898,838	150,414	246,775	127,261	2,425,939
1988	102	3,895	7,296	795,841	370,420	2,997,159	267,775	4,438,491
1989	101	3,183	3,542	1,159,287	68,233	27,712	1,624	1,260,398
1990	102	5,405	9,901	2,093,650	130,131	550,008	270,004	3,053,694
1991	103	3,856	3,157	1,895,665	165,625	1,169,248	261,096	3,494,791
1992	102	4,172	10,832	1,277,449	310,943	1,554,073	222,134	3,375,431
1993	103	4,241	19,515	1,697,351	229,459	1,648,377	122,360	3,717,062
1994	100	3,707	3,919	1,618,973	237,204	431,063	227,276	2,518,435
1995	101	5,113	5,493	1,724,045	281,518	2,057,998	380,954	4,450,008
1996	101	4,565	3,145	1,958,393	193,246	189,068	120,891	2,464,743
1997	100	3,394	3,120	770,347	90,908	844,431	155,905	1,864,711
1998	86	3,348	4,503	1,054,439	129,539	776,988	128,996	2,094,465
1999	91	4,382	3,507	3,116,527	89,610	1,698,651	140,597	5,048,892
2000	100	3,268	2,612	1,775,225	123,222	428,064	120,957	2,450,080
2001	93	2,906	2,939	1,511,587	131,448	1,281,767	199,003	3,126,744
2002	42	2,432	1,521	1,050,553	49,372	66,050	54,559	1,222,055
2003	44	2,073	3,068	1,100,297	103,896	502,638	64,044	1,773,943
2004	33	1,346	2,520	704,652	37	2,380	505	711,473
2005	97	1,669	3,408	1,152,133	6,956	194,045	8,821	1,365,363
2006	49	2,066	2,256	902,709	39,221	383,547	61,630	1,389,363
2007	56	2,101	1,773	834,547	73,277	2,019,748	78,553	3,007,898
2008	55	2,217	970	687,270	161,536	2,389,958	209,325	3,449,059
2009	56	2,172	3,319	1,198,105	110,373	1,408,339	256,425	2,976,561
2010	66	2,532	10,380	1,379,785	159,198	489,781	581,329	2,620,473
Averages								
1991-10	79	3,078	4,598	1,370,503	134,329	976,811	169,768	2,656,078
2001-10	59	2,151	3,215	1,052,164	83,531	873,825	151,419	2,164,293
2006-10	56	2,218	3,740	1,000,483	108,721	1,338,275	237,452	2,688,671
2008-10	59	2,307	4,890	1,088,387	143,702	1,429,359	349,026	3,015,364

Table 13.–Annual Chignik Management Area Chinook salmon harvest, 1970 through 2010.

	Test Fish		Commercial Catch		Home Pack		Total	
Year	Number	Pounds	Number	Pounds	Number	Pounds [a]	Number	Pounds
1970	ND	ND	1,226	28,507	ND	ND	1,226	28,507
1971	ND	ND	2,010	25,887	ND	ND	2,010	25,887
1972	ND	ND	464	8,091	ND	ND	464	8,091
1973	ND	ND	525	17,001	ND	ND	525	17,001
1974	ND	ND	255	5,997	ND	ND	255	5,997
1975	ND	ND	549	14,108	ND	ND	549	14,108
1976	ND	ND	2,290	29,229	ND	ND	2,290	29,229
1977	ND	ND	710	21,176	ND	ND	710	21,176
1978	ND	ND	1,603	42,439	ND	ND	1,603	42,439
1979	ND	ND	1,253	18,998	ND	ND	1,253	18,998
1980	ND	ND	2,344	32,255	ND	ND	2,344	32,255
1981	ND	ND	2,694	50,832	ND	ND	2,694	50,832
1982	ND	ND	5,236	59,753	ND	ND	5,236	59,753
1983	ND	ND	5,488	96,159	ND	ND	5,488	96,159
1984	ND	ND	4,318	99,567	ND	ND	4,318	99,567
1985	10	249	1,877	44,625	ND	ND	1,887	44,874
1986	ND	ND	3,037	66,772	ND	ND	3,037	66,772
1987	0	0	2,651	49,482	ND	ND	2,651	49,482
1988	0	0	7,296	128,880	ND	ND	7,296	128,880
1989	0	0	3,542	76,698	ND	ND	3,542	76,698
1990	0	0	9,901	134,265	ND	ND	9,901	134,265
1991	3	37	3,154	66,666	ND	ND	3,157	66,703
1992	2	8	10,830	138,082	ND	ND	10,832	138,090
1993	14	65	19,501	234,188	ND	ND	19,515	234,253
1994	16	245	3,903	71,620	ND	ND	3,919	71,865
1995	0	0	5,261	111,187	232	4,903	5,493	116,090
1996	0	0	3,105	62,603	40	806	3,145	63,409
1997	7	149	3,025	47,075	88	1,369	3,120	48,593
1998	21	450	4,374	66,080	108	1,632	4,503	68,162
1999	0	0	3,296	56,706	211	3,630	3,507	60,336
2000	0	0	2,592	34,757	20	268	2,612	35,025
2001	4	120	2,845	39,252	90	1,242	2,939	40,614
2002	3	25	1,441	13,725	77	733	1,521	14,483
2003	2	13	2,757	39,716	309	4,451	3,068	44,180
2004	4	57	2,337	43,652	179	3,343	2,520	47,052
2005	1	23	3,137	55,638	271	6,157	3,409	61,818
2006	1	21	2,187	38,015	68	1,536	2,256	39,572
2007	11	228	1,746	29,745	16	308	1,773	30,281
2008	0	0	955	14,463	15	227	970	14,690
2009	0	0	3,244	30,791	75	1,166	3,319	31,957
2010	0	0	10,262	102,684	118	1,708	10,380	104,392
Averages								
1991-10	4	72	4,498	64,832	120	2,092	4,598	66,578
2001-10	3	49	3,091	40,768	122	2,087	3,216	42,904
2006-10	2	50	3,679	43,140	58	989	3,740	44,178
2008-10	0	0	4,820	49,313	69	1,034	4,890	50,346

[a] Weights of home pack fish are not reported on fish tickets; therefore, they were calculated from the average weight of the commercial harvest.

Table 14.–Chignik Management Area Chinook salmon harvest (including home pack and the department's test fishery catches), by district and year, 1970 through 2010.

	District					
Year	Chignik Bay	Central	Eastern	Western	Perryville	Total
1970	867	5	55	230	69	1,226
1971	656	23	134	266	931	2,010
1972	226	0	24	72	142	464
1973	520	0	5	0	0	525
1974	200	27	0	28	0	255
1975	542	7	0	0	0	549
1976	2,135	15	3	60	77	2,290
1977	692	12	0	1	5	710
1978	1,386	49	19	130	19	1,603
1979	856	101	6	181	109	1,253
1980	929	148	169	739	359	2,344
1981	2,006	302	188	99	99	2,694
1982	3,269	41	38	1,354	534	5,236
1983	3,560	161	260	1,390	117	5,488
1984	3,696	63	72	487	0	4,318
1985	1,809	50	7	21	0	1,887
1986	2,592	58	14	350	23	3,037
1987	1,931	60	6	512	142	2,651
1988	4,331	1,094	190	1,216	465	7,296
1989	3,532	9	1	0	0	3,542
1990	3,719	2,175	175	3,190	642	9,901
1991	1,996	775	165	197	24	3,157
1992	3,181	2,010	181	4,300	1,160	10,832
1993	5,240	6,865	2,568	3,113	1,729	19,515
1994	1,808	1,303	43	452	313	3,919
1995	3,219	845	108	897	424	5,493
1996	1,590	1,022	263	162	108	3,145
1997	1,384	1,609	60	60	7	3,120
1998	1,805	1,798	79	567	254	4,503
1999	2,270	852	147	216	22	3,507
2000	598	530	53	1,421	10	2,612
2001	1,235	770	302	627	5	2,939
2002	920	17	0	584	0	1,521
2003	2,834	189	0	45	0	3,068
2004	2,520	0	0	0	0	2,520
2005	2,714	391	0	297	6	3,408
2006	2,009	165	3	79	0	2,256
2007	667	421	152	532	1	1,773
2008	219	195	16	503	37	970
2009	552	552	199	1,987	29	3,319
2010	1,564	2,420	834	5,476	86	10,380
Averages						
1991-10	1,916	1,136	259	1,076	211	4,598
2001-10	1,523	512	151	1,013	16	3,215
2006-10	1,002	751	241	1,715	31	3,740
2008-10	778	1,056	350	2,655	51	4,890

Table 15.–Chignik Management Area Chinook salmon harvest (including home pack and the department's test fishery catches), by district and day, 2010.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
6/11	0	Closed	Closed	Closed	Closed	Closed
6/12	Closed	Closed	Closed	Closed	Closed	Closed
6/13	0	Closed	Closed	Closed	Closed	Closed
6/14	Closed	Closed	Closed	Closed	Closed	Closed
6/15	0	Closed	Closed	Closed	Closed	Closed
6/16	0	0	0	0	Closed	0
6/17	5	11	0	0	Closed	16
6/18	2	9	0	4	Closed	15
6/19	12	17	3	0	Closed	32
6/20	4	9	16	0	Closed	29
6/21	10	26	8	0	Closed	44
6/22	7	4	27	0	Closed	38
6/23	4	19	34	9	Closed	66
6/24	8	9	0	24	Closed	41
6/25	2	16	6	0	Closed	24
6/26	6	0	0	0	Closed	6
6/27	2	7	12	0	Closed	21
6/28	Closed	Closed	Closed	Closed	Closed	0
6/29	Closed	Closed	Closed	Closed	Closed	0
6/30	Closed	Closed	Closed	Closed	Closed	0
7/1	Closed	Closed	Closed	Closed	Closed	0
7/2	106	14	0	0	Closed	120
7/3	35	12	27	0	Closed	74
7/4	83	36	10	0	Closed	129
7/5	128	18	45	0	Closed	191
7/6	82	85	13	0	Closed	180
7/7	66	26	179	0	Closed	271
7/8	65	93	17	15	Closed	190
7/9	47	0	0	0	Closed	47
7/10	Closed	Closed	Closed	Closed	Closed	0
7/11	40	2	0	81	0	123
7/12	118	225	0	594	0	937
7/13	128	9	42	31	14	224
7/14	70	66	24	1,234	0	1394
7/15	67	254	56	312	0	689
7/16	52	115	0	1,213	0	1380
7/17	84	57	13	231	0	385
7/18	6	42	2	257	0	307
7/19	Closed	Closed	Closed	Closed	Closed	0
7/20	Closed	Closed	Closed	Closed	Closed	0
7/21	32	7	0	29	0	68
7/22	20	36	0	158	0	214
7/23	27	10	52	182	0	271
7/24	17	30	48	348	0	443
7/25	39	23	6	3	0	71

-continued-

Table 15.–Page 2 of 2.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
7/26	Closed	Closed	Closed	Closed	Closed	0
7/27	Closed	Closed	Closed	Closed	Closed	0
7/28	Closed	Closed	Closed	Closed	Closed	0
7/29	10	7	17	37	0	71
7/30	14	11	0	27	2	54
7/31	10	61	9	53	1	134
8/1	21	69	Closed	66	5	161
8/2	35	57	Closed	87	0	179
8/3	26	11	Closed	46	Closed	83
8/4	10	37	Closed	50	Closed	97
8/5	3	61	Closed	42	Closed	106
8/6	4	82	Closed	Closed	Closed	86
8/7	9	124	Closed	1	0	134
8/8	4	24	Closed	71	0	99
8/9	2	6	Closed	12	0	20
8/10	5	46	Closed	28	0	79
8/11	8	126	Closed	42	Closed	176
8/12	4	266	Closed	Closed	Closed	270
8/13	3	36	0	1	0	40
8/14	1	0	0	0	0	1
8/15	0	3	0	0	0	3
8/16	5	0	0	32	0	37
8/17	1	0	1	16	0	18
8/18	5	0	1	62	0	68
8/19	2	7	0	3	0	12
8/20	0	54	129	2	0	185
8/21	2	19	0	0	0	21
8/22	1	26	37	0	0	64
8/23	1	0	0	0	0	1
8/24	2	0	0	0	0	2
8/25	0	0	0	0	0	0
8/26	2	0	0	60	0	62
8/27	0	0	0	0	0	0
8/28	0	0	0	7	0	7
8/29	0	0	0	6	9	15
8/30	0	0	0	0	0	0
8/31	0	0	0	0	18	18
9/1	0	0	0	0	0	0
9/2	0	0	0	0	28	28
9/3	0	0	0	0	9	9
9/4	0	0	0	0	0	0
9/5	0	0	0	0	0	0
9/6	0	0	0	0	0	0
9/7	0	0	0	0	0	0
Total	1,564	2,420	834	5,476	86	10,380

Table 16.–Total harvest of sockeye salmon considered by regulation to be Chignik-bound in the Chignik, Cape Igvak, and Southeastern District Mainland commercial salmon fisheries, 1970 through 2010.

	Testfish		Commercial Catch		Home Pack		Total CMA Harvest		Cape Igvak[a]		SEDM[b]		Total Chignik-Bound	
Year	Number	Pounds	Number	Pounds	Number	Pounds [c]	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
1970	ND	ND	1,325,734	9,210,127	ND	ND	1,325,734	9,210,127	ND	ND	ND	ND	1,325,734	9,210,127
1971	ND	ND	1,016,136	7,534,367	ND	ND	1,016,136	7,534,367	ND	ND	ND	ND	1,016,136	7,534,367
1972	ND	ND	378,218	2,863,742	ND	ND	378,218	2,863,742	ND	ND	ND	ND	378,218	2,863,742
1973	ND	ND	870,354	7,023,294	ND	ND	870,354	7,023,294	ND	ND	ND	ND	870,354	7,023,294
1974	ND	ND	662,905	4,756,653	ND	ND	662,905	4,756,653	ND	ND	ND	ND	662,905	4,756,653
1975	ND	ND	399,593	2,773,725	ND	ND	399,593	2,773,725	ND	ND	ND	ND	399,593	2,773,725
1976	ND	ND	1,163,728	8,562,989	ND	ND	1,163,728	8,562,989	ND	ND	ND	ND	1,163,728	8,562,989
1977	ND	ND	1,972,207	17,247,659	ND	ND	1,972,207	17,247,659	ND	ND	ND	ND	1,972,207	17,247,659
1978	ND	ND	1,576,283	12,451,982	ND	ND	1,576,283	12,451,982	225,078	1,583,809	ND	ND	1,801,361	14,035,791
1979	ND	ND	1,049,691	7,862,600	ND	ND	1,049,691	7,862,600	13,950	96,507	ND	ND	1,063,641	7,959,107
1980	ND	ND	859,966	5,795,098	ND	ND	859,966	5,795,098	32	147	63,724	442,601	923,722	6,237,846
1981	ND	ND	1,839,469	13,486,031	ND	ND	1,839,469	13,486,031	282,727	1,876,246	122,198	888,410	2,244,394	16,250,687
1982	ND	ND	1,521,686	11,340,439	ND	ND	1,521,686	11,340,439	166,756	1,162,053	62,789	463,729	1,751,231	12,966,221
1983	ND	ND	1,824,175	11,926,829	ND	ND	1,824,175	11,926,829	318,048	1,926,770	227,392	1,631,668	2,369,615	15,485,267
1984	ND	ND	2,660,619	18,536,287	ND	ND	2,660,619	18,536,287	449,372	2,820,646	423,292	3,053,430	3,533,283	24,410,363
1985	4,875	30,480	916,627	5,415,817	ND	ND	921,502	5,446,297	123,627	637,207	51,421	337,919	1,096,550	6,421,423
1986	ND	ND	1,645,834	11,254,860	ND	ND	1,645,834	11,254,860	188,017	1,153,092	118,006	841,446	1,951,857	13,249,398
1987	679	4,637	1,898,159	13,997,077	ND	ND	1,898,838	14,001,714	321,506	2,146,841	146,886	1,121,094	2,367,230	17,269,649
1988	3,425	24,287	792,416	5,690,165	ND	ND	795,841	5,714,452	10,520	63,641	19,320	140,708	825,681	5,918,801
1989	6,433	46,532	1,152,854	7,922,748	ND	ND	1,159,287	7,969,280	0	0	4,485	32,262	1,163,772	8,001,542
1990	5,522	33,915	2,088,128	13,775,854	ND	ND	2,093,650	13,809,769	107,706	665,309	117,065	783,670	2,318,421	15,258,748
1991	8,106	54,892	1,887,559	12,889,560	ND	ND	1,895,665	12,944,452	324,195	1,886,494	152,714	1,037,726	2,372,574	15,868,672
1992	12,423	80,326	1,265,026	8,292,576	ND	ND	1,277,449	8,372,902	150,434	896,108	93,845	608,765	1,521,728	9,877,775
1993	5,444	34,231	1,691,907	10,228,401	ND	ND	1,697,351	10,262,632	300,055	1,639,082	128,608	847,879	2,126,014	12,749,593
1994	9,139	54,433	1,609,834	10,091,402	ND	ND	1,618,973	10,145,835	250,230	1,423,150	142,350	934,493	2,011,553	12,503,478
1995	9,023	57,674	1,715,022	11,464,647	0	0	1,724,045	11,522,321	169,530	899,572	89,086	547,563	1,982,661	12,969,456
1996	4,317	36,511	1,954,036	14,866,234	40	304	1,958,393	14,903,049	308,327	1,954,430	127,201	884,305	2,393,921	17,741,784
1997	11,299	77,874	758,384	4,782,715	664	4,187	770,347	4,864,776	0	0	0	0	770,347	4,864,776
1998	12,374	66,040	1,041,798	6,372,010	267	1,633	1,054,439	6,439,683	8,813	39,133	66,893	408,902	1,130,145	6,887,718
1999	5,994	42,216	3,110,507	20,527,837	26	172	3,116,527	20,570,225	456,039	2,469,213	173,621	1,086,186	3,746,187	24,125,624
2000	11,604	88,790	1,763,621	13,577,434	0	0	1,775,225	13,666,224	271,344	1,703,875	103,419	737,462	2,149,988	16,107,561

-continued-

Table 16.–Page 2 of 2.

	Testfish		Commercial Catch		Home Pack		Total CMA Harvest		Cape Igvak[a]		SEDM[b]		Total Chignik-Bound	
Year	Number	Pounds	Number	Pounds	Number	Pounds [c]	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
2001[d]	14,011	98,197	1,497,359	10,972,234	217	1,590	1,511,587	11,072,021	215,214	1,287,154	51,141	368,970	1,777,942	12,728,145
2002	9,101	61,656	1,040,081	7,176,261	1,371	9,460	1,050,553	7,247,377	136,488	727,894	63,026	502,353	1,250,067	8,477,624
2003	5,582	36,334	1,092,304	7,137,591	2,411	15,755	1,100,297	7,189,680	121,887	599,342	70,044	466,153	1,292,228	8,255,175
2004	5,919	38,317	697,043	4,460,437	1,690	10,998	704,652	4,509,752	160,665	781,265	55,123	355,703	920,440	5,291,017
2005	7,076	43,988	1,143,693	7,468,609	1,364	8,702	1,152,133	7,521,299	274,328	1,681,630	170,662	1,088,207	1,597,123	10,291,136
2006	6,641	42,420	895,801	5,804,939	267	1,625	902,709	5,848,984	41,834	266,483	62,010	398,724	1,006,553	6,514,191
2007	5,152	38,112	829,110	5,769,736	285	1,346	834,547	5,809,194	52,527	325,619	0	0	887,074	6,134,813
2008	5,166	35,271	682,104	4,734,436	0	0	687,270	4,769,707	0	0	0	0	687,270	4,769,707
2009	1,687	12,833	1,196,325	8,248,669	93	631	1,198,105	8,262,133	126,968	811,617	48,322	314,210	1,373,395	9,387,960
2010	6,545	34,237	1,372,267	8,940,207	973	6,490	1,379,785	8,980,934	185,193	1,035,324	85,267	559,226	1,650,245	10,575,484
Averages														
1991-10	7,830	51,718	1,362,189	9,190,297	-	-	1,370,503	9,245,159	177,704	1,021,369	84,167	557,341	1,632,373	10,806,084
2001-10	6,688	44,137	1,044,609	7,071,312	867	5,660	1,052,164	7,121,108	131,510	751,633	60,560	405,355	1,244,234	8,242,525
2006-10	5,038	32,575	995,121	6,699,597	324	2,018	1,000,483	6,734,190	81,304	487,809	39,120	254,432	1,120,907	7,476,431
2008-10	4,466	27,447	1,083,565	7,307,771	355	2,374	1,088,387	7,337,591	104,054	615,647	44,530	291,145	1,236,970	8,244,384

[a] The Cape Igvak allocation began in 1978. From 1978 to 2002, 80% of the Cape Igvak sockeye salmon harvest was considered Chignik River-bound. Beginning in 2002, that percentage was changed to 90%.

[b] Beginning in 1980, 80% of the SEDM harvest in specific areas during specific times was considered Chignik River-bound.

[c] Weights of home pack are not reported on fish tickets; therefore, the weights were calculated from the average weight of the commercial harvest for that year.

[d] Due to a strike by Alaska Peninsula fishermen, foregone harvest of 27,896 sockeye salmon was added to the SEDM catch for management purposes; this foregone harvest is not included in this table.

Table 17.–Total annual Chignik Management Area sockeye salmon harvest (including home pack and the department's test fishery catches), by district, 1970 through 2010.

