Fishery Management Report No. 15-29

2012 Kuskokwim Area Management Report

by

Travis Elison

Aaron Tiernan

and

Davin Taylor

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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

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Travis Elison, Aaron Tiernan, and Davin Taylor
Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage

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

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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.adfg.alaska.gov/sf/publications/. This publication has undergone regional peer review.

Travis Elison, Aaron Tiernan, and Davin Taylor
Alaska Department of Fish and Game, Division of Commercial Fisheries,
333 Raspberry Road, Anchorage, AK 99518, USA

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ABSTRACT

The *2012 Kuskokwim Area Management Report* is an annual volume reporting on management activities of the Alaska Department of Fish and Game, Division of Commercial Fisheries staff in the Kuskokwim River and Kuskokwim Bay. The report emphasizes a descriptive account of the information, decisions, and rationale used to manage the Kuskokwim River and Bay subsistence and commercial salmon (Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, sockeye *O. nerka*, and coho *O. kisutch*) and Pacific herring *Clupea pallasii* fisheries, and outlines basic management objectives and procedures. We have included all information deemed necessary to fully explain the rationale behind management decisions in 2012. To aid in the use of the document as a reference source, all narrative and data tabulations in this volume are combined into 4 sections: salmon, subsistence, herring, and miscellaneous fisheries. The extensive set of tables has been updated to record previously unlisted data for easy reference. Fisheries data in this report supersedes information in previous reports. Corrections or comments should be directed to the Anchorage office (Attention: Kuskokwim Area Management Biologist, 333 Raspberry Road, Anchorage, Alaska, 99518).

Keywords: Pacific salmon *Oncorhynchus* spp., Chinook salmon, *Oncorhynchus tshawytscha*, chum *O. keta*, sockeye *O. nerka*, coho, *O. kisutch*, Pacific herring, *Clupea pallasii*, Kuskokwim River, Kuskokwim Bay, subsistence fisheries, commercial fisheries, subsistence, Annual Management Report (AMR).

INTRODUCTION

MANAGEMENT AREA DESCRIPTION

The Kuskokwim Management Area (KMA) includes the Kuskokwim River drainage, all waters of Alaska that flow into the Bering Sea between Cape Newenham and the Naskonat Peninsula, and Nunivak and St. Matthew Islands (Figure 1).

KUSKOKWIM SALMON FISHERY

There are 38 communities consisting of approximately 4,800 households within the KMA. Of those households, approximately 75% are situated within the drainage of the Kuskokwim River (Shelden et al. 2014). Bethel is the largest community in the region, containing approximately 2,000 households. Much of the Pacific salmon *Oncorhynchus* spp. fishing effort occurs within the mainstem of the Kuskokwim River; however, fishing also occurs in many of the tributaries that contain salmon. Residents of Quinhagak, Goodnews Bay, and Platinum, located along the south shore of Kuskokwim Bay, harvest salmon stocks primarily from the Kanektok, Arolik, and Goodnews River systems. Residents of Kipnuk, Kwigillingok, and Kongiganak, located on the north Kuskokwim Bay, harvest salmon from within the Kuskokwim River drainage and from local drainages that drain into Kuskokwim Bay. Residents of Toksook Bay, Nightmute, Tununak, Newtok, Chefornak, and Mekoryuk, which are situated near the Bering Sea Coast, harvest salmon from coastal waters and local streams. There are over 40 fish species present in the Kuskokwim Management Area (Appendix A1).

There are currently 4 commercial salmon fishing districts in the KMA (5 AAC 07.200). Districts 1, 2, 3, and 4 were established in 1960; however, District 3 (Upper Kuskokwim River) was removed from regulation in 1966 due to lack of landings, and District 5 (Goodnews Bay) was established in 1968 (Appendix A2). District 1, Lower Kuskokwim River, consists of the Kuskokwim River from a line between Apokak Slough and the southernmost tip of Eek Island and Popokamiut upstream to a line between the Alaska Department of Fish and Game (ADF&G) regulatory markers located at Bogus Creek, about 9 miles upstream of the Tuluksak River (Figure 2). District 1 was divided into 2 subdistricts in 2000. Subdistrict 1-A consists of that portion of District 1 upstream from a line between regulatory markers located at the downstream

end of Steamboat Slough and includes Statistical Areas 335-13 and 335-14. Subdistrict 1-B consists of that portion of District 1 downstream from regulatory markers at Steamboat Slough and includes Statistical Areas 335-11 and 335-12. Subdistrict registration requirements are in effect in District 1 (5 AAC 07.370). District 2, Middle Kuskokwim River, consists of Kuskokwim River from ADF&G regulatory markers located at the upstream entrance to the second slough on the west bank downstream from Kalskag to the regulatory markers at Chuathbaluk (Figure 3). The most recent commercial fishing periods occurred in District 2 in 2000. For historical catch information from District 2, see Brazil et al. (2013). District 4, Quinhagak, consists of the waters of Kuskokwim Bay from the northernmost edge of the mouth of Weelung Creek to the southernmost tip of the south mouth of Arolik River and extends 3 miles from the coast (Figure 4). The Kanektok and Arolik rivers are the main spawning streams in the district. District 5 consists of that portion of Goodnews Bay east of a line from ADF&G regulatory markers located approximately 2 miles south and 2 miles north on the seaward side of the entrance of Goodnews Bay, and west of a line between the mouth of Ukfigag Creek to the mouth of the Tunulik River (Figure 5). The Goodnews River drainage is the main spawning drainage in the district.

MANAGEMENT

Background

The overall goal of Kuskokwim Area research and management programs is to manage salmon runs for sustained yield by the policies set forth by the Alaska Board of Fisheries (BOF), including the *Policy for the Management of Sustainable Salmon Fisheries* (5 AAC 39.222) and *Policy for Statewide Salmon Escapement Goal*s (5 AAC 39.223). For all statewide fisheries, the Alaska State Legislature has designated subsistence fishing as the highest priority among beneficial users of the resource (AS 16.05.258 Subsistence Use and Allocation of Fish and Game).

The Kuskokwim Management Area includes the Kuskokwim River and Kuskokwim Bay salmon fisheries. The immense size of the Kuskokwim River drainage and the distances between the commercial and subsistence fisheries and the escapement monitoring projects throughout the drainage adds complexity to the management of Kuskokwim River salmon fisheries (Appendix A3). Chinook salmon *O. tshawytscha* begin entry into the Kuskokwim River in late May, and sockeye *O. nerka* and chum *O. keta* salmon begin their entry in mid-June. Chinook and sockeye salmon runs slow in early July, whereas chum salmon run entry begins to slow in late July when coho *O. kisutch* salmon run entry begins. Coho salmon entry to the river slows in late August to early September. Fishery management information on run size and timing by species is limited until the salmon are distributed throughout the drainage and on the spawning grounds hundreds of miles from, and months after, the lower river fishery has been initiated.

Kuskokwim Bay salmon have similar run timing into the Kanektok, Goodnews, and Arolik rivers. These are small drainages in comparison to Kuskokwim River. Although evaluation of run size and timing in the Kuskokwim Bay rivers is not immediate, it is much timelier than the Kuskokwim River and there are fewer stocks to evaluate. Therefore, many of the factors that make Kuskokwim River fisheries management difficult are not present in Kuskokwim Bay fisheries.

Kuskokwim River Chinook salmon are primarily harvested for subsistence use. Commercial salmon fishing is restricted to 6.0-inch gillnet mesh size; however, in District 1, ADF&G may

have fishing periods during which gillnet mesh size may not exceed 8.0 in. To date, no fishing periods have been established that allow mesh size between 6.0 and 8.0 in. Small numbers of Chinook salmon are harvested in directed commercial fisheries during late June and July under a guideline harvest range of 0–50,000 fish. Directed Chinook salmon fisheries do occur in District 4, targeting Chinook salmon bound for the Kanektok and Arolik rivers, and District 5, targeting fish bound for the Goodnews River drainage. Chinook salmon are targeted because of timing of the fishery; however, only 6.0 in or smaller mesh size gillnets are allowed in Districts 4 and 5. The harvest of sockeye salmon was considered incidental to chum salmon harvest in Kuskokwim River between 1987 and 2003. However, beginning in 2004, a guideline harvest level of 0–50,000 sockeye salmon was established. Districts 4 and 5 commercial fisheries target sockeye and chum salmon. Coho salmon are targeted in all 3 commercial fishing districts, and directed coho salmon fisheries occur from late July through early September.

The KMA commercial fishery was relatively stable from 1980 to 1996, and harvests ranged from 740,000 fish to 2.3 million fish (Appendix A4). Effort ranged from 714 to 1,066 permits fished (Brazil et al. 2013), and the exvessel value of the fishery ranged from $2.9 million to $12.7 million (Appendix A5). Beginning in 1997, the value of salmon (particularly for chum salmon) began to decline, which led to a decreasing trend in fishing effort, number of fish harvested, and the exvessel value of the fishery. From 1997 through 2002, commercial salmon harvests in the area ranged from 185,000 fish in 2002 to 758,000 fish in 1998. Effort ranged from 407 permits in 2002 to 707 permits in 1998, and the exvessel value of the fishery ranged from $324,000 in 2002 to $1.6 million in 1998. Furthermore, poor Chinook and chum salmon returns between 1999 and 2001 resulted in limited commercial fishing opportunity in the Kuskokwim River during June and July.

As Kuskokwim River Chinook and chum salmon abundances rebounded in the mid-2000s, poor market conditions for chum salmon, in concert with limited processing capacity, continued to limit District 1 commercial salmon fishing opportunity during June and July. Likewise, the same factors limited District 4 and District 5 commercial fishing opportunity during July, and buyers imposed harvest limits on fishermen during early July between 2006 and 2008 (Appendix A2). Since 2004, commercial salmon harvests in the area have ranged between 393,700 fish and 687,800 fish (Appendix A4). Effort ranged between 434 permit holders and 530 permit holders, and the exvessel value of salmon in the KMA has rebounded from the early 2000s with the exvessel value ranging between $1.1 million and $2.9 million (Appendix A5). A new fish processing plant located in Platinum began operation in 2009 and has improved processing capacity in the area, and the chum salmon market has improved. Both factors led to increased fishing opportunity since 2009.

Kuskokwim River Chinook salmon are primarily harvested for subsistence use; however, harvest has been below the historical average since 1996 (Appendix B1). Since 2000, Chinook salmon harvests have contributed between 0% and 13% of the District 1 commercial salmon exvessel value (Appendix B2). Chinook salmon run reconstruction information indicates a Chinook salmon exploitation rate of approximately 40% since 2000, with the majority of the harvest (96%) attributed to the subsistence fishery (Kevin Schaberg, Commercial Fisheries Biologist, ADF&G, Anchorage; personal communication).

Kuskokwim River sockeye salmon are primarily harvested in the subsistence fishery, but they are also harvested in District 1 commercial fisheries (Appendix B4). Kuskokwim River

commercial sockeye salmon harvests make up about 15% of the district's total exvessel value (Appendix B2). Sockeye salmon exploitation and total run estimates are unknown.

Historically, Kuskokwim River chum salmon, although an important subsistence species, have been primarily targeted for commercial use (Appendix B5). However, from 1996 to 2009, that fishery was constrained by low market interest in chum salmon and limited processing capacity. Since 1996, commercial chum salmon harvests have contributed less than 20% of the total exvessel value of the District 1 commercial salmon fishery, but since 2011 chum salmon harvests have contributed over 40% of the total exvessel value in District 1 (Appendix B2). Chum salmon exploitation rates are unavailable because total run estimates are unknown.

Kuskokwim River coho salmon are primarily harvested in the commercial fishery (Appendix B6). Kuskokwim River coho salmon commercial fishing in recent years has accounted for the largest number of salmon harvested of greatest value, accounting for over half of the District 1 exvessel value (Appendix B2). Based on preliminary run reconstruction information, the exploitation rate of coho salmon was approximately 20% since 2000 (Kevin Schaberg, Commercial Fisheries Biologist, ADF&G, Anchorage; personal communication).

Historically, in Kuskokwim Bay commercial fisheries, the greatest harvest in terms of number has been sockeye salmon followed by coho, chum, and Chinook salmon (Appendices C2 and D2). Sockeye salmon historically hold the greatest exvessel value in District 4, but chum salmon exceeded the exvessel value of sockeye salmon in 2011 and 2012 (Appendix C4). Sockeye salmon have the highest exvessel value in District 5 (Appendix D4). Although many more coho salmon are harvested than Chinook salmon, total harvest value for each species has been similar. Pink salmon are the least valuable species in KMA commercial fisheries and have not been purchased by area fish buyers in recent years. In 2012, the processor paid the same price for Chinook, sockeye, chum, and coho salmon. This resulted in chum salmon having the highest exvessel value followed by sockeye, coho, and Chinook salmon (Appendix A6).

Local KMA residents owned 697 of the 723 commercial permits renewed in 2012, non-area Alaska residents held 19, and non-Alaskan residents owned 7 permits (Appendix A7).

Salmon Stock Status

Salmon returns to most Western Alaska rivers (including Kuskokwim River) were generally below average from 1997 to 2001. However, these declines were not as evident in the Kuskokwim Bay rivers. The KMA was declared an economic disaster area by the State of Alaska in 1997, 1998, 2000, and 2001 because of the extremely low chum and Chinook salmon commercial harvest levels and exvessel values (Appendix A2). In 2001, Kuskokwim River Chinook and chum salmon were both designated as stocks of yield concern by the BOF (Burkey et al. 2000).

In 2002, Chinook and chum salmon returns to the Kuskokwim River began to rebound and reached near record abundances from 2004 through 2007 (Estensen et al. 2009). This led the BOF to discontinue the stock of concern status for both species in winter 2007 (Linderman and Bergstrom 2006). Since 2007, Chinook salmon abundance has decreased with 2 of the lowest total runs occurring in 2010 and 2012. The Kuskokwim River was declared a fisheries disaster by the State of Alaska for low Chinook salmon runs in 2011 and 2012. The Department of Commerce determined that a commercial fisheries disaster occurred under the Magnuson–Stevens Fishery Conservation and Management Act of 1976. Chum salmon have returned to

near-average to above-average levels, and sockeye salmon abundance has varied from average to above average. Coho salmon abundance has been below average since 2009.

Alaska Board of Fisheries

KMA fisheries are governed by regulations of Title 5 of the Alaska Administrative Code (AAC). Subsistence fishing regulations fall within Chapter 01, commercial fishing regulations in Chapter 07, commercial herring fishing regulations in Chapter 27, and sport fishing regulations in Chapter 70. Other regulations pertaining to the KMA fisheries include Chapter 39 (General Provisions and Policies) and Chapter 75 (Sport Fishing General Provisions). Commercial resident species fishery requirements are outlined in 5 AAC 39.734 and 5 AAC 39.780.

The process of developing fishing regulations for the KMA fisheries occurs within the established BOF process. Public input concerning regulation changes and allocation issues is provided through various means including submission of proposals, direct testimony to the BOF, and public participation by local Fish and Game Advisory Committees and the Kuskokwim River Salmon Management Working Group (Working Group). Within the KMA there are 5 Fish and Game Advisory Committees: Central Bering Sea, Lower Kuskokwim, Central Kuskokwim, Stony/Holitna, and McGrath. Under the current operating schedule, the BOF meets on a 3-year cycle. Proposals regarding the KMA were most recently discussed during January 2010. There was one regulatory proposal to repeal the commercial fishing regulation that could allow use of up to 8.0 in mesh size by emergency order (Estensen et al. 2009). This proposal failed. The next regularly scheduled BOF meeting to address Kuskokwim Area finfish issues is scheduled for January 2013.

FEDERAL SUBSISTENCE PROGRAM

The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 provides a priority to rural Alaska residents for the taking of fish and wildlife on federal public lands and created a regional advisory council (RAC) to allow rural residents to provide input into the federal subsistence program. On October 1, 1999, the Secretaries of Interior and Agriculture published regulations to expand federal involvement in subsistence fisheries to waters in which the federal government claims a federal reserved water right (applicable waters). The Secretary of Interior and the Secretary of Agriculture delegated their authority in Alaska to the Federal Subsistence Board (FSB) to ensure rural residents receive a priority for subsistence harvest on federal public lands and applicable waters. Federal subsistence fishing regulations are adopted by the FSB. RACs provide recommendations and information to the FSB, review policies and management plans, provide a public forum, and deal with other matters relating to subsistence uses. The FSB may close fishing for other uses on federal public lands and applicable waters if necessary to ensure a priority for federally qualified rural subsistence users. A federal inseason manager has been designated by the FSB to implement management actions, if necessary, in waters adjacent to federal public lands within the KMA. ADF&G is the primary management authority for this drainage, whereas the federal inseason manager is tasked with providing for federally qualified users and therefore coordinates with state managers regarding the Kuskokwim River federal subsistence salmon fisheries downstream of Aniak.

Federal subsistence fishing schedules, openings, closings, and fishing methods are established in regulation (Department of Interior 36 CFR Part 242 and 50 CFR Part 100). In general, these regulations are the same as those issued for the subsistence harvest of fish under the Alaska Administrative Code. However, differences in regulations do exist in some cases. For example,

subsistence fishing is closed for a set amount of time before, during, and after commercial fishing periods under federal regulations, but it is handled by emergency order under State regulations.

2012 Management Plan

The Kuskokwim River salmon fisheries are managed according to the *Kuskokwim River Salmon Management Rebuilding Plan* (5 AAC 07.365), adopted by the BOF in January 2001 (Burkey et al. 2000) and amended in January 2004 (Bergstrom and Whitmore 2004) and again in 2007 (Linderman and Bergstrom 2006). The purpose of this plan is to provide guidelines for rebuilding and management of the Kuskokwim River salmon fishery that will result in the sustained yield of salmon stocks large enough to meet escapement goals, provide amounts reasonably necessary for subsistence (ANS), and provide for fisheries other than subsistence. Additionally, subsistence-fishing closures are scheduled by emergency order prior to, during, and after commercial fishing periods to ensure salmon harvested during open subsistence fishing periods do not reach the commercial market.

The Quinhagak (District 4) fishery targets fish bound primarily for the Kanektok and Arolik rivers and is managed according to the *District 4 Management Plan* (5 AAC 07.367). The objective of this plan is to maintain a level of sustained yield that will provide for subsistence needs, long-term economic health of commercial and sport fishing industries, and recreational opportunities of all freshwater systems flowing into the district. Regulations do provide for subsistence fishing closures prior to, during, and after commercial fishing periods. There is no specific management plan for the Goodnews Bay fishery (District 5); however, the fishery is managed similar to District 4 except that commercial fishing is delayed until late June to increase Chinook salmon escapements into the Goodnews River drainage.

Subsistence

Alaska Statute Title 16.05.258, *Subsistence Use and Allocation of Fish and Game*, establishes the subsistence-use priority for reasonable harvest opportunity consistent with sustained yield, when resources are not abundant enough to provide for all consumptive uses. In 1993, the BOF made a positive finding for customary and traditional use for all salmon in the entire Kuskokwim Area (Appendix A2). In 2001, ADF&G recommended that the BOF amend 5 AAC 01.286 to include a revised finding of the ANS for the Kuskokwim Area using subsistence harvest data through 1999. After a thorough review of various options, the BOF made a finding of the ANS for the Kuskokwim River by species and for the remainder of the Kuskokwim Area by all species combined (Bergstrom and Whitmore 2004). The ANS ranges for Kuskokwim River drainage by species are as follows: 64,500–83,000 Chinook salmon, 39,500–75,500 chum salmon, 27,500–39,500 sockeye salmon, and 24,500–35,000 coho salmon. The ANS range for the remainder of the Kuskokwim Area is 7,500–13,500 salmon. In establishing the ANS range, the BOF used harvest information that represents the pattern of use in the subsistence fishery.