	District					
Year	Chignik Bay	Central	Eastern	Western	Perryville	Total
1970	1,122,993	10,252	187,210	3,751	1,528	1,325,734
1971	885,632	41,958	81,155	6,403	988	1,016,136
1972	354,912	2,429	15,985	4,734	158	378,218
1973	845,079	8,039	17,234	2	0	870,354
1974	539,196	120,412	199	3,098	0	662,905
1975	387,128	12,448	0	17	0	399,593
1976	1,112,533	48,327	1,254	425	1,189	1,163,728
1977	1,851,733	119,484	0	909	81	1,972,207
1978	1,474,673	89,826	7,161	4,482	141	1,576,283
1979	909,056	104,892	12,558	20,319	2,866	1,049,691
1980	708,828	74,628	60,947	9,227	6,336	859,966
1981	1,355,524	426,159	36,618	14,751	6,417	1,839,469
1982	1,413,806	66,278	10,209	30,279	1,114	1,521,686
1983	1,597,059	123,590	73,824	25,246	4,456	1,824,175
1984	1,942,822	517,653	184,495	15,470	179	2,660,619
1985	811,956	77,314	18,720	13,175	337	921,502
1986	1,389,172	182,884	6,424	44,362	22,992	1,645,834
1987	1,559,757	255,118	14,498	56,524	12,941	1,898,838
1988	529,540	124,103	25,699	93,070	23,429	795,841
1989	1,156,782	2,473	32	0	0	1,159,287
1990	1,400,069	566,601	51,443	53,192	22,345	2,093,650
1991	1,487,421	315,570	59,751	19,766	13,157	1,895,665
1992	792,889	332,860	12,327	30,004	109,369	1,277,449
1993	762,730	557,020	186,364	54,051	137,186	1,697,351
1994	908,042	573,484	20,041	64,325	53,081	1,618,973
1995	1,083,707	415,436	48,842	79,874	96,186	1,724,045
1996	1,003,683	743,658	145,668	47,529	17,855	1,958,393
1997	407,427	295,084	20,650	44,768	2,418	770,347
1998	622,005	286,643	30,555	87,940	27,296	1,054,439
1999	2,356,146	612,589	79,717	57,859	10,216	3,116,527
2000	1,327,249	358,985	71,572	15,034	2,385	1,775,225
2001	1,082,291	382,172	28,377	17,673	1,074	1,511,587
2002	993,756	44,368	2,835	9,425	169	1,050,553
2003	1,000,247	64,440	1,701	29,069	4,840	1,100,297
2004	704,471	181	0	0	0	704,652
2005	1,039,076	84,879	2	27,927	249	1,152,133
2006	726,749	103,272	3,118	69,570	0	902,709
2007	545,438	138,922	29,882	119,489	816	834,547
2008	527,026	83,111	2,279	68,257	6,597	687,270
2009	869,906	191,611	29,900	102,803	3,885	1,198,105
2010	846,823	371,090	102,587	56,736	2,549	1,379,785
Averages						
1991-10	954,354	297,769	43,808	50,105	24,466	1,370,503
2001-10	833,578	146,405	20,068	50,095	2,018	1,052,164
2006-10	703,188	177,601	33,553	83,371	2,769	1,000,483
2008-10	747,918	215,271	44,922	75,932	4,344	1,088,387

Table 18.–Chignik Management Area sockeye salmon harvest (including home pack and the department's test fishery catches), by district and day, 2010.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
6/11	762	Closed	Closed	Closed	Closed	762
6/12	Closed	Closed	Closed	Closed	Closed	0
6/13	898	Closed	Closed	Closed	Closed	898
6/14	Closed	Closed	Closed	Closed	Closed	0
6/15	4,885	Closed	Closed	Closed	Closed	4,885
6/16	3,152	0	0	0	Closed	3,152
6/17	28,470	10,163	0	0	Closed	38,633
6/18	31,157	20,239	2,580	2,715	Closed	56,691
6/19	38,255	12,336	1,226	0	Closed	51,817
6/20	32,999	10,042	4,723	0	Closed	47,764
6/21	31,510	15,086	8,689	0	Closed	55,285
6/22	19,181	12,579	12,087	0	Closed	43,847
6/23	25,255	31,666	7,945	1,419	Closed	66,285
6/24	29,697	3,698	3,334	2,358	Closed	39,087
6/25	25,768	15,948	1,230	887	Closed	43,833
6/26	23,901	2,000	0	0	Closed	25,901
6/27	8,041	10,272	3,919	0	Closed	22,232
6/28	Closed	Closed	Closed	Closed	Closed	0
6/29	Closed	Closed	Closed	Closed	Closed	0
6/30	Closed	Closed	Closed	Closed	Closed	0
7/1	Closed	Closed	Closed	Closed	Closed	0
7/2	41,642	22,904	0	0	Closed	64,546
7/3	20,260	14,428	5,663	0	Closed	40,351
7/4	22,978	13,830	2,613	0	Closed	39,421
7/5	21,813	3,856	4,456	0	Closed	30,125
7/6	18,571	22,008	3,597	0	Closed	44,176
7/7	18,011	10,148	17,767	0	Closed	45,926
7/8	20,443	17,859	1,760	242	Closed	40,304
7/9	7,204	0	0	0	Closed	7,204
7/10	Closed	Closed	Closed	Closed	Closed	0
7/11	19,108	1,036	0	1,069	0	21,213
7/12	25,792	19,663	0	1,876	0	47,331
7/13	18,492	1,251	3,243	3,177	328	26,491
7/14	19,762	6,596	2,430	4,300	0	33,088
7/15	24,980	4,537	7,634	2,274	0	39,425
7/16	18,715	8,038	0	3,490	0	30,243
7/17	17,571	11,559	1,310	2,852	0	33,292
7/18	4,045	6,386	746	757	0	11,934
7/19	Closed	Closed	Closed	Closed	Closed	0
7/20	Closed	Closed	Closed	Closed	Closed	0
7/21	8,549	437	0	337	0	9,323
7/22	10,100	2,579	0	6,306	0	18,985
7/23	8,172	4,409	1,761	3,592	128	18,062
7/24	9,977	6,102	682	1,676	0	18,437
7/25	5,751	3,481	1,372	134	0	10,738

-continued-

Table 18.–Page 2 of 2.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
7/26	Closed	Closed	Closed	Closed	Closed	0
7/27	Closed	Closed	Closed	Closed	Closed	0
7/28	Closed	Closed	Closed	Closed	Closed	0
7/29	11,563	3,961	57	2,397	0	17,978
7/30	11,342	3,440	1	1,264	49	16,096
7/31	5,424	3,263	1,002	1,414	417	11,520
8/1	7,927	2,855	Closed	3,907	626	15,315
8/2	5,832	6,004	Closed	1,747	135	13,718
8/3	4,616	2,092	Closed	75	Closed	6,783
8/4	5,359	3,513	Closed	126	Closed	8,998
8/5	5,478	1,151	Closed	251	Closed	6,880
8/6	3,918	2,194	Closed	Closed	Closed	6,112
8/7	5,930	1,875	Closed	36	0	7,841
8/8	5,767	413	Closed	599	0	6,779
8/9	3,161	520	Closed	156	0	3,837
8/10	4,583	1,598	Closed	279	0	6,460
8/11	4,315	4,816	Closed	53	Closed	9,184
8/12	4,307	2,948	Closed	Closed	Closed	7,255
8/13	2,925	573	0	31	0	3,529
8/14	2,651	0	0	0	0	2,651
8/15	4,078	404	161	0	0	4,643
8/16	4,800	60	0	965	0	5,825
8/17	3,575	0	44	346	0	3,965
8/18	5,897	0	0	284	0	6,181
8/19	10,782	450	0	400	0	11,632
8/20	6,616	1,224	317	291	0	8,448
8/21	5,285	1,769	0	446	0	7,500
8/22	5,455	813	238	0	0	6,506
8/23	4,225	0	0	0	0	4,225
8/24	3,662	0	0	77	0	3,739
8/25	4,093	18	0	0	0	4,111
8/26	5,438	0	0	1,910	0	7,348
8/27	4,232	0	0	0	0	4,232
8/28	4,166	0	0	144	0	4,310
8/29	3,090	0	0	56	85	3,231
8/30	2,634	0	0	0	0	2,634
8/31	1,683	0	0	0	452	2,135
9/1	1,667	0	0	0	0	1,667
9/2	734	0	0	21	314	1,069
9/3	1,032	0	0	0	15	1,047
9/4	1,402	0	0	0	0	1,402
9/5	1,312	0	0	0	0	1,312
9/6	0	0	0	0	0	0
9/7	0	0	0	0	0	0
Total	846,823	371,090	102,587	56,736	2,549	1,379,785

Table 19.–Harvest of sockeye salmon considered by regulation to be Chignik-bound in the Chignik, Cape Igvak, and Southeastern District Mainland commercial salmon fisheries from June 1 to July 25, 1978 through 2010.

	Chignik[a]		Cape Igvak[a]		Southeastern District Mainland[a]		
Year	Catch[b]	Percent	Catch[b]	Percent	Catch[c]	Percent	Total
1978	1,454,389	86.6	225,078	13.4	ND	ND	1,679,467
1979	794,504	98.3	13,950	1.7	ND	ND	808,454
1980	670,001	91.3	32	0.0	63,724	8.7	733,757
1981	1,606,300	79.9	282,727	14.1	122,198	6.1	2,011,225
1982	1,250,768	84.5	166,756	11.3	62,789	4.2	1,480,313
1983	1,450,832	72.7	318,048	15.9	227,392	11.4	1,996,272
1984	2,474,405	73.9	449,372	13.4	423,292	12.6	3,347,069
1985	690,698	79.8	123,627	14.3	51,421	5.9	865,746
1986	1,456,729	82.6	188,017	10.7	118,006	6.7	1,762,752
1987	1,659,236	78.0	321,506	15.1	146,886	6.9	2,127,628
1988	675,487	95.8	10,520	1.5	19,320	2.7	705,327
1989	496,044	99.1	0	0.0	4,485	0.9	500,529
1990	1,205,575	84.3	107,706	7.5	117,065	8.2	1,430,346
1991[d]	1,962,583	80.5	324,195	13.3	152,714	6.3	2,439,492
1992	1,054,309	81.2	150,434	11.6	93,845	7.2	1,298,588
1993	1,495,098	77.7	300,055	15.6	128,608	6.7	1,923,761
1994[e]	1,632,435	80.6	250,230	12.4	142,350	7.0	2,025,015
1995	1,024,785	79.8	169,530	13.2	89,086	6.9	1,283,401
1996	1,710,249	79.7	308,327	14.4	127,201	5.9	2,145,777
1997	443,892	100.0	0	0.0	0	0.0	443,892
1998[f]	786,466	91.2	8,813	1.0	66,893	7.8	862,172
1999	2,326,811	78.7	456,039	15.4	173,621	5.9	2,956,471
2000	1,509,652	80.1	271,344	14.4	103,419	5.5	1,884,415
2001[g]	1,134,991	79.4	215,214	15.1	79,037	5.5	1,429,242
2002	849,980	81.0	136,488	13.0	63,026	6.0	1,049,494
2003	855,179	81.7	121,887	11.6	70,044	6.7	1,047,110
2004	681,120	75.9	160,665	17.9	55,123	6.1	896,908
2005	1,098,718	70.8	274,328	17.7	177,906	11.5	1,550,952
2006	741,887	87.7	41,834	4.9	62,010	7.3	845,731
2007	601,213	92.0	52,527	8.0	0	0.0	653,740
2008	445,199	100.0	0	0.0	0	0.0	445,199
2009	871,890	83.3	126,968	12.1	48,322	5.5	1,047,180
2010	1,125,135	80.6	185,193	13.3	85,267	7.6	1,395,595
Averages							
1991-10	1,117,580	83.1	177,704	11.2	85,924	5.8	1,381,207
2001-10	840,531	83.2	131,510	11.4	64,074	5.6	1,036,115
2006-10	757,065	88.7	81,304	7.7	39,120	4.1	877,489
2008-10	814,075	88.0	104,054	8.5	44,530	4.4	962,658

-continued-

Table 19.–Page 2 of 2.

[a] Through 2001, the Cape Igvak and Southeastern District Mainland figures represent 80% of the total sockeye salmon catch for those areas through July 25, based on the regulations in effect during those years. In 2002 the BOF increased the percentage of sockeye salmon harvest considered Chignik-bound from 80% to 90% in the Cape Igvak fishery. The figures reported in this table are the portion of the catches considered Chignik-bound. These figures do not include Chignik test fishery harvests or fish retained for home pack as they are not included in the allocation scheme.

[b] Beginning in 1978 the *Cape Igvak Salmon Management Plan* allocated up to 15% of the total catch of Chignik-bound sockeye salmon to the Cape Igvak fishery.

[c] Beginning in 1985 the Southeastern District Mainland was allowed an allocation of 6.2% of the total harvest of Chignik-bound sockeye salmon through July 25. Certain areas (which changed frequently) were excluded from the allocation and managed for local (Orzinski Lake) stocks (see regulations from the individual years). After July 25 the entire Southeast District Mainland was managed based on local stock abundance. The allocation level changed to 6.0% beginning in 1988. Beginning in 1992, the allocation of Chignik-bound sockeye to the Southeastern District Mainland fishery was increased to 7.0%. Prior to the 1996 season, the BOF decreased the allocation from 7.0% to 6.0%. The allocation was increased from 6.0% to 7.6% prior to the 2007 season.

[d] Includes a foregone harvest of 278,305 sockeye salmon during a Chignik area strike (June 23 to July 4).

[e] Includes a foregone harvest of 208,921 sockeye salmon during a Chignik area strike (June 2 to June 25).

[f] Includes a foregone harvest of 52,131 sockeye salmon during a Chignik area strike (June 16 to June 29).

[g] Includes a foregone harvest of 389,887 sockeye salmon in Chignik during a Chignik area strike (June 16 to 29), and foregone harvest of 27,896 sockeye salmon in the SEDM during a strike on the South Peninsula (June 14 to July 2).

Table 20.–Chignik sockeye salmon escapement, total harvest considered Chignik-bound, and total run, 1970 through 2010.

	Early Run			Late Run			Total Run [a,b,c]		
Year	Esc.	Harvest	Run	Esc.	Harvest	Run	Esc.	Harvest	Run
1970	536,257	1,566,065	2,102,322	119,952	262,244	382,196	656,209	1,828,309	2,484,518
1971	671,668	555,832	1,227,500	232,501	709,190	941,691	904,169	1,265,022	2,169,191
1972	326,320	43,220	369,540	231,270	386,615	617,885	557,590	429,835	987,425
1973	533,047	610,488	1,143,535	249,144	355,195	604,339	782,191	965,683	1,747,874
1974	351,701	204,722	556,423	326,245	648,283	974,528	677,946	853,005	1,530,951
1975	308,914	7,873	316,787	268,734	417,560	686,294	577,648	425,433	1,003,081
1976	551,254	599,341	1,150,595	279,509	727,043	1,006,552	830,763	1,326,384	2,157,147
1977	482,247	534,198	1,016,445	251,753	1,602,363	1,854,116	734,000	2,136,561	2,870,561
1978	458,660	940,188	1,398,848	223,887	885,173	1,109,060	682,547	1,825,361	2,507,908
1979	385,694	186,537	572,231	352,122	933,788	1,285,910	737,816	1,120,325	1,858,141
1980	311,332	73,742	385,074	352,729	849,980	1,202,709	664,061	923,722	1,587,783
1981	438,540	800,364	1,238,904	392,909	1,444,030	1,836,939	831,449	2,244,394	3,075,843
1982	616,117	1,324,396	1,940,513	221,601	426,835	648,436	837,718	1,751,231	2,588,949
1983	426,177	1,128,246	1,554,423	409,458	1,241,369	1,650,827	835,635	2,369,615	3,205,250
1984	597,712	2,919,984	3,517,696	267,862	613,299	881,161	865,574	3,533,283	4,398,857
1985	376,576	654,431	1,031,007	369,262	442,119	811,381	745,838	1,096,550	1,842,388
1986	566,088	1,364,295	1,930,383	207,231	587,562	794,793	773,319	1,951,857	2,725,176
1987	589,291	1,947,088	2,536,379	214,452	420,142	634,594	803,743	2,367,230	3,170,973
1988	420,577	271,377	691,954	255,180	554,304	809,484	675,757	825,681	1,501,438
1989	384,004	234,237	618,241	557,171	929,535	1,486,706	941,175	1,163,772	2,104,947
1990	434,543	582,520	1,017,063	335,867	1,735,901	2,071,768	770,410	2,318,421	3,088,831
1991	657,511	1,711,549	2,384,420	382,587	661,025	1,028,252	1,040,098	2,372,574	3,412,672
1992	360,681	744,417	1,105,098	405,922	777,311	1,183,233	766,603	1,521,728	2,288,331
1993	364,261	926,892	1,291,153	333,116	1,199,122	1,532,238	697,377	2,126,014	2,823,391
1994	769,462	1,595,176	2,364,638	197,447	416,377	613,824	966,909	2,011,553	2,978,462
1995	366,163	666,799	1,032,962	373,757	1,315,862	1,689,619	739,920	1,982,661	2,722,581
1996	464,461	1,688,264	2,152,725	284,676	705,657	990,333	749,137	2,393,921	3,143,058
1997	396,667	234,824	631,491	378,951	535,523	914,474	775,618	770,347	1,545,965
1998	410,659	313,158	723,817	290,469	816,987	1,107,456	701,128	1,130,145	1,831,273
1999	457,429	2,022,272	2,479,701	258,537	1,723,915	1,982,452	715,966	3,746,187	4,462,153
2000	536,141	1,574,391	2,110,532	269,084	575,597	844,681	805,225	2,149,988	2,955,213
2001	744,013	563,539	1,307,552	392,905	1,214,403	1,607,308	1,136,918	1,777,942	2,914,860
2002	380,701	684,728	1,065,428	343,616	565,339	908,955	724,317	1,250,067	1,974,383
2003	350,004	640,084	990,088	334,119	652,144	986,263	684,123	1,292,228	1,976,351
2004	363,800	727,975	1,091,775	214,459	192,465	406,924	578,259	920,440	1,498,700
2005	355,091	1,109,881	1,464,972	225,366	487,242	712,608	580,457	1,597,123	2,177,580
2006	366,497	436,028	802,525	368,996	570,525	939,521	735,493	1,006,553	1,742,046
2007	361,091	267,805	628,896	293,883	619,269	913,152	654,974	887,074	1,542,048
2008	377,579	253,490	631,069	328,479	433,780	762,259	706,058	687,270	1,393,328
2009	391,476	520,630	912,106	328,586	852,765	1,181,351	720,062	1,373,395	2,093,457
2010	432,535	833,713	1,266,248	311,291	816,532	1,127,823	743,826	1,650,245	2,394,071
Averages									
1991-10	445,311	875,781	1,321,860	315,812	756,592	1,071,636	761,123	1,632,373	2,393,496
2001-10	412,279	603,787	1,016,066	314,170	640,446	954,616	726,449	1,244,234	1,970,682
2006-10	385,836	462,333	848,169	326,247	658,574	984,821	712,083	1,120,907	1,832,990
2008-10	400,530	535,944	936,474	322,785	701,026	1,023,811	723,315	1,236,970	1,960,285

[a] Includes Cape Igvak and SEDM harvests considered Chignik-bound as defined in regulation. However, portions of the harvests from Cape Igvak and SEDM from 1970 to 1979 were not considered Chignik-bound by regulation, but were included in this table for comparison purposes.

[b] Does not include subsistence-caught fish.

[c] Includes harvests from the Chignik Lagoon test fishery and fish retained for home pack.

Table 21.–Chignik sockeye salmon forecasts and actual runs, by run and year, 1994 through 2010, in millions of fish.

	Early Run			Late Run			Total Run		
Year	Forecast	Actual	% Error	Forecast	Actual	% Error	Forecast	Actual	% Error
1994	1.80	2.36	-23.88	1.30	0.61	111.79	3.10	2.98	4.08
1995	1.90	1.03	83.88	0.90	1.69	-46.72	2.80	2.72	2.84
1996	1.40	2.15	-34.97	1.60	0.99	61.61	3.00	3.14	-4.55
1997	1.00	0.63	58.44	1.60	0.91	75.03	2.60	1.55	68.25
1998	0.90	0.72	24.36	1.10	1.11	-0.66	2.00	1.83	9.23
1999	1.05	2.48	-57.66	1.29	1.98	-34.93	2.34	4.46	-47.56
2000	3.90	2.11	84.66	1.09	0.84	29.04	4.99	2.96	68.77
2001	1.00	1.31	-23.49	0.91	1.61	-43.38	1.91	2.91	-34.46
2002	1.03	1.06	-3.24	1.09	0.91	19.85	2.12	1.97	7.40
2003	1.64	0.99	65.62	1.19	1.00	19.00	2.83	1.99	42.20
2004	1.26	1.09	15.60	1.08	0.41	163.41	2.34	1.50	56.00
2005	1.84	1.46	26.03	0.55	0.71	-22.54	2.39	2.17	10.14
2006	1.21	0.78	55.13	0.28	0.96	-70.83	1.49	1.74	-14.37
2007	1.02	0.60	71.14	0.90	0.95	-5.24	1.92	1.55	24.21
2008	1.07	0.60	78.33	0.65	0.79	-17.97	1.72	1.39	23.60
2009	0.85	0.87	-2.30	0.54	1.23	-56.10	1.39	2.10	-33.81
2010	1.08	1.20	-10.00	1.11	1.19	-6.72	2.19	2.39	-8.37
Averages									
2001-10	1.20	1.00	27.28	0.83	0.98	-2.05	2.03	1.97	7.25
2006-10	1.05	0.81	38.46	0.70	1.02	-31.37	1.74	1.83	-1.75
2008-10	1.00	0.89	22.01	0.77	1.07	-26.93	1.77	1.96	-6.19

Table 22.–Chignik Management Area coho salmon harvest, by year, 1970 through 2010.

	Testfish		Commercial Catch		Home Pack		Total	
Year	Number	Pounds	Number	Pounds	Number	Pounds[a]	Number	Pounds
1970	ND	ND	15,348	103,879	ND	ND	15,348	103,879
1971	ND	ND	14,557	96,832	ND	ND	14,557	96,832
1972	ND	ND	19,615	138,345	ND	ND	19,615	138,345
1973	ND	ND	22,322	172,190	ND	ND	22,322	172,190
1974	ND	ND	12,245	97,037	ND	ND	12,245	97,037
1975	ND	ND	53,283	467,912	ND	ND	53,283	467,912
1976	ND	ND	35,167	294,954	ND	ND	35,167	294,954
1977	ND	ND	17,430	156,418	ND	ND	17,430	156,418
1978	ND	ND	20,212	158,270	ND	ND	20,212	158,270
1979	ND	ND	99,129	725,035	ND	ND	99,129	725,035
1980	ND	ND	119,573	771,392	ND	ND	119,573	771,392
1981	ND	ND	78,805	602,603	ND	ND	78,805	602,603
1982	ND	ND	300,273	2,373,268	ND	ND	300,273	2,373,268
1983	ND	ND	61,927	488,203	ND	ND	61,927	488,203
1984	ND	ND	110,128	949,965	ND	ND	110,128	949,965
1985	0	0	191,162	1,709,637	ND	ND	191,162	1,709,637
1986	ND	ND	116,633	867,195	ND	ND	116,633	867,195
1987	0	0	150,414	1,189,803	ND	ND	150,414	1,189,803
1988	0	0	370,420	2,889,427	ND	ND	370,420	2,889,427
1989	0	0	68,233	559,140	ND	ND	68,233	559,140
1990	0	0	130,131	933,745	ND	ND	130,131	933,745
1991	42	253	165,583	1,182,704	ND	ND	165,625	1,182,957
1992	1	8	310,942	2,362,683	ND	ND	310,943	2,362,691
1993	356	2,024	229,103	1,459,220	ND	ND	229,459	1,461,244
1994	103	506	237,101	1,996,320	ND	ND	237,204	1,996,826
1995	0	0	280,605	2,062,086	913	6,709	281,518	2,068,795
1996	0	0	193,226	1,485,947	20	154	193,246	1,486,101
1997	0	0	90,908	756,509	0	0	90,908	756,509
1998	0	0	129,512	1,045,823	27	218	129,539	1,046,041
1999	0	0	89,410	617,320	200	1,381	89,610	618,701
2000	0	0	123,222	943,536	0	0	123,222	943,536
2001	0	0	131,441	1,012,153	7	54	131,448	1,012,207
2002	0	0	49,208	360,781	164	1,202	49,372	361,983
2003	44	287	103,778	857,097	74	611	103,896	857,995
2004	0	0	37	283	0	0	37	283
2005	0	0	6,951	46,970	5	30	6,956	47,000
2006	0	0	39,046	290,720	175	1,312	39,221	292,032
2007	0	0	73,221	543,761	56	416	73,277	544,177
2008	0	0	161,536	1,290,277	0	0	161,536	1,290,277
2009	0	0	110,373	732,346	0	0	110,373	732,346
2010	0	0	159,198	1,137,878	0	0	159,198	1,137,878
Averages								
1991-10	27	154	134,220	1,009,221	103	755	134,329	1,009,979
2001-10	4	29	83,479	627,227	48	363	83,531	627,618
2006-10	0	0	108,675	798,996	46	346	108,721	799,342
2008-10	0	0	143,702	1,053,500	0	0	143,702	1,053,500

[a] Weights of home pack fish are not reported on fish tickets; therefore, the weights were calculated from the average weight of the commercial harvest for that year.

Table 23.–Chignik Management Area coho salmon harvest (including home pack and the department's test fishery catches), by district and year, 1970 through 2010.

	District					
Year	Chignik Bay	Central	Eastern	Western	Perryville	Total
1970	4,578	62	399	9,745	564	15,348
1971	10,928	62	301	2,297	969	14,557
1972	17,692	2	160	1,579	182	19,615
1973	22,304	6	12	0	0	22,322
1974	11,056	414	0	775	0	12,245
1975	52,407	260	0	0	616	53,283
1976	34,426	173	109	32	427	35,167
1977	16,810	189	7	378	46	17,430
1978	14,467	24	21	3,848	1,852	20,212
1979	52,966	3,556	3,869	31,300	7,438	99,129
1980	49,784	7,167	13,872	34,631	14,119	119,573
1981	35,578	8,693	6,222	22,047	6,265	78,805
1982	132,262	6,564	31,476	122,707	7,264	300,273
1983	29,519	330	441	27,173	4,464	61,927
1984	72,722	1,705	403	33,263	2,035	110,128
1985	156,553	7,111	3,203	23,357	938	191,162
1986	60,197	3,027	1,033	33,726	18,650	116,633
1987	77,333	3,806	7	58,688	10,580	150,414
1988	94,292	21,628	6,167	207,086	41,247	370,420
1989	68,231	2	0	0	0	68,233
1990	61,260	27,659	32	23,422	17,758	130,131
1991	56,574	9,294	1,187	57,373	41,197	165,625
1992	80,946	19,612	4,260	140,560	65,565	310,943
1993	48,808	36,421	4,240	84,056	55,934	229,459
1994	70,541	19,794	176	110,476	36,217	237,204
1995	54,646	46,975	458	88,116	91,323	281,518
1996	45,361	35,440	33	91,587	20,825	193,246
1997	32,847	45,878	1,801	9,139	1,243	90,908
1998	23,070	32,743	1,227	55,359	17,140	129,539
1999	23,144	24,308	3,095	36,405	2,658	89,610
2000	11,620	37,943	2,555	69,599	1,505	123,222
2001	10,007	31,062	2,303	86,580	1,496	131,448
2002	8,461	4,442	0	36,283	186	49,372
2003	37,800	7,632	0	55,225	3,239	103,896
2004	37	0	0	0	0	37
2005	510	730	12	5,045	659	6,956
2006	7,057	2,170	1	29,993	0	39,221
2007	11,790	12,830	420	47,525	712	73,277
2008	46,400	7,647	1,052	97,153	9,284	161,536
2009	9,570	13,276	2,888	80,395	4,244	110,373
2010	17,469	27,982	3,109	104,886	5,752	159,198
Averages						
1991-10	29,833	20,809	1,441	64,288	17,959	134,329
2001-10	14,910	10,777	979	54,309	2,557	83,531
2006-10	18,457	12,781	1,494	71,990	3,998	108,721
2008-10	24,480	16,302	2,350	94,145	6,427	143,702

Table 24.–Chignik Management Area coho salmon harvest (including home pack and the department's test fishery catches), by district and day, 2010.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
6/11	0	Closed	Closed	Closed	Closed	Closed
6/12	Closed	Closed	Closed	Closed	Closed	Closed
6/13	0	Closed	Closed	Closed	Closed	Closed
6/14	Closed	Closed	Closed	Closed	Closed	Closed
6/15	0	Closed	Closed	Closed	Closed	Closed
6/16	0	0	0	0	Closed	0
6/17	0	0	0	0	Closed	0
6/18	0	0	0	0	Closed	0
6/19	0	0	0	0	Closed	0
6/20	1	0	0	0	Closed	1
6/21	0	0	0	0	Closed	0
6/22	0	0	0	0	Closed	0
6/23	0	0	0	0	Closed	0
6/24	0	0	0	1	Closed	1
6/25	0	0	0	0	Closed	0
6/26	0	0	0	0	Closed	0
6/27	0	0	0	0	Closed	0
6/28	Closed	Closed	Closed	Closed	Closed	0
6/29	Closed	Closed	Closed	Closed	Closed	0
6/30	Closed	Closed	Closed	Closed	Closed	0
7/1	Closed	Closed	Closed	Closed	Closed	0
7/2	0	4	0	0	Closed	4
7/3	0	0	2	0	Closed	2
7/4	3	84	6	0	Closed	93
7/5	1	0	0	0	Closed	1
7/6	1	120	24	0	Closed	145
7/7	0	24	204	0	Closed	228
7/8	2	458	32	36	Closed	528
7/9	2	0	0	0	Closed	2
7/10	Closed	Closed	Closed	Closed	Closed	0
7/11	3	0	0	670	0	673
7/12	31	1,040	0	2,354	0	3,425
7/13	2	95	267	3,815	979	5,158
7/14	281	427	370	5,899	0	6,977
7/15	50	927	455	1,741	0	3,173
7/16	18	732	0	3,107	0	3,857
7/17	2	347	528	2,596	0	3,473
7/18	1	212	23	2,565	0	2,801
7/19	Closed	Closed	Closed	Closed	Closed	0
7/20	Closed	Closed	Closed	Closed	Closed	0
7/21	16	8	0	2,838	0	2,862
7/22	14	322	0	9,399	0	9,735
7/23	121	390	118	5,859	58	6,546
7/24	256	470	161	7,159	0	8,046
7/25	65	232	17	360	0	674

-continued-

Table 24.–Page 2 of 2.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
7/26	Closed	Closed	Closed	Closed	Closed	0
7/27	Closed	Closed	Closed	Closed	Closed	0
7/28	Closed	Closed	Closed	Closed	Closed	0
7/29	9	224	4	2,422	0	2,659
7/30	3	465	0	4,251	28	4,747
7/31	71	2,436	218	5,052	581	8,358
8/1	12	1,893	Closed	8,811	574	11,290
8/2	88	1,096	Closed	4,093	111	5,388
8/3	161	732	Closed	294	Closed	1,187
8/4	17	2,247	Closed	384	Closed	2,648
8/5	494	1,172	Closed	1,271	Closed	2,937
8/6	6	1,094	Closed	Closed	Closed	1,100
8/7	13	952	Closed	327	0	1,292
8/8	23	711	Closed	4,021	0	4,755
8/9	15	93	Closed	2,532	0	2,640
8/10	40	564	Closed	2,917	0	3,521
8/11	50	3,341	Closed	607	Closed	3,998
8/12	51	3,240	Closed	Closed	Closed	3,291
8/13	55	132	0	106	0	293
8/14	10	0	0	0	0	10
8/15	8	257	157	0	0	422
8/16	99	334	0	3,697	0	4,130
8/17	20	0	132	3,522	0	3,674
8/18	134	0	0	1,000	0	1,134
8/19	109	74	0	1,602	0	1,785
8/20	148	346	293	1,136	0	1,923
8/21	112	405	0	3,503	0	4,020
8/22	125	216	98	0	0	439
8/23	162	0	0	0	0	162
8/24	263	0	0	538	0	801
8/25	339	66	0	0	0	405
8/26	507	0	0	2,313	0	2,820
8/27	602	0	0	0	0	602
8/28	831	0	0	1,834	0	2,665
8/29	1,007	0	0	203	304	1,514
8/30	1,253	0	0	0	0	1,253
8/31	1,196	0	0	0	1,122	2,318
9/1	2,185	0	0	0	0	2,185
9/2	1,232	0	0	51	1,848	3,131
9/3	2,026	0	0	0	147	2,173
9/4	1,787	0	0	0	0	1,787
9/5	1,336	0	0	0	0	1,336
9/6	0	0	0	0	0	0
9/7	0	0	0	0	0	0
Total	17,469	27,982	3,109	104,886	5,752	159,198

Table 25.–Chignik Management Area pink salmon harvest, by year, 1970 through 2010.

	Testfish		Commercial Catch		Home Pack		Total	
Year	Number	Pounds	Number	Pounds	Number	Pounds[a]	Number	Pounds
1970	ND	ND	1,157,172	4,104,927	ND	ND	1,157,172	4,104,927
1971	ND	ND	612,290	2,291,832	ND	ND	612,290	2,291,832
1972	ND	ND	72,161	278,778	ND	ND	72,161	278,778
1973	ND	ND	25,444	104,457	ND	ND	25,444	104,457
1974	ND	ND	69,515	290,712	ND	ND	69,515	290,712
1975	ND	ND	66,165	260,631	ND	ND	66,165	260,631
1976	ND	ND	395,287	1,749,923	ND	ND	395,287	1,749,923
1977	ND	ND	604,806	2,435,862	ND	ND	604,806	2,435,862
1978	ND	ND	985,114	3,454,877	ND	ND	985,114	3,454,877
1979	ND	ND	1,905,198	7,154,954	ND	ND	1,905,198	7,154,954
1980	ND	ND	1,093,184	3,635,145	ND	ND	1,093,184	3,635,145
1981	ND	ND	1,162,613	4,479,368	ND	ND	1,162,613	4,479,368
1982	ND	ND	873,384	2,916,671	ND	ND	873,384	2,916,671
1983	ND	ND	321,178	1,200,888	ND	ND	321,178	1,200,888
1984	ND	ND	444,804	1,651,249	ND	ND	444,804	1,651,249
1985	0	0	160,128	643,731	ND	ND	160,128	643,731
1986	ND	ND	647,125	2,374,311	ND	ND	647,125	2,374,311
1987	0	0	246,775	899,560	ND	ND	246,775	899,560
1988	0	0	2,997,159	10,723,505	ND	ND	2,997,159	10,723,505
1989	0	0	27,712	94,269	ND	ND	27,712	94,269
1990	0	0	550,008	1,675,644	ND	ND	550,008	1,675,644
1991	2,660	9,237	1,166,588	3,348,394	ND	ND	1,169,248	3,357,631
1992	114	536	1,553,959	5,798,623	ND	ND	1,554,073	5,799,159
1993	1,826	5,539	1,646,551	5,308,258	ND	ND	1,648,377	5,313,797
1994	14	55	431,049	1,494,604	ND	ND	431,063	1,494,659
1995	0	0	2,057,998	7,350,386	0	0	2,057,998	7,350,386
1996	0	0	183,806	536,218	5,262	15,351	189,068	551,569
1997	0	0	844,431	2,784,333	0	0	844,431	2,784,333
1998	0	0	776,988	2,586,026	0	0	776,988	2,586,026
1999	0	0	1,698,651	4,845,435	0	0	1,698,651	4,845,435
2000	0	0	428,064	1,183,004	0	0	428,064	1,183,004
2001	0	0	1,281,760	4,077,814	7	22	1,281,767	4,077,836
2002	66	276	65,984	206,385	0	0	66,050	206,661
2003	570	2,167	501,661	1,951,928	407	1,584	502,638	1,955,679
2004	0	0	2,380	7,589	0	0	2,380	7,589
2005	8	48	193,803	611,023	234	813	194,045	611,884
2006	0	0	383,574	1,403,428	0	0	383,574	1,403,428
2007	0	0	2,019,748	7,388,012	0	0	2,019,748	7,388,012
2008	0	0	2,389,958	8,192,350	0	0	2,389,958	8,192,350
2009	0	0	1,408,339	4,502,661	0	0	1,408,339	4,502,661
2010	0	0	489,774	1,663,961	7	24	489,781	1,663,985
Averages								
1991-10	263	893	976,253	3,262,022	370	1,112	976,812	3,263,804
2001-10	64	249	873,698	3,000,515	66	244	873,828	3,001,008
2006-10	0	0	1,338,279	4,630,082	1	5	1,338,280	4,630,087
2008-10	0	0	1,429,357	4,786,324	2	8	1,429,359	4,786,332

[a] Weights of home pack fish are not reported on fish tickets; therefore, they were calculated from the average weight of the commercial harvest.

Table 26.–Chignik Management Area pink salmon harvest (including home pack and the department's test fishery catches), by district and year, 1970 through 2010.

	District					
Year	Chignik Bay	Central	Eastern	Western	Perryville	Total
1970	46,297	27,919	268,857	442,684	371,415	1,157,172
1971	65,281	20,518	28,959	285,447	212,085	612,290
1972	31,606	766	12,928	14,880	11,981	72,161
1973	22,674	293	2,477	28	0	25,472
1974	33,484	22,084	568	13,379	0	69,515
1975	27,377	31,342	0	7,446	0	66,165
1976	108,827	16,583	28,828	135,803	105,246	395,287
1977	60,932	120,018	239	379,038	44,579	604,806
1978	137,074	61,224	86,778	419,280	280,758	985,114
1979	312,406	284,414	292,364	744,613	271,401	1,905,198
1980	180,912	108,682	472,510	216,460	114,620	1,093,184
1981	121,380	210,023	173,293	433,605	224,312	1,162,613
1982	82,973	80,606	89,074	602,408	18,323	873,384
1983	27,284	7,861	7,817	164,338	113,878	321,178
1984	165,178	47,250	57,715	173,820	841	444,804
1985	14,429	16,087	6,570	80,577	42,465	160,128
1986	191,264	44,127	49,635	200,793	161,306	647,125
1987	13,887	7,769	2,079	187,701	35,339	246,775
1988	119,794	318,370	1,006,366	1,141,382	411,247	2,997,159
1989	27,691	21	0	0	0	27,712
1990	94,528	233,677	40,574	135,810	45,419	550,008
1991	76,163	173,967	27,979	419,264	471,875	1,169,248
1992	178,105	205,750	183,119	628,900	358,199	1,554,073
1993	55,909	205,037	52,755	685,605	649,071	1,648,377
1994	59,425	99,149	12,952	174,641	84,896	431,063
1995	106,939	469,745	8,572	791,718	681,024	2,057,998
1996	1,804	20,717	7,201	100,871	58,475	189,068
1997	39,461	603,575	72,347	118,003	11,045	844,431
1998	26,054	233,732	66,725	343,187	107,290	776,988
1999	59,001	664,208	40,571	771,411	163,460	1,698,651
2000	28,067	271,417	10,500	106,147	11,933	428,064
2001	75,142	641,438	97,438	424,537	43,212	1,281,767
2002	10,253	17,580	0	36,918	1,299	66,050
2003	56,042	88,736	267	326,239	31,354	502,638
2004	2,378	2	0	0	0	2,380
2005	71,438	99,491	21	20,952	2,143	194,045
2006	62,419	79,726	79,465	161,964	0	383,574
2007	187,670	612,921	43,379	1,152,331	23,447	2,019,748
2008	232,444	369,298	416,520	1,062,482	309,214	2,389,958
2009	77,569	317,085	275,791	711,890	26,004	1,408,339
2010	30,683	183,008	43,264	225,716	7,110	489,781
Averages						
1991-10	71,848	267,829	71,943	413,139	152,053	976,812
2001-10	80,604	240,929	95,615	412,303	44,378	873,828
2006-10	118,157	312,408	171,684	662,877	73,155	1,338,280
2008-10	113,565	289,797	245,192	666,696	114,109	1,429,359

Table 27.–Chignik Management Area pink salmon harvest (including home pack and the department's test fishery catches), by district and day, 2010.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
6/11	0	Closed	Closed	Closed	Closed	0
6/12	Closed	Closed	Closed	Closed	Closed	0
6/13	0	Closed	Closed	Closed	Closed	0
6/14	Closed	Closed	Closed	Closed	Closed	0
6/15	0	Closed	Closed	Closed	Closed	0
6/16	0	0	0	0	Closed	0
6/17	5	147	0	0	Closed	152
6/18	1	355	96	1,727	Closed	2,179
6/19	2	95	0	0	Closed	97
6/20	4	128	449	0	Closed	581
6/21	1	982	426	0	Closed	1,409
6/22	0	286	1,299	0	Closed	1,585
6/23	0	774	501	719	Closed	1,994
6/24	33	287	523	1,234	Closed	2,077
6/25	1	1,597	420	35	Closed	2,053
6/26	8	205	0	0	Closed	213
6/27	0	400	648	0	Closed	1,048
6/28	Closed	Closed	Closed	Closed	Closed	0
6/29	Closed	Closed	Closed	Closed	Closed	0
6/30	Closed	Closed	Closed	Closed	Closed	0
7/1	Closed	Closed	Closed	Closed	Closed	0
7/2	5	806	0	0	Closed	811
7/3	50	1,229	1,105	0	Closed	2,384
7/4	56	2,377	61	0	Closed	2,494
7/5	4	204	422	0	Closed	630
7/6	18	1,108	702	0	Closed	1,828
7/7	151	458	2,084	0	Closed	2,693
7/8	74	1,678	604	115	Closed	2,471
7/9	2	0	0	0	Closed	2
7/10	Closed	Closed	Closed	Closed	Closed	0
7/11	29	54	0	919	0	1,002
7/12	48	5,604	0	2,876	0	8,528
7/13	42	338	2,291	4,094	706	7,471
7/14	424	2,694	1,800	6,966	0	11,884
7/15	113	3,233	2,813	2,421	0	8,580
7/16	287	4,468	0	3,752	0	8,507
7/17	277	4,771	1,595	3,075	0	9,718
7/18	67	3,345	350	3,487	0	7,249
7/19	Closed	Closed	Closed	Closed	Closed	0
7/20	Closed	Closed	Closed	Closed	Closed	0
7/21	973	416	0	2,634	0	4,023
7/22	572	3,170	0	15,870	0	19,612
7/23	1,011	6,039	5,994	10,975	331	24,350
7/24	2,434	8,716	3,435	13,118	0	27,703
7/25	1,067	4,231	2,995	1,343	0	9,636

-continued-

Table 27.–Page 2 of 2.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
7/26	Closed	Closed	Closed	Closed	Closed	0
7/27	Closed	Closed	Closed	Closed	Closed	0
7/28	Closed	Closed	Closed	Closed	Closed	0
7/29	1,324	6,862	3,286	16,452	0	27,924
7/30	1,285	6,114	228	15,452	88	23,167
7/31	1,469	17,218	4,410	16,546	1,620	41,263
8/1	942	13,949	Closed	29,392	2,514	46,797
8/2	1,217	13,443	Closed	14,935	856	30,451
8/3	865	7,609	Closed	873	Closed	9,347
8/4	762	11,910	Closed	1,834	Closed	14,506
8/5	2,704	7,129	Closed	5,870	Closed	15,703
8/6	492	4,675	Closed	Closed	Closed	5,167
8/7	536	5,064	Closed	1,388	0	6,988
8/8	636	1,634	Closed	8,266	0	10,536
8/9	415	893	Closed	5,297	0	6,605
8/10	502	2,012	Closed	6,362	0	8,876
8/11	584	10,821	Closed	1,503	Closed	12,908
8/12	488	8,939	Closed	Closed	Closed	9,427
8/13	350	646	0	829	0	1,825
8/14	218	0	0	0	0	218
8/15	439	646	981	0	0	2,066
8/16	787	505	0	7,051	0	8,343
8/17	515	0	165	3,792	0	4,472
8/18	867	0	1,301	2,452	0	4,620
8/19	986	530	0	3,086	0	4,602
8/20	556	633	1,496	3,064	0	5,749
8/21	653	1,045	0	2,693	0	4,391
8/22	458	455	251	0	0	1,164
8/23	314	0	533	0	0	847
8/24	312	0	0	513	0	825
8/25	241	81	0	0	0	322
8/26	372	0	0	1,592	0	1,964
8/27	361	0	0	0	0	361
8/28	564	0	0	951	0	1,515
8/29	210	0	0	163	245	618
8/30	158	0	0	0	0	158
8/31	113	0	0	0	314	427
9/1	78	0	0	0	0	78
9/2	34	0	0	0	426	460
9/3	44	0	0	0	10	54
9/4	40	0	0	0	0	40
9/5	33	0	0	0	0	33
9/6	0	0	0	0	0	0
9/7	0	0	0	0	0	0
Total	30,683	183,008	43,264	225,716	7,110	489,781

Table 28.–Chignik Management Area chum salmon harvest, by year, 1970 through 2010.

	Testfish		Commercial Catch		Home Pack		Total	
Year	Number	Pounds	Number	Pounds	Number	Pounds [a]	Number	Pounds
1970	ND	ND	437,252	3,004,113	ND	ND	437,252	3,004,113
1971	ND	ND	353,952	2,420,446	ND	ND	353,952	2,420,446
1972	ND	ND	78,298	603,726	ND	ND	78,298	603,726
1973	ND	ND	8,701	67,812	ND	ND	8,701	67,812
1974	ND	ND	34,312	246,288	ND	ND	34,312	246,288
1975	ND	ND	25,161	176,046	ND	ND	25,161	176,046
1976	ND	ND	81,403	678,545	ND	ND	81,403	678,545
1977	ND	ND	110,452	937,365	ND	ND	110,452	937,365
1978	ND	ND	120,889	984,141	ND	ND	120,889	984,141
1979	ND	ND	188,907	1,378,938	ND	ND	188,907	1,378,938
1980	ND	ND	252,521	1,765,287	ND	ND	252,521	1,765,287
1981	ND	ND	580,332	4,502,632	ND	ND	580,332	4,502,632
1982	ND	ND	390,096	3,231,403	ND	ND	390,096	3,231,403
1983	ND	ND	159,412	1,205,266	ND	ND	159,412	1,205,266
1984	ND	ND	63,303	485,967	ND	ND	63,303	485,967
1985	0	0	22,805	145,276	ND	ND	22,805	145,276
1986	ND	ND	176,640	1,304,418	ND	ND	176,640	1,304,418
1987	0	0	127,261	943,941	ND	ND	127,261	943,941
1988	0	0	267,775	2,196,377	ND	ND	267,775	2,196,377
1989	0	0	1,624	11,888	ND	ND	1,624	11,888
1990	0	0	270,004	1,757,019	ND	ND	270,004	1,757,019
1991	607	4,260	260,489	1,671,939	ND	ND	261,096	1,676,199
1992	16	140	222,118	1,592,186	ND	ND	222,134	1,592,326
1993	57	300	122,303	735,747	ND	ND	122,360	736,047
1994	521	3,437	226,755	1,627,574	ND	ND	227,276	1,631,011
1995	0	0	380,949	2,814,987	5	37	380,949	2,815,024
1996	0	0	99,791	779,840	21,100	164,891	120,891	944,731
1997	0	0	155,905	1,196,999	0	0	155,905	1,196,999
1998	0	0	128,841	917,648	155	1,104	128,996	918,752
1999	0	0	140,594	1,064,433	3	0	140,597	1,064,433
2000	0	0	120,957	1,033,665	0	0	120,957	1,033,665
2001	0	0	198,874	1,609,533	129	1,044	199,003	1,610,577
2002	46	334	54,513	406,382	0	0	54,559	406,716
2003	137	1,394	63,907	447,921	0	0	64,044	449,315
2004	0	0	2,380	7,589	0	0	2,380	7,589
2005	2	15	8,704	63,379	115	825	8,821	64,219
2006	0	0	61,630	450,686	0	0	61,630	450,686
2007	0	0	78,552	648,355	1	8	78,553	648,363
2008	0	0	209,325	1,726,108	0	0	209,325	1,726,108
2009	0	0	256,424	1,922,522	1	9	256,425	1,922,531
2010	0	0	581,329	4,437,042	0	0	581,329	4,437,042
Averages								
1991-10	69	494	168,717	1,257,727	1,344	10,495	169,862	1,266,617
2001-10	19	174	151,564	1,171,952	25	189	151,607	1,172,315
2006-10	0	0	237,452	1,836,943	0	3	237,452	1,836,946
2008-10	0	0	349,026	2,695,224	0	3	349,026	2,695,227

[a] Weights of home pack fish are not reported on fish tickets; therefore, they were calculated from the average weight of the commercial harvest.

Table 29.–Chignik Management Area chum salmon harvest (including home pack and the department's test fishery catches), by district and year, 1970 through 2010.