Cooperative Management Process

The Kuskokwim River Salmon Management Working Group (Working Group) was formed in 1988 by the BOF in response to requests from stakeholders in the Kuskokwim River that sought a more active role in the management of salmon fishery resources (Francisco et al. 1989). The Working Group has become the forum through which inseason management decisions are made regarding Kuskokwim River subsistence, commercial, and sport salmon fisheries. Pre- and

postseason Working Group activity provides the opportunity to participate in the regulatory processes that establish fishery management policies and regulations. In 2001, the Working Group modified their bylaws in order to more effectively address federal subsistence management views by including seats for member representatives from the Yukon and Kuskokwim Delta and Western Interior Federal Subsistence Regional Advisory Councils. The Working Group further modified their bylaws in 2005 to include representation from communities at the headwaters of the drainage, which had not been previously represented in the Working Group.

Participation in the Working Group process requires a great deal of time from its members and agency staff. The Working Group typically meets first in the spring each calendar year, conducts intensive and frequent meetings during the summer, and holds a wrap-up session in the fall or early winter. Funding provided by the Federal Office of Subsistence Management (OSM) is an essential part of enhancing the Working Group process. This funding allows ADF&G staff to more effectively prepare for meetings through better and more frequent distribution of updated fishery status information in a standardized format. The funding also provided travel for Working Group members to participate in meetings relevant to issues concerning Kuskokwim River fisheries, such as the preseason interagency meetings in Anchorage and Kuskokwim Area. State general funds provide additional salary for ADF&G staff that coordinates with the Working Group. The combined federal and state funds have further strengthened the Working Group process.

Working Group representative participation in meetings in Bethel and outside the Kuskokwim River drainage allows for an exchange of information between members and fishery assessment project leaders and research planners. Representatives were also able to testify at regulatory meetings in support of Working Group positions. The relationship among Working Group members, project leaders, research planners, and policymakers continues to be fostered, and these interactions are critical to the Working Group process. This relationship ensures that stakeholders remain up to date on new information and maintain their direct involvement in the management of the fishery.

The Working Group met 15 times in 2012. During these meetings, fishery management information was presented by Working Group members, state and federal staff, Tribal organizations, fishery partners, and the public. The Working Group discussed subsistence and commercial fishing reports from members and the public; the lower Kuskokwim River inseason subsistence harvest report (Chavez and Shelden 2013); test fishery project summaries; and reports from weir, tagging, sonar, and aerial survey programs (Bailey and Shelden 2013).

RUN STRENGTH INDICATORS

Salmon managers require timely inseason assessment of salmon run abundance. In the Kuskokwim River, escapement projects are of limited utility because of the great distances between the areas of harvest and the project locations (Appendix A3). Consequently, managers rely on the Bethel test fishery, commercial catch statistics, and informal reports from subsistence and sport fishermen to augment escapement data.

In the Kuskokwim Bay, escapement monitoring projects are much closer to the commercial fishing districts, so escapement data can be more effectively used for inseason management. Kuskokwim Bay managers also make use of commercial catch statistics and information from

subsistence and sport fishermen. Catch statistics are especially important in District 4 where reliable escapement monitoring has historically been lacking.

Bethel Test Fishery

Daily inseason assessment of the Kuskokwim River relative salmon run strength and timing is available from a drift gillnet test fishery operated near Bethel. The Bethel test fishery is located at river mile 80 of the Kuskokwim River, which is about the midpoint of District 1 (Figure 2). The project began in 1984 and the methodology has remained largely unchanged; methods used for the project can be found in Bue and Brazil (2012). From early June through late August the test fish crew conducts 3 or 4 systematic gillnet drifts beginning 1 hour after high tide. The drifts are done at 3 stations distributed across the width of the channel. Each drift is 20 minutes using two 50-fathom gillnets; 1 net is hung with 5.375 in mesh web and the other with 8.0 in mesh. The 2 gillnets are rotated between the 3 stations following a systematic schedule. Both mesh sizes are operated from early June through about July 10 when Chinook, sockeye, and chum salmon all occur in relatively high abundance. The 8.0 in mesh is discontinued after about July 10 when Chinook salmon abundance diminishes. Test fishing with the 5.375 in mesh continues until about August 24.

Beginning in 2012, the Bethel test fishery was used as a platform for a sockeye salmon mark–recapture genetics project. This project included the use of a 50-fathom gillnet hung with 4.0 in mesh web. This net was fished after the other 2 gillnets within the test fishery. Sockeye salmon that were captured in the 4.0 in mesh gillnet were then kept separate from all the other catch and sampled as their own group.

The test fishery catch from each tide is tallied by species and distributed to charities or sold to a local fish buyer. Catch statistics for Chinook, sockeye, chum, and coho salmon are presented as daily catch per unit effort (CPUE) data. Current and past year CPUE data are compared along with data from escapement projects to assess relative abundance and run timing. The comparisons are subjective in that managers need to consider variables such as water level, fishing patterns, and changing river morphology when comparing data from between years, and even within years.

Historically, other test fisheries have been attempted in the Kuskokwim River: Kwegooyuk test fishery, 1966–1983 (Baxter 1970; Huttunen 1984); Eek test fishery, 1988–1994; Kuskokwim River subsistence test fishery, 1988–1990 (Kuskokwim Fishermen's Cooperative 1991); Aniak test fishery, 1992–1995; Chuathbaluk test fishery, 1992–1993; and the Lower Kuskokwim River test fishery, 1995. Most of these projects were initiated at the prompting of groups other than ADF&G. They were all eventually discontinued for a variety of reasons including lack of funding, consistency problems, difficulties with catch disposition, and ambiguous results.

Inseason Subsistence Catch Monitoring

Inseason interviews of subsistence fishermen have been conducted in the Bethel area by Orutsararmiut Native Council (ONC) technicians in cooperation with ADF&G since 2001. The Fisheries Information Services (FIS) Division of the U.S. Fish and Wildlife Service (USFWS) Office of Subsistence Management (OSM) provides funding for this cooperative program under the *Kuskokwim River Salmon Inseason Subsistence Catch Monitoring* project (FIS 10-354; Chavez and Shelden 2013). Information from the interviews, in combination with other fisheries information, is used to assess salmon run timing and relative abundance. Together, this

information assists fishery management to meet salmon escapement goals, provide fishermen with subsistence fishing opportunity, and provide opportunity for commercial and sport fisheries if enough salmon are available. Additionally, this program provides timely insight into the progress of the subsistence fishery; a relative index of catch based on those interviewed; and allows an avenue for local user input into the management process. Comparisons of inseason interview responses can be made among weeks, within a year, and between years to help identify differences in salmon run timing and abundance, and gain insight into the fishery (gear usage or inseason harvest indices). Summaries of interview responses are presented to the Working Group throughout the subsistence fishing season (Bailey and Shelden 2013). Fishery managers and the Working Group use these summaries in the decision-making process for the Kuskokwim River subsistence and commercial salmon fisheries.

Commercial Catch Statistics

Comparison of commercial catch statistics with historical information is another common method for assessing run strength. However, the usefulness of this approach can be confounded by inconsistencies in the number of participating fishermen, the duration of commercial fishing periods, water levels, and other variables that might influence catch or the effort applied by fishermen.

HARVEST AND EXVESSEL VALUE SUMMARY

Emergency orders are used to manage the commercial and subsistence salmon fisheries in the Kuskokwim Area (Table 1).

Kuskokwim River

A total of 23 commercial fishing periods occurred in District 1 between July 13 and August 27 (Table 2). There were 2 registered buyers that purchased fish and 1 catcher/seller in the Kuskokwim Area in 2012. Processing capacity limited commercial fishing to alternating subdistricts except for 1 full district opening on August 21. Consistent with *Fishing periods* (5 AAC 07.320), processing capacity and fish abundance did allow for 2-hour extensions of fishing time in the lower section of Subdistrict 1-B. On average, 102 permit holders participated in each commercial fishing opening. Chinook salmon catch rates were low because commercial fishing was delayed to minimize incidental harvest. Sockeye and chum salmon catch rates were average. Coho salmon catch rates were below average.

The District 1 commercial harvest was 14 Chinook salmon, 2,857 sockeye salmon, 65,171 chum salmon, and 86,389 coho salmon (Tables 2 and 3). An additional 351 Chinook salmon were harvested during the commercial fishery and reported on fish tickets as retained for personal use because the buyers agreed not to purchase Chinook salmon due to the poor run. These fish are included in subsistence harvest through the postseason subsistence harvest survey. The Chinook, sockeye, and coho salmon harvests were below-average harvests, whereas chum salmon harvest was above average. The total exvessel value of the District 1 commercial salmon fishery was $597,998, which was above the 10-year average value of $537,552 (Table 3 and Appendix B2).. A total of 379 individual permit holders recorded landings in District 1 during the 2012 season (Table 2), which is on par with the average of 377 permit holders (Appendix A5). District 2 has not had a commercial fishery since 2000.

Kuskokwim Bay

The District 4 commercial salmon fishing season opened on June 27, which was about a week later than the normal start date of June 15 due to concerns about Chinook salmon abundance and subsistence fishermen reports of late run timing. The second commercial period was delayed until July 4 because of continued Chinook salmon abundance concerns. On that date sockeye salmon harvest greatly exceeded Chinook salmon abundance and by regulation, management was directed toward sockeye salmon harvest, which allows for 3 periods per week. Fishing was reduced to 2 periods per week during the weeks of July 16, July 23, and July 30 due to concerns for chum salmon escapement. On August 1, coho salmon harvest greatly exceeded sockeye and chum salmon abundance and at that time management was directed toward coho salmon harvest. Coho salmon management allows for 3 periods per week as was the case in 2012, except that 1 period was pulled on August 13 due to low catch rates on August 8 and August 10. There were a total of 22 commercial fishing periods, and the last fishing period was on August 29 (Table 4). Subsistence fishing was closed 8 hours before, 8 hours during, and 6 hours after commercial fishing periods.

A total of 6,675 Chinook salmon, 37,688 sockeye salmon, 61,140 chum salmon, and 31,214 coho salmon were commercially harvested in District 4. A total of 179 individual permit holders (making at least 1 recorded landing) participated in the commercial fishery (Table 4). Chinook, sockeye, and coho salmon catch rates were below average. Catch rates for chum salmon were average. Chum salmon harvest was approximately 7% above average. Chinook (65%), sockeye (51%), and coho (35%) salmon harvests were below average (Appendix C2). The Chinook salmon harvest was the lowest since 1975. Chinook, sockeye, chum, and coho salmon were all purchased for $0.85 per pound. Total exvessel value of the fishery was $824,435, approximately 6% below the 10-year average value (Table 3). Coho salmon average weight of 6.1 pounds was notable because it was below the historical (1985–2011) average weight of 7.6 pounds.

The District 5 commercial fishing season began on June 27, which was about a week later than normal due to concerns for Chinook salmon abundance. Sockeye salmon abundance exceeded Chinook salmon abundance on the first period; however, the second period was delayed until July 4 because of continued Chinook abundance concerns. At that time, management was directed toward sockeye salmon harvest. There were 3 periods per week throughout the sockeye salmon run. On August 8 coho salmon catch exceeded sockeye salmon catch and therefore management was directed toward coho salmon. There were 3 periods per week throughout the coho salmon run with an additional period on August 23 due to high harvests and catch rates during the prior 3 periods. There were a total of 28 commercial fishing periods, with the last fishing period on August 29 (Table 5). Subsistence fishing was closed 8 hours before, 8 hours during, and 6 hours after commercial fishing periods.

A total of 1,531 Chinook salmon, 50,635 sockeye salmon, 24,487 chum salmon, and 25,515 coho salmon were commercially harvested. A total of 58 individual permit holders (making at least 1 recorded landing) participated in the fishery (Table 5). Chinook salmon catch rates were below average. Catch rates for chum, sockeye, and coho salmon were above average. Sockeye (81%), chum (133%), and coho (98%) salmon harvests were above the average (Appendix D2). The sockeye salmon harvest was the third highest on record and the chum salmon harvest was the fourth highest on record. Chinook salmon harvest was approximately 22% below the 10-year average. Chinook, sockeye, chum, and coho salmon were all purchased for $0.85 per pound. Total exvessel value of the fishery was $617,766, approximately 146% above the 10-year

average value (Table 3). Coho salmon average weight of 6.6 pounds was notable because it was below the historical (1985–2011) average weight of 8.0 pounds.

SUBSISTENCE SALMON FISHERY

The subsistence salmon fishery in the Kuskokwim Area is one of the largest and most important in the state and supports one of the largest subsistence salmon fisheries in North America. Many households throughout the region are involved in harvesting, processing, and preserving salmon for subsistence use. The movement of families from permanent winter communities to summer fish camps, situated along rivers and sloughs, is a significant element of annual subsistence harvest efforts. Approximately 2,200 households in the Kuskokwim area harvest salmon for subsistence use each year (Shelden et al. 2014). Many other households, which are not directly involved in catching salmon, participate by assisting family and friends with cutting, drying, smoking, and associated preservation activities (salting, canning, and freezing). Studies conducted by the Division of Subsistence indicate that fish contribute as much as 85% of the total pounds of fish and wildlife harvested in a community annually, and salmon as much as 53% of the total annual harvest (Coffing 1991). Harvest of salmon for subsistence use is as much as 650 pounds per capita in some Kuskokwim River communities (Coffing et al. 2001).

REGULATIONS

The subsistence salmon fishing season is open unless a subsistence fishing schedule closure is imposed (5 AAC 07.365), or when closures to the fishery are implemented by emergency order prior to, during, and after commercial fishing periods (5 AAC 01.260). Salmon may be taken for subsistence purposes by gillnet, beach seine, hook and line attached to a rod or pole, hand line, or fish wheels, subject to restrictions (5 AAC 01.270). Additionally, salmon may be taken by spear in the Holitna, Kanektok, Arolik, and Goodnews Bay drainages. The aggregate length of set or drift gillnets in use by any individual for the taking of salmon for subsistence purposes may not exceed 50 fathoms. The maximum depth of gillnets with 6.0 in or smaller mesh size is 45 meshes in depth, whereas gillnets with greater than 6.0 in mesh size may not be more than 35 meshes in depth.

The 2012 preseason Chinook salmon forecast was 197,000 fish (range 158,000–236,000), which was below the average total return of 260,000 fish. In 2011 the Kuskokwim River experienced the second lowest estimated total run of 132,000 and a spawning escapement of 73,000 Chinook salmon. In 2010 the Kuskokwim River experienced the lowest estimated total run of 123,000 and lowest spawning escapement of Chinook salmon on record, 56,000. In 2011, the Kwethluk and Tuluksak rivers did not meet Chinook salmon SEG for the fourth and fifth consecutive years, respectively. The George River had not met its SEG in 3 of the past 4 years. In 2011 aerial survey indices on the Aniak River tributaries, Kipchuk River and Salmon River, were among the lowest on record. Based upon recent low runs of Chinook salmon and the 2012 forecast, the Chinook salmon run was to be managed conservatively in an effort to meet escapement goals in 2012.

The following preseason management actions were taken effective June 1 until July 25, 2012, in an effort to achieve escapement goals.

Subsistence Chinook salmon fishing with hook and line gear was closed and subsistence fishing was restricted to the use of gillnets with 4.0 in or less mesh not to exceed 60 feet in the following waters of the Kuskokwim River drainage:

- The Kwethluk River drainage including its confluence with Kuskokuak Slough and downstream to ADF&G regulatory markers located at the downstream mouth of the slough.
- The Kasigluk and Kisaralik river drainages including Old Kuskokuak Slough to ADF&G markers at the confluence of Old Kuskokuak Slough with Kuskokuak Slough.
- The Tuluksak River drainage including its confluence with the Kuskokwim River and downstream approximately 1 mile to ADF&G regulatory markers.
- The Aniak River drainage to ADF&G regulatory markers at its confluence with the Kuskokwim River.
- The George River drainage including its confluence with the Kuskokwim River and downstream approximately a half mile to ADF&G regulatory markers.

ADF&G, the Federal Inseason Manager, and the Working Group agreed to a 2012 inseason Chinook salmon management objective (management objective) of 127,000 fish in order to meet existing escapement goals. It was also agreed that the management objective would be evaluated inseason using the Bethel test fishery (BTF) catch per unit effort (CPUE).

Under the management plan, during subsistence salmon fishing closures, 4.0 in or less mesh size gillnets not to exceed 60 feet in length are allowed to harvest non-salmon species such as whitefish.

During the June 8 Working Group meeting, a joint recommendation from ADF&G and the Federal Inseason Manager, which was supported unanimously by the Working Group, initiated a 7-day subsistence salmon fishing rolling closure effective Sunday, June 10, in the lower section of Subdistrict 1-B of District 1. The BTF CPUE of Chinook salmon indicated late run timing and lower-than-expected abundance, and the management objective was unlikely to be met.

The rolling closure was implemented in a stepwise progression up the Kuskokwim River consistent with salmon run timing:

- In rolling closure Section 1 (Section 1), effective from June 10 to June 16, subsistence salmon fishing with gillnets and subsistence Chinook salmon fishing with hook and line gear was closed. Those waters were defined as that portion of the Kuskokwim River and its tributaries upstream from a line from Apokak Slough to the southernmost tip of Eek Island to Popokamiut, to a line between ADF&G regulatory markers located between the Kialik and Johnson rivers.
- In rolling closure Section 2 (Section 2), effective from June 13 to June 19, subsistence salmon fishing with gillnets and subsistence Chinook salmon fishing with hook and line gear was closed. Those waters were defined as that portion of the Kuskokwim River and its tributaries upstream from a line between ADF&G regulatory markers located between the Kialik and Johnson rivers to a line between ADF&G regulatory markers located approximately half a mile upstream of the Tuluksak River mouth.
- In rolling closure Section 3 (Section 3), effective from June 17 to June 23, subsistence salmon fishing with gillnets and subsistence Chinook salmon fishing with hook and line gear was closed, and a fish wheel used to take fish had to be equipped with a live box that contained no less than 45 cubic feet of water volume while in operation. The live box had to be checked at least once every 6 hours while in operation and all Chinook salmon had to be returned to the water alive. Those waters were defined as that portion of the

Kuskokwim River and its tributaries upstream from a line between ADF&G regulatory markers located approximately one half mile upstream of the Tuluksak River mouth to a line between ADF&G regulatory markers located at the downstream edge of Chuathbaluk.

During the June 15 Working Group meeting, a joint recommendation from ADF&G and the Federal Inseason Manager was presented to extend the 7-day rolling closure along the Kuskokwim River for 5 additional days in an effort to conserve Chinook salmon. The BTF CPUE indicated that there was not enough Chinook salmon to meet the management objective. The Working Group did not support the recommendation. However, the following actions were implemented:

- In Section 1, effective from June 17 to June 21, subsistence salmon fishing with gillnets and subsistence Chinook salmon fishing with hook and line gear was closed.
- In Section 2, effective from June 20 to June 24, subsistence salmon fishing with gillnets and subsistence Chinook salmon fishing with hook and line gear was closed.
- In Section 3, effective from June 24 to June 28, subsistence salmon fishing with gillnets and subsistence Chinook salmon fishing with hook and line gear was closed, and a fish wheel had to be equipped with a live box.
- In Rolling Closure Section 4 (Section 4), effective from June 22 to July 3, subsistence salmon fishing with gillnets and subsistence Chinook salmon fishing with hook and line gear was closed, and a fish wheel had to be equipped with a live box. Those waters were defined as that portion of the Kuskokwim River and its tributaries upstream from a line between ADF&G regulatory markers located at the downstream edge of Chuathbaluk to a line between ADF&G regulatory markers located downstream of the Holitna River mouth.
- In Rolling Closure Section 5 (Section 5), effective from June 27 to July 8, subsistence salmon fishing with gillnets and subsistence Chinook salmon fishing with hook and line gear was closed, and a fish wheel had to be equipped with a live box. Those waters were defined as that portion of the Kuskokwim River and its tributaries upstream from a line between ADF&G regulatory markers located at the Holitna River mouth upstream to the headwaters of the Kuskokwim River.

During the June 20 Working Group meeting, ADF&G and the Federal Inseason Manager recommended a 3-day subsistence fishing opening to allow 6.0 in or smaller mesh size gillnets after each section's 12-day rolling closure. Subsistence Chinook salmon fishing with hook and line gear remained closed. After the 3-day opening, fishing was restricted to gillnet mesh of 4.0 in or less in an effort to conserve Chinook salmon. The assessment of chum and sockeye salmon at the BTF indicated that abundance of these species were still low but their abundance were increasing and expected to increase further based on historic run timing. The Working Group did not support the recommendation. However, the following management actions were implemented:

- In Section 1, effective from June 22 to June 24, subsistence salmon fishing opened to the use of gillnets with 6.0 in or less mesh. Effective June 25, fishing with gillnets greater than 4.0 in mesh was scheduled to close. Subsistence Chinook salmon fishing with hook and line gear remained closed.

- In Section 2, effective from June 25 to June 27, subsistence salmon fishing opened to the use of gillnets with 6.0 in or less mesh. Effective June 28, fishing with gillnets greater than 4.0 in mesh was scheduled to close. Subsistence Chinook salmon fishing with hook and line gear remained closed.
- In Section 3, effective from June 29 to July 1, subsistence salmon fishing opened to the use of gillnets with 6.0 in or less mesh. Effective July 2, fishing with gillnets greater than 4.0 in mesh was scheduled to close. Subsistence Chinook salmon fishing with hook and line gear remained closed, and a fish wheel had to be equipped with a live box.
- In Section 4, effective from July 4 to July 6, subsistence salmon fishing opened to the use of gillnets with 6.0 in or less mesh. Effective July 7, fishing with gillnets greater than 4.0 in mesh was scheduled to close. Subsistence Chinook salmon fishing with hook and line gear remained closed, and a fish wheel had to be equipped with a live box.
- In Section 5, effective from July 9 to July 11, subsistence salmon fishing opened to the use of gillnets with 6.0 in or less mesh. Effective July 12, fishing with gillnets greater than 4.0 in mesh was scheduled to close. Subsistence Chinook salmon fishing with hook and line gear remained closed, and a fish wheel had to be equipped with a live box.

On June 23, ADF&G and the Federal Inseason Manager jointly announced that subsistence salmon fishing in Section 1 with 6.0 in or less mesh was extended an additional 3 days to June 27. Effective June 28 fishing with gillnets greater than 4.0 in mesh was closed. Chinook salmon fishing with hook and line gear remained closed. The BTF CPUE of chum and sockeye salmon indicated there was a harvestable surplus of those species. This assessment was supported by subsistence harvest reports from Section 1 on June 22. This action allowed additional opportunity to harvest chum and sockeye salmon with 6.0 in or less mesh in Section 1.

During the June 26 Working Group meeting, ADF&G asked for a recommendation from the Working Group on further management of the subsistence salmon fishery. The Working Group unanimously recommended that subsistence fishing opportunity with 6.0 in or less mesh gillnets be extended for 3 additional days in Section 2 and the duration of closures in Sections 3, 4, and 5 be reduced from 12 days to 10 days.

In consideration of the Working Group's recommendation, the BTF assessment of a harvestable surplus of chum and sockeye salmon, and daily assessment of the runs, ADF&G and the Federal Inseason Manager jointly announced the following actions to allow opportunity to harvest chum and sockeye salmon while conserving Chinook salmon:

- In Section 1, effective June 30, subsistence salmon fishing opened to fishing with gillnets of 6.0 in or less mesh. Chinook salmon fishing with hook and line gear remained closed.
- In Section 2, subsistence salmon fishing with gillnets of 6.0 in or less mesh was extended to June 30. Effective July 1 to July 2, fishing with gillnets greater than 4.0 in mesh was closed. Chinook salmon fishing with hook and line gear remained closed. Effective July 3, Section 2 reopened to subsistence salmon fishing with gillnets of 6.0 in or less mesh. Chinook salmon fishing with hook and line gear remained closed.
- In Section 3, subsistence salmon fishing with gillnets of 6.0 in or less mesh was extended to July 4. Effective July 5 to July 6, fishing with gillnets greater than 4.0 in mesh was closed. Effective July 7, Section 3 reopened to subsistence salmon fishing with gillnets of 6.0 in or less mesh. Fish wheel restrictions remained in effect and Chinook salmon fishing with hook and line gear remained closed.

- In Section 4, subsistence salmon fishing with gillnets of 6.0 in or less mesh was extended to July 9. Fish wheel restrictions remained in effect. Chinook salmon fishing with hook and line gear remained closed. Section 4 subsistence salmon fishing with gillnets of 6.0 in or less mesh was extended again effective July 9.
- In Section 5, subsistence salmon fishing with gillnets of 6.0 in or less mesh was extended to July 14. Fish wheel restrictions remained in effect. Chinook salmon fishing with hook and line gear remained closed.

During the July 14 Working Group meeting, ADF&G and Federal Inseason Manager announced relaxing subsistence salmon fishing restrictions effective July 16. Implementation of this action was in a stepwise progression up the Kuskokwim River consistent with salmon run timing:

- Section 1 opened to subsistence salmon fishing with unrestricted gillnet mesh size, and Chinook salmon fishing with hook and line gear opened effective July 16.
- Section 2 opened to subsistence salmon fishing with unrestricted gillnet mesh size, and Chinook salmon fishing with hook and line gear opened effective July 19.
- Section 3 opened to subsistence salmon fishing with unrestricted gillnet mesh size, and Chinook salmon fishing with hook and line gear opened effective July 23. Additionally, a fish wheel was not required to have a live box.
- Section 5 subsistence salmon fishing with gillnets of 6.0 in or less mesh was extended effective July 14. Additionally, in Section 5 effective July 16, subsistence fishing with hook and line gear was opened with a daily bag limit of 3 and no possession, season, or size limits, and a fish wheel was not required to have a live box.

In Sections 4 and 5, subsistence salmon fishing with unrestricted gear resumed effective July 23.

SUBSISTENCE SURVEY

ADF&G conducts annual household surveys to collect information about the harvest and use of salmon in the Kuskokwim Area (Appendices A10–A13). Prior to statehood, subsistence salmon harvest information was collected periodically by various federal departments and bureaus. Beginning in 1960, Division of Commercial Fisheries collected subsistence salmon harvest information along the Kuskokwim River drainage by surveying fishermen at their fish camps during late July. Over the years, data collection methods changed several times. Harvest surveys were initiated in Quinhagak in 1967 and in Goodnews Bay and Platinum starting in 1979. In 1988, the Division of Subsistence took over the annual subsistence salmon harvest survey project from Division of Commercial Fisheries and collected and analyzed harvest data through 2007. Division of Subsistence made several changes to the methodology, including starting the data collection in October, well after the summer and fall salmon harvest was completed. This was done primarily to improve estimates of the subsistence coho salmon harvest (for detailed Division of Subsistence harvest monitoring methods, see Walker and Coffing 1993). In 2008, Division of Commercial Fisheries resumed responsibility for the annual postseason harvest survey project in the Kuskokwim Area and dedicated a full-time Fishery Biologist II, based in Anchorage, as the project leader, and a seasonal Fishery Biologist I as the crew leader, based in Bethel. The project methodology remains similar to that used by Division of Subsistence since 1989 except that instead of attempting a 100% survey of each community, a stratified random sampling method is used in order to sample communities most effectively within budget constraints on a yearly basis (Toshihide Hamazaki, Commercial Fisheries Biometrician, ADF&G, Anchorage; personal communication). Analysis of the stratified sampling compared

with the 100% attempted sampling, as well as adjusted historical salmon harvest estimates from 1989 to 2009, are reported in Hamazaki (2011). Current methods used to estimate subsistence salmon harvest in 2010, 2011, and 2012 are reported in the *Reconstruction of subsistence salmon harvest in the Kuskokwim Area, 1990–2009* (Hamazaki 2011).

ADF&G collaborates with local tribal organizations including ONC in Bethel and KNA in Aniak to complete the annual postseason harvest surveys. The Fisheries Information Services (FIS) Division of the U.S. Fish and Wildlife Service (USFWS) Office of Subsistence Management (OSM) provides funding for this cooperative program under the *Kuskokwim Area Postseason Subsistence Harvest Surveys* project (FIS 10-352; Shelden et al. 2014). Subsistence surveys have been primarily aimed at gathering data on the harvest and use of Chinook, chum, sockeye, and coho salmon. Pink salmon are harvested in the Kuskokwim Area; however, they are generally available only during even-numbered years. Data for subsistence pink salmon harvests have not been consistently collected during the annual fall survey efforts, and although data have been collected on pink salmon beginning in 2008, those harvests are not reported here. Other Division of Subsistence community baseline studies conducted in the region also include pink salmon harvest data.

SUBSISTENCE HARVEST

Subsistence harvests of salmon have remained relatively stable since 1990 with the exception of the 2012 Chinook salmon harvest, the result of a poor run (Appendix A10 and Appendix B3). The preliminary 2012 total subsistence salmon harvest estimates for the Kuskokwim Area were 25,336 Chinook, 50,616 sockeye, 81,912 chum, and 30,065 coho salmon (Appendices A10–A14; Shelden et al. 2014). The Chinook salmon subsistence harvest was the lowest in our dataset and was 72% below the 10-year average. The majority of the reduced harvest occurred in the Lower Kuskokwim River as the result of a poor run and substantial subsistence fishing restrictions. The sockeye salmon harvest was 15% below, the chum salmon harvest was 27% below, and the coho salmon harvest was 14% below 10-year average.

Residents of communities in the lower Kuskokwim River (from Tuluksak downstream to Eek), took 74% of the subsistence salmon harvest. The lower river communities are relatively densely populated, with approximately 76% of the total number of households in the Kuskokwim Area.

ESCAPEMENT

The vast size, remoteness, and geomorphic diversity of the Kuskokwim Area present challenges to monitoring salmon escapements and assessing salmon run abundance. For the past 2 decades, efforts have been taken to expand coverage and apply new technologies to improve estimation of salmon run timing and run strength monitoring by comparison of current year to historic information. Aerial spawning-ground surveys have been the most cost-effective means of monitoring salmon escapements, but their usefulness and reliability are limited. The more thorough and rigorous ground-based projects such as weirs, counting towers, and sonar have been operated in only a few locations because of costs and limited budgets. Since 2000 the number of escapement projects in the Kuskokwim Area has increased through cooperative partnerships with federal agencies and local organizations (Appendix A8). These cooperative efforts have added substantially to our ability to monitor salmon escapements and to evaluate the effectiveness of inseason management actions.

There are currently 25 established escapement goals: 14 Chinook, 4 chum, 3 coho, and 4 sockeye salmon stocks (Appendix A9). Comprehensive reviews of escapement data for most Kuskokwim Area stocks were conducted in 2004 (ADF&G 2004), in 2007 (Molyneaux and Brannian 2006), and again in 2009 (Volk et al. 2009). Two new goals were established in 2010: a coho salmon lower bound SEG of > 19,000 fish at the Kwethluk River weir, and a sockeye salmon SEG range of 4,400 to 17,000 fish at the Kogrukluk River weir. Kuskokwim Area escapement goals were reviewed in the later part of 2012 for the 2013 Alaska Board of Fisheries cycle.

Throughout the Kuskokwim Management Area in 2012, chum salmon abundance was average while sockeye and coho salmon abundance was below average and Chinook salmon abundance was poor. Sockeye, chum, and coho salmon escapements goals were achieved in all systems with established goals. Chinook salmon escapements were below the escapement goals in all of 5 systems with weir-based escapement goals, and only 2 of 7 aerial survey escapement goals were achieved.

GROUND BASED

Numerous ground-based escapement assessment projects exist throughout the Kuskokwim River drainage and Kuskokwim Bay drainages (Figure 6). Below is a summary of salmon escapement at each project for 2012. Please refer to each project's annual report for specifics such as methods, daily passage counts, climate and hydrological information, and escapement age, sex, and length (ASL) information. The *AYK Database Management System* contains historical as well as current ASL information from the various escapement monitoring projects (past and present), as well information from the area commercial and subsistence harvests (http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx).

Kuskokwim River

Kwethluk River Weir

In 2012, Kwethluk River weir operated from July 3 to September 12, but high water conditions from June through early August resulted in incomplete escapement counts of Chinook, sockeye, and chum salmon. The coho salmon escapement was 19,960 fish (Appendix B12; Miller and Harper 2013a), which is above the lower-bound SEG of > 19,000 fish.

Tuluksak River Weir

In 2012, Tuluksak River salmon escapements included 560 Chinook, 187 sockeye, 16,981 chum, and 4,407 coho salmon during the June 27 through September 9 operational period (Appendices B8 and B10–B12; Miller and Harper 2013b). Chinook salmon escapements have not met the lower end of the SEG range (1,000 to 2,100 fish) since the goal was established in 2007.

Aniak River Sonar

The Aniak River sonar project did not operate in 2012. This project was used to index chum salmon escapements into the Aniak River, and it did not provide abundance information for sockeye, chum, and coho salmon. Therefore, ADF&G is working on shifting resources to operating a weir project on the Salmon River, which is a tributary to the Aniak River. This project is expected to provide escapement information for Chinook, sockeye, chum, and coho salmon.

George River Weir

In 2012, George River salmon escapements included 2,302 Chinook, 79 sockeye, 34,336 chum, and 15,272 coho salmon during the June 30 through September 16 operational period (Appendices B8 and B10–B12; Blain et al. 2014). The Chinook salmon escapement in 2012 did not met the lower end of the SEG range (3,100 to 7,900 fish) for the fourth time since the goal was established in 2007.

Kogrukluk River Weir

In 2012, Kogrukluk River weir operated from June 29 to September 16, but high water conditions from June through early August resulted in incomplete escapement counts of Chinook, sockeye, and chum salmon. The coho salmon escapement was 13,967 fish, which is within the SEG of 13,000 to 28,000 (Appendix B12; Blain et. al 2014).

Tatlawiksuk River Weir

In 2012, Tatlawiksuk River weir salmon escapements included 1,116 Chinook, 9 sockeye, 44,572 chum, and 8,070 coho salmon during the June 23 to September 15 operational period (Appendices B8 and B10–B12; Blain et al. 2014). The chum and coho salmon escapements were average, and the Chinook salmon escapement was below average.

Takotna River Weir

In 2012, Takotna River salmon escapements included 228 Chinook, 6,050 chum, and 1,838 coho salmon during the July 5 through September 15 operational period (Appendices B8, B11, and B12; Blain et al. 2014). The chum salmon escapement was average, and the Chinook and coho salmon escapements were below average.

Telaquana River Weir

Telaquana River sockeye salmon escapement was 22,994 sockeye during the July 5 through August 29 operational period (Appendix B10; Blain et al. 2014). This was the third year of operation for this project.

Kuskokwim Bay

Kanektok River Weir

Fish passage in 2012 through the Kanektok River weir during its operation from July 6 through August 15 was estimated to be 1,568 Chinook, 88,800 sockeye, 24,173 chum, 4,284 coho, and 62,141 pink salmon (Appendix C8; Taylor 2014). Escapement estimates for coho and pink salmon are incomplete because the project does not operate through the entire coho and pink salmon runs. No formal escapement goals for any species have been established at the weir.

Middle Fork Goodnews River Weir

Fish passage in 2012 through the Middle Fork Goodnews River during its operation from June 29 to September 3 was estimated to be 513 Chinook, 30,472 sockeye, 10,723 chum, 13,679 coho, and 6,316 pink salmon (Appendix D8; Taylor 2013). Chinook and chum salmon escapements were below the respective escapement goals; however, passage counts were incomplete for these species because of high water conditions. Escapements of sockeye and coho salmon achieved the escapement goals.

AERIAL SURVEYS

Escapement goals based on aerial surveys do not represent the entire spawning populations in the respective streams. The surveys are mostly conducted 1 time each season during a window of a few days when the maximum numbers of fish are expected to be on the spawning grounds. The escapement goals developed from these surveys are based on the raw, unexpanded counts; therefore, each count serves as an index of abundance rather than a complete census.

Aerial surveys are ordinarily restricted to clear-water streams and lakes, the distribution of which is geographically skewed toward the lower Kuskokwim River basin and coastal streams. Tributaries in the middle and upper Kuskokwim River are often stained from organics or clouded by glacier runoff, both of which markedly reduce the visibility of fish. Escapement assessment through aerial surveys is also subject to a high degree of variability depending on viewing conditions and the experience of staff conducting the surveys.

Aerial surveys are best directed at indexing spawning populations of Chinook and sockeye salmon because these fish are typically more visible than chum and coho salmon. In addition, chum salmon have protracted run timing, and coho salmon are frequently difficult to survey because of adverse weather conditions.

Kuskokwim River

Lower Kuskokwim River

Aerial surveys for Chinook salmon were conducted over lower river tributaries (Figure 7) in 2012. Weather and stream conditions in the lower river were generally poor with only 1 useable survey index estimate on the Kisarolik River. An escapement goal has been established for the Kisarolik River, and the 2012 survey was within the SEG range (Appendix B9).

Middle Kuskokwim River

Aerial surveys for Chinook salmon were conducted over the Kipchuck, Salmon, Holokuk, and Oskawalik rivers in 2012 (Figure 7; Appendix B9). Escapement goals have been established for the Aniak, Salmon, and Holitna rivers. Survey conditions allowed ADF&G staff to fly a majority of the systems in this section of the drainage. Index estimates from the Middle Kuskokwim River tributaries were well below average, and the established Salmon River SEG was not met.

Upper Kuskokwim River

Aerial surveys were conducted over the Gagarayah, Cheeneetnuk, and Salmon (Pitka Fork) rivers in 2012 (Figure 7; Appendix B9). Aerial survey SEG have been established for the Gagarayah, Cheeneetnuk, and Salmon rivers. Both the Gagarayah and Cheeneetnuk rivers were below their respective SEG, whereas the Salmon River aerial survey SEG was met.

Kuskokwim Bay

Kuskokwim Bay

Kanektok River (Figure 8) Chinook, sockeye, and chum salmon have established an aerial survey SEG (Appendix C9). The North Fork Goodnews River has established an SEG for Chinook and sockeye salmon (Figure 9 and Appendix D9). An aerial survey was flown over the Kanektok River in 2012, but it was rated as poor because of turbid water conditions. An aerial survey rated as good for survey conditions was conducted on the North Fork Goodnews River in

2012 to estimate Chinook and sockeye salmon escapements. The estimate of Chinook salmon was below the SEG and estimate of sockeye salmon within the SEG (Appendix D9). Aerial surveys for chum salmon have not been flown since 2003 (Appendix D9).

KUSKOKWIM HERRING FISHERY

MANAGEMENT AREA

The Kuskokwim Management Area includes all waters of Alaska that flow into the Bering Sea between Cape Newenham and the Naskonat Peninsula (60°58.17′N lat, 165°11′W long) to 3 miles seaward as well as the waters surrounding Nunivak and St. Matthew Islands to 3 miles seaward (5 AAC 27.870) (Figure 10). This area supports 5 Pacific herring (*Clupea pallasii*) commercial gillnet sac roe districts and a significant subsistence herring fishery.

The Security Cove District includes all waters between the latitude of Cape Newenham and the latitude of the Salmon River (58°51.83′N lat).

The Goodnews Bay District includes the waters of Goodnews Bay east of a line between the north spit (59°03.58′N lat, 161°49.17′W long) and south spit (59°02.92′N lat, 161°49.08′W long) at the mouth and west of a line between Ukfigag Creek (59°04.17′N lat, 161°36′W long) and Tunulik River (59°00.08′N lat, 161°00.37′W long).

The Cape Avinof District consists of all waters landward of Kikegtek, Pingurbek, and Kwigluk Islands from the longitude of Ishkowik River (162°44′W long) to the latitude of the Tern Mountain (60°42′N lat).

The Nelson Island District consists of all waters north of Chinigyak Cape (60°27′N lat) and east of Atrnak Point (165°15′W long), and all waters north of Talurarevuk Point (60°35′N lat) and south of the southernmost tip of Chinit Point (60°36′N lat) and east of 165°30′W long and all waters north of the northernmost tip of Chinit Point (60°37′N lat) and south of Kigigak Island (60°49′N lat) and east of 165°30′W long.

The Nunivak Island District includes all waters extending 3 miles seaward of mean low water along the northern, eastern, and southern sides of Nunivak Island from Kikoojit Rocks (60°20′N lat, 166°40′W long) to Cape Mendenhall (59°45.17′N lat, 166°07′W long) (5 AAC 27.875).