	District					
Year	Chignik Bay	Central	Eastern	Western	Perryville	Total
1970	1,660	28,628	241,108	139,551	26,305	437,252
1971	19,449	13,723	102,344	177,534	40,902	353,952
1972	18,178	1,566	27,723	18,535	12,296	78,298
1973	7,254	229	1,218	16	0	8,717
1974	17,317	13,516	255	3,224	0	34,312
1975	21,137	3,225	0	799	0	25,161
1976	19,237	3,358	10,020	33,051	15,737	81,403
1977	8,621	8,888	1,507	88,027	3,409	110,452
1978	15,020	10,317	17,451	45,991	32,110	120,889
1979	32,176	11,427	36,090	82,326	26,888	188,907
1980	19,944	38,902	56,805	91,868	45,002	252,521
1981	38,061	160,730	108,668	221,579	51,294	580,332
1982	16,034	33,669	64,513	253,299	22,581	390,096
1983	16,747	9,815	8,250	101,959	22,641	159,412
1984	8,173	8,150	21,134	25,364	482	63,303
1985	4,905	5,242	864	10,704	1,090	22,805
1986	18,167	29,502	17,880	74,070	37,021	176,640
1987	5,163	9,437	8,890	86,898	16,873	127,261
1988	7,013	39,316	77,511	102,730	41,205	267,775
1989	1,587	34	3	0	0	1,624
1990	11,460	113,741	27,463	91,603	25,737	270,004
1991	17,545	51,429	4,925	98,603	88,594	261,096
1992	12,711	45,569	61,209	65,466	37,179	222,134
1993	8,116	43,306	21,157	25,045	24,736	122,360
1994	25,250	69,552	4,333	94,116	34,025	227,276
1995	14,588	107,066	8,074	158,273	92,953	380,954
1996	782	46,993	19,837	36,303	16,976	120,891
1997	20,978	104,259	11,397	16,280	2,991	155,905
1998	7,352	43,191	5,180	41,425	31,848	128,996
1999	12,150	75,495	11,332	37,089	4,531	140,597
2000	8,389	66,904	8,045	34,823	2,796	120,957
2001	11,534	84,132	50,911	37,466	14,960	199,003
2002	3,949	9,643	513	40,337	117	54,559
2003	10,891	11,304	50	39,883	1,916	64,044
2004	499	6	0	0	0	505
2005	2,370	5,329	2	1,054	66	8,821
2006	2,303	9,455	776	49,096	0	61,630
2007	3,829	19,595	7,851	46,943	335	78,553
2008	13,453	40,130	58,925	88,078	8,739	209,325
2009	14,553	62,149	59,800	116,231	3,692	256,425
2010	27,388	226,501	116,336	204,911	6,193	581,329
Averages						
1991-10	10,932	56,100	22,533	61,571	18,632	169,768
2001-10	9,077	46,824	29,516	62,400	3,602	151,419
2006-10	12,305	71,566	48,738	101,052	3,792	237,452
2008-10	18,465	109,593	78,354	136,407	6,208	349,026

Table 30.–Chignik Management Area chum salmon harvest (including home pack and the department's test fishery catches), by district and day, 2010.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
6/11	0	Closed	Closed	Closed	Closed	0
6/12	Closed	Closed	Closed	Closed	Closed	0
6/13	0	Closed	Closed	Closed	Closed	0
6/14	Closed	Closed	Closed	Closed	Closed	0
6/15	0	Closed	Closed	Closed	Closed	0
6/16	0	0	0	0	Closed	0
6/17	8	422	0	0	Closed	430
6/18	6	1,109	401	754	Closed	2,270
6/19	10	662	0	0	Closed	672
6/20	5	542	989	0	Closed	1,536
6/21	3	1,759	1,075	0	Closed	2,837
6/22	7	957	1,552	0	Closed	2,516
6/23	9	2,104	911	1,265	Closed	4,289
6/24	141	767	560	2,406	Closed	3,874
6/25	12	1,813	350	209	Closed	2,384
6/26	4	365	0	0	Closed	369
6/27	5	715	904	0	Closed	1,624
6/28	Closed	Closed	Closed	Closed	Closed	0
6/29	Closed	Closed	Closed	Closed	Closed	0
6/30	Closed	Closed	Closed	Closed	Closed	0
7/1	Closed	Closed	Closed	Closed	Closed	0
7/2	50	5,741	0	0	Closed	5,791
7/3	129	4,690	2,444	0	Closed	7,263
7/4	148	5,274	351	0	Closed	5,773
7/5	55	2,028	1,938	0	Closed	4,021
7/6	28	7,895	845	0	Closed	8,768
7/7	342	4,304	8,967	0	Closed	13,613
7/8	198	7,001	1,610	317	Closed	9,126
7/9	14	0	0	0	Closed	14
7/10	Closed	Closed	Closed	Closed	Closed	0
7/11	51	379	0	1,726	0	2,156
7/12	258	14,551	0	7,973	0	22,782
7/13	360	944	9,060	5,466	1,206	17,036
7/14	525	6,843	3,360	7,488	0	18,216
7/15	221	4,594	4,398	2,550	0	11,763
7/16	778	4,702	0	4,462	0	9,942
7/17	266	5,393	2,582	4,456	0	12,697
7/18	68	4,726	247	3,347	0	8,388
7/19	Closed	Closed	Closed	Closed	Closed	0
7/20	Closed	Closed	Closed	Closed	Closed	0
7/21	2,679	488	0	2,422	0	5,589
7/22	676	3,020	0	16,894	0	20,590
7/23	908	5,696	5,428	15,452	321	27,805
7/24	2,183	7,880	13,257	19,288	0	42,608
7/25	884	6,038	2,697	2,244	0	11,863

-continued-

Table 30.–Page 2 of 2.

	District					
Date	Chignik Bay	Central	Eastern	Western	Perryville	Total
7/26	Closed	Closed	Closed	Closed	Closed	0
7/27	Closed	Closed	Closed	Closed	Closed	0
7/28	Closed	Closed	Closed	Closed	Closed	0
7/29	1,792	10,220	18,185	11,643	0	41,840
7/30	1,115	8,624	1,605	10,402	63	21,809
7/31	1,388	16,512	6,886	16,207	968	41,961
8/1	610	13,630	Closed	20,322	2,251	36,813
8/2	1,408	14,965	Closed	11,260	623	28,256
8/3	970	4,460	Closed	1,182	Closed	6,612
8/4	545	11,766	Closed	2,068	Closed	14,379
8/5	1,842	4,546	Closed	2,029	Closed	8,417
8/6	331	4,780	Closed	Closed	Closed	5,111
8/7	540	4,167	Closed	331	0	5,038
8/8	531	678	Closed	7,405	0	8,614
8/9	473	574	Closed	1,888	0	2,935
8/10	589	2,177	Closed	3,237	0	6,003
8/11	489	7,449	Closed	742	Closed	8,680
8/12	317	5,563	Closed	Closed	Closed	5,880
8/13	237	825	0	2,507	0	3,569
8/14	202	0	0	0	0	202
8/15	365	171	5,507	0	0	6,043
8/16	345	353	0	4,312	0	5,010
8/17	271	0	1,629	1,930	0	3,830
8/18	460	0	1,115	1,576	0	3,151
8/19	380	188	0	2,699	0	3,267
8/20	170	457	16,133	2,106	0	18,866
8/21	157	608	0	1,400	0	2,165
8/22	128	336	203	0	0	667
8/23	87	0	1,147	0	0	1,234
8/24	85	0	0	139	0	224
8/25	79	50	0	0	0	129
8/26	128	0	0	463	0	591
8/27	57	0	0	0	0	57
8/28	75	0	0	273	0	348
8/29	38	0	0	58	87	183
8/30	25	0	0	0	0	25
8/31	40	0	0	0	223	263
9/1	20	0	0	0	0	20
9/2	13	0	0	13	432	458
9/3	21	0	0	0	19	40
9/4	17	0	0	0	0	17
9/5	17	0	0	0	0	17
9/6	0	0	0	0	0	0
9/7	0	0	0	0	0	0
Total	27,388	226,501	116,336	204,911	6,193	581,329

Table 31.–Value of the commercial salmon harvest, by species, and average value per active permit, in dollars, in the Chignik Management Area, 1970 through 2010.

	Chinook		Sockeye		Coho		Pink		Chum			Number of	Value Per
Year	Total[a]	Average[b]	Total[a]	Average[b]	Total[a]	Average[b]	Total[a]	Average[b]	Total[a]	Average[b]	Total Value	Permits[c]	Permit
1970	6,129	77	2,190,272	27,378	18,397	230	635,673	7,946	376,025	4,700	3,226,496	80	40,331
1971	6,472	84	2,034,279	26,419	23,240	302	366,693	4,762	326,760	4,244	2,757,444	77	35,811
1972	2,028	25	825,498	10,319	35,699	446	48,401	605	87,759	1,097	999,385	80	12,492
1973	5,255	67	3,030,057	38,355	73,663	932	20,610	261	10,180	129	3,139,765	79	39,744
1974	2,941	31	3,618,781	38,498	31,933	340	64,069	682	51,125	544	3,768,849	94	40,094
1975	6,561	76	1,384,271	16,096	213,539	2,483	104,115	1,211	61,704	717	1,770,190	86	20,584
1976	13,800	179	4,751,000	61,701	138,000	1,792	568,300	7,381	183,600	2,384	5,654,700	77	73,438
1977	18,828	214	14,553,720	165,383	104,819	1,191	920,881	10,465	368,066	4,183	15,966,314	88	181,435
1978	56,700	597	15,653,500	164,774	116,400	1,225	1,131,500	11,911	404,500	4,258	17,362,600	95	182,764
1979	32,050	311	11,345,503	110,151	710,192	6,895	2,622,269	25,459	126,866	1,232	14,836,880	103	144,047
1980	67,657	651	5,532,290	53,195	520,655	5,006	1,477,060	14,203	1,061,963	10,211	8,659,625	104	83,266
1981	75,231	716	17,262,119	164,401	439,900	4,190	1,881,334	17,917	2,431,421	23,156	22,090,005	105	210,381
1982	75,276	731	13,038,510	126,587	1,782,027	17,301	578,184	5,613	1,356,597	13,171	16,830,594	103	163,404
1983	96,159	943	10,728,088	105,177	219,650	2,153	240,171	2,355	421,713	4,134	11,705,781	102	114,763
1984	114,502	1,145	20,402,076	204,021	759,972	7,600	330,916	3,309	146,024	1,460	21,753,490	100	217,535
1985	67,088	633	7,997,834	75,451	1,471,418	13,881	140,076	1,321	59,475	561	8,735,891	106	82,414
1986	84,800	831	16,882,290	165,513	667,740	6,546	356,147	3,492	456,546	4,476	18,447,523	102	180,858
1987	72,739	706	24,783,033	240,612	1,035,129	10,050	269,868	2,620	339,819	3,299	26,500,588	103	257,287
1988	286,740	2,839	14,350,354	142,083	4,153,424	41,123	6,771,266	67,042	2,189,293	21,676	27,751,077	101	274,763
1989	78,999	790	13,047,378	130,474	436,892	4,369	32,994	330	4,745	47	13,601,008	100	136,010
1990	185,256	1,834	22,509,923	222,871	700,309	6,934	502,693	4,977	878,510	8,698	24,776,691	101	245,314
1991	50,027	490	11,002,784	107,870	650,626	6,379	402,916	3,950	502,860	4,930	12,609,213	102	123,620
1992	193,326	1,914	12,552,025	124,277	1,323,107	13,100	811,882	8,038	414,005	4,099	15,294,345	101	151,429
1993	175,690	1,722	8,210,106	80,491	730,622	7,163	637,666	6,252	184,012	1,804	9,938,096	102	97,432
1994	38,096	385	10,046,245	101,477	1,094,415	11,055	226,504	2,288	430,888	4,352	11,836,148	99	119,557
1995	60,174	602	11,969,210	119,692	834,337	8,343	977,811	9,778	634,780	6,348	14,476,312	100	144,763
1996	25,041	250	12,640,560	126,406	447,228	4,472	24,827	248	32,279	323	13,169,935	100	131,699
1997	20,642	211	4,860,589	49,598	453,905	4,632	348,042	3,551	239,400	2,443	5,922,577	98	60,434
1998	31,934	376	6,631,192	78,014	397,413	4,675	310,323	3,651	137,647	1,619	7,508,509	85	88,335
1999	27,212	302	21,132,550	234,806	170,931	1,899	578,861	6,432	118,547	1,317	22,028,101	90	244,757

-continued-

Table 31.–Page 2 of 2.

	Chinook		Sockeye		Coho		Pink		Chum			Number of	Value Per
Year	Total[a]	Average[b]	Total[a]	Average[b]	Total[a]	Average[b]	Total[a]	Average[b]	Total[a]	Average[b]	Total Value	Permits[c]	Permit
2000	16,336	165	11,812,368	119,317	283,061	2,859	106,470	1,075	93,030	940	12,311,264	99	124,356
2001	12,205	133	7,419,339	80,645	263,160	2,860	366,714	3,986	209,239	2,274	8,270,657	92	89,898
2002	3,516	36	4,564,214	46,103	36,078	364	10,333	104	40,671	411	4,654,812	99	47,018
2003	20,212	202	5,283,962	52,840	173,625	1,736	182,100	1,821	71,140	711	5,731,039	100	57,310
2004	26,191	262	3,568,350	35,684	59	1	835	8	647	6	3,596,082	100	35,961
2005	36,060	377	6,314,036	64,429	11,280	115	55,070	562	10,917	111	6,427,363	98	65,585
2006	26,895	560	4,703,317	97,986	105,132	2,190	126,309	2,631	81,123	1,690	5,042,776	48	105,058
2007	26,176	476	4,154,210	75,531	195,754	3,559	1,034,322	18,806	162,089	2,947	5,572,550	55	101,319
2008	15,249	282	4,121,611	76,326	778,282	14,413	1,810,965	33,536	533,358	9,877	7,259,465	54	134,435
2009	30,714	558	7,058,058	128,328	220,824	4,015	800,530	14,555	520,791	9,469	8,630,917	55	156,926
2010[d]	160,076	2,463	11,271,976	173,415	566,191	8,711	565,941	8,707	1,774,763	27,304	14,338,947	65	220,599
Averages													
1991-10	49,789	588	8,465,835	98,662	436,801	5,127	468,921	6,499	309,609	4,149	9,730,955	87	115,025
2001-10	35,729	535	5,845,907	83,129	235,038	3,796	495,312	8,472	340,474	5,480	6,952,461	77	101,411
2006-10	51,822	868	6,261,834	110,317	373,237	6,578	867,613	15,647	614,425	10,257	8,168,931	55	143,667
2008-10	68,680	1,101	7,483,882	126,023	521,766	9,046	1,059,145	18,933	942,971	15,550	10,076,443	58	170,653

[a] Total value of commercial catch in dollars, by species. Value does not include home pack or department test fishery.

[b] Average value of commercial catch in dollars, by species. Average value does not include home pack or department test fishery.

[c] Includes the number of commercial permits that received income from the harvest. These figures do not include department test fishery harvests.

[d] Values represent the initial price paid, and do not include any postseason adjustments by any processor. The average 2010 exvessel prices per pound were: Chinook - $1.56, sockeye - $1.26, coho - $0.50, pink - $0.34, chum - $0.40.

Table 32.–Historical number of subsistence permits issued and returned and estimated subsistence salmon harvest, by species and year, 1980 through 2009.

	Permits		Estimated Salmon Harvest					
Year	Issued	Returned	Chinook	Sockeye	Coho	Chum	Pink	Total
1980	82	37	6	12,475	32	169	478	13,160
1981	29	7	0	2,049	0	0	0	2,049
1982	59	15	3	8,532	12	0	2	8,549
1983	32	21	0	3,078	1,319	850	1,250	6,497
1984	77	64	23	8,747	464	204	330	9,768
1985	59	48	1	7,177	50	25	26	7,279
1986	74	38	4	10,347	205	77	98	10,731
1987	2	1	0	400	0	0	0	400
1988	80	34	9	9,073	1,455	142	54	10,733
1989	68	23	24	7,551	384	147	81	8,187
1990	72	23	103	8,099	210	115	470	8,997
1991	95	58	42	11,483	13	81	275	11,894
1992	98	19	55	8,648	709	145	305	9,862
1993	201	141	122	14,710	3,765	642	1,265	20,504
1994	219	122	165	13,978	4,055	382	1,720	20,300
1995	111	95	98	9,563	1,191	150	723	11,725
1996	119	104	48	7,357	2,126	355	2,204	12,090
1997	126	103	28	13,442	2,678	840	2,035	19,023
1998	104	72	91	7,750	1,390	186	1,007	10,424
1999	106	88	243	9,040	1,679	136	1,191	12,289
2000	130	112	163	9,561	1,802	517	1,185	13,228
2001	135	122	171	8,633	1,859	213	2,787	13,663
2002	120	86	74	10,092	1,401	23	390	11,980
2003	146	127	267	10,989	2,256	286	1,597	15,395
2004	104	57	88	7,029	1,981	202	1,047	10,357
2005	119	100	224	8,171	2,112	353	730	11,590
2006	113	79	258	8,079	1,539	275	1,035	11,186
2007	128	83	84	10,191	1,936	165	996	13,372
2008	89	69	41	7,189	877	57	619	8,783
2009[a]	95	82	104	6,785	1,174	137	707	8,907
Averages								
1990-09	122	87	123	9,539	1,738	263	1,114	12,778
2000-09	118	92	147	8,672	1,694	223	1,109	11,846
2007-09	104	78	76	8,055	1,329	120	774	10,354

Source: Alaska Department of Fish and Game, Division of Subsistence, Alaska Subsistence Fisheries Database.

[a] From 1993 through 2008, postseason household surveys were conducted to supplement harvest data collected through returned permits. Limited budgets prevented administering the surveys for 2009, likely resulting in an underestimate of subsistence harvests since not all subsistence fishing households obtained a permit. To compensate for this underestimate, the average annual harvest for the period 1999–2008 reported during postseason surveys was added to harvests from returned permits to estimate the total subsistence harvest for 2009.

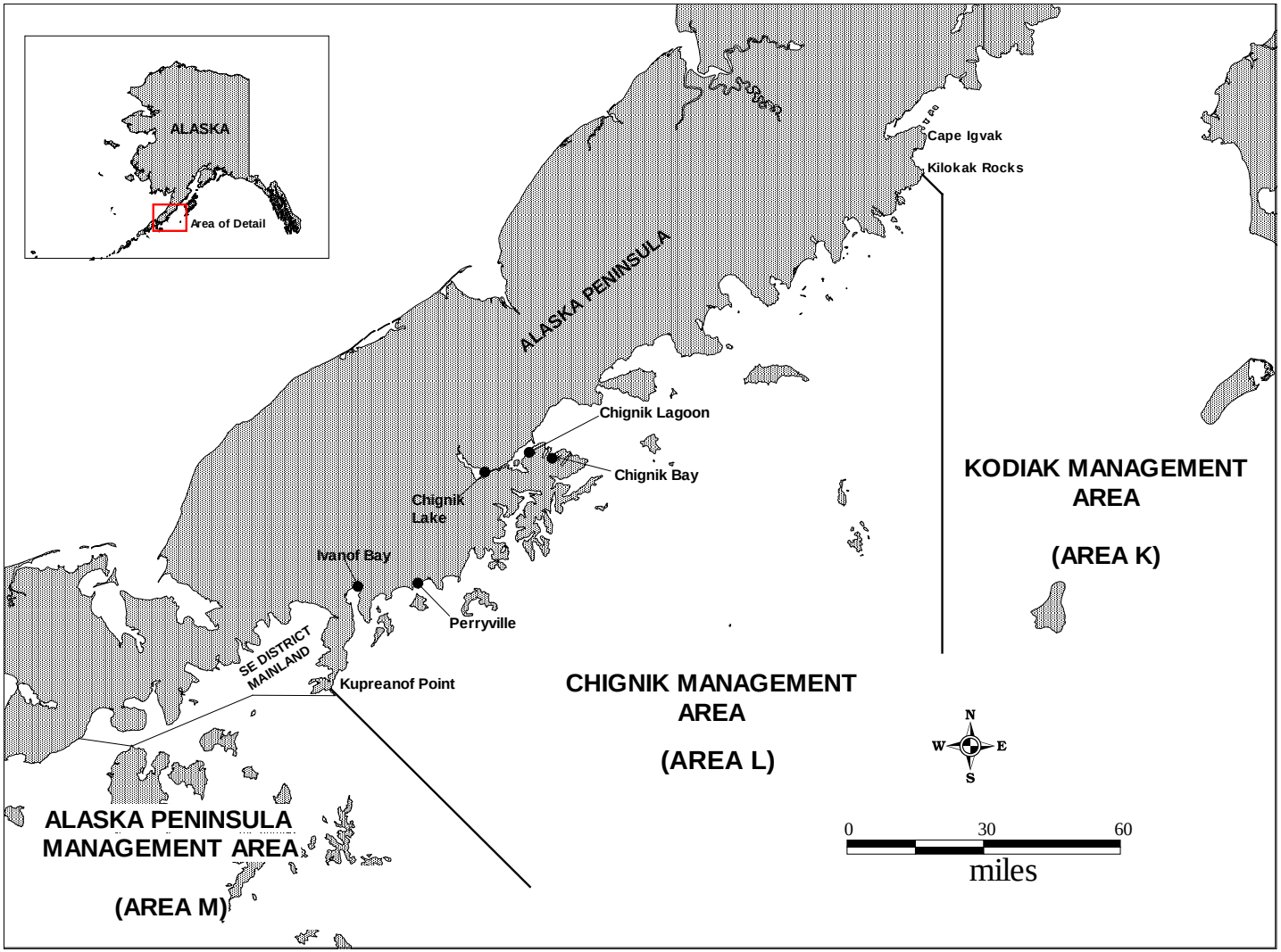

Figure 1.–Map of the Alaska Peninsula illustrating the relative locations of the Chignik, Kodiak, and Alaska Peninsula management areas.

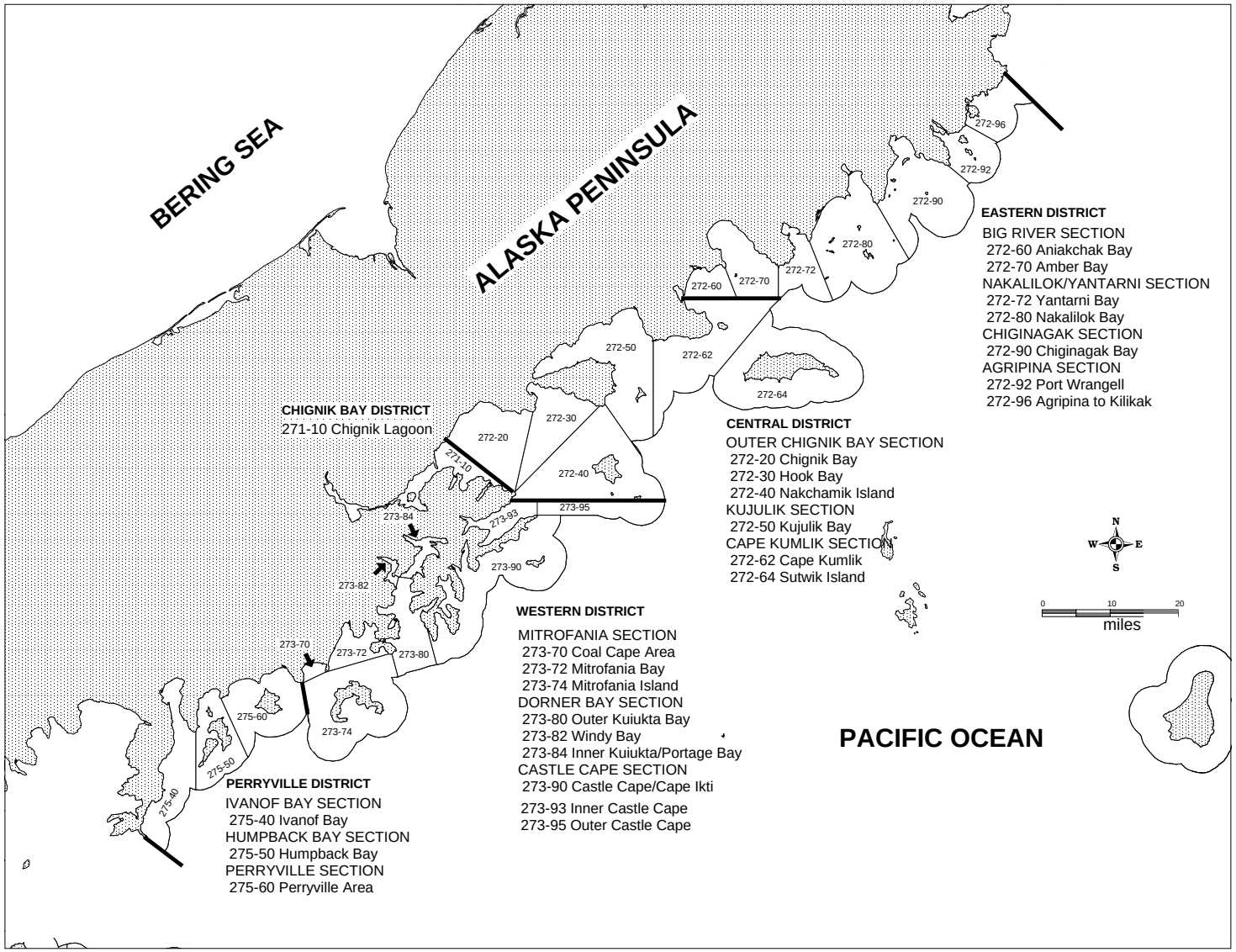

Figure 2.–Map of the Chignik Management Area illustrating district and section boundaries and statistical areas.