FISHERY MANAGEMENT

The *Bering Sea Herring Fishery Management Plan* (5 AAC 27.060) requires minimum spawning biomass thresholds for each district before commercial fishing. The thresholds are as follows: Security Cove, 1,200 short tons; Goodnews Bay, 1,200 short tons; Cape Avinof, 500 short tons; Nelson Island, 3,000 short tons; and Nunivak Island, 1,500 short tons[1]. This plan sets the maximum exploitation rate at 20% of the estimated spawning biomass for Security Cove, Goodnews Bay, Nunivak Island, and Nelson Island. Other regulations further reduce the maximum allowable exploitation rate in the Cape Avinof District to 15% of the estimated available biomass and directs management in the Nelson Island District to include 200 short tons of the 20% exploitation rate for subsistence (5 AAC 27.895).

[1] The Alaska Board of Fisheries requires that inseason catch and aerial survey biomass estimates be calculated and reported in short tons. The English short ton = 2,000 lb or 907.2 kg. The metric tonne (1,000 kg or 2,205 lbs) = tons/1.1023.

All commercial herring fisheries are opened and closed by emergency order for an orderly fishery and to allow periodic assessment of herring biomass. ADF&G attempts to harvest stocks in good condition (large volume, increasing abundance, good recruitment) at the upper end of the exploitation range (15–20%). Stocks in poor condition (small volume, decreasing abundance, poor recruitment) are exploited at lower than maximum rates (0–15%).

Commercial Fishery

The Kuskokwim Area commercial herring fishery was initiated in 1977 in Security Cove and Goodnews Bay districts with the first documented deliveries in 1978 in Security Cove District and 1979 in Goodnews Bay District. In 1978, purse seines were allowed in Security Cove District; however, since that time the fishery has been limited to gillnet. Spawn-on-kelp fisheries were prohibited in 1978 before fisheries were established. Initially these fisheries were managed through open seasons and guideline harvest levels. In 1981 emergency order authority was established to open and close fisheries to provide for an orderly fishery and periodic assessments of herring biomass. A minimum threshold herring abundance of 800 to 1,000 short tons or spawning activity was established before implementation of the fishery, and the guideline harvest levels were established not to exceed 20% of estimated herring biomass. The length of gillnet was established at 100 fathoms. In 1986 the northern boundary of Security Cove was moved from Carter Spit south to the latitude of Salmon River (58°52′N lat) to provide spatial separation between Security Cove and Goodnews Bay districts. By 1987 the minimum inseason biomass threshold was established at 1,200 short tons and the Goodnews Bay District was designated a superexclusive use area by the BOF, limiting permit holder and vessel participation in the commercial fishery. In 1997 a moratorium on entry into the Goodnews Bay fishery was initiated limiting participation in the fishery to 182 permits. The Goodnews Bay superexclusive use area designation was later repealed by the BOF in 2004.

In 1985, commercial herring fishing was initiated in Nelson and Nunivak Island districts. Emergency order authority was established to open and close these fisheries to provide for an adequate subsistence harvest and orderly commercial fishery, and to allow for periodic reassessments of herring biomass. A minimum threshold herring abundance of 1,100 to 1,700 short tons or spawning activity was established before implementation of the fishery, with a guideline harvest level set at 10% of estimated returning biomass to provide protection for the subsistence fisheries. Gillnet length was limited to 100 fathoms. In 1986 the waters within Nelson Island District from Atranak Point and Talurarevuk Point and the waters between the southern and northern edges of Chinit Point were closed by emergency order at the request of local governing groups to prevent interference with the subsistence fishery. By 1988 these waters were closed to commercial herring fishing by regulation. Beginning in 1987, mechanical shakers were eliminated in Nelson and Nunivak Island fisheries and vessel length was limited to 30 feet. Both districts were designated as combined superexclusive use areas. Implementation of the superexclusive use designation with vessel length restrictions and prohibition of mechanical shakers was in response to requests from fishermen living in communities adjacent to the fisheries. These fishermen believed it would be in the best interest of the fisheries to standardize equipment to help prevent overinvestment and to limit participation by allowing fishermen to only participate in 1 herring fishery (Whitmore et al. 2005).

The combined superexclusive use designation allows for fishermen holding permits for both Nunivak and Nelson Island fisheries to participate in commercial herring fisheries in both districts during the same season. In 1987 the minimum inseason biomass threshold was increased

to 2,500 short tons, and the commercial guideline harvest level was increased from 10% to a maximum of 15% of estimated biomass in both districts. In December 1997, the BOF adopted a proposal that raised the Nelson Island District harvest level to 20% of the available biomass minus 200 short tons allocated for subsistence use and increased the commercial guideline harvest level to 20% of the estimated biomass for the Nunivak Island District. In 1987 the Commercial Fisheries Entry Commission (CFEC) initiated the first steps toward limited entry status in the Nelson Island and Nunivak Island districts and both districts were given limited entry status in 1990. In the winter of 2000, the BOF adopted regulations to allow for development of a cooperative herring purse seine fishery in Nunivak Island District and made the regulation permanent in 2001. In 2006 the Alaska Supreme Court determined that authorizing cooperative fisheries of any sort was beyond BOF authority. Consequently, the management plan for gillnet and cooperative purse seine fishery in the Nunivak Island District was repealed by the BOF in 2006 (5 AAC 27.894).

In 1988, commercial herring fishing was initiated in the Cape Avinof District. A minimum threshold herring abundance of 500 short tons or spawning activity was established before implementation of the fishery, and a guideline harvest level was established not to exceed 15% of the estimated biomass. Commercial herring fishery regulations established the use of gillnets up to 100 fathoms in length, mechanical shakers were prohibited, vessel length was limited to 30 feet, and a superexclusive use designation was established.

Kuskokwim Area herring fisheries developed rapidly in response to the relatively strong market for herring sac roe. During 1981 to 1984, an average of 206 fishermen harvested 1,400 short tons of herring with an average value of $477,000 in Security Cove and Goodnews Bay districts. Addition of Nelson and Nunivak Island fisheries in 1985 and the Cape Avinof fishery in 1988 resulted in an average of 442 fishermen harvesting an average of 2,200 short tons of herring with an average value of $1.33 million during 1985 to 1989. During the 1990 and 1991 seasons, fishermen participation, harvest levels, and values decreased in response to a decline in herring abundance caused by a lack of recruitment of younger age herring into the fishery. Additional year classes of herring began recruiting to the fishery in 1992. The fishery peaked in 1996 when 802 fishermen harvested over 5,000 short tons of herring valued at $3.5 million. Although harvest levels remained high during 1997 to 1999 seasons, value declined. The trend in declining value was followed by an annual reduction in effort and harvest levels that continued through the 2006 season, during which 32 fishermen harvested 390 short tons of herring valued at $70,000. The decline in markets for herring sac roe continued through 2012 with no commercial herring harvest occurring in the Kuskokwim Area since 2006 (Appendices E1 and E2).

Subsistence Fishery

Subsistence fishing for Pacific herring in the northeastern Bering Sea is very important in villages of the Yukon–Kuskokwim River delta. Primarily residents of the coastal villages of Kwigillingok, Kongiganak, Kipnuk, Chefornak, Toksook Bay, Nightmute, Tununak, and Newtok participate in the subsistence fishery. Herring stocks utilized by the subsistence fishery are the same stocks targeted by the commercial fishery.

Subsistence harvest surveys occurred sporadically in Kuskokwim delta villages from 1975 to 1996 with surveys conducted annually in Nelson Island villages from 1985 to 1996. Subsistence survey results reflect harvest trends and reported catches represent minimum figures because not all area villages were surveyed and not all fishermen were contacted in those communities. No

subsistence herring surveys have been conducted in the Nelson Island District since 1996 or in the Nunivak Island District since 1993. Available data suggests that Nelson Island villages harvest approximately 110 short tons of herring annually (Burkey et al. 1998).

STOCK ASSESSMENT

The remoteness of the Kuskokwim Area herring fishing districts present challenges in assessing abundance, implementing fisheries, and monitoring escapement toward sustained yield fishery management. Although the fisheries typically progress in a northward progression, the herring fishery and spawn timing is quite similar.

When the market conditions were strong and the Kuskokwim herring fishery was active, there was an intensive aerial survey program that included contracting a survey aircraft for the duration of the season. The pilot and observer would station out of field camps at the herring districts. Starting around 2004 this effort was reduced to flying opportunistic surveys with chartered aircraft from Bethel. Due to a lack of market interest in recent years, funding for herring assessment and management was reallocated to other programs. As a result, surveys were not flown during the 2011 and 2012 seasons in any of the herring districts, Security Cove, Goodnews Bay, Nelson Island, and Central Kuskokwim Bay. However, using other recent-year biomass estimates and survival rates by age, herring biomass was projected for each district in 2012 as well as guideline harvest levels (Table 6).

Also as a result of the declining interest in the commercial sac roe herring market, the ADF&G test fishing program has been reduced from as many as 6 field camp projects in the 1990s, to only 2 test fishery projects in 2010, and no test fisheries were operated in 2011 or 2012. In future years, due to the decline in the commercial sac roe herring market, funding is no longer available for herring test fishing and associated sampling projects and aerial surveys.

If the herring market rebounds, aerial survey data collection methods will be similar to those used since 1978. Standard conversions of 1.52 tons/538 ft^2 (water depths less than 16 ft), 2.58 tons/538 ft^2 (water depths between 16 and 26 ft), and 2.83 tons/538 ft^2 (water depths greater than 26 ft) were used to convert estimated herring school surface areas to biomass.

Test fishing with variable mesh gillnets (VMG) is used to collect samples of herring to determine age, sex, size, and sexual maturity (ASL) of the run, and to note occurrence of other schooling fishes. This sampling program was important for determining herring stock status and for making biomass projections. The last year of data collection from the Goodnews Bay and Nelson Island Districts occurred in 2010. The last year of data collection from Security Cove District was in 2003, from the Cape Avinof District in 2001, and from the Nunivak Island District in 1999. If the catch sampling program is reinstated in the future, in the absence of data from the Security Cove District, VMG data from Goodnews Bay is used to estimate the metrics for the Security Cove District. VMG data from Nelson Island has been used to estimate the metrics for the Nunivak Island and Cape Avinof districts.

MISCELLANEOUS FISHERIES

Several species other than salmon, herring and halibut are used for commercial, subsistence, and recreation purposes in the Kuskokwim Management Area. They are inconnu or sheefish (*Stenodus leucichthys*), whitefish (*Coregonus* and *Prosopium*), char (*Salvelinus*), burbot (*Lota lota*), Arctic grayling (*Thymallus arcticus*), northern pike (*Esox lucius*), Arctic lamprey

(*Lampetra japonica*), rainbow smelt (*Osmerus mordax*), blackfish (*Dallia pectoralis*), rainbow trout (*Oncorhynchus mykiss*), lake trout (*Salvelinus namaycush*), threespine stickleback (*Gasterosteus aculeatus*), ninespine stickleback (*Pungitius pungitius*), longnose sucker (*Catostomus catostomus*), and saffron or "tomcod" (*Eleginus gracilus*).

FRESHWATER COMMERCIAL

The commercial fishery has been sporadic, primarily harvesting whitefish and burbot for local markets. Some of the whitefish harvest occurs under the ice in the winter.

A permit from the Commercial Fisheries Entry Commission is required. A permit from ADF&G to conduct commercial fisheries on whitefish, pike, smelt, burbot, and lamprey is also required. Those species may also be taken incidentally to commercial salmon fishing. There were no freshwater permits issued by the Bethel ADF&G office in 2012 for the Kuskokwim Area. The guidelines for permits are as follows:

1. All waters of the area except the Johnson River drainage and Whitefish Lake are open to commercial harvest of freshwater finfish. The heavy subsistence utilization of freshwater species in these areas is the reason for the closure.
2. Only whitefish, cisco, smelt, pike, burbot, and lamprey may be taken. Sheefish, char, and trout may not be taken due to their smaller populations, lower reproductive rates, and their heavy utilization in the subsistence and sport fisheries.
3. All legal commercial gear types are allowed.
4. Gillnets may not be less than 2.5 in or greater than 5.0 in stretch mesh. Long lines and set lines must use hooks with a gap between point and shank larger than three quarters inch.

No commercial landings of freshwater fish have been documented since 2003 (Appendix A14).

Stock Status

Limited ADF&G observations, advisory committee recommendations, and fishermen interviews did not indicate declining populations in most of the drainages. However, residents of Kasigluk, Atmautluak, and Nunapitchuk have expressed concerns that subsistence fishermen are overexploiting the whitefish stocks in Nunavakpak Lake (near Kasigluk).

SALTWATER COMMERCIAL

A poorly documented commercial fishery on saffron or "tomcod" (*Eleginus gracilus*) has occurred in the Kuskokwim Area for some time. These fish were surplus to subsistence needs and fishermen and local stores were, and often still are, unaware of the regulatory requirements. ADF&G has been trying to inform buyers and sellers of these requirements. Since 1988, ADF&G has had information on the sale of fish exported from the coastal villages to Bethel. Sales within the villages remain undocumented. No commercial landings were documented in 2012.

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TABLES AND FIGURES

Table 1.–Commercial and subsistence salmon fishing emergency order (EO) summary, Kuskokwim Management Area, 2012.

EO Number	Effective Date	Expiration Date	EO Description
3-S-WR-01-12	12:01 AM Wednesday, June 1, 2012	11:59 PM Wednesday, July 25, 2012	Tributary subsistence closures
3-S-WR-02-12	12:01 AM Sunday, June 10, 2012	11:59 PM Saturday, June 16, 2012	Section 1, 7-day subsistence closure
3-S-WR-03-12	12:01 AM Wednesday June 13, 2012	11:59 PM Tuesday, June 19, 2012	Section 2, 7-day subsistence closure
3-S-WR-04-12	12:01 AM Sunday June 17, 2012	11:59 PM Saturday, June 23, 2012	Section 3, 7-day subsistence closure
3-S-WR-05-12	12:01 AM Sunday, June 17, 2012	11:59 PM Thursday, June 21, 2012	Section 1, 5-day subsistence closure
3-S-WR-06-12	12:01 AM Wednesday June 20, 2012	11:59 PM Sunday, June 24, 2012	Section 2, 5-day subsistence closure
3-S-WR-07-12	12:00 AM Friday, June 22, 2012	11:59 PM Sunday, June 24, 2012	Section 1, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-08-12	12:00 AM Monday, June 25, 2012	11:59 PM Wednesday, June 27, 2012	Section 2, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-09-12	12:01 AM Friday June 22, 2012	11:59 PM Tuesday, July 3, 2012	Section 4, 12-day subsistence closure
3-S-WR-10-12	12:00 AM Sunday June 24, 2012	11:59 PM Thursday, June 28, 2012	Section 3, 5-day subsistence closure
3-S-WR-11-12	12:01 AM Wednesday June 27, 2012	11:59 PM Sunday, July 8, 2012	Section 5, 12-day subsistence closure
3-S-WR-12-12	12:00 AM Friday June 29, 2012	11:59 PM Sunday, July 1, 2012	Section 3, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-13-12	12:00 AM Wednesday July 4, 2012	11:59 PM Friday, July 6, 2012	Section 4, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-14-12	12:00 AM Monday July 9, 2012	11:59 PM Wednesday, July 11, 2012	Section 5, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-15-12	12:00 AM Monday, June 25, 2012	11:59 PM Wednesday, June 27, 2012	Section 1, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-16-12	12:00 AM Thursday, June 28, 2012	until superseded	Section 1, subsistence closure
3-S-WR-17-12	11:59 PM Wednesday June 27, 2012	11:59 PM Saturday, June 30, 2012	Section 2, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-18-12	12:00 AM Monday July 2, 2012	11:59 PM Wednesday, July 4, 2012	Section 3, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-19-12	11:59 PM Friday July 6, 2012	11:59 PM Monday, July 9, 2012	Section 4, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-20-12	11:59 PM Wednesday July 11, 2012	11:59 PM Saturday, July 14, 2012	Section 5, 3 days subsistence restricted to 6 in or less mesh size
3-S-WR-21-12	12:00 AM Saturday, June 30, 2012	12:00 AM Monday, July 16, 2012	Section 1, subsistence restricted to 6 in or less mesh size
3-S-WR-22-12	12:00 AM Sunday July 1, 2012	11:59 PM Wednesday, July 18, 2012	Section 2, 2-day subsistence closure then restricted to 6 in or less mesh size
3-S-WR-23-12	12:00 AM Thursday July 5, 2012	11:59 PM Sunday, July 22, 2012	Section 3, 2-day subsistence closure then restricted to 6 in or less mesh size
3-S-WR-24-12	11:59 PM Monday July 9, 2012	11:59 PM Sunday, July 22, 2012	Section 4, restricted to 6 in or less mesh size
3-S-WR-25-12	11:59 PM Saturday July 14, 2012	11:59 PM Sunday, July 22, 2012	Section 5, restricted to 6 in or less mesh size
3-S-WR-26-12	12:00 PM Friday, July 13, 2012	11:59 PM Saturday, September 1, 2012	Opens commercial fishing season in W1 (District 1)
3-S-WR-27-12	12:00 PM Friday, July 13, 2012	11:59 PM Saturday, September 1, 2012	Establishes subsistence fishing closures during commercial periods
3-S-WR-28-12	12:00 PM Friday, July 13, 2012	4:00 PM Friday, July 13, 2012	W1-B, 4 hr commercial period
3-S-WR-29-12	12:00 AM Monday July 16, 2012	11:59 PM Sunday, July 22, 2012	Section 5, Chinook salmon hook and line bag limit
3-S-WR-30-12	12:00 PM Monday, July 16, 2012	11:59 PM Wednesday, July 25, 2012	W1-A, 4 hr commercial period; closes Tuluksak waters to commercial fishing
3-S-WR-31-12	10:00 AM Tuesday, July 17, 2012	4:00 PM Tuesday, July 17, 2012	W1-B, 4 hr commercial period with a 2 hr extension in the Lower Subdistrict 1-B

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Table 1.–Page 2 of 3.

EO Number	Effective Date	Expiration Date	EO Description
3-S-WR-32-12	12:00 PM Thursday, July 19, 2012	11:59 PM Thursday, July 19, 2012	W1-A, 4 hr commercial period
3-S-WR-33-12	10:00 AM Friday, July 20, 2012	4:00 PM Friday, July 20, 2012	W1-B, 4 hr commercial period with a 2 hr extension in the Lower Subdistrict 1-B
3-S-WR-34-12	12:00 PM Monday, July 23, 2012	4:00 PM Monday, July 23, 2012	W1-A, 4 hr commercial period
3-S-WR-35-12	10:00 AM Tuesday, July 24, 2012	4:00 PM Tuesday, July 24, 2012	W1-B, 4 hr commercial period with a 2 hr extension in the Lower Subdistrict 1-B
3-S-WR-36-12	12:00 PM Thursday, July 26, 2012	4:00 PM Thursday, July 26, 2012	W1-A, 4 hr commercial period
3-S-WR-37-12	10:00 AM Friday, July 27, 2012	4:00 PM Friday, July 27, 2012	W1-B, 4 hr commercial period with a 2 hr extension in the Lower Subdistrict 1-B
3-S-WR-38-12	12:00 PM Monday, July 30, 2012	4:00 PM Monday, July 30, 2012	W1-A, 4 hr commercial period
3-S-WR-39-12	10:00 AM Tuesday, July 31, 2012	4:00 PM Tuesday, July 31, 2012	W1-B, 4 hr commercial period with a 2 hr extension in the Lower Subdistrict 1-B
3-S-WR-40-12	12:00 PM Thursday, August 2, 2012	4:00 PM Thursday, August 2, 2012	W1-A, 4 hr commercial period
3-S-WR-41-12	10:00 AM Friday, August 3, 2012	4:00 PM Friday, August 3, 2012	W1-B, 4 hr commercial period with a 2 hr extension in the Lower Subdistrict 1-B
3-S-WR-42-12	12:00 PM Monday, August 6, 2012	4:00 PM Monday, August 6, 2012	W1-A, 4 hr commercial period
3-S-WR-43-12	10:00 AM Tuesday, August 7, 2012	4:00 PM Tuesday, August 7, 2012	W1-B, 4 hr commercial period with a 2 hr extension in the Lower Subdistrict 1-B
3-S-WR-44-12	12:00 PM Thursday, August 9, 2012	4:00 PM Thursday, August 9, 2012	W1-A, 4 hr commercial period
3-S-WR-45-12	10:00 AM Friday, August 10, 2012	4:00 PM Friday, August 10, 2012	W1-B, 4 hr commercial period with a 2 hr extension in the Lower Subdistrict 1-B
3-S-WR-46-12	12:00 PM Tuesday, August 14, 2012	4:00 PM Tuesday, August 14, 2012	W1-A, 4 hr commercial period
3-S-WR-47-12	10:00 AM Thursday, August 16, 2012	4:00 PM Thursday, August 16, 2012	W1-B, 4 hr commercial period with a 2 hr extension in the Lower Subdistrict 1-B
3-S-WR-48-12	11:00 AM Saturday, August 18, 2012	5:00 PM Saturday, August 18, 2012	W1-A, 6 hr commercial period
3-S-WR-49-12	11:00 AM Tuesday, August 21, 2012	5:00 PM Tuesday, August 21, 2012	W1, 6 hr commercial period
3-S-WR-50-12	11:00 AM Friday, August 24, 2012	11:59 PM Saturday, September 1, 2012	Waive the subdistrict re-registration requirement for W1
3-S-WR-51-12	11:00 AM Friday, August 24, 2012	5:00 PM Friday, August 24, 2012	W1-A, 6 hr commercial period
3-S-WR-52-12	11:00 AM Monday, August 27, 2012	5:00 PM Monday, August 27, 2012	W1-A, 6 hr commercial period
3-S-WB-01-12	9:00 AM Wednesday, June 27, 2012	9:00 PM Saturday, September 8, 2012	Establish commercial season; reduce subsistence closers during commercial periods
3-S-WB-02-12	9:00 AM Wednesday, June 27, 2012	9:00 PM Wednesday, June 27, 2012	W4 & W5 commercial periods
3-S-WB-03-12	9:00 AM Wednesday, July 4, 2012	9:00 PM Wednesday, July 4, 2012	W4 & W5 commercial periods

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Table 1.–Page 3 of 3.

EO Number	Effective Date	Expiration Date	EO Description
3-S-WB-04-12	9:00 AM Saturday, July 7, 2012	9:00 PM Monday, July 9, 2012	W4 & W5 commercial periods
3-S-WB-05-12	9:00 AM Wednesday, July 11, 2012	9:00 PM Saturday, July 14, 2012	W4 & W5 commercial periods
3-S-WB-06-12	9:00 AM Monday, July 16, 2012	9:00 PM Wednesday, July 18, 2012	W4 & W5 commercial periods
3-S-WB-07-12	9:00 AM Friday, July 20, 2012	9:00 PM Monday, July 23, 2012	W4 & W5 commercial periods
3-S-WB-08-12	9:00 AM Wednesday, July 25, 2012	9:00 PM Friday, July 27, 2012	W4 & W5 commercial periods
3-S-WB-09-12	9:00 AM Monday, July 30, 2012	9:00 PM Wednesday, August 1, 2012	W4 & W5 commercial periods
3-S-WB-10-12	9:00 AM Friday, August 3, 2012	9:00 PM Monday, August 6, 2012	W4 & W5 commercial periods
3-S-WB-11-12	9:00 AM Wednesday, August 8, 2012	9:00 PM Friday, August 10, 2012	W4 & W5 commercial periods
3-S-WB-12-12	9:00 AM Monday, August 13, 2012	9:00 PM Wednesday, August 15, 2012	W4 & W5 commercial periods
3-S-WB-13-12	9:00 AM Friday, August 17, 2012	9:00 PM Friday, August 17, 2012	W4 & W5 commercial periods
3-S-WB-14-12	9:00 AM Monday, August 20, 2012	9:00 PM Wednesday, August 22, 2012	W4 & W5 commercial periods
3-S-WB-15-12	9:00 AM Thursday, August 23, 2012	9:00 PM Thursday, August 23, 2012	W5 commercial period
3-S-WB-16-12	9:00 AM Friday, August 24, 2012	9:00 PM Friday, August 24, 2012	W4 & W5 commercial periods
3-S-WB-17-12	9:00 AM Monday, August 27, 2012	9:00 PM Wednesday, August 29, 2012	W4 & W5 commercial periods

Table 2.–Commercial salmon harvest by period, District W-1, Kuskokwim River, Kuskokwim Management Area, 2012.

Period	Date		Permits fished	Hours fished		Permit hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1	Jul 13	[a]	151	4		604	9	0.00	1,041	1.72	16,270	26.94	20	0.03
2	Jul 16	[b]	46	4		184	0	0.00	301	1.64	7,020	38.15	5	0.03
3	Jul 17	[a]	150	4	[d]	600	0	0.00	707	1.18	11,793	19.66	122	0.20
4	Jul 19	[b]	51	4		204	0	0.00	209	1.02	6,046	29.64	221	1.08
5	Jul 20	[a]	157	4	[d]	628	5	0.00	162	0.26	8,690	13.84	509	0.81
6	Jul 23	[b]	41	4		164	0	0.00	135	0.82	3,859	23.53	324	1.98
7	Jul 24	[a]	132	4	[d]	528	0	0.00	52	0.10	2,893	5.48	1,562	2.96
8	Jul 26	[b]	53	4		212	0	0.00	31	0.15	3,255	15.35	1,545	7.29
9	Jul 27	[a]	140	4	[d]	560	0	0.00	101	0.18	1,847	3.30	2,912	5.20
10	Jul 30	[b]	59	4		236	0	0.00	11	0.05	1,131	4.79	4,815	20.40
11	Jul 31	[a]	133	4	[d]	532	0	0.00	33	0.06	631	1.19	3,485	6.55
12	Aug 2	[b]	65	4		260	0	0.00	8	0.03	485	1.87	3,496	13.45
13	Aug 3	[a]	132	4	[d]	528	0	0.00	9	0.02	493	0.93	6,958	13.18
14	Aug 6	[b]	68	4		272	0	0.00	8	0.03	206	0.76	5,407	19.88
15	Aug 7	[a]	157	4	[d]	628	0	0.00	9	0.01	164	0.26	5,148	8.20
16	Aug 9	[b]	65	4		260	0	0.00	10	0.04	77	0.30	3,672	14.12
17	Aug 10	[a]	144	4	[d]	576	0	0.00	7	0.01	98	0.17	5,209	9.04
18	Aug 14	[b]	80	4		320	0	0.00	5	0.02	80	0.25	7,568	23.65
19	Aug 16	[a]	109	4	[d]	436	0	0.00	7	0.02	28	0.06	7,996	18.34
20	Aug 18	[b]	89	6		534	0	0.00	2	0.00	48	0.09	11,017	20.63
21	Aug 21	[c]	164	6		984	0	0.00	4	0.00	21	0.02	8,315	8.45
22	Aug 24	[b]	81	6		486	0	0.00	2	0.00	18	0.04	3,036	6.25
23	Aug 27	[b]	74	6		444	0	0.00	3	0.01	18	0.04	3,047	6.86
Total			379[e]	100		6,976	14		2,857	7	65,171		86,389	

[a] Subdistrict W-1B (below Bethel) opening.

[b] Subdistrict W-1A (above Bethel) opening.

[c] Subdistricts W-1A and W-1B.

[d] 2 hours of additional fishing time was allowed in lower section of W1-B.

[e] Number of individual permit holders participating for the season.

Table 3.–Commercial salmon harvest and exvessel value by district, Kuskokwim Management Area, 2012.

	Chinook	Sockeye	Chum	Pink	Coho	Total
Lower Kuskokwim River, District W-1						
Fish	14	2,857	65,171	0	86,389	154,431
Pounds	265	19,254	399,334	0	501,245	920,098
Price	$0.85	$0.84	$0.65	$0.00	$0.65	
Value	$225	$16,154	$257,932	$0	$323,687	$597,998
2002–2011 Average						
Fish	2,858	12,705	46,750	4	165,145	227,461
Value	$24,370	$58,208	$65,030	$0	$389,944	$537,552
Quinhagak, District W-4						
Fish	6,675	37,688	61,140	0	31,214	136,717
Pounds	101,099	244,733	426,871	0	197,221	969,924
Price	$0.85	$0.85	$0.85	$0.00	$0.85	
Value	$85,934	$208,023	$362,840	$0	$167,638	$824,435
2002–2011 Average						
Fish	17,169	72,962	55,661	2	45,877	191,671
Value	$149,807	$308,212	$101,747	$0	$139,381	$873,649
Goodnews Bay, District W-5						
Fish	1,531	50,635	24,487	0	25,515	102,168
Pounds	24,128	352,255	173,413	0	177,257	727,053
Price	$0.85	$0.85	$0.85	$0.00	$0.85	
Value	$20,509	$299,187	$147,401	$0	$150,668	$617,766
2002–2011 Average						
Fish	1,964	27,923	10,484	1	12,887	53,259
Value	$17,027	$121,159	$16,828	$0	$44,969	$251,278
Kuskokwim Area total						
Fish	8,220	91,180	150,798	0	143,118	393,316
Pounds	125,492	616,242	999,618	0	875,723	2,617,075
Price	$0.85	$0.86	$0.68	$0.00	$0.75	
Value	$106,668	$523,364	$768,173	$0	$642,091	$2,040,296
2002–2011 Average						
Fish	21,991	113,752	112,928	4	223,701	472,376
Value	$191,204	$487,579	$183,604	$1	$574,294	$1,662,479

Table 4.–Commercial salmon harvest by period, District 4, Quinhagak, Kuskokwim Bay, 2012.

Period	Date	Permits fished	Hours fished	Permit hours	Chinook		Sockeye		Chum		Coho	
					Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE
1	Jun 27	107	12	1,284	1,569	1.2	3,015	2.3	3,182	2.5	0	0.0
2	Jul 4	128	12	1,536	1,960	1.3	13,023	8.5	8,986	5.9	0	0.0
3	Jul 7	134	12	1,608	1,189	0.7	9,043	5.6	11,941	7.4	0	0.0
4	Jul 9	127	12	1,524	705	0.5	4,505	3.0	8,539	5.6	1	0.0
5	Jul 11	119	12	1,428	379	0.3	2,676	1.9	5,652	4.0	0	0.0
6	Jul 13	70	12	840	212	0.3	1,718	2.0	3,354	4.0	4	0.0
7	Jul 16	106	12	1,272	301	0.2	1,916	1.5	9,063	7.1	9	0.0
8	Jul 18	82	12	984	197	0.2	909	0.9	5,721	5.8	14	0.0
9	Jul 23	56	12	672	44	0.1	347	0.5	1,695	2.5	73	0.1
10	Jul 27	32	12	384	28	0.1	177	0.5	1,481	3.9	317	0.8
11	Aug 1	35	12	420	19	0.0	75	0.2	521	1.2	1,103	2.6
12	Aug 3	19	12	228	20	0.1	30	0.1	137	0.6	623	2.7
13	Aug 6	48	12	576	15	0.0	134	0.2	372	0.6	2,168	3.8
14	Aug 8	45	12	540	7	0.0	24	0.0	158	0.3	1,627	3.0
15	Aug 10	41	12	492	5	0.0	23	0.0	62	0.1	2,091	4.3
16	Aug 15	53	12	636	7	0.0	28	0.0	65	0.1	3,686	5.8
17	Aug 17	31	12	372	8	0.0	5	0.0	8	0.0	2,607	7.0
18	Aug 20	62	12	744	5	0.0	3	0.0	134	0.2	3,869	5.2
19	Aug 22	52	12	624	2	0.0	20	0.0	33	0.1	5,417	8.7
20	Aug 24	48	12	576	3	0.0	6	0.0	25	0.0	3,881	6.7
21	Aug 27	53	12	636	0	0.0	10	0.0	6	0.0	2,302	3.6
22	Aug 29	27	12	324	0	0.0	1	0.0	5	0.0	1,422	4.4
Total		179[a]	264	17,700	6,675		37,688		61,140		31,214	

[a] Number of individual permit holders participating for the season.

Table 5.–Commercial salmon harvest by period, District W-5 Goodnews Bay, Kuskokwim Bay, 2012.

		Permits	Hours	Permit	Chinook		Sockeye		Chum		Coho	
Period	Date	fished	fished	hours	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE
1	Jun 27	15	12	180	92	0.51	2,688	14.93	1,314	7.30	0	0.00
2	Jul 4	22	12	264	172	0.65	4,325	16.38	2,348	8.89	7	0.03
3	Jul 7	37	12	444	130	0.29	6,934	15.62	3,430	7.73	0	0.00
4	Jul 9	38	12	456	205	0.45	4,836	10.61	2,493	5.47	0	0.00
5	Jul 11	39	12	468	376	0.80	4,574	9.77	3,015	6.44	0	0.00
6	Jul 12	38	12	456	204	0.45	4,075	8.94	2,320	5.09	0	0.00
7	Jul 14	35	12	420	85	0.20	2,561	6.10	2,371	5.65	0	0.00
8	Jul 16	34	12	408	54	0.13	4,088	10.02	1,632	4.00	0	0.00
9	Jul 18	34	12	408	58	0.14	3,457	8.47	2,420	5.93	2	0.00
10	Jul 20	38	12	456	45	0.10	4,113	9.02	1,491	3.27	2	0.00
11	Jul 23	28	12	336	25	0.07	2,035	6.06	681	2.03	9	0.03
12	Jul 25	18	12	216	15	0.07	877	4.06	334	1.55	18	0.08
13	Jul 27	19	12	228	15	0.07	1,197	5.25	263	1.15	64	0.28
14	Jul 30	18	12	216	17	0.08	1,031	4.77	95	0.44	171	0.79
15	Aug 1	13	12	156	8	0.05	433	2.78	108	0.69	157	1.01
16	Aug 3	14	12	168	8	0.05	501	2.98	52	0.31	291	1.73
17	Aug 6	13	12	156	3	0.02	655	4.20	32	0.21	536	3.44
18	Aug 8	17	12	204	1	0.00	559	2.74	29	0.14	1,173	5.75
19	Aug 10	22	12	264	4	0.02	535	2.03	13	0.05	1,456	5.52
20	Aug 13	30	12	360	2	0.01	446	1.24	10	0.03	2,536	7.04
21	Aug 15	30	12	360	4	0.01	265	0.74	10	0.03	2,660	7.39
22	Aug 17	26	12	312	0	0.00	117	0.38	7	0.02	2,516	8.06
23	Aug 20	28	12	336	2	0.01	99	0.29	8	0.02	3,373	10.04
24	Aug 22	22	12	264	5	0.02	68	0.26	1	0.00	2,204	8.35
25	Aug 23	17	12	204	1	0.00	51	0.25	5	0.02	2,204	10.80
26	Aug 24	19	12	228	0	0.00	56	0.25	3	0.01	2,144	9.40
27	Aug 27	19	12	228	0	0.00	42	0.18	2	0.01	2,658	11.66
28	Aug 29	15	12	180	0	0.00	17	0.09	0	0.00	1,334	7.41
Total		58[a]	336	8,376	1,531		50,635		24,487		25,515	

[a] Number of individual permit holders participating for the season.

Table 6.–Projections of Pacific herring spawning biomass and harvest levels for 2012 season, Kuskokwim Bay, 2012.

District	2011 Observed biomass (st) [a]	2012 Projected biomass (st)	2012 Guideline harvest (st)	Exploitation rate (%)	Threshold [b]
Security Cove	13,119	12,193	2,439	20	1,200
Goodnews Bay	36,810	33,008	6,602	20	1,200
Cape Avinof	2,324	2,095	314	15	500
Nelson Island [c]	5,252	4,703	741	16[c]	3,000
Nunivak Island	3,206	2,879	576	20	1,500
Kuskokwim Bay Totals	60,711	54,878	10,672		

Note: Herring weight presented in short tons (st).

[a] 2011 projected biomass was used because recent biomass estimate was unavailable.

[b] Threshold biomass needed to allow commercial fishery (5 AAC 27.060).

[c] Nelson Island exploitation rate is 20% of projected biomass minus 200 st for subsistence harvest.

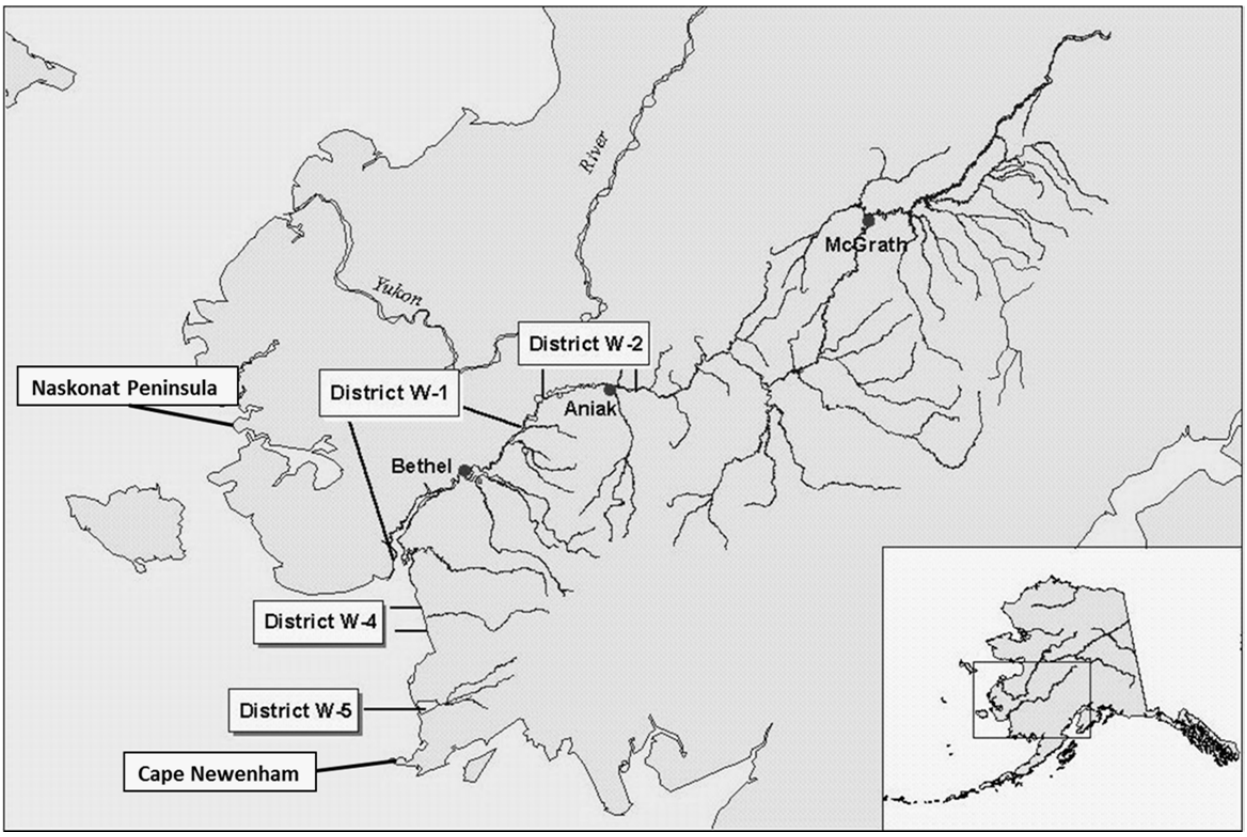

Figure 1.–Map of the Kuskokwim Management Area with salmon fishing districts.