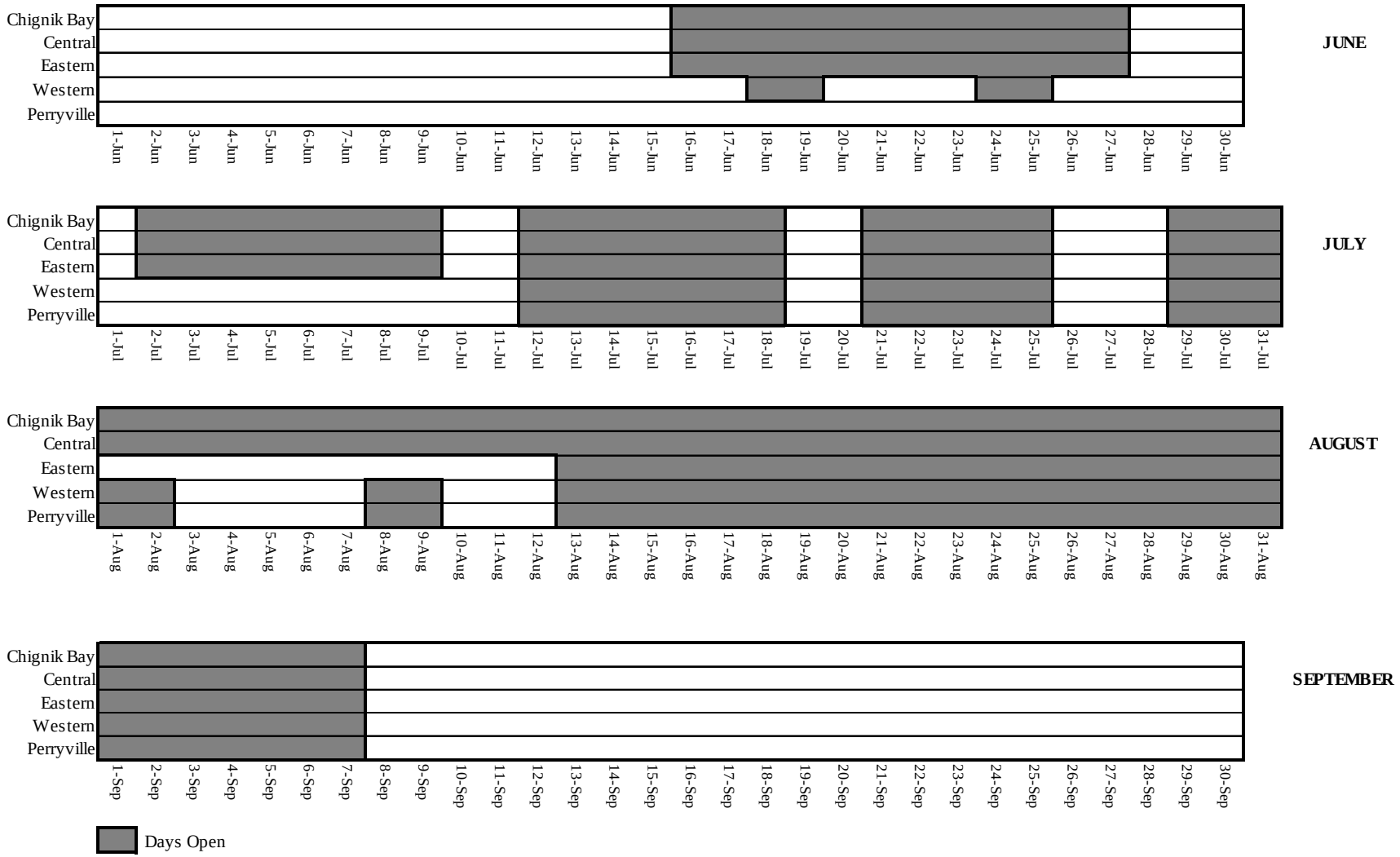

Figure 3.–Representation of days open to commercial salmon fishing, by district and month, 2010.

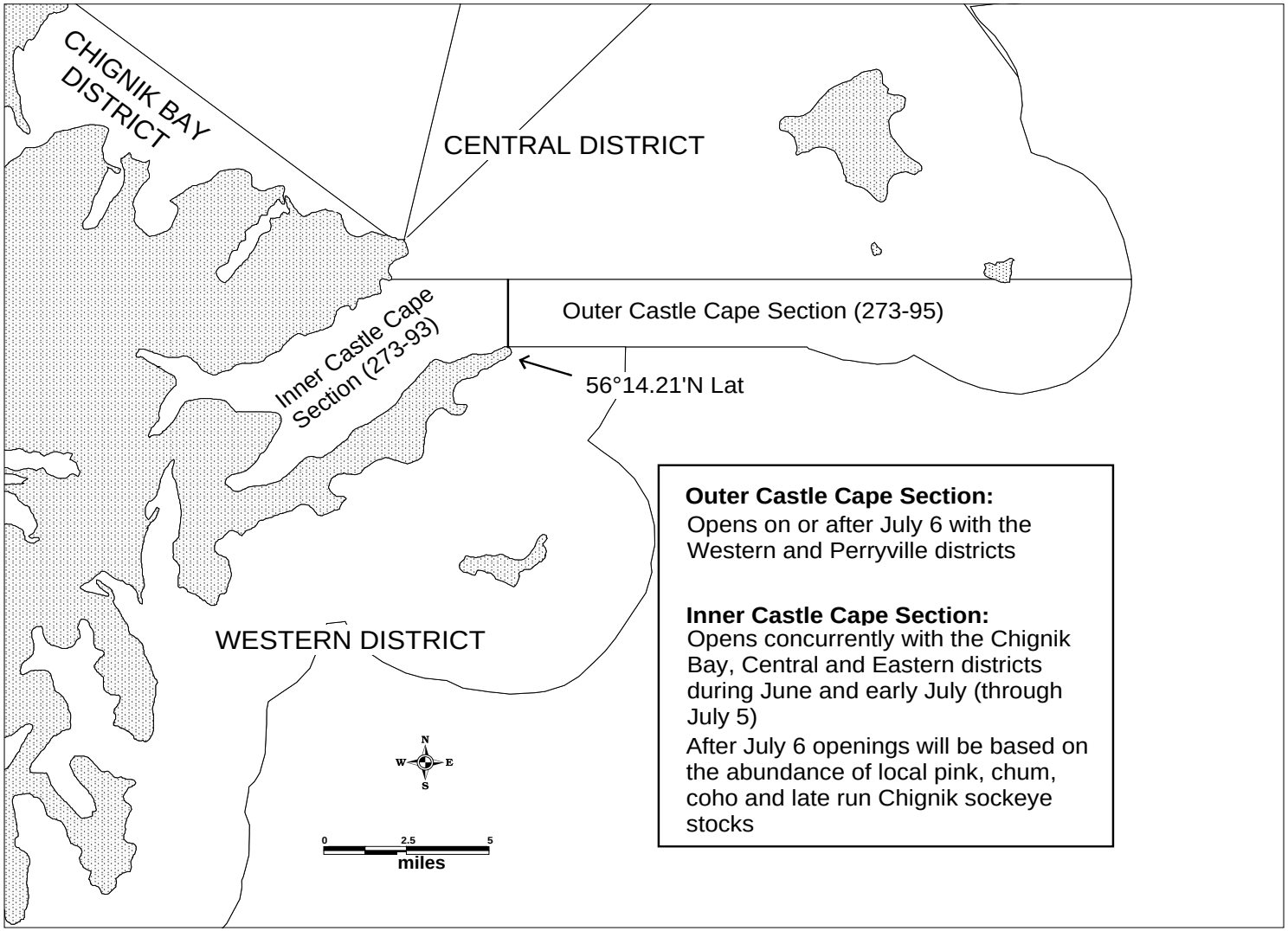

Figure 4.–Map depicting the newly established Inner (273-93), and Outer (273-95) Castle Cape Sections of the Western District.

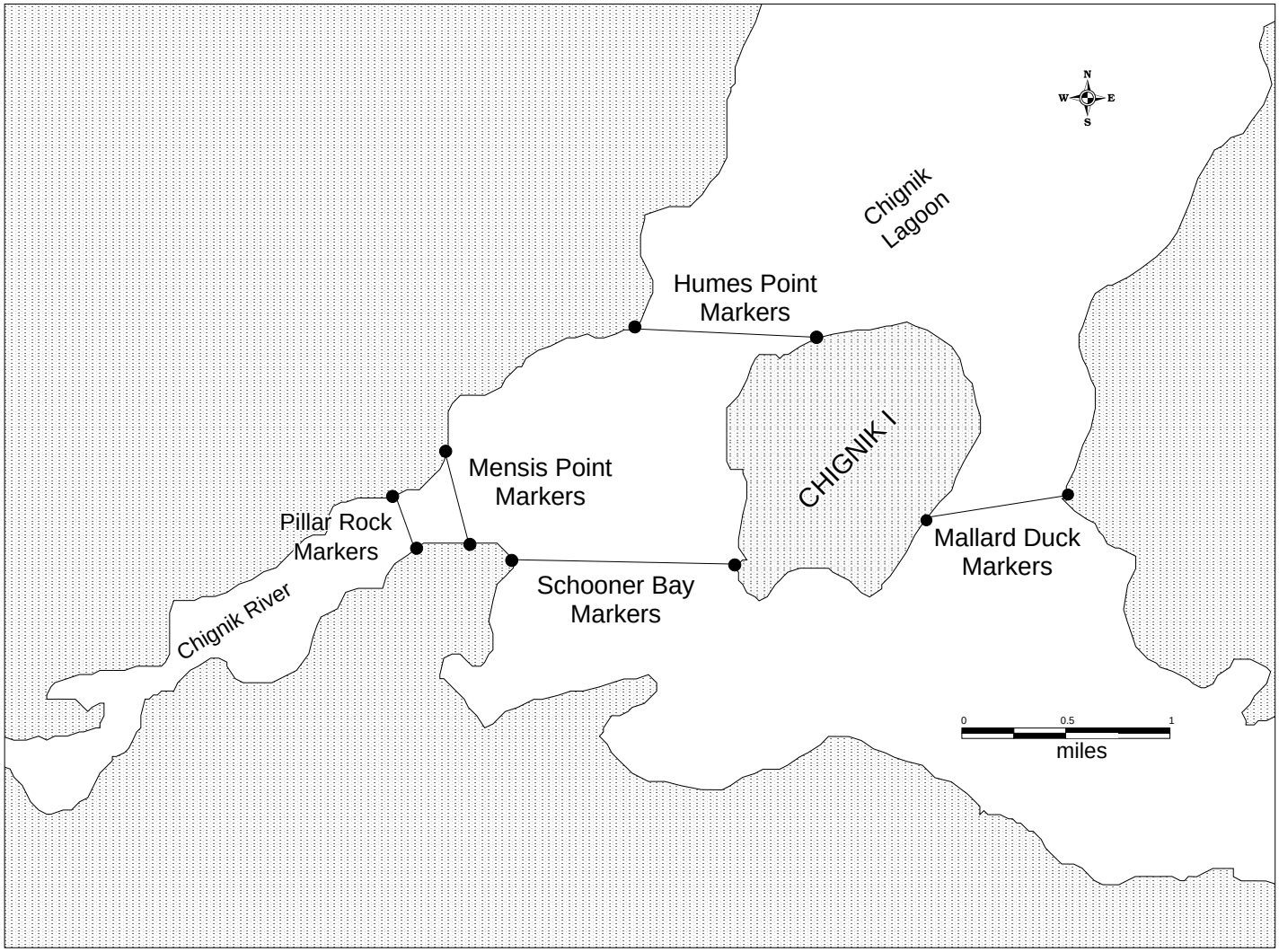

Figure 5.–Map of upper Chignik Lagoon showing the location of the Pillar Rock, Mensis Point, Humes Point, Mallard Duck, and Schooner Bay marker locations.

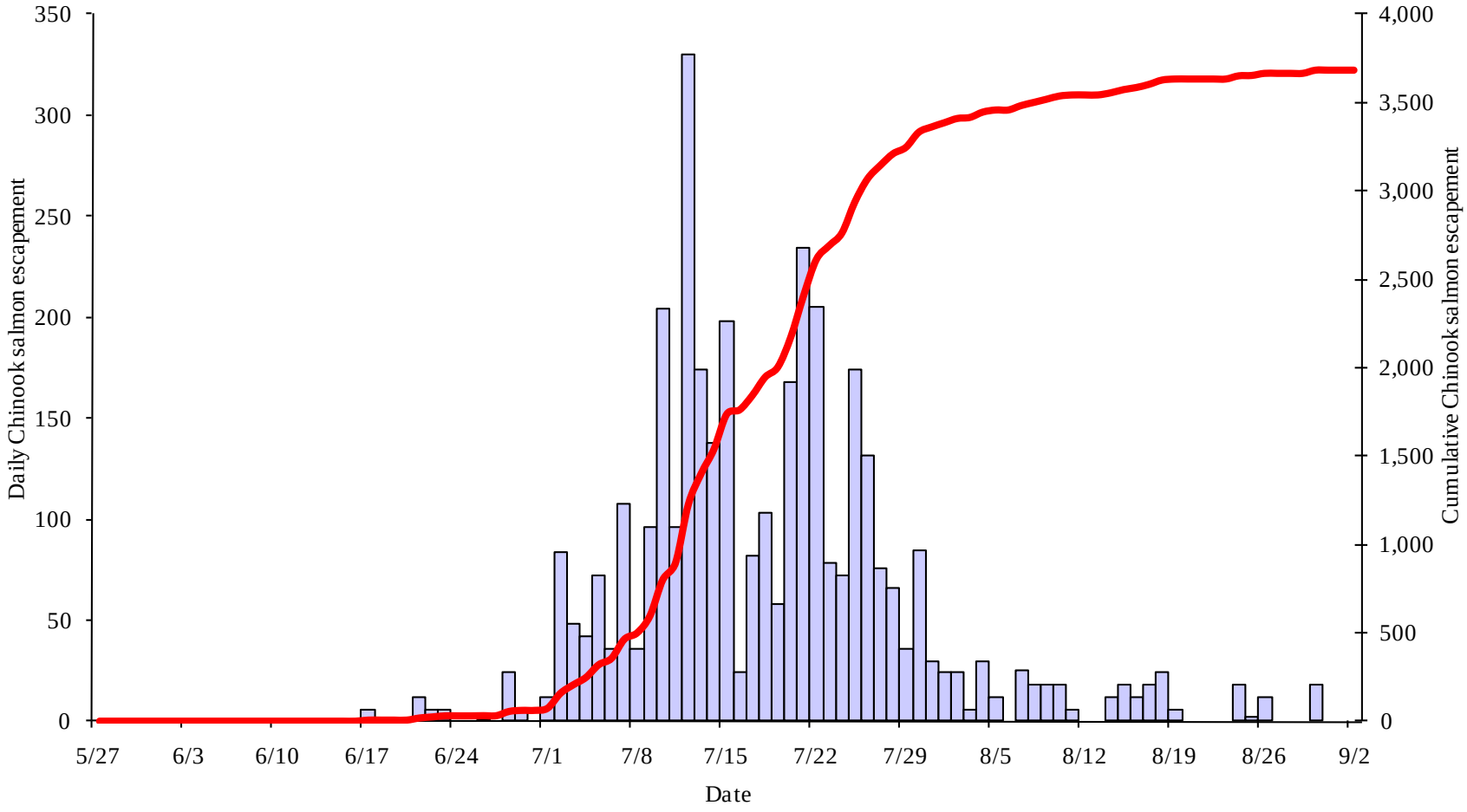

Figure 6.–Chignik River estimated daily and cumulative Chinook salmon escapement, 2010.

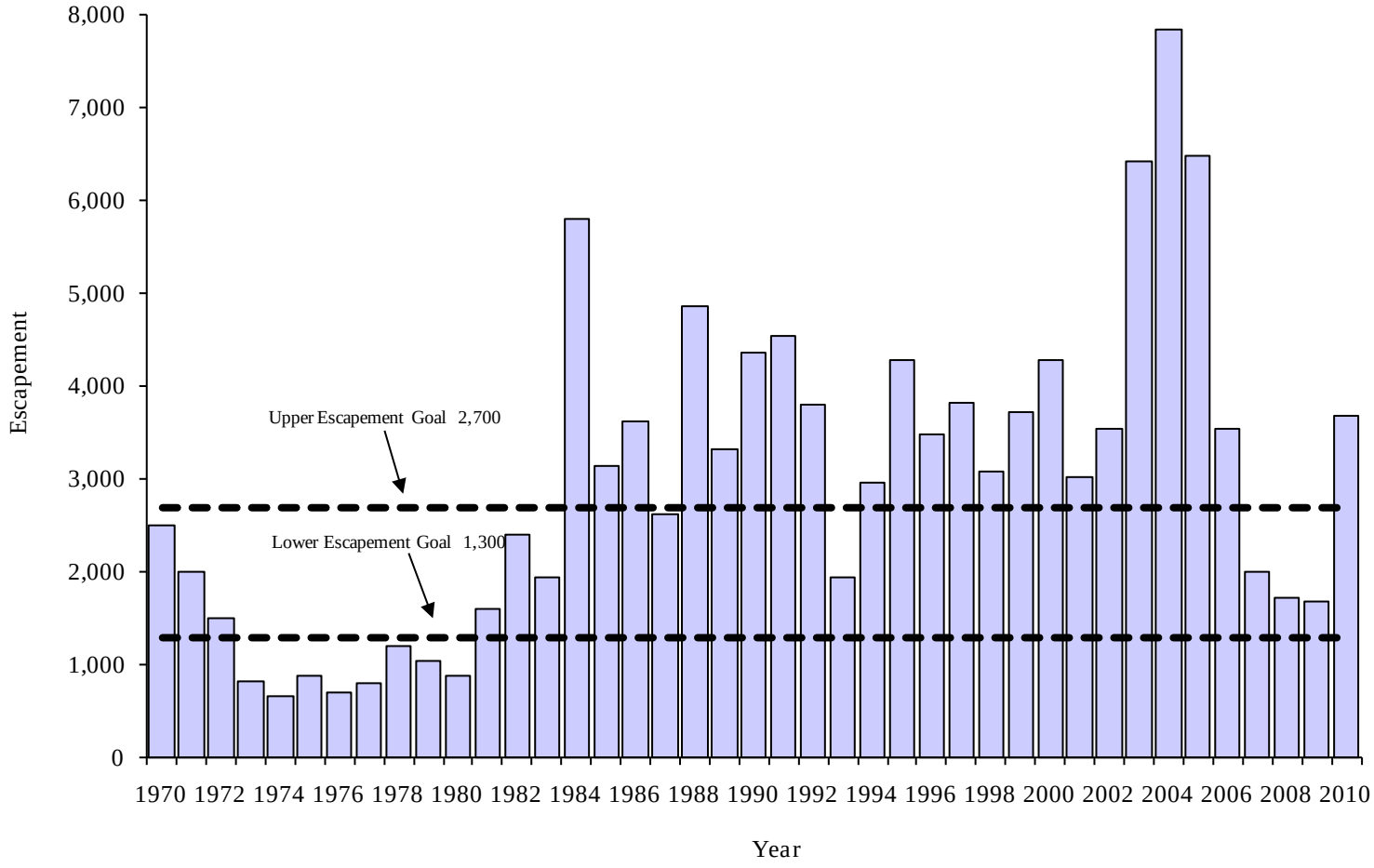

Figure 7.–Chignik River Chinook salmon escapement as compared to the current escapement goal range, by year, 1970 to 2010.