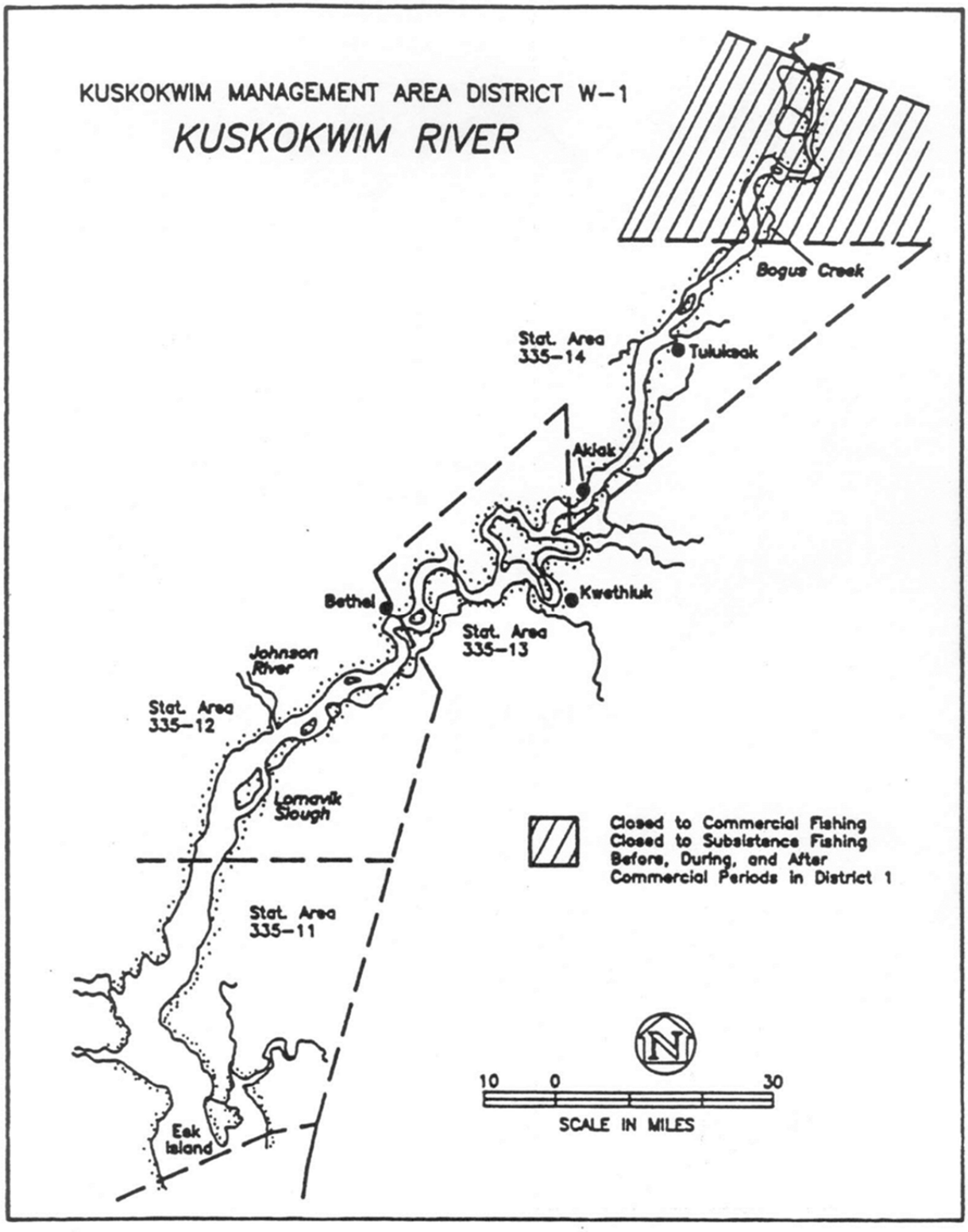

Figure 2.–Map of commercial fishing District W-1, Kuskokwim River, Kuskokwim Management Area.

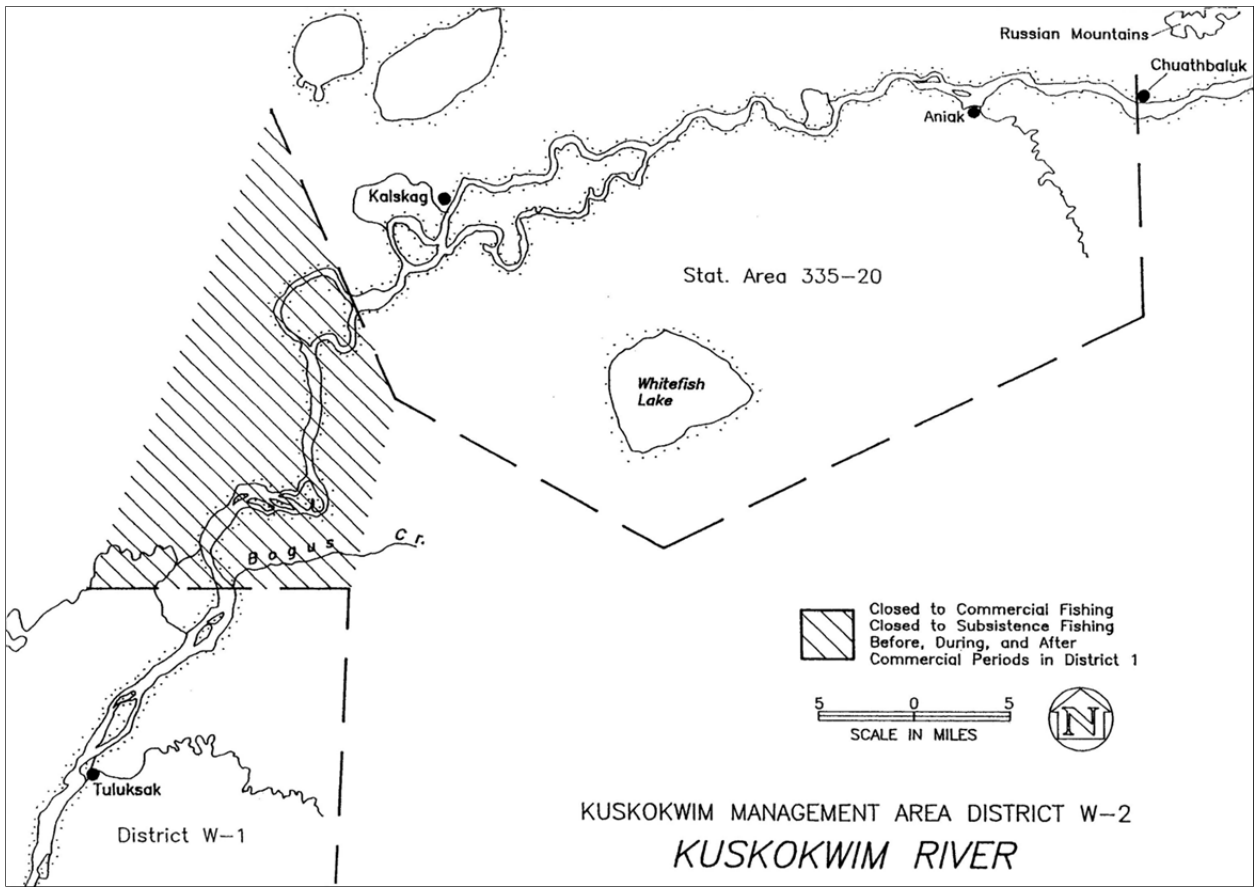

Figure 3.–Map of commercial fishing District W-2, Kuskokwim River, Kuskokwim Management Area.

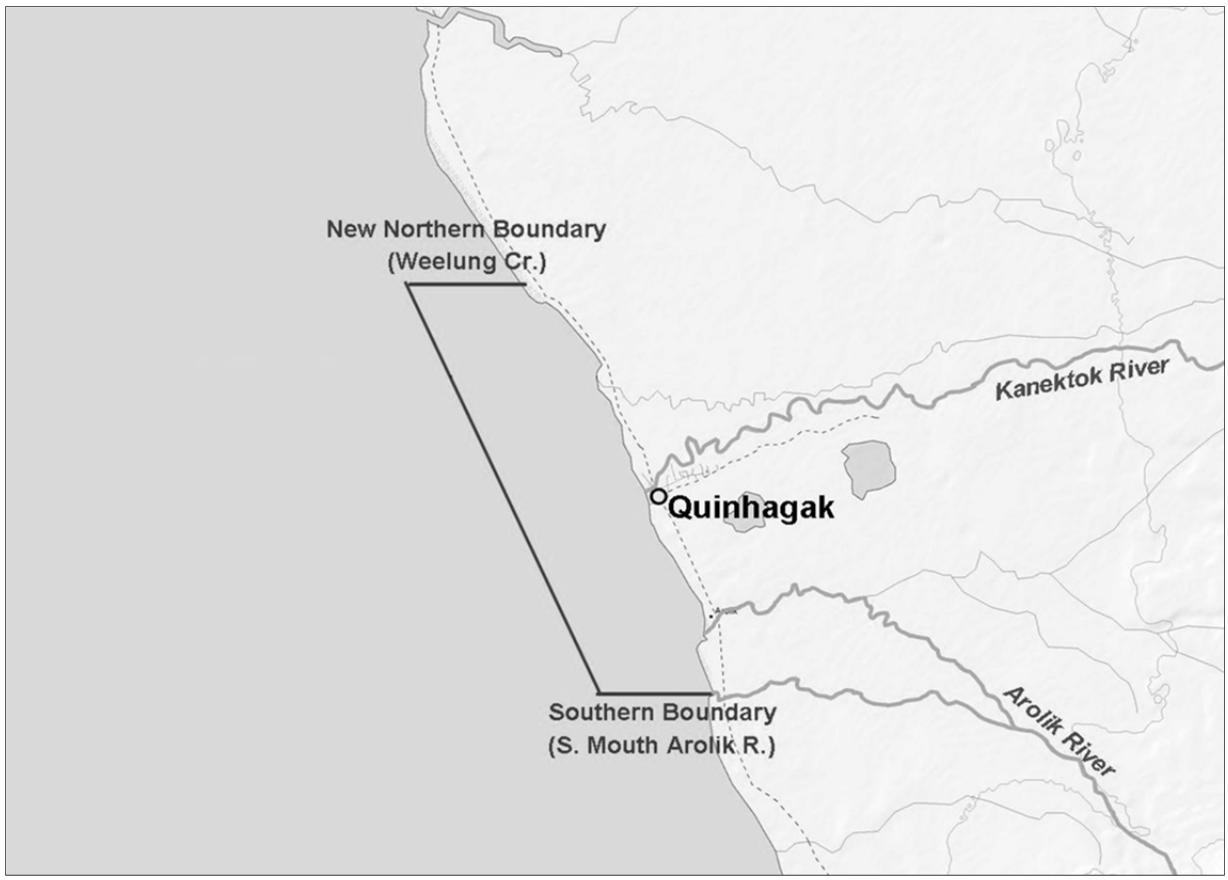

Figure 4.–Map of commercial fishing District W-4, Quinhagak, Kuskokwim Management Area.

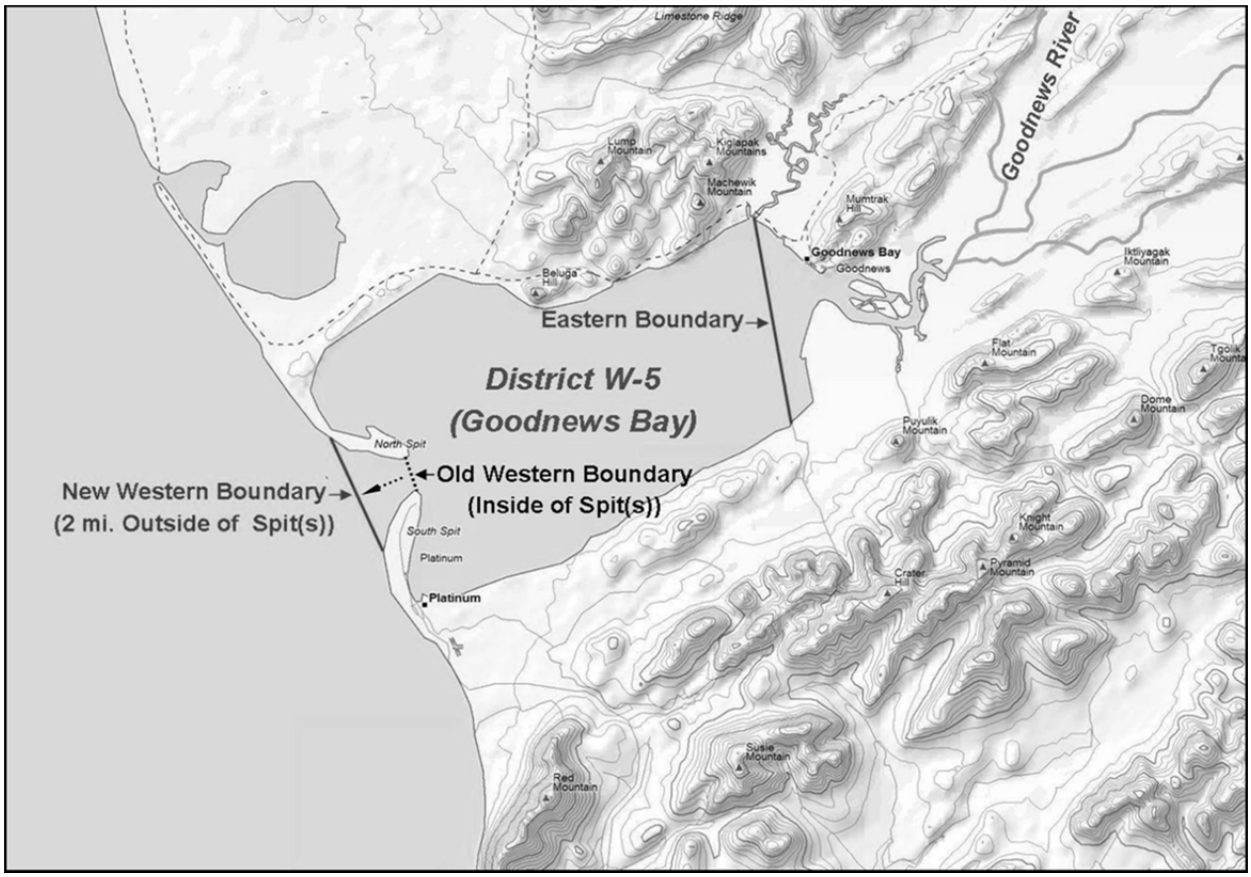

Figure 5.–Map of commercial fishing District W-5, Goodnews Bay, Kuskokwim Management Area.

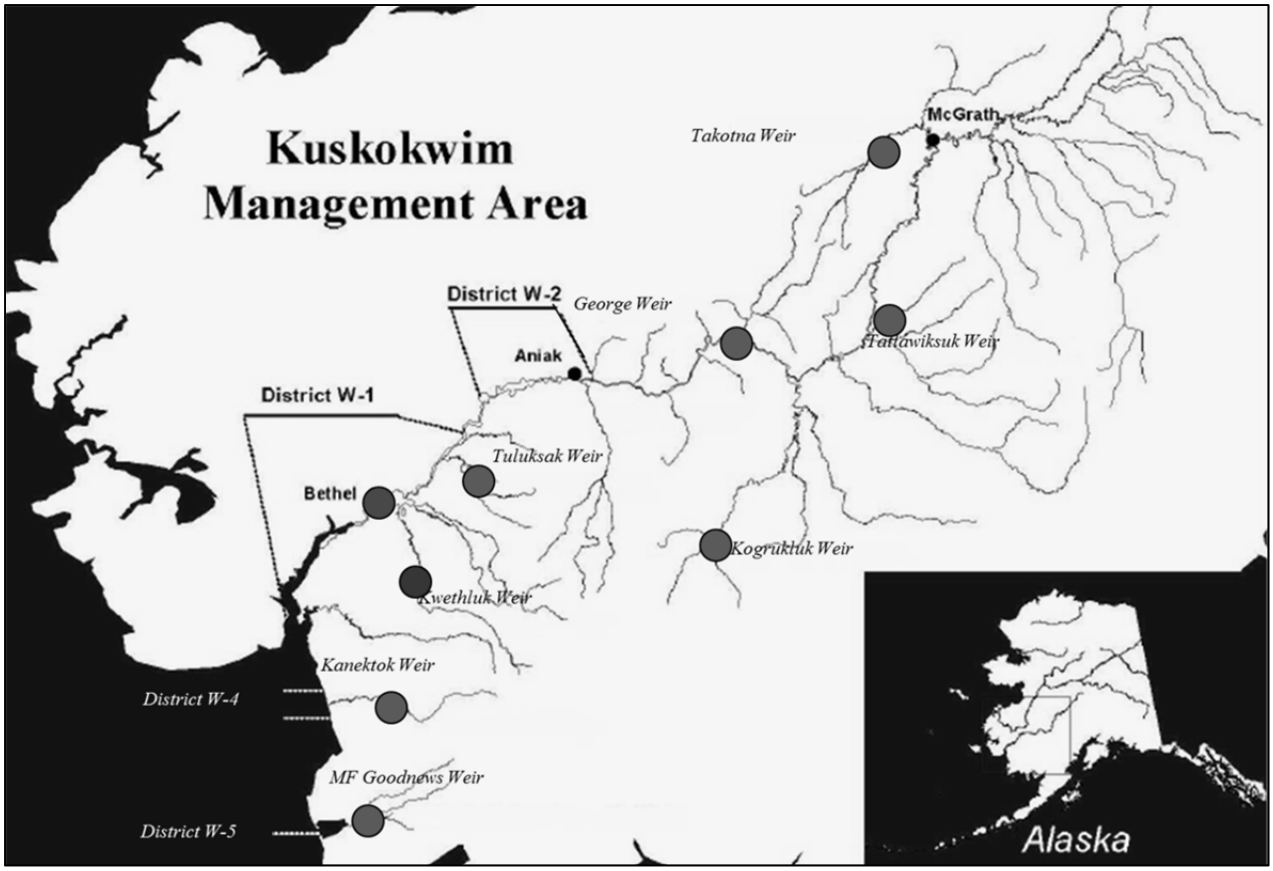

Figure 6.–Ground-based escapement projects, Kuskokwim Management Area.

Figure 7.–Map of aerial survey streams, Kuskokwim Management Area.

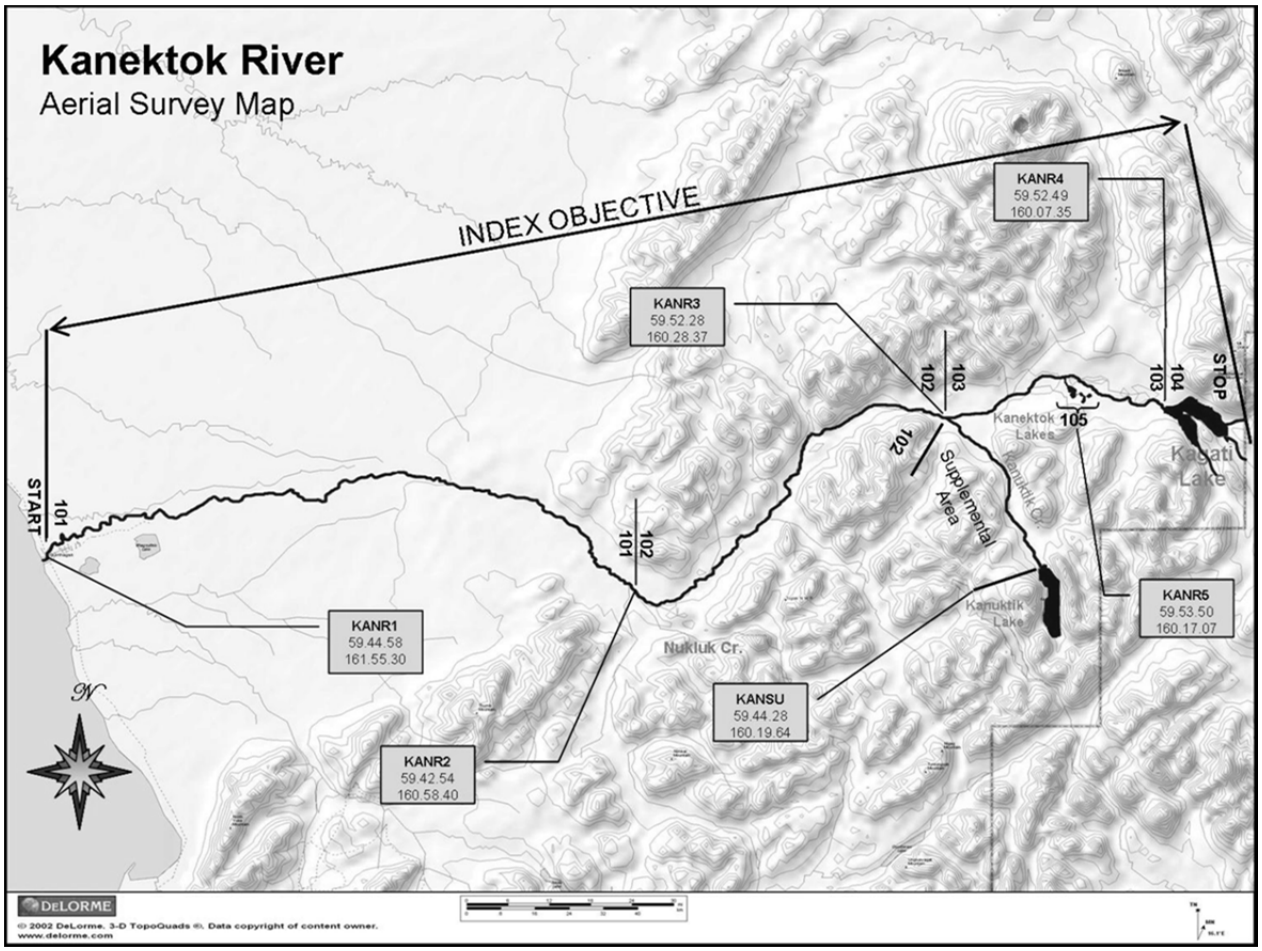

Figure 8.–Aerial survey map of the Kanektok River, Kuskokwim Management Area.

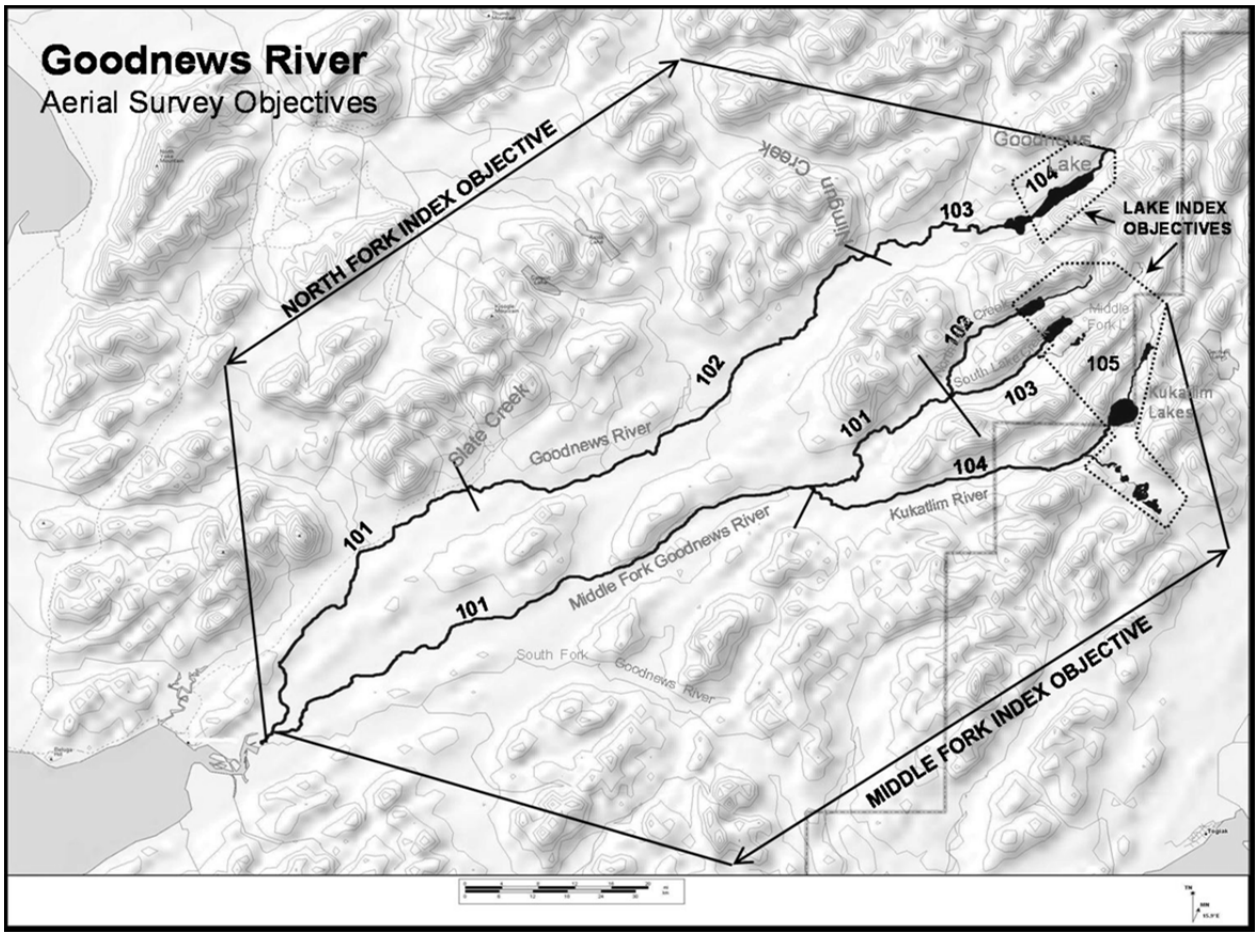

Figure 9.–Aerial survey map of the Goodnews River drainage, Kuskokwim Management Area.

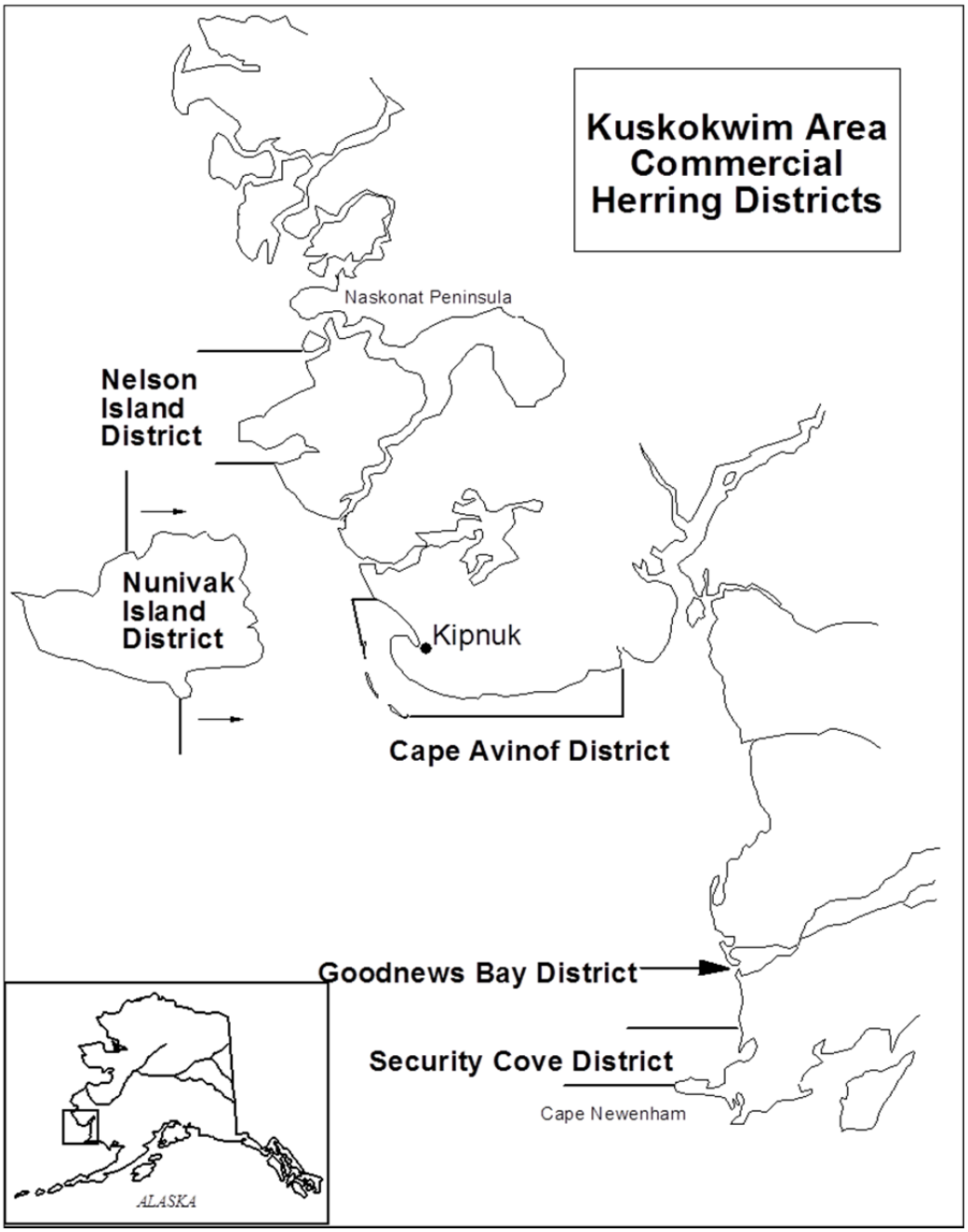

Figure 10.–Commercial herring districts, Kuskokwim Management Area.

APPENDIX A: KUSKOKWIM AREA

Appendix A1.–Fish species commonly found in Kuskokwim Area.

Species code	Genus and species	Common name
110	*Gadus macrocephalus*	Pacific cod
113	*Eleginus gracilis*	Saffron cod
129	*Platichthys stellatus*	Starry flounder
122	*Pleuronectes glacialis*	Arctic flounder
127	*Pleuronectes aspera*	Yellowfin sole
128	*Pleuronectes vetulus*	English sole
162	*Cottus cognatus*	Slimy sculpin
166	*Oligocottus maculosus*	Tidepool sculpin
192	*Hexagrammos stelleri*	Whitespotted greenling
200	*Hippoglossus stenolepis*	Pacific halibut
230	*Clupea pallasi*	Pacific herring
410	*Oncorhynchus tshawytscha*	Chinook salmon
420	*Oncorhynchus nerka*	Sockeye salmon
430	*Oncorhynchus kisutch*	Coho salmon
440	*Oncorhynchus gorbuscha*	Pink salmon
450	*Oncorhynchus keta*	Chum salmon
500	*Esox lucius*	Northern pike
513	*Osmerus mordax*	Rainbow smelt
514	*Hypomesus olidus*	Pond smelt
516	*Mallotus villosus*	Capelin
520	*Salvelinus alpinus*	Arctic char
532	*Salvelinus malma*	Dolly Varden
541	*Oncorhynchus mykiss*	Rainbow trout
550	*Salvelinus namaycush*	Lake trout
570	*Stenodus leucichthys*	Inconnu
588	*Coregonus nasus*	Broad whitefish
589	*Coregonus pidschian*	Humpback whitefish
583	*Coregonus sardinella*	Least cisco
584	*Coregonus autumnalis*	Arctic cisco
586	*Prosopium cylindraceum*	Round whitefish
590	*Lota lota*	Burbot
600	*Lampetra tridentata*	Pacific lamprey
601	*Lampetra camtschatic*	Arctic lamprey
610	*Thymallus arcticus*	Arctic grayling
630	*Dallia pectoralis*	Alaska blackfish
640	*Catostomus catostomus*	Longnose sucker
660	*Gasterosteus aculeatus*	Threespine stickleback
661	*Pungitius pungitius*	Ninespine stickleback
670	*Percopsis omiscomaycus*	Trout perch
NA	*Megalocottus platycephalus*	Belligerent sculpin
NA	*Myoxocephalus quadricornis*	Fourhorn sculpin

Note: Based on American Fisheries Society Special Publication No. 20, Common and Scientific Names of Fishes from the United States and Canada (Fifth Edition). Committee and Names of Fishes, Bethesda, Maryland, 1991.

Appendix A2.–Historical events, Kuskokwim management area, 1913–2012.

Year	Event
1913	Commercial sale of salmon export first documented in the Kuskokwim Area.
1954	Commercial Chinook salmon quota established.
1959	First Chinook landing since quota established.
1960	Kanektok counting tower (1960–1962)
	Quinhagak District (W-4) commercial salmon fishery established.
	Kuskokwim Area divided into 4 subdistricts: Lower Kuskokwim River (Subdistrict 1), Middle Kuskokwim River (Subdistrict 2), Upper Kuskokwim River (Subdistrict 3), Quinhagak (Subdistrict 4). District boundaries are not well recorded; in the Aniak area, some commonly used drift sites overlap between District 2 and 3, which confused catch reporting.
	Kuskokwim River drainage surveys, 1960.
1961	ADF&G Kuskokwim River tagging study.
1962	ADF&G Kuskokwim River tagging study.
	Boundary between Subdistricts 2 and 3 changed; the new location was not recorded but the most likely location was Kolmakof River. The reason for the change was to move the boundary to a point which was between commonly used gillnet locations and thereby avoid confusion in catch reporting. As a result, there were no landings in Subdistrict 3.
1963	ADF&G Kuskokwim River tagging study.
	Boundaries of subdistrict documented; Subdistrict 1 extended from Kuskokuak to Mishevik Slough, Subdistrict 2 was from Mishevik Slough to Kolmakof River, and Subdistrict 3 was upstream of Kolmakof River.
1965	Kwegooyuk test fishery (1965–1984; no records available for 1965).
1966	ADF&G Kuskokwim River tagging study.
	Subdistrict 3 was deleted from the regulations due to a lack of landings.
1968	Goodnews Bay District (W-5) commercial salmon fishery established.
1969	District 4 tagging study (1969–1970) on Chinook and chum salmon.
	Kogrukluk River (a.k.a. Holitna River, Ignatti) tower/weir (1969–present).
1970	Effect of explosive detonation in ice on northern pike.
1971	Commercial fishing time in the Kuskokwim River reduced from two 24-hour periods per week to two 12-hour periods per week.
	Chum salmon fishery begins in the Kuskokwim River; season was from 25 June to 31 July, location limited to waters downstream of Napakiak, mesh size restricted to 6 in or smaller.
	Fishing periods established by Emergency Order in August.
	Gillnet mesh size in Districts 4 and 5 restricted to 6 in or smaller.
1974	Commercial sale of salmon roe from subsistence caught fish (1974–1977).

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Year	Event
1976	Commercial fishing time in the Kuskokwim River was reduced from two 12-hour periods per week to two 6-hour periods per week.
	Eek River reconnaissance survey.
	Study on genetic variants in chum and Chinook salmon.
1977	Fishing periods to be established by Emergency Order before 26 June and after 31 July.
	Limited entry permits issued.
	Subsistence fishing closed 24 hours before, during, and 6 hours after each commercial fishing period.
	Hoholitna River reconnaissance survey.
1978	Kasigluk River reconnaissance survey.
	Kwethluk River sonar project.
1979	The portion of District 1 used during the chum salmon season was extended from Napakiak upstream to Bethel.
	Kasigluk River sonar project.
	High seas salmon fleet moved from west of 160° W longitude to west of 180° W longitude.
1980	Subsistence fishing closed 24 hours before, during, and 6 hours after each commercial fishing period.
	Aniak River sonar project.
1981	Pilot test fish and FanScan projects at Bethel.
	Inventory of Kisaralik River and Lake.
	Goodnews River counting tower (1981–1990).
	Salmon River (Pitka Fork drainage) weir project (1981–1984).
	Species identification program results in better differentiation of sockeye and chum salmon.
1982	Kanektok River sonar project (1982–1986).
1983	Pilot test fish project at Bethel using drift gillnets.
	Provisional escapement goals established for many of the major spawning tributaries in the area.
	Management strategy shifts from guideline harvest based to obtaining escapement objective.
1984	Kwegooyuk test fishery replaced by the Bethel drift test fishery.
1985	Commercial fishing restricted to mesh sizes less than or equal to 6 in.
	Chum salmon season utilizes entire length of District 1.
1986	Migratory timing of coho salmon in the Kuskokwim Area, 1979–1984.
	Kuskokwim River salmon abundance estimate based on calibrated test fish CPUE.
	Downstream boundary of District 1 extended to a line from Apokak Slough to Popokamiut.
1987	Discontinued the directed commercial Chinook salmon fishery in the Kuskokwim River.
	Sale of Chinook salmon limited to 14,000 in the Kuskokwim River June commercial fishery.

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Year	Event
1987 (cont.)	First fishing period restricted to that portion of District 1, which is downstream of Bethel, due to Chinook conservation concerns.
	Subsistence fishing in all of District 2 and its tributary streams is closed before, during, and after commercial periods.
	South Peninsula sockeye and chum salmon tagging study.
1988	Review of the estimation of Kuskokwim River annual salmon passage through expansion of the Bethel test fish CPUE.
	Kuskokwim River sonar project (1988–1995).
	Kuskokwim River subsistence test fisheries (1988–1990).
	District 1 upstream boundary extended to Bogus Creek.
	District 2 reduced in size; downstream boundary moved upstream to High Bluffs and upstream boundary moved downstream to Chuathbaluk.
	Portion of Kuskokwim River between Districts 1 and 2 closed to subsistence fishing when District 1 subsistence fishing is closed.
	Reorganization of District 1 Statistical Areas.
	District 4 Salmon Management Plan adopted.
	Establishment of the Kuskokwim River Salmon Management Working Group (1988–present).
	Eek Test Fishery (1988–1990, 1992–1995).
1989	USFWS conducted genetic sampling throughout the Kuskokwim Area.
	USFWS conducted Chinook tagging study in the lower Kuskokwim River.
	Record low temperatures recorded in interior Alaska coupled with shallow snowpack threaten survival of salmon eggs/fry from 1988 spawning.
1990	ADF&G genetic sampling (1990–1996).
	Reorganization of District 1 statistical areas.
	Upstream boundary of District 1 moved downstream from Bogus Creek to Big (Nelson) Island.
	Downstream boundary of District 2 moved upstream to second slough below Kalskag.
	District 4 northern boundary is extended north to Weelung Creek.
1991	USFWS operates Tuluksak River weir (1991–1994).
	Weir replaces counting tower on Goodnews River (1991–present).
1992	Aniak and Chuathbaluk test fisheries (1992–1995).
	Eek test fishery is reestablished for the coho season.
	USFWS operates Kwethluk River weir (1992).
	Ban on high-seas drift gillnet fishing imposed.
	Unusual proportion of returning 5-year-old chum salmon had reduced growth between the second third annuli.