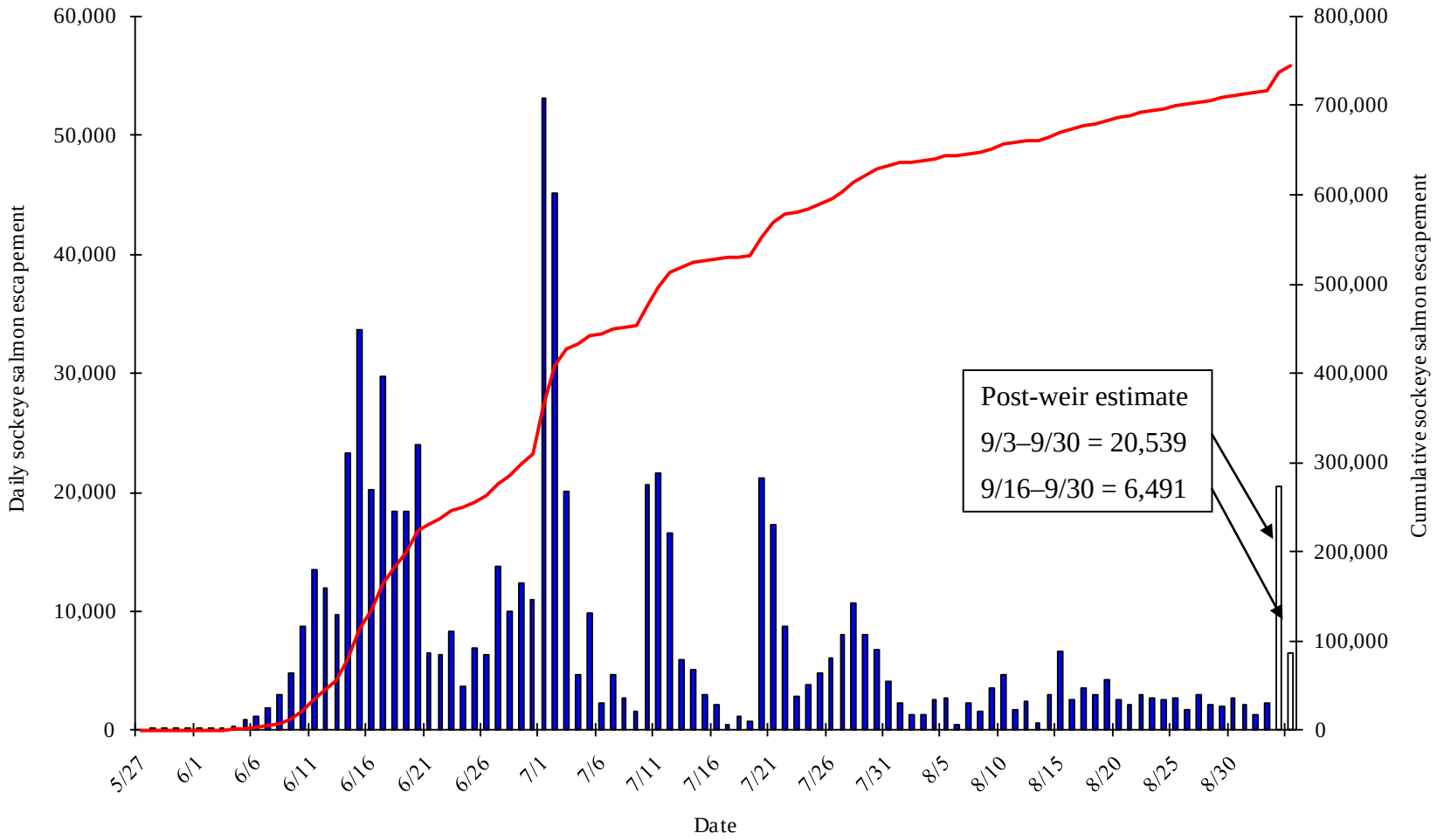

Figure 8.–Chignik River sockeye salmon daily and cumulative escapement, 2010

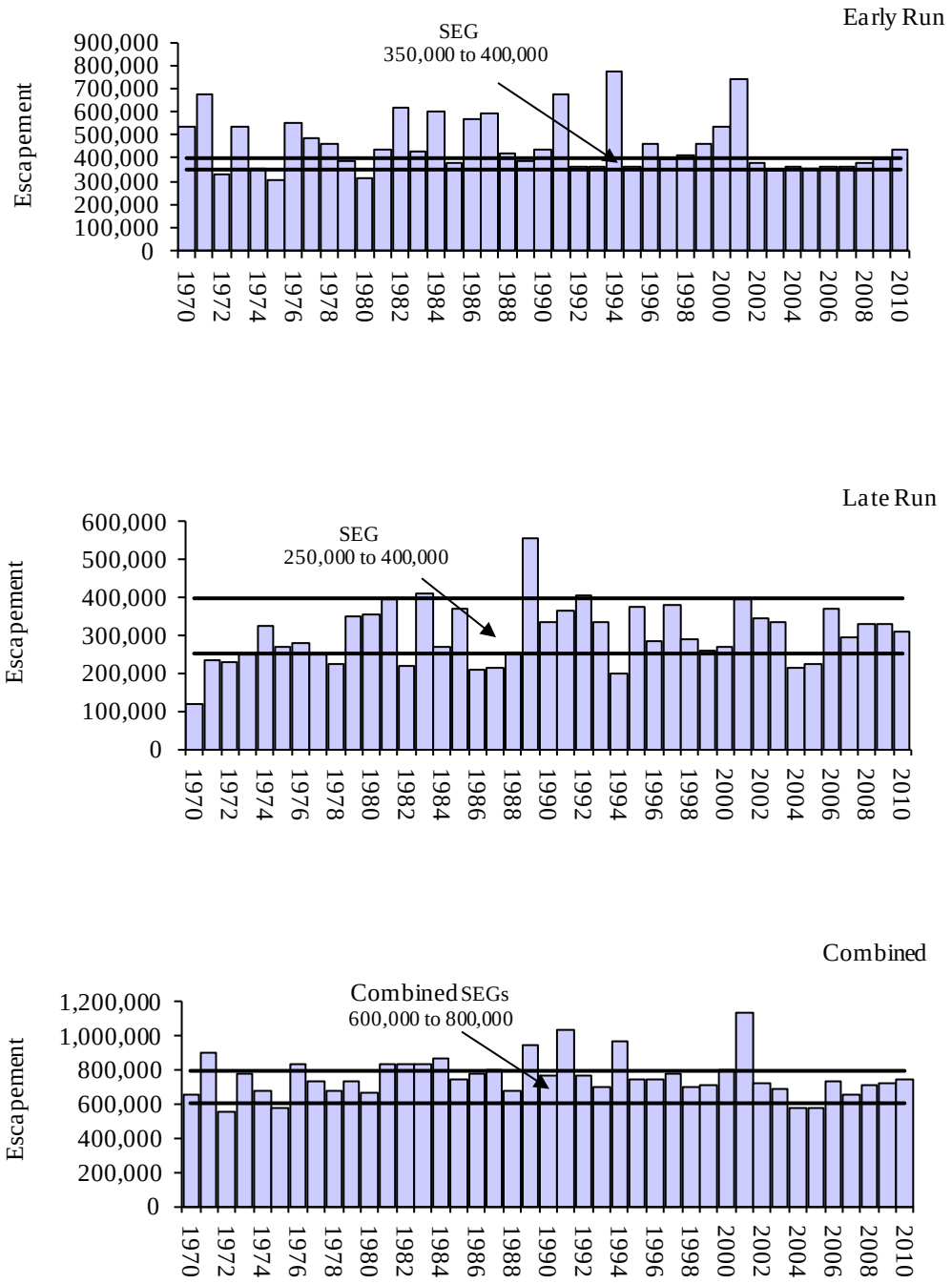

Figure 9.–Chignik River sockeye salmon early, late, and combined run escapements 1970 through 2010, compared to the 2010 sustainable escapement goals (including a late run IRRG of 50,000).

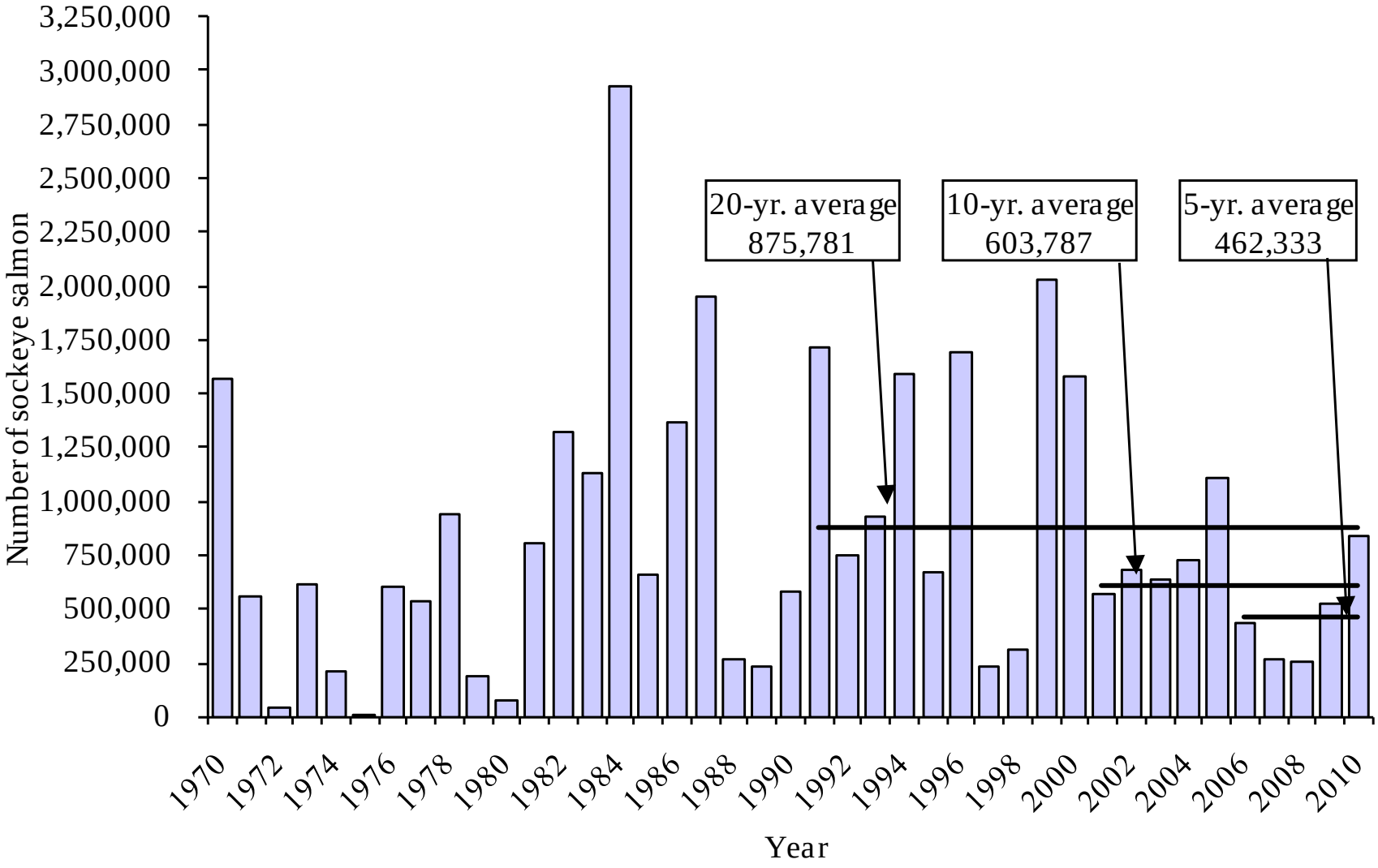

Figure 10.–Chignik-bound sockeye salmon early-run harvest, 1970 through 2010.

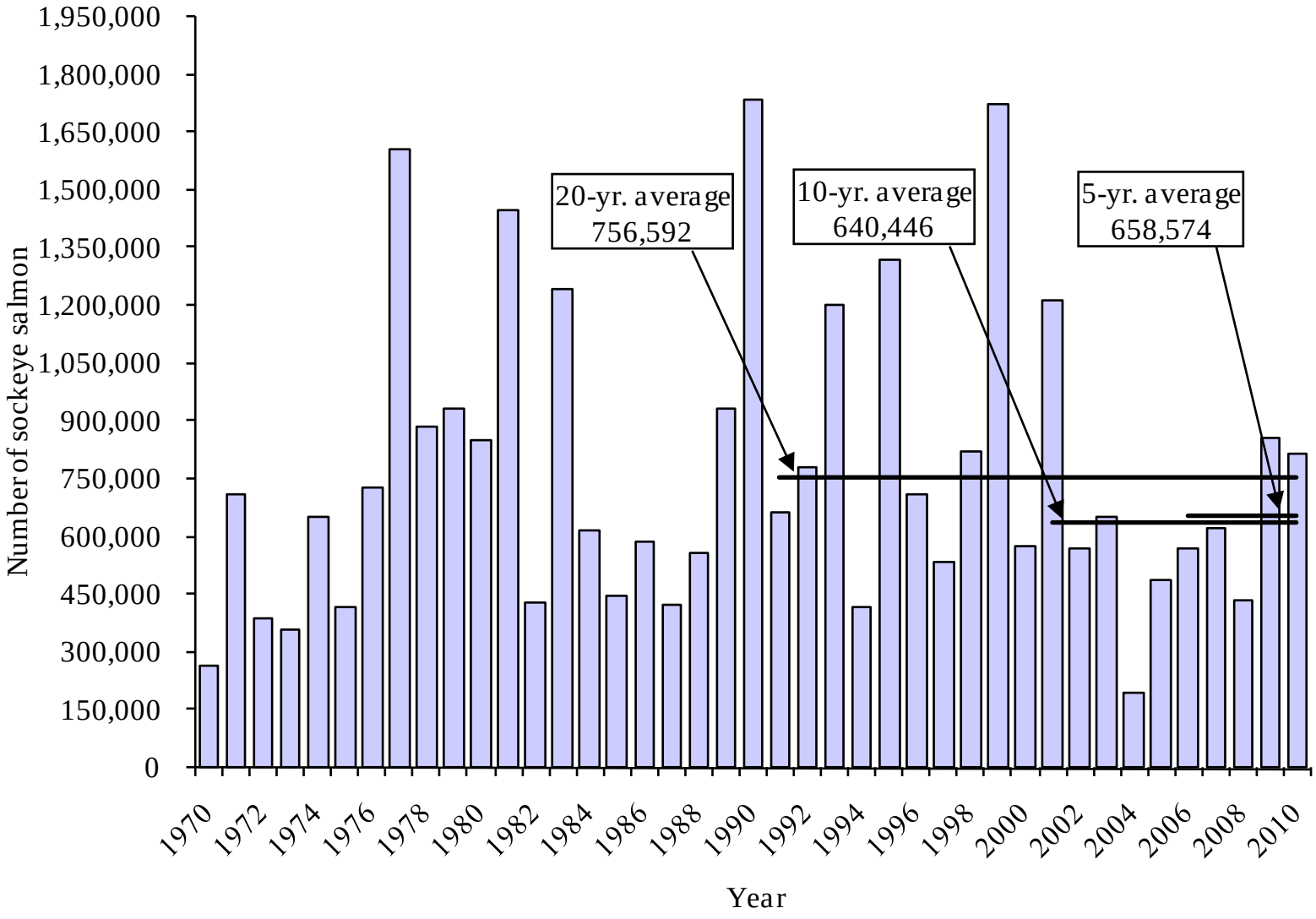

Figure 11.–Chignik-bound sockeye salmon late-run harvest, 1970 through 2010.

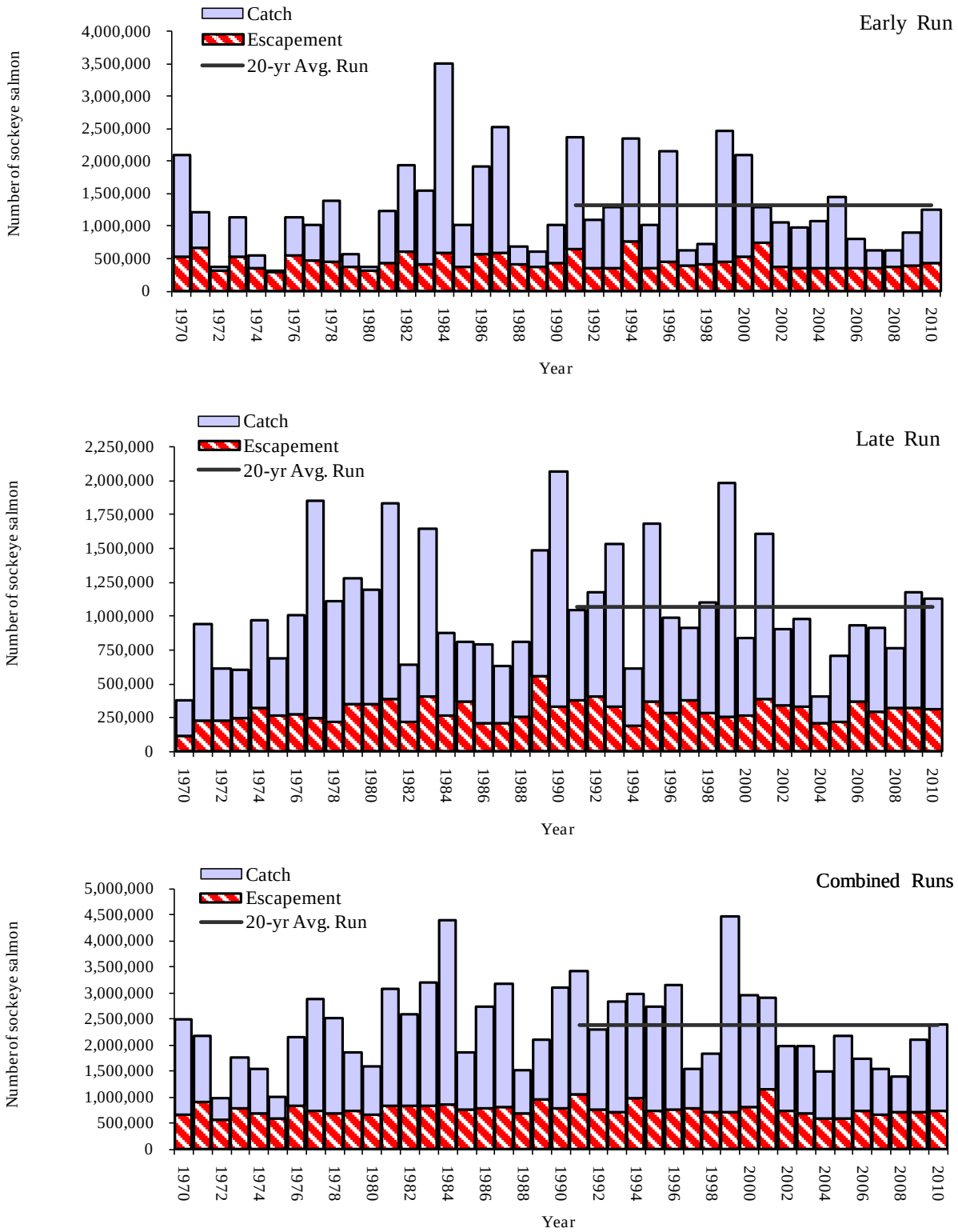

Figure 12.–Total sockeye salmon escapement and catch considered Chignik-bound including home pack, the department's test fishery harvest, and Cape Igvak and SEDM allocations, by year and run, 1970 through 2010.

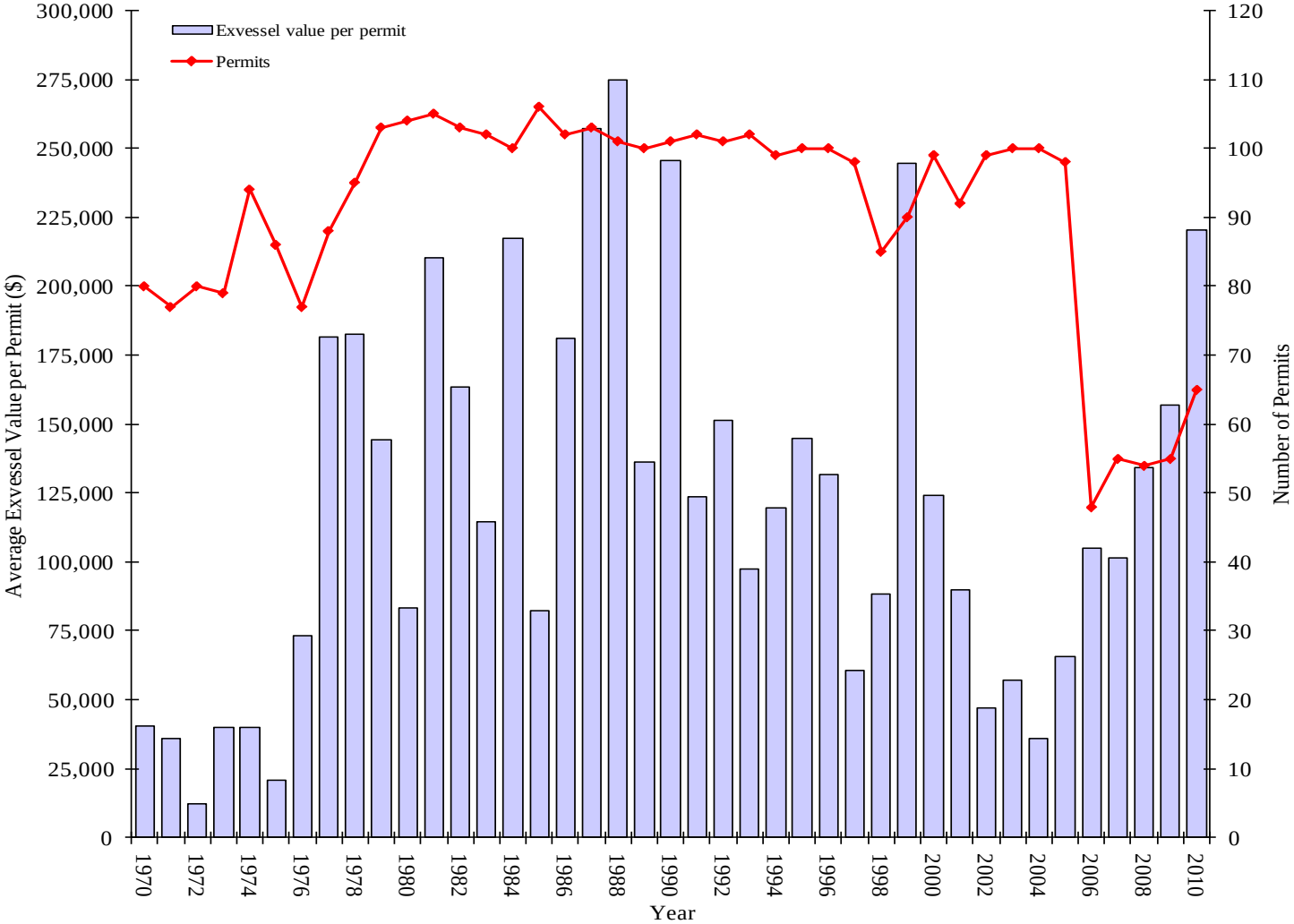

Figure 13.–Average exvessel value, in dollars, per permit and total permits fished by year 1970 through 2010.

APPENDIX A. MEMORANDUM RECOMMENDING TARGETING THE LOWER BOUNDS OF THE CHIGNIK SOCKEYE SALMON ESCAPEMENT GOALS DURING THE 2010 SEASON

Appendix A1.–Memorandum recommending targeting the lower bounds of the Chignik sockeye salmon escapement goals during the 2010 season.

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

MEMORANDUM

TO:	Steve Honnold Regional Supervisor Division of Commercial Fisheries Region IV – Kodiak and Matt Nemeth Regional Finfish Research Supervisor Division of Commercial Fisheries Region IV – Kodiak and Jeff Wadle Regional Finfish Management Supervisor Division of Commercial Fisheries Region IV – Kodiak	DATE: PHONE: FAX:	May 17, 2010 (907) 486-1805 (907) 486-1841
THRU:	Todd Anderson Chignik Area Management Biologist Division of Commercial Fisheries Region IV – Kodiak		
FROM:	Mary Beth Loewen Finfish Research Biologist Division of Commercial Fisheries Region IV - Kodiak	SUBJECT:	Chignik Sockeye Salmon Escapement Goal Range Targets

The purpose of this memorandum is to discuss current escapement goals to the Chignik watershed in terms of the condition of sockeye salmon rearing habitat in Chignik and Black lakes. This discussion is based on data from the Chignik Watershed Ecological Assessment Project, the Chignik Smolt Enumeration Project, current management objectives, and recent adult return data.

The current Chignik early-run (Black Lake) sustainable escapement goal (SEG) range is 350,000 to 400,000 fish through July 4. In 2007, goals for the late-run (Chignik Lake) SEG were increased from a range of 200,000 to 250,000 fish, to a range of 200,000 to 400,000 fish from July 5 until the end of the run. Supplemental to the late-run SEG, an Inriver Run Goal for subsistence fishermen of 50,000 yields a total late-run escapement and Inriver Run Goal range of 250,000 to 400,000 sockeye salmon.

Fluctuations in salmon escapements and their subsequent smolt production can greatly affect juvenile fish life history strategies and survival. A high abundance of juvenile sockeye salmon, resulting from high escapement levels, can negatively impact the zooplankton forage base because the zooplankton community is a complex, dynamic web of different species susceptible to different selective pressures. Total sockeye salmon escapement estimates have been in excess of the current SEG ranges for two of the past 16 years (1995 – 2009; Table 1).

Table 1. Sockeye salmon escapements in the Chignik watershed from1995 to 2009.

	Early Run Escapement	Late Run Escapement	Total Run Escapement
Escapement Goals	350,000-400,000	200,000-400,000	550,000-800,000
Inriver Run Goal		50,000	
Year			
1995	366,495	373,425	739,920
1996	464,748	284,389	749,137
1997	396,668	378,950	775,618
1998	410,659	290,469	701,128
1999	457,424	258,542	715,966
2000	536,141	269,084	805,225
2001	744,013	392,905	1,136,918
2002	380,701	344,519	725,220
2003	350,004	334,141	684,145
2004	363,800	214,459	578,259
2005	355,091	225,366	580,457
2006	366,497	368,996	735,493
2007	361,091	293,883	654,974
2008	377,579	328,479	706,058
2009	391,476	328,586	720,062

From 1995 to 2009 the early-run escapements have exceeded the current SEG upper range five times. Although late-run escapements have fluctuated over the past 15 years, they have been within the bounds of current SEG in all years. Since 2002, when the recommendation of targeting the lower range of the escapement goals was implemented, early- and late-run escapements have consistently been within the escapement goal range.

Beginning in 2002, management staff were advised to target the lower ranges of the escapement goals for the two stocks of Chignik sockeye salmon (Bouwens and Poetter 2006). This protocol was initially recommended because limnology data collected in 2000 and 2001 indicated the zooplankton forage bases in Black and Chignik lakes were overgrazed by juvenile sockeye salmon (Bouwens and Finkle 2003; Finkle and Bouwens 2001). Early-run juvenile sockeye salmon, which rear and compete in Chignik Lake (Narver 1966; Parr 1972), can deplete the forage base shared by both stocks, as well as their natal Black Lake. In an effort to improve rearing conditions in the Chignik watershed, and therefore juvenile sockeye salmon survival, the lower ranges of the escapement goals for both lakes were targeted. The objective was to reduce the overgrazing of zooplankton, allowing the zooplankton biomass to

rebound and thereby strengthen the forage base for rearing juvenile sockeye salmon in the watershed. In 2008, to provide for stronger late-run returns and subsistence needs, the middle of the late-run escapement objective range was targeted. However, flooding in the Chignik Lake and River occurred in December of 2007. The scouring and water turnover associated with strong "flush" flooding may have impacted zooplankton communities through alteration of nutrient exchange timing or disruption of the phytoplankton community, causing decreased zooplankton biomass (Elwood and Waters 1969; Paidere et al. 2007; Reynolds 1993). Postseason analysis revealed that 2008 zooplankton population levels were not as robust as anticipated, likely due to flood effects, so the lower third of the late-run escapement was again targeted in 2009.

In the Chignik watershed, the late-summer migration of early-run juvenile sockeye salmon to Chignik Lake can affect the Chignik Lake zooplankton forage base shared by both stocks (Finkle 2007; Narver 1966; Parr 1972). Limnology data collected from both Black and Chignik lakes indicated that the forage base was subject to top-down pressures by overgrazing from 2000 to 2007, but may be improving (Finkle and Bouwens 2001; Bouwens and Finkle 2003; Finkle 2007; Loewen and Bradbury *in press*). Seasonal averages of both copepod and cladoceran densities were greater in 2009 than in the previous four years, with copepod *Cyclops* predominating copepod biomass (although copepod nauplii were also present in high numbers) and *Bosmina* the predominant cladoceran. The average monthly weighted biomass of cladocerans in Black Lake was extremely high relative to recent years. Since cladocerans are a preferred food source for juvenile sockeye salmon, their abundance may be an indicator of potential juvenile sockeye salmon production (Koenings and Burkett 1987; Kyle 1992).

Evidence of overgrazed zooplankton populations can be indicated by reductions in zooplankton length and shifts in species composition (Kyle 1992; Schindler 1992). The continued observed trend of inseason zooplankton composition changes and density fluctuations are indicative of top-down grazing pressure on zooplankton, as the emigration of sockeye salmon juveniles from Black Lake in July and August corresponded to the greatest overall zooplankton densities, and greatest number of *Bosmina* in zooplankton samples from Black Lake. This *Bosmina* spike coincides with the migration of Black Lake juvenile sockeye salmon to Chignik Lake, which suggests that the impact and magnitude of top-down pressures are greater than bottom-up pressures in Black Lake as biomass increases with a reduction in grazing pressure. Observed inseason water nutrient composition changes also suggest top-down limitations occurred, because the nutrients that drove primary production, chlorophyll *a* and phaeophytin *a*, fluctuated minimally over the 2009 sampling season.

Intense grazing pressure on zooplankton can cause a shift in zooplankton abundance and species composition to fewer and less nutritional species of sockeye salmon forage (Kerfoot 1987; Koenings and Burkett 1987). Since 2000, the seasonal zooplankton species composition in both lakes has varied in abundance; the copepods *Cyclops* or *Diaptomus* have been more abundant in June and the cladoceran *Bosmina* has been more abundant in August. Although juvenile salmon do prey on *Cyclops*, *Diaptomus*, and *Bosmina*, these species are inefficient grazers on phytoplankton, and are poor transmitters of energy and nutrients through the food web (Kerfoot 1987). In 2007 and 2009, however, the most abundant cladoceran was *Daphnia*, which is an important primary prey item for juvenile sockeye salmon (Kyle 1992; Honnold and Schrof 2001) and may be a more important indicator of lake forage activity than *Bosmina*, which are smaller and therefore may be more difficult for juvenile sockeye salmon to locate and eat. The seasonal biomass of *Daphnia* in Chignik Lake (34.3 mg/m2) was the greatest in the past five years.

Edmundson and Mazumder (2001) suggested that juvenile sockeye salmon starve when zooplankton biomass levels approach about 100 mg/m2 and are fully satiated at levels above 1,000 mg/m2. Zooplankton biomass had steadily increased from 2003-2007, but dropped again in 2008, likely due to flood effects. Zooplankton biomass levels in 2009 were greater than 2008, but not as high as in 2007, primarily due to the large *Cyclops* population in Chignik Lake in 2007.

Data from the Chignik Smolt Enumeration Project (Finkle and Ruhl 2008; Loewen and Bradbury *in press*) also indicated that the past (1997 to 2002) numbers of juvenile sockeye salmon rearing in the freshwater ecosystem may have taxed the available forage base; from 2003 to 2009 an average of 6.3 million smolt per year emigrated from the watershed compared to a 1994 to 2002 average of 16.8 million smolt per year. The 2003 to 2009 outmigration estimates included five of the six lowest estimates of juvenile sockeye salmon outmigration from the watershed (Finkle and Ruhl 2008), although the 2009 outmigration was the largest in six years. This may indicate that the freshwater survival of juvenile sockeye salmon is improving from recent years, when low food availability due to overgrazing from prior years of rearing juvenile sockeye salmon limited survivorship. Finally, in 2009, only 1.6% of the total estimated outmigrating population were age-0. smolt, suggesting that fish are more able to successfully forage and overwinter in Chignik Lake. In 2005, 2006, and 2008 increased numbers of age-0. fish in smolt trap

catches suggested a downstream migration to Chignik Lagoon to find better rearing conditions than those available in Chignik Lake.

The lower-than-average 2004-2007 adult runs were the recruits of overescaped brood years (1998-2002) that were subject to poor zooplankton forage base conditions from 2000 to 2003. The effects of the targeted lower escapement goal ranges from 2003 to 2007 have begun to be realized starting in 2008, when approximately 1.4 million sockeye salmon returned, and in 2009 when approximately 2.1 million sockeye salmon returned, but will not be fully understood until the runs are fully recruited and more years of adult salmon return information is available. The 2010 forecast is for a return of 2.1 million sockeye salmon to the Chignik Management Area.

The goal of targeting the lower ranges of the escapement objectives was implemented from 2002 to 2009 to relieve the top-down pressure on the zooplankton populations from overescapement to each lake. To date, the general response to this strategy has been an apparent increase in the zooplankton forage base in both lakes. This general protocol is still relevant because the zooplankton populations are susceptible to overgrazing from large juvenile populations as a result of large adult escapements, and also stochastic events such as flooding. Thus, it is recommended that the lower half of the early-run escapement objective (~350,000-375,000 fish) be targeted in 2010. Subsequently, this recommendation is expected to increase the overall ecological health of the system in terms of sockeye salmon production, while reducing the risk of overescaping the system and increasing competition as the forage base in nursery lakes continue to recover. It is recommended to continue to target the lower third of the late-run SEG (~260,000 fish) in order to provide stronger, future late-run returns while allowing subsistence needs to be met without depleting zooplankton levels in each nursery lake, especially Chignik Lake.

LITERATURE CITED

Bouwens, K.A. and H. Finkle. 2003. Chignik watershed ecological assessment project season report, 2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K03-10.

Bouwens, K.A. and A. Poetter. 2006. 2002 Chignik Management Area annual management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Management Report No. 06-21, Anchorage.

Edmundson, J.A. and A. Mazumder. 2001. Linking growth of juvenile sockeye salmon to habitat temperature in Alaskan lakes. Transactions of the American Fisheries Society. 130:644-662.

Elwood, J.W. and T. F. Waters. 1969. Effects of Floods on Food Consumption and Production Rates of a Stream Brook Trout Population. Transactions of the American Fisheries Society. 98:2:253-262.

Finkle, H. 2007. Chignik watershed ecological assessment project season report, 2006. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fisheries Management Report No. 07-51. Kodiak.

Finkle, H. and K.A. Bouwens. 2001. Chignik watershed ecological assessment project season report, 2000. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K01-51.

Finkle H. and D. Ruhl. 2008. Sockeye salmon smolt investigations on the Chignik River system, 2008. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fisheries Data Series Report No. 09-16. Kodiak.

Honnold, S. G. and S. T. Schrof. 2001. The results of sockeye salmon *Oncorhynchus nerka* stocking into Hidden Lake on the Kodiak National Wildlife Refuge: Juvenile and adult production, commercial harvest, and ecosystem effects, 1987-1999, Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K01-32, Kodiak.

Kerfoot, W. C. 1987. Cascading effects and indirect pathways. p. 57-69 in Kerfoot, W.C. and A. Sih. {ed.} Predation: Direct and indirect impacts on aquatic communities. University Press of New England. Hanover and London.

Koenings, J.P. and R.D. Burkett. 1987. Population characteristics of sockeye salmon (Oncorhynchus nerka) smolt relative to temperature regimes, euphotic volume, fry density, and forage base within Alaskan lakes. p. 216-234 in H.D. Smith L. Margolis, and C.C. Wood {ed.} Sockeye Salmon (Oncorhynchus nerka) population biology and future management. Can. Spec. Publ. Fish. Aquat. Sci. 96.

Kyle, G. B. 1992. Assessment of lacustrine productivity relative to juvenile sockeye salmon (*Oncorhynchus nerka)* production in Chignik and Black Lakes: Results from 1991 surveys. Alaska Department of Fish and Game, FRED Division Report 119.

Loewen, M. and J. Bradbury. *In press*. Sockeye Salmon Smolt Investigations on the Chignik River, 2009. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fisheries Data Series Report No. 10-XX. Kodiak.

Narver, D.W. 1966. Pelagial ecology and carrying capacity of sockeye in the Chignik Lakes, Alaska. Ph.D. Thesis. Univ. of Washington, Seattle. 348 p.

Paidere, J., D. Gruberts, A. Skute, and I. Druvietis. 2007. Impact of two different flood pulses on planktonic communities of the largest floodplain lakes of the Daugava River (Latvia). Hydrobiologia. 592:303-314.

Parr, W.H., Jr. 1972. Interactions between sockeye salmon and resident lake fish in the Chignik Lakes, Alaska. M. Sc. thesis. Univ. of Washington, Seattle. 103 p.

Reynolds, C.S. 1993. Scales of disturbance and their role in plankton ecology. Hydrobiologia. 294:1-3:151-171.

Schindler, D. E. 1992. Nutrient regeneration of sockeye salmon (*Oncorhynchus nerka*) fry and subsequent effects on zooplankton and phytoplankton. Can. J. Fish. Aquat. Sci. 49:2498-2506.

APPENDIX B. SUMMARY OF 2010 EMERGENCY ORDERS

Appendix B1.–Summary of the 2010 Chignik Management Area Emergency Orders.

E.O. Number	Issued	Effective	Action taken
4-FS-L-01-10	4:15 PM 6/15/2010	8:00 PM 6/16/2010	**Opens** the Chignik Bay, Central, and Eastern districts as well as the Inner Castle Cape Subsection of the Western District for 48 hours from 8:00 PM Wednesday, June 16 until 8:00 PM Friday, June 18. **Closed Waters** Effective 8:00 PM Wednesday, June 16 salmon may only be taken northeast of Humes Point.
4-FS-L-02-10	6:15 PM 6/16/2010	8:00 PM 6/18/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay, Central, and Eastern districts as well as the Inner Castle Cape Subsection of the Western District for 24 hours from 8:00 PM Friday, June 18 until 8:00 PM Saturday, June 19. **Opens** the Western District, excluding the Inner Castle Cape Subsection, for 48 hours from 8:00 PM Thursday, June 17 to 8:00 PM Saturday, June 19.
4-FS-L-03-10	5:15 PM 6/17/2010	9:00 PM 6/17/2010	**Closed Waters** Effective 9:00 PM Thrsday, June 17 salmon may only be taken northeast of Mensis Point.
4-FS-L-04-10	6:15 PM 6/18/2010	8:00 PM 6/19/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay, Central, and Eastern districts as well as the Inner Castle Cape Subsection of the Western District for 52 hours from 8:00 PM Saturday, June 19 to 11:59 PM Monday, June 21.
4-FS-L-05-10	5:00 PM 6/20/2010	11:59 PM 6/21/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay, Central, and Eastern districts as well as the Inner Castle Cape Subsection of the Western District for 89 hours from 11:59 PM Monday, June 21 until 5:00 PM Friday, June 25. **Opens** the Western District, excluding the Inner Castle Cape Subsection, for 48 hours from 5:00 PM Wednesday, June 23 to 5:00 PM Friday, June 25.
4-FS-L-06-10	6:15 PM 6/24/2010	5:00 PM 6/25/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay, Central, Eastern districts as well as the Inner Castle Cape Subsection of the Western District for 48 hours from 5:00 PM Friday, June 25 to 5:00 PM Sunday, July 27. **Closed Waters** Effective 10:00 AM Friday, July 25 salmon may only be taken northeast of Humes Point.
4-FS-L-07-10	4:00 PM 7/1/2010	8:00 AM 7/2/2010	**Opens** the Chignik Bay, Central, and Eastern districts as well as the Inner Castle Cape Subsection of the Western District for 96 hours from 8:00 AM Friday, July 2 until 8:00 AM Tuesday, July 6. **Closed Waters** Effective 8:00 AM Friday, July 2 salmon may only be taken northeast of Mensis Point.
4-FS-L-08-10	5:15 PM 7/5/2010	8:00 AM 7/6/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay, Central, Eastern districts as well as the Inner Castle Cape Subsection of the Western District for 79 hours from 8:00 AM Tueday, July 6 to 3:00 PM Friday, July 9.
4-FS-L-09-10	6:15 PM 7/10/2010	5:00 PM 7/11/2010	**Opens** the Chignik Bay, Central, Eastern, Western, and Perryville districts for 72 hours from 5:00 PM Sunday, July 11 to 5:00 PM Wednesday, July 14. **Closed Waters** Effective 5:00 PM Sunday, July 11 salmon may only be taken northeast of Humes Point.
4-FS-L-10-10	10:15 AM 7/11/2010	5:00 PM 7/11/2010	**Closed Waters** Effective 5:00 PM Sunday, July 11 salmon may only be taken northeast of Mensis Point.
4-FS-L-11-10	5:00 PM 7/13/2010	5:00 PM 7/14/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay and Central districts as well as the Inner Castle Cape Subsection of the Western District for 89 hours from 5:00 PM Wednesday, July 14 until 10:00 AM Sunday, July 18. **Extends** the current commercial salmon fishing period in the Eastern, Western, and Perryville districts for an additional 48 hours from 5:00 PM Wednesday, July 14 to 5:00 PM Friday, July 16.

-continued-

Appendix B1.–Page 2 of 3.

E.O. Number	Issued	Effective	Action taken
4-FS-L-12-10	9:15 AM 7/16/2010	5:00 PM 7/16/2010	**Extends** the current commercial salmon fishing period in the Eastern, Western and Perryville districts for an additional 41 hours from 5:00 PM Friday, July 16 to 5:00 PM Sunday, July 18.
4-FS-L-13-10	1:00 PM 7/20/2010	2:00 PM 7/21/2010	**Opens** the Chignik Bay, Central, Eastern, Western and Perryville districts for 48 hours from 2:00 PM Wednesday, July 21 to 2:00 PM Friday, July 23. **Closed Waters** Effective 2:00 PM Wednesday, July 21 salmon may only be taken northeast of Humes Point.
4-FS-L-14-10	6:15 PM 7/22/2010	2:00 PM 7/23/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay, Central, Eastern, Western, and Perryville districts for 51 hours from 2:00 PM Friday, July 23 to 5:00 PM Sunday, July 25.
4-FS-L-15-10	6:15 PM 7/27/2010	7:00 AM 7/29/2010	**Opens** the Chignik Bay, Central, Eastern, Western, and Perryville districts for 61 hours from 7:00 AM Thursday, July 29 to 8:00 PM Saturday, July 31. **Closed Waters** Effective 7:00 AM Thursday, July 29 salmon may only be taken northeast of Humes Point.
4-FS-L-16-10	9:15 AM 7/29/2010	7:00 PM 7/29/2010	**Closed Waters** Effective 7:00 PM Thursday, July 29 salmon may only be taken northeast of Mensis Point.
4-FS-L-17-10	4:00 PM 7/30/2010	8:00 PM 7/31/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay, Central, Western, and Perryville districts for 48 hours from 8:00 PM Saturday, July 31 to 8:00 PM Monday, August 2.
4-FS-L-18-10	6:15 PM 8/1/2010	8:00 PM 8/2/2009	**Extends** the current commercial salmon fishing period in the Chignik Bay and Central districts for 72 hours from 8:00 PM Monday, August 2 to 8:00 PM Thursday, August 5.
4-FS-L-19-10	11:00 AM 8/2/2010	8:00 PM 8/2/2010	**Extends** the current commercial salmon fishing period in the Inner Castle Cape Subsection of the Western District for 72 hours from 8:00 PM Monday, August 2 to 8:00 PM Thursday, August 5.
4-FS-L-20-10	6:15 PM 8/4/2010	8:00 PM 8/5/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay and Central districts as well as the Inner Castle Cape Subsection of the Western District for 96 hours from 8:00 PM Thursday, August 5 to 8:00 PM Monday, August 9. **Opens** the Western District, exluding the Inner Castle Cape Subsection, and the Perryville District for 48 hours from 8:00 PM Saturday, August 7 to 8:00 PM Monday, August 9.
4-FS-L-21-10	6:15 PM 8/8/2010	8:00 PM 8/9/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay and Central districts as well as the Inner Castle Cape Subsection of the Western District from 8:00 PM Monday, August 9 to 8:00 PM Monday, August 16. **Extends** the current commercial salmon fishing period in the Western District, exluding the Inner Castle Cape Subsection, and the Perryville District for 28 hours from 8:00 PM Monday, August 9 to 11:59 PM Tuesday, August 10.
4-FS-L-22-10	6:15 PM 8/12/2010	6:00 PM 8/13/2010	**Extends** the current commercial salmon fishing period in the Chignik Bay and Central districts until further notice. **Opens** the Eastern, Western, and Perryville districts for 96 hours from 6:00 PM Friday, August 13 to 6:00 PM Tuesday, August 17.
4-FS-L-23-10	12:15 PM 8/16/2010	6:00 PM 8/17/2010	**Extends** the current commercial salmon fishing period in the Eastern, Western, and Perryville districts for 78 hours from 6:00 PM Tuesday, August 17 to 11:59 PM Friday, August 20.

-continued-

Appendix B1.–Page 3 of 3.

E.O. Number	**Issued**	**Effective**	Action taken
4-FS-L-24-10	6:15 PM 8/19/2010	11:59 PM 8/20/2010	**Extends** the current commercial salmon fishing period in the Eastern, Western, and Perryville districts, excluding the Perryville Section, for 96 hours from 11:59 PM Friday, August 20 to 11:59 PM Tuesday, August 24.
4-FS-L-25-10	6:15 PM 8/23/2010	11:59 PM 8/24/2010	**Extends** the current commercial salmon fishing period in the Eastern, Western, and Perryville districts, excluding the Perryville Section, for 96 hours from 11:59 PM Tuesday, August 24 to 11:59 PM Saturday, August 28.
4-FS-L-26-10	4:00 PM 8/26/2010	11:59 PM 8/28/2010	**Extends** the current commercial salmon fishing period in the Eastern, Western, and Perryville districts, excluding the Perryville Section until further notice.
4-FS-L-27-10	12:00 PM 9/7/2010	11:59 PM 9/7/2010	**Closes** the current commercial salmon fishing period in the Chignik Bay, Central, Eastern, Western, and Perryville districts at 11:59 PM Tuesday, September 7.

APPENDIX C. MEMORANDUM SUMMARIZING THE DEPLOYMENT OF DIDSON IN THE CHIGNIK RIVER, 2010

Appendix C1.–Memorandum summarizing the deployment of DIDSON in the Chignik River, 2010.

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

MEMORANDUM

TO: Mark Witteveen
Finfish Research Biologist
Division of Commercial Fisheries
Region IV – Kodiak

DATE: October 13, 2010
PHONE: (907) 486-1805
FAX: (907) 486-1841

SUBJECT: Chignik DIDSON deployment

FROM: Mary Beth Loewen
Finfish Research Biologist
Division of Commercial Fisheries
Region IV - Kodiak

This memo describes the initial findings from a two-week DIDSON deployment on the Chignik River in June 2010.

In 2010, staff arrived in Chignik in May to find extremely low water and the largest snowpack in many years. Concerns that low water levels threatened the commercial fishery opener by delaying the installation of the weir prompted staff to borrow a DIDSON sonar unit from Region III as a backup to the weir. The DIDSON was to be used as an emergency backup system for escapement estimation in the event that the piledriver could not be floated. As the snowpack melted, high water conditions threatened the installed weir, requiring 24-hour observation and maintenance to maintain the structure. At this point, the DIDSON was deployed to obtain counts of escapement in the event of a weir washout. The DIDSON successfully ensonified fish for 15 days despite changes in water level.

Split-beam sonar has been deployed in the Chignik Management Area several times in the past decade in attempts to enumerate riverine escapement in Black and Chignik rivers. Feasibility studies have been conducted to find suitable placement for a sonar site on the Black River, and in 2000, split-beam sonar that had been deployed in Black River was relocated to the Chignik River Weir when high water compromised the weir structure. However, each of these projects were short-term funded projects or feasibility studies. In 2003, bottom profiles and flow rates for several sites in the Chignik River were measured, with the beamwidth and detection capabilities of DIDSON sonar specifically in mind.

In 2010 a DIDSON LongRange (working range approximately 60m) was initially deployed May 27th, with significant fish passage beginning June 3rd. Beginning June 3rd, the sonar was operated continually,

and the only loss of recording due to generator malfunction or the necessity to move and aim the sonar with water level fluctuation. The DIDSON was deployed approximately 125m downstream of the current sockeye salmon smolt traps (56° 15.484'N 158° 43.765' W; Figures 1 and 2). The width of the river at this point is approximately 47m, and maximum bottom depth of 3.15m. This site was chosen based on bottom profiles established in the 2003 study, river width, and suitable bank structure for running the computer and generator necessary to operate the DIDSON. The bottom in this area is comprised primarily of cobble, some boulders, and rock, and the opposite bank is a steep rocky wall.

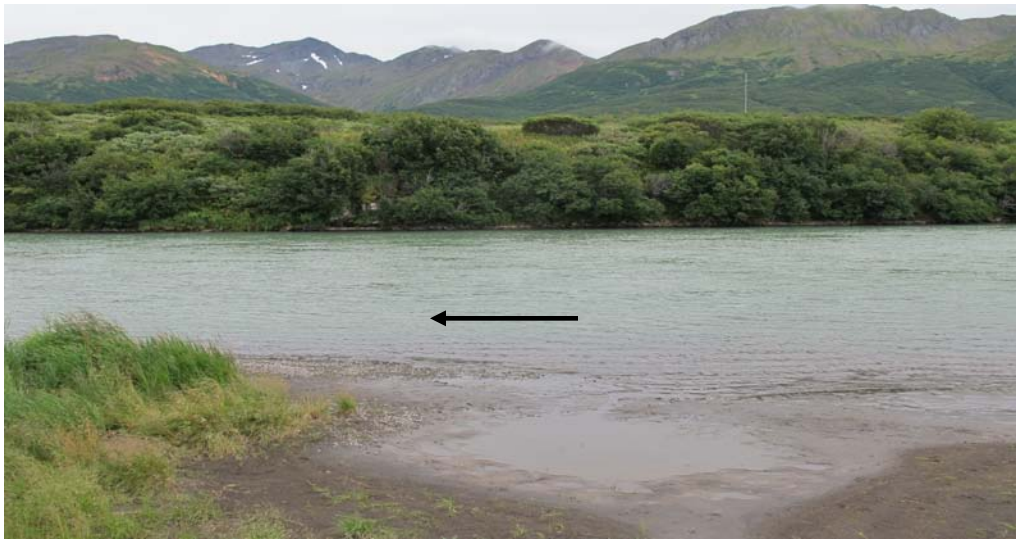

Figure 1. Looking to south bank from sonar site. Smolt trap approximately 125m from right edge of photo. Arrow shows flow direction.

Figure 2. Looking to north bank, where sonar and generator were located. Arrow shows approximate deployment point in river, which is the same point at the end of the black arrow in first photo. Arrow shows flow direction.

Ensonification of the entire river width was possible with the DIDSON, although most salmon were observed within 30m of the face of the sonar (approximately 83% of counted fish). While schools and individual fish were still distinguishable at distance, the resolution of the echogram deteriorated and counting salmon was more difficult at longer window ranges (40m window length). When it became clear that most fish passage occurred within 30 m of the north bank (Figure 3), this nearshore area was more intensely sampled. During the first 10 minutes of each hour, a window length of 40m was used to ensonify the entire river, and the rest of the hour a 20m window was used. Time-stratified sampling in this way is standard on many Alaska systems where river width exceeds working beam resolution.

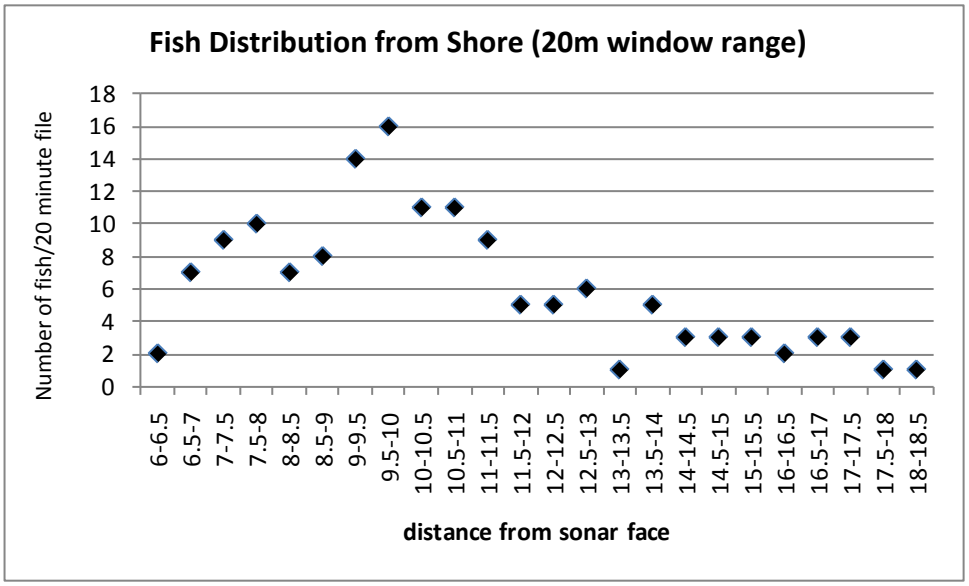

Figure 3. Typical cross-river distribution of salmon moving past DIDSON sonar, Chignik River June 2010.

Fish observed passing through the weir gates would pass the sonar approximately thirty minutes to one hour later. Upstream movement patterns matched those seen at the weir site with little to no fish passage during the midnight- 5:00 a.m. hours. No evidence of milling or fish backing down river was observed. The highest 10 minute count of any file was 260 fish. Clouds of what were likely sockeye salmon smolt moving downstream during nighttime hours were recorded, but no attempt was made to enumerate these small fish.

Normal weir enumeration procedures (10 minute actual counts expanded by a factor of 6) were maintained throughout the DIDSON period. Further work with whole-hour counts at the weir and comparison with sonar enumeration is needed to ascertain where discrepancies in enumeration by day occur. Past split-beam sonar enumeration was found to be within 4% accurate of the weir counts (Anders, unpublished memo 2000) and DIDSON counts compared well with weir counts, especially during high passage days. For example, 8,958 sockeye salmon were counted through weir camera gates compared to 8,274 fish counted on the sonar on June 12th, and 11,934 sockeye salmon were counted past the weir, with 9,073 fish counted using DIDSON on June 13th.

Concerns for implementation of a DIDSON sonar system at Chignik River as a backup or support to enumeration at the Chignik River weir include:

1. Processing of files would require at least two trained employees. Counting high passage can be time-intensive, so a dedicated technician is needed in order to stay up-to-date with passage enumeration during periods of large escapements.
2. A small (approximately 2 tripod) weir behind the sonar itself would allow for deployment further offshore, without the risk of fish traveling undetected upstream. This was not a problem in 2010, but should be incorporated into future work for high passage days.
3. A tent or weatherport on the bank would allow for safe, weather-proof operation of laptops, generator, inverter, and a place for technicians to count while at the sonar site.
4. Later in season when multiple species are moving upstream, some method of species identification, likely beach seining, would be necessary for accurate species apportionment to the signal return.

CC: Anderson, Honnold, Nemeth, Nichols, Wadle.

APPENDIX D. 2010 CHIGNIK SOCKEYE SALMON POSTWEIR ESCAPEMENT ESTIMATE MEMORANDUM

Appendix D1.–2010 Chignik sockeye salmon post-weir escapement estimate memorandum.

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

MEMORANDUM

TO:	Todd Anderson Chignik Assistant Area Management Biologist Commercial Fisheries Division Region IV - Chignik	DATE: PHONE: FAX:	November 3, 2010 (907) 486-1805 (907) 486-1841
And	Jeff Wadle Regional Finfish Management Supervisor Commercial Fisheries Division Region IV – Kodiak	SUBJECT:	Chignik Post-weir Escapement Estimate
FROM:	Mary Loewen Finfish Research Biologist Commercial Fisheries Division Region IV - Kodiak		

In 2010 the Chignik sockeye salmon post-weir escapement was estimated using time series analysis of run data collected between July 30th and September 2nd (Figure 1), after which the weir was dismantled. The Chignik sockeye salmon run is historically composed 100% of late-run fish after July 31st (M. Witteveen, Fishery Biologist ADF&G, 2004 memo) and the 2010 run data exhibited a steady declining trend for the overall sockeye salmon run. The data used in this analysis are considered preliminary.

Time series analysis estimates the rate of decay in the run and forecasts future escapements after weir removal assuming that the forecast escapement follows the same rate of decay as the run. If fishing occurs during a post-weir period, those harvests must be subtracted from the post-weir estimate. In 2010, harvests occurred on three days (September 3rd through September 5th) following removal of the weir. The catch data were subtracted from their respective time-series analysis daily run estimates to calculate the daily escapement estimates for those days.

The data used in the Chignik sockeye salmon time series analysis (Figure 2) followed autoregressive one [AR(1)] type decay (Chatfield 1985), which is typical for Chignik sockeye salmon post-weir estimate analyses. The 2010 analysis resulted in an estimated escapement for September 3rd to September 15th of 20,539 sockeye salmon. The estimated escapement for September 16th to September 30th was 6,491 sockeye salmon. The estimated sockeye salmon escapement for the entire month of September was 30,630 fish, which includes 3,600 sockeye salmon counted through the weir on September 1st and 2nd.

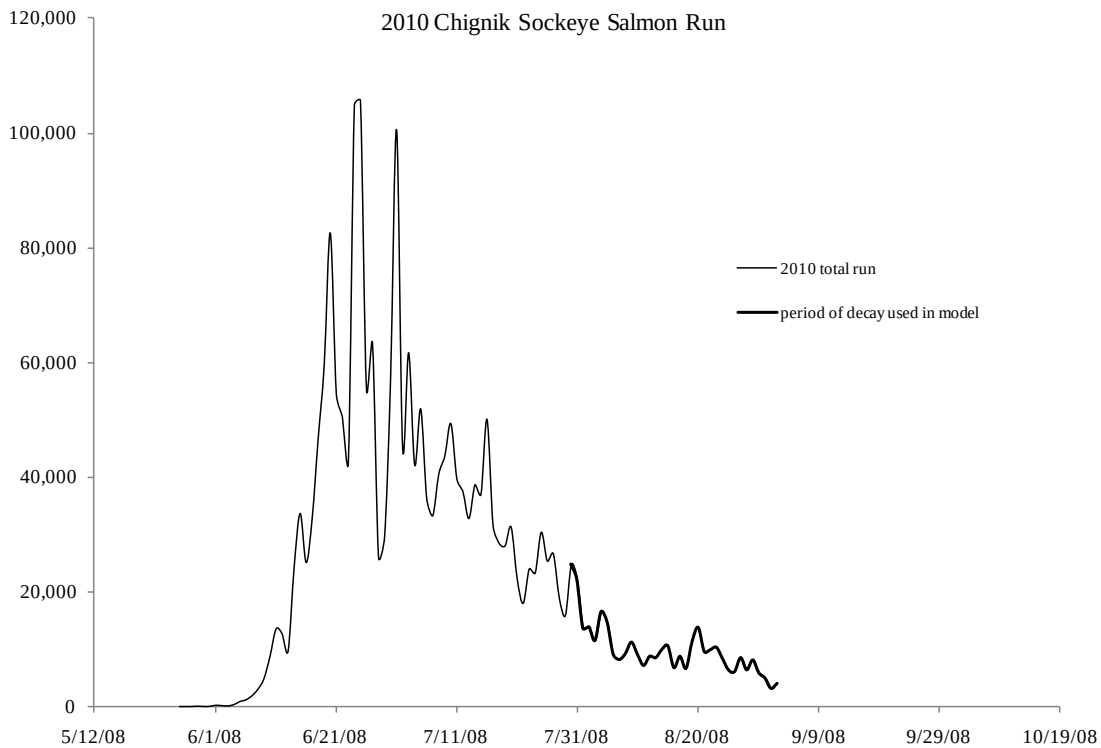

Figure 1. 2010 Chignik sockeye salmon run prior to weir removal. Data from July 30th to September 2nd were used in the model.

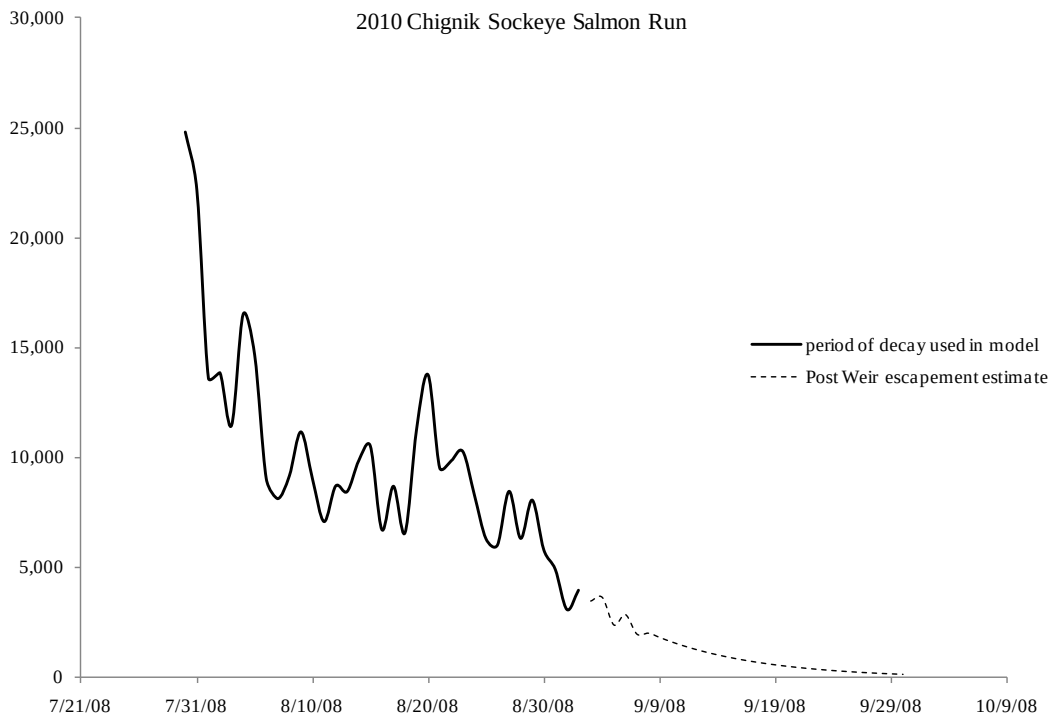

Figure 2. Detail of period of run decay and post-weir estimate for 2010 Chignik sockeye salmon run.

The error associated with this estimate was similar to past time series post-weir estimates.

CC: David Barnard, Steve Honnold, Matt Nemeth, Nat Nichols, Mark Witteveen

Chatfield, C. 1985. The Analysis of Time Series: An Introduction, 3rd ed. Chatman and Hall, London.

APPENDIX E. COMMERCIAL SALMON FISHERY CATCH AND EFFORT, BY DAY

Appendix E1.–Commercial salmon fishing effort and harvest (including home pack but not including the department's test fishery harvest), by day in the Chignik Management Area, 2010.

	Effort		Chinook		Sockeye		Coho		Pink		Chum		Total	
Date	Permits	Landings	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
16-Jun	8	8	0	0	3,152	20,095	0	0	0	0	0	0	3,152	20,095
17-Jun	38	40	16	304	38,633	244,448	0	0	152	439	430	3,876	39,231	249,067
18-Jun	43	43	15	215	56,691	342,623	0	0	2,179	3,696	2,270	16,517	61,155	363,051
19-Jun	44	47	32	508	51,817	329,388	0	0	97	279	672	5,718	52,618	335,893
20-Jun	41	45	29	438	47,764	300,067	1	6	581	2,080	1,536	10,874	49,911	313,465
21-Jun	45	49	44	582	55,285	342,604	0	0	1,409	3,756	2,837	19,775	59,575	366,717
22-Jun	44	49	38	397	43,847	271,717	0	0	1,585	3,597	2,516	18,195	47,986	293,906
23-Jun	56	57	66	827	66,285	415,093	0	0	1,994	7,752	4,289	32,051	72,634	455,723
24-Jun	46	49	41	455	39,087	252,474	1	5	2,077	5,450	3,874	30,017	45,080	288,401
25-Jun	48	49	24	320	43,833	281,947	0	0	2,053	4,503	2,384	17,668	48,294	304,438
26-Jun	36	40	6	88	25,901	169,699	0	0	213	586	369	2,634	26,489	173,007
27-Jun	42	44	21	347	22,232	145,003	0	0	1,048	3,027	1,624	13,574	24,925	161,951
28-Jun							Fishery Closed							
29-Jun							Fishery Closed							
30-Jun							Fishery Closed							
1-Jul							Fishery Closed							
2-Jul	58	62	120	1,873	64,546	413,261	4	27	811	1,898	5,791	44,003	71,272	461,062
3-Jul	56	59	74	1,069	40,351	271,703	2	14	2,384	7,641	7,263	54,624	50,074	335,051
4-Jul	51	53	129	2,209	39,421	258,083	93	593	2,494	5,787	5,773	44,124	47,910	310,796
5-Jul	47	50	191	2,572	30,125	207,915	1	5	630	2,365	4,021	29,317	34,968	242,174
6-Jul	52	53	180	2,576	44,176	287,105	145	919	1,828	5,406	8,768	70,191	55,097	366,197
7-Jul	47	47	271	2,844	45,926	302,990	228	1,604	2,693	7,038	13,613	107,540	62,731	422,016
8-Jul	47	53	190	2,516	40,304	276,785	528	3,548	2,471	7,878	9,126	67,177	52,619	357,904
9-Jul	16	16	47	702	7,204	51,222	2	9	2	8	14	108	7,269	52,049
10-Jul							Fishery Closed							
11-Jul	35	38	123	1,341	21,213	147,704	673	4,043	1,002	3,007	2,156	15,064	25,167	171,159
12-Jul	55	57	937	9,601	47,331	321,115	3,425	25,307	8,528	29,183	22,782	177,512	83,003	562,718
13-Jul	50	53	224	3,294	26,491	185,778	5,158	31,546	7,471	22,866	17,036	125,154	56,380	368,638
14-Jul	53	57	1,394	11,236	33,088	225,707	6,977	45,660	11,884	35,382	18,216	143,612	71,559	461,597
15-Jul	53	57	689	6,573	39,425	272,203	3,173	19,875	8,580	28,175	11,763	91,318	63,630	418,144
16-Jul	50	51	1,380	9,665	30,243	209,717	3,857	29,342	8,507	29,971	9,942	75,482	53,929	354,177
17-Jul	48	49	385	4,126	33,292	223,154	3,473	23,559	9,718	30,747	12,697	88,011	59,565	369,597
18-Jul	35	35	307	2,638	11,934	79,328	2,801	19,101	7,249	25,345	8,388	57,941	30,679	184,353

-continued-

Appendix E1.–Page 2 of 3.

	Effort		Chinook		Sockeye		Coho		Pink		Chum		Total	
Date	Permits	Landings	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
19-Jul							Fishery Closed							
20-Jul							Fishery Closed							
21-Jul	40	40	68	1,006	9,323	63,269	2,862	18,044	4,023	14,620	5,589	45,873	21,865	142,812
22-Jul	52	57	214	2,390	18,985	126,079	9,735	64,087	19,612	67,150	20,590	159,989	69,136	419,695
23-Jul	52	53	271	2,556	18,062	118,008	6,546	42,465	24,350	84,881	27,805	198,338	77,034	446,248
24-Jul	51	51	443	3,681	18,437	121,841	8,046	57,957	27,703	96,046	42,608	330,051	97,237	609,576
25-Jul	46	46	71	771	10,738	65,519	674	5,015	9,636	35,998	11,863	88,392	32,982	195,695
26-Jul							Fishery Closed							
27-Jul							Fishery Closed							
28-Jul							Fishery Closed							
29-Jul	57	58	71	861	17,978	115,554	2,659	20,189	27,924	99,931	41,840	341,634	90,472	578,169
30-Jul	45	47	54	765	16,096	104,852	4,747	29,513	23,167	75,696	21,809	165,257	65,873	376,083
31-Jul	54	58	134	1,739	11,520	73,257	8,358	58,398	41,263	140,314	41,961	313,629	103,236	587,337
1-Aug	51	52	161	1,962	15,315	95,597	11,290	75,729	46,797	151,846	36,813	255,086	110,376	580,220
2-Aug	51	52	179	2,046	13,718	84,501	5,388	43,568	30,451	106,717	28,256	232,789	77,992	469,621
3-Aug	32	32	83	647	6,783	43,726	1,187	8,724	9,347	29,815	6,612	56,525	24,012	139,437
4-Aug	39	39	97	798	8,998	55,323	2,648	20,575	14,506	55,505	14,379	112,498	40,628	244,699
5-Aug	36	37	106	1,462	6,880	45,527	2,937	22,772	15,703	55,818	8,417	71,602	34,043	197,181
6-Aug	27	29	86	886	6,112	37,256	1,100	8,479	5,167	20,862	5,111	40,421	17,576	107,904
7-Aug	24	25	134	1,125	7,841	50,936	1,292	9,080	6,988	25,680	5,038	38,783	21,293	125,604
8-Aug	42	42	99	1,021	6,779	44,422	4,755	34,372	10,536	34,620	8,614	67,363	30,783	181,798
9-Aug	29	29	20	225	3,837	25,380	2,640	18,455	6,605	21,173	2,935	20,472	16,037	85,705
10-Aug	35	35	79	699	6,460	41,998	3,521	25,182	8,876	32,431	6,003	44,854	24,939	145,164
11-Aug	39	39	176	1,775	9,184	57,752	3,998	31,221	12,908	48,208	8,680	65,786	34,946	204,742
12-Aug	31	32	270	2,748	7,255	44,969	3,291	20,730	9,427	32,865	5,880	45,260	26,123	146,572
13-Aug	19	20	40	364	3,529	22,897	293	2,062	1,825	6,619	3,569	25,058	9,256	57,000
14-Aug	8	8	1	20	2,651	17,543	10	50	218	846	202	1,339	3,082	19,798
15-Aug	16	16	3	33	4,643	30,538	422	3,050	2,066	7,523	6,043	42,433	13,177	83,577
16-Aug	28	28	37	381	5,825	38,423	4,130	28,124	8,343	31,239	5,010	37,225	23,345	135,392
17-Aug	20	21	18	174	3,965	25,919	3,674	27,885	4,472	14,860	3,830	30,018	15,959	98,856
18-Aug	21	21	68	507	6,181	41,068	1,134	8,662	4,620	16,891	3,151	23,033	15,154	90,161

-continued-

Appendix E1.–Page 3 of 3.

	Effort		Chinook		Sockeye		Coho		Pink		Chum		Total	
Date	Permits	Landings	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
19-Aug	26	28	12	141	11,632	77,331	1,785	12,099	4,602	14,827	3,267	23,729	21,298	128,127
20-Aug	20	22	185	1,941	8,448	55,761	1,923	15,400	5,749	18,386	18,866	151,450	35,171	242,938
21-Aug	20	20	21	216	7,500	49,775	4,020	31,379	4,391	14,789	2,165	15,230	18,097	111,389
22-Aug	16	18	64	526	6,506	43,943	439	3,060	1,164	3,979	667	4,490	8,840	55,998
23-Aug	12	12	1	30	4,225	27,744	162	1,338	847	2,832	1,234	9,735	6,469	41,679
24-Aug	15	15	2	29	3,739	24,665	801	5,704	825	2,722	224	1,632	5,591	34,752
25-Aug	15	15	0	0	4,111	27,705	405	3,088	322	1,040	129	887	4,967	32,720
26-Aug	15	16	62	656	7,348	49,157	2,820	21,803	1,964	6,760	591	4,604	12,785	82,980
27-Aug	12	12	0	0	4,232	27,434	602	4,752	361	1,392	57	343	5,252	33,921
28-Aug	15	16	7	78	4,310	28,070	2,665	19,379	1,515	4,909	348	2,345	8,845	54,781
29-Aug	11	11	15	173	3,231	20,934	1,514	11,721	618	2,048	183	1,187	5,561	36,063
30-Aug	10	10	0	0	2,634	16,919	1,253	10,683	158	608	25	166	4,070	28,376
31-Aug	13	13	18	196	2,135	13,680	2,318	18,507	427	1,494	263	1,814	5,161	35,691
1-Sep	8	8	0	0	1,667	10,718	2,185	18,842	78	297	20	121	3,950	29,978
2-Sep	8	9	28	340	1,069	7,003	3,131	24,067	460	1,450	458	3,082	5,146	35,942
3-Sep	11	11	9	108	1,047	7,017	2,173	18,761	54	183	40	263	3,323	26,332
4-Sep	7	7	0	0	1,402	8,866	1,787	15,911	40	137	17	83	3,246	24,997
5-Sep	9	9	0	0	1,312	8,893	1,336	11,833	33	116	17	96	2,698	20,938
6-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	65	2,529	10,380	104,392	1,373,240	8,946,697	159,198	1,137,878	489,781	1,663,985	581,329	4,437,042	2,613,928	16,289,994