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Year	Event
1992 (cont.)	Failure of age-4 chum salmon in the Kuskokwim River; Aniak drainage especially hard hit; attributed to cold winter of 1988–1989.
1993	Failure of age-4 and age-5 chum salmon in the Kuskokwim River, Yukon River, and the Norton Sound/Kotzebue Area; cause unknown; especially hard hit were the Aniak drainage and the Yukon fall chum; commercial fishing severely restricted, chum sport fishery was closed, and the subsistence salmon fishery was restricted and closed for a period of time (first time ever).
	The BOF made a positive finding for customary and traditional use for all salmon in the entire Kuskokwim Area.
1994	Working Group commissioned and Dr. Mundy started "Recommendations for Strengthening the Cooperative Management Process of the Kuskokwim River Salmon Management Working Group."
	Upstream boundary of District 1 moved upstream to Bogus Creek.
1995	BSFA operates a chum salmon radiotelemetry project on the Kuskokwim River.
	Takotna Community School and ADF&G operate a salmon counting tower on the Takotna River (1995–1998).
	AVCP and BSFA operate the Lower Kuskokwim test fishery in cooperation with ADF&G; the project is a modification of the Eek test fishery.
1996	ADF&G genetic sampling for late spawning chum salmon and one mixed-stock sample from District 1.
	Near record low water levels during June and early August coupled with record high water temperatures.
	Irregular fishing schedule in District 1 during June and July due to limited market interest for chum salmon.
	Record early coho run coupled with record high harvest and escapement at Kogrukluk River.
	AVCP and ADF&G operate a salmon counting tower on the Kwethluk River (1996–1999).
	KNA and ADF&G operate a salmon weir on the George River (1996–present).
	Aniak River sonar is relocated to allow for full channel ensonification and configurable sonar technology is employed (1996–present).
	Native Village of Kwinhagak (NVK) begins development of a salmon counting tower on the Kanektok River.
1997	Kuskokwim River declared an economic disaster area due to very low chum and coho salmon returns, harvests and exvessel prices. Northern boundary of District 4 moved 3 miles south from July 14 to July 28. Record low chum salmon escapement at Kogrukluk River weir.
	Second summer of record low water levels in the Kuskokwim River basin during the summer and fall coupled with record high water temperatures.
	Anomalous Bering Sea conditions: warm water, odd plankton blooms, sea bird die-offs, etc.
	Aniak chum salmon return vastly exceeded expectations based on 1992–1993 spawning abundance estimates.
	Due to an extremely low return of chum salmon, ADF&G, AVCP, KNA, KRSMWG, ONC, TCC, and McGrath Native Village Council issue a joint appeal for subsistence users to conserve chum salmon. Record low subsistence harvest of chum salmon in the Kuskokwim Area.
	Aniak processor does not operate due to depressed salmon market (1997–present).

-continued-

Year	Event
1997 (cont.)	Sale of salmon roe is prohibited in Districts 1 and 2 (effective beginning December 1997).
	Middle Fork Goodnews River weir converted from fixed-panel to a resistance board "floating weir" and operated through majority of coho run for first time (1997-present).
	NVK and ADF&G operate a salmon counting tower on the Kanektok River (1997–1998).
1998	Kuskokwim River declared an economic disaster area for second straight year due to low chum and coho salmon returns, harvests, and exvessel prices.
	KNA and ADF&G operate a salmon weir on the Tatlawiksuk River (1998–present).
	Second year of anomalous Bering Sea conditions: warm water, odd plankton blooms, sea bird die-offs, etc.
	High water levels severely restrict operational period of many Kuskokwim Area escapement projects.
	Record low average water temperature measured at the Bethel test fish site.
1999	Kuskokwim River experiences extremely low returns, harvests, and exvessel prices of Chinook, chum, and coho salmon for third consecutive year. All species have very late run timing. Kuskokwim Bay coho returns and harvests extremely low.
	Federal government assumes control of subsistence fishery management in federal waters on October 1.
	KNA-operated salmon weirs on the Tatlawiksuk and George rivers converted to resistance board (floating) weirs and operations extended through coho run.
	Kuskokwim River sonar project begins redevelopment using split-beam sonar and is relocated to a new site one mile above upstream end of Church Slough.
2000	Kuskokwim River declared an economic disaster area due to extremely low chum salmon return, harvest, and exvessel price. Chinook salmon returns are very low for second consecutive year. Many subsistence fishermen report that they were unable to meet their Chinook and chum salmon harvest goals.
	Due to an extremely low return of Chinook salmon, ADF&G, AVCP, KNA, KRSMWG, Kwethluk IRA, TCC, McGrath Native Village Council, and USFWS issue a joint appeal for subsistence users to conserve Chinook salmon.
	ADF&G and Federal Office of Subsistence Management (FOSM) restrict subsistence Chinook salmon fishery.
	Takotna Community Schools and ADF&G operate a resistance board weir on the Takotna River (2000-present).
	Kwethluk IRA and USFWS operate a resistance board weir on the Kwethluk River (2000 to present).
	District W-1 divided into Subdistricts W-1A (above Bethel) and W-1B (below Bethel) and fishermen are required to register to fish in only one subdistrict. Due to limited processing capacity, only one subdistrict is opened at a time to reduce harvest.
	Commercial fishermen required to identify vessels with either ADF&G or CFEC permit number.

-continued-

Year	Event
2000 (cont.)	ADF&G Division of Sport Fish creates Lower Yukon–Kuskokwim Management Area and stations Area Management Biologist in Bethel.
	Line attached to a pole (rod and reel) added to legal gear for subsistence fishing in AVCP area (prior to 2000 fishing season).
	Use of rod and reel for subsistence extended throughout the Kuskokwim Area (2000–2001 BOF meeting).
2001	Alaska Board of Fisheries designates Kuskokwim River Chinook and chum salmon to be stocks of yield concern based on the Sustainable Fisheries Policy because of poor runs since 1997.
	Subsistence fishing schedule implemented in the Kuskokwim River during June and July to conserve Chinook and chum salmon and provide for adequate fishing opportunity throughout the drainage.
	Kuskokwim River declared an economic disaster area due to low chum salmon return, harvest and exvessel price. No commercial fishing periods in Kuskokwim River in June and July. Chinook salmon returns are below average in size.
	Due to an extremely low return of Chinook salmon, ADF&G, AVCP, KNA, KRSMWG, Kwethluk IRA, McGrath Native Village Council, ONC, and USFWS issue a joint appeal for subsistence users to conserve Chinook and chum salmon.
	Native Community of Tuluksak and USFWS operate a resistance board weir on the Tuluksak River.
	NVK and ADF&G operate a salmon counting weir on the Kanektok River.
	ADF&G/CF and KNA operate fish wheels at Kalskag and Birch Tree Crossing to tag salmon and then make salmon population estimates.
2002	The State of Alaska declared the Kuskokwim region a disaster area for the fifth year in 6 because of low salmon prices in the bay and river and a complete lack of buyers during the chum season on the river.
	ADF&G did not join USFWS and Native groups in issuing a preseason appeal for subsistence users to conserve Chinook and chum salmon because such a request is allocative in nature and only the BOF makes allocation decisions.
	In June the Federal Subsistence Board adopted a special regulatory action that tied the time allowed for sport fishing to the time allowed for subsistence net and fish wheel fishing in federal waters in the Kuskokwim River drainage. Upon a request for reconsideration by ADF&G, the Federal Subsistence Board rescinded its decision. The reason for the rescission was that under ANILCA, sport fishing on federal waters is managed by ADF&G unless there are overriding conservation or subsistence concerns. In this instance there were no overriding conservation or subsistence concerns.
	A subsistence fishing schedule was implemented in the Kuskokwim River during June to conserve Chinook and chum salmon and to provide adequate subsistence fishing opportunity throughout the drainage. However, because an average Chinook run and an above-average chum run developed, the subsistence schedule was lifted on June 28.
	The Kuskokwim River Fisheries Co-op dissolved. ACR #28 was accepted by BOF so that the formation of a Chignik-style salmon fishing cooperative on the Kuskokwim River could be considered.

-continued-

Year	Event
2002 (cont.)	ADF&G/SF and KNA operated salmon radiotelemetry projects on the Kuskokwim mainstem and on the Holitna River to estimate salmon abundance.
	Second consecutive season of no chum salmon (June or July) directed commercial fishery.
2003	A subsistence fishing schedule was implemented in the Kuskokwim River during June to conserve Chinook and chum salmon and to provide adequate subsistence fishing opportunity throughout the drainage. However, because an average Chinook and chum salmon run developed, the subsistence schedule was lifted on July 3.
	Third consecutive season of no chum salmon (June or July) directed commercial fishery.
	ADF&G/SF and KNA operated salmon radiotelemetry projects on the Kuskokwim mainstem and on the Holitna River to estimate salmon abundance.
	Record high coho salmon escapements throughout the Kuskokwim Area.
2004	The Alaska Board of Fisheries continued the stock of yield concern designation for Kuskokwim River Chinook and chum salmon based on the Sustainable Fisheries Policy. Chinook and chum salmon returns have been improving since 2000; however, a majority of annual returns in the previous 5 years did not have adequate harvestable surpluses beyond escapement and subsistence needs.
	The Alaska Board of Fisheries provided a commercial guideline harvest level of 0–50,000 sockeye salmon for the Kuskokwim River.
	The Alaska Board of Fisheries readopted regulations 1) to increase subsistence fishing opportunity prior to and after commercial salmon fishing periods, 2) to provide opportunity for subsistence salmon fishing to occur in a portion of the District 1 subdistrict not open to commercial fishing, and 3) to modify Kuskokwok Slough subsistence fishing regulations to be consistent with District 1 waters.
	The northern boundary of District W-4 (Quinhagak) was relocated approximately one mile north from Oyak Creek to the northernmost edge of the mouth of Weelung Creek.
	The western boundary of District W-5 (Goodnews Bay) was relocated seaward from a line between the northern and southern most points of the North and South spits at the entrance to Goodnews Bay to a line extending from approximately 2 miles South on the seaward entrance of Goodnews Bay to approximately 2 miles North on the seaward entrance to Goodnews Bay.
	Regulations for Districts 4 and 5 were amended to provide emergency order authority to increase gillnet length to 100 fathoms provided run strength was adequate.
	The Goodnews Bay District herring superexclusive use regulations were repealed.
	Evaluation of AYK Region escapement goals and methodology resulted in revisions of the majority of existing Kuskokwim Area escapement goals to Sustainable Escapement Goal ranges using the Bue-Hasbrouck method (ADF&G 2004; Bue and Hasbrouck 2001).
	A subsistence fishing schedule was implemented in the Kuskokwim River during June to conserve Chinook and chum salmon and to provide adequate subsistence fishing opportunity throughout the drainage. However, because an above average Chinook salmon run and an average to above-average chum salmon run developed, the subsistence schedule was lifted on June 18.
	A limited chum and sockeye directed commercial fishery was prosecuted in late June and early July for the first time since 2000. Participation and processor capacity was limited compared to previous years.

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Year	Event
2004 (cont.)	Water levels in rivers throughout the Kuskokwim Area were well below average from mid-July through September. Kuskokwim River water level attained a 50-year low during August as measured at the USGS gauging station at Crooked Creek.
2005	Chum escapements were at record highs at nearly all monitoring projects with the exception of George River where escapement was near average.
	Chinook escapements ranged from above average to record highs at nearly all monitored locations with the exception of George River where the escapement was near average.
	Commercial salmon fishing opportunity in District 1 reduced in July because of poor chum salmon market conditions.
	Commercial salmon fishing opportunity in the Kuskokwim Bay districts was reduced during July because of limited processing capacity, and in August because of below-average coho salmon abundance.
2006	Commercial salmon fishing opportunity in District 1 reduced in July because of poor chum salmon market conditions.
	Chum salmon escapements were at record highs at the Kwethluk, George, and Takotna river monitoring projects.
	During 4 commercial periods in early July limits were imposed on the number of fish that could be delivered by District 4 and 5 fishermen because of limited capacity to process an above average catch.
2007	The Alaska Board of Fisheries (BOF) discontinued the stock of concern designation for Kuskokwim River Chinook and chum salmon based on at or above the historical average runs each year since 2002.
	The BOF passed a proposal giving ADF&G authority to allow up to 8 in mesh gillnets in District 1 by emergency order; otherwise, all commercial openings will continue to be limited to gillnet mesh sizes of 6 in or less. The BOF's intent in allowing for up to 8 in mesh gear was not to establish a large mesh gear Chinook salmon commercial fishery, but to provide a management tool that may or may not be used. Additionally, the commercial Chinook salmon fishery closure was discontinued, and the commercial salmon fishery is to be managed based on run strength and harvestable surpluses of Chinook, sockeye, and chum salmon.
	The BOF passed a proposal giving ADF&G authority to allow the lower portion of Subdistrict 1-B to open to commercial fishing up to 2 hours earlier than the remainder of Subdistrict 1-B.
	A lack of processing capacity, commercial interest, and continued poor chum salmon market conditions resulted in no commercial openings in June and July.
	From late June through mid-July, limits on the number of fish that could be delivered by District 4 and 5 fishermen were imposed because of limited processing capacity.
2008	Commercial salmon fishing opportunity in District 1 reduced in July because of poor chum salmon market conditions.
	From late June through mid-July, limits on the number of fish that could be delivered by District 4 and 5 fishermen were imposed because of limited processing capacity.

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Year	Event
2010	Kuskokwim River Chinook salmon spawning escapements were among the lowest on record and only the Kogrukluk achieved the lower end of the escapement goal.
	Kuskokwim River Tributaries, Kwethluk, and Tuluksak were closed to subsistence and sport harvest of Chinook salmon for most of the season by the USFWS.
	Kuskokwim River chum salmon catch was the largest since 1998.
	Kuskokwim River sockeye salmon run timing was the latest on record for the Bethel test fishery with 2 distinct pulses and an average commercial harvest.
	Telaquana Lake weir passed over 70,000 sockeye salmon.
	High water levels were sustained through most of August on the Kuskokwim River.
	Coho salmon fishery closed on August 12 due to low abundance and the commercial catch was the lowest since 1999.
	District W-4 highest exvessel value since 1988, primarily attributed to record sockeye salmon harvest.
	District W-5 had its highest exvessel value since 1994.
2011	Kuskokwim River Chinook salmon spawning escapements continued to be below average and only Kogrukluk met the escapement goal.
	Preseason management actions were taken in an effort to achieve escapement goals.
	Subsistence Chinook salmon fishing with hook and line gear was closed and subsistence fishing was restricted to the use of gillnets with 4 in or less mesh not to exceed 60 ft in the Tuluksak, Kisaralik, Kasigluk, and Kwethluk rivers including Kuksokuak Slough.
	Subsistence fishing was closed in District 1 from June 16 to June 19 and June 23 to June 28.
	Subsistence fishing was restricted to 6 in or smaller mesh from June 29 to July 7.
	Federal Special Actions in 3-KS-01-11 and 3-KS-02-11 preempted state management emergency orders from June 30 to July 2, 2011.
	Kuskokwim River chum salmon catch was the largest since 1998.
2012	Kuskokwim River Chinook salmon run was smallest on record resulting in 12 days of subsistence salmon fishing closures, additional Chinook salmon subsistence fishing restrictions, and the lowest Chinook salmon subsistence harvest on record.
	High water plagued escapement projects throughout the season and Chinook salmon escapement goals that were assessed were not achieved.
	Kuskokwim River declared an economic disaster due to low exvessel value and very small Chinook salmon subsistence harvest.
	District 4 and Kanektok River had the lowest catch and escapement of Chinook salmon on record.
	District 5 had highest sockeye salmon catch since 1994.

Appendix A3.–Distance to selected locations from mouth of the Kuskokwim River.

Location [a]	Distance from river mouth [b]		Distance from Bethel	
	Kilometer	Miles	Kilometer	Miles
Popokamiut (Downstream boundary District 1)	(3)	(2)	(109)	(68)
Kuskokwim River Mouth [b]	0	0	(106)	(66)
Apokak Slough (Downstream boundary District 1)	5	0	(106)	(66)
Eek River	13	8	(93)	(58)
Eek (community)	46	29	(60)	(37)
Kwegooyuk	22	13	(85)	(53)
Kinak River	32	20	(74)	(46)
Tuntutuliak (community)	45	28	(61)	(38)
Kialik River	50	31	(56)	(35)
Fowler Island	68	42	(39)	(24)
Johnson River	77	48	(29)	(18)
Napakiak (community)	87	54	(19)	(12)
Napaskiak (community)	97	60	(10)	(6)
Oscarville (community)	97	60	(10)	(6)
Bethel (community)	106	66	0	0
Gweek River	135	84	29	18
Kwethluk River	131	82	25	16
Kwethluk (community)	132	82	26	16
Kwethluk River Weir	216	134	109	68
Akiachak (community)	143	89	37	23
Kasigluk River	150	93	43	27
Kisaralik River	151	94	45	28
Akiak (community)	161	100	55	34
Mishevik Slough,	183	114	77	48
Tuluksak River	192	119	85	53
Tuluksak (community)	192	120	86	54
Tuluksak River Weir	248	154	142	88
Nelson Island	190	118	84	52
Bogus Creek (Upstream Boundary District 1)	203	126	97	60
High Bluffs	233	145	127	79
Downstream Boundary District 2	262	163	156	97
Mud Creek Slough	267	166	161	100
Lower Kalskag	259	161	153	95
Kalskag (community)	263	163	157	97
Lower Kalskag Fishwheel (2004)	249	155	143	89
Kalskag Fishwheel (2002, 2003, and 2005)	270	168	163	102
Birchtree Fishwheel (2001 to 2004)	294	183	187	117
Aniak River	307	191	201	125
Aniak (community)	307	191	201	125
Aniak Sonar Site	323	201	217	135
Chuathbaluk (community)	323	201	217	135
Upstream Boundary District 2	322	200	216	134
Kolmakof River	344	214	238	148
Napaimiut (community)	359	223	253	157

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Location [a]	Distance from river mouth [b]		Distance from Bethel	
	Kilometer	Miles	Kilometer	Miles
Holokuk River	362	225	256	159
Sue Creek	381	237	275	171
Oskawalik River	398	247	291	181
Crooked Creek (community)	417	259	311	193
Georgetown (community)	446	277	340	211
George River	446	277	340	211
George River Weir	453	281	347	215
Red Devil (community)	472	293	365	227
Sleetmute (community)	488	303	381	237
Holitna River	491	305	385	239
Hoholitna River	538	334	432	268
Chukowan River	709	441	603	375
Kogrukluk River	709	441	603	375
Kogrukluk River Weir	710	441	604	375
Stony River (community)	534	332	428	266
Stony River	536	333	430	267
Lime Village (community)	644	400	538	334
Telaquana River	727	452	621	386
Telaquana Lake (outlet)	756	470	650	404
Swift River	560	348	454	282
Tatlawiksuk River	563	350	457	284
Tatlawiksuk River Weir	568	353	462	287
Devil's Elbow	599	372	492	306
Vinasale (abandoned community)	665	413	558	347
Takotna River	752	467	645	401
Takotna (community)	832	517	726	451
Takotna River Weir	835	519	729	453
McGrath (community)	753	468	647	402
Middle Fork	806	501	700	435
Big River	827	514	721	448
Pitka Fork	845	525	739	459
Medfra (community)	863	536	756	470
South Fork	869	540	763	474
East Fork	882	548	776	482
North Fork	884	549	777	483
Nikolai (community)	941	585	835	519
Swift Fork	1,078	670	972	604
Telida (community)	1,128	701	1,022	635
Highpower Creek	1,151	715	1,044	649
Fish Creek	1,234	767	1,128	701
Headwaters South Fork	1,292	803	1,186	737
Headwaters North Fork	1,548	962	1,442	896

Note: Distances are determined using a computer version (Garmin Topo MapSource) of U.S. Geological Survey 1:100,000 scale maps. Routing is as if traveling by boat. Parentheticals around numbers indicate downstream distances from Bethel.

[a] Locations not on the mainstem of the Kuskokwim River are listed as subordinate to the point of departure from the mainstem.

[b] The "mouth" of the Kuskokwim River is defined as the southernmost tip of Eek Island (lat 60°05.569 N, long 162°19.054 W) and is 1 of 3 points that define the downstream boundary of District 1.

Appendix A4.–Commercial salmon harvest, including personal use, Kuskokwim Area, 1960–2012.

	Commercial harvest					
Year	Chinook	Sockeye	Chum	Pink	Coho	Total
1960[a]	5,969	5,649	0	0	5,498	17,116
1961[a]	23,246	2,308	18,864	90	5,090	49,598
1962[a]	20,867	10,313	45,707	4,340	12,432	93,659
1963[a]	18,571	0	0	0	15,660	34,231
1964[a]	21,230	13,422	707	939	28,992	65,290
1965[a]	24,965	1,886	4,242	0	12,191	43,284
1966	25,823	1,030	2,610	268	22,985	52,716
1967	29,986	652	8,235	0	58,239	97,112
1968	43,157	5,884	19,684	75,818	154,275	298,818
1969	64,777	10,362	50,377	1,251	110,473	237,240
1970	64,722	12,654	60,566	27,422	62,245	227,609
1971	44,936	6,054	99,423	13	10,006	160,432
1972	55,598	4,312	97,197	1,952	23,880	182,939
1973	51,374	5,224	184,207	634	152,408	393,847
1974	30,670	29,003	196,127	60,099	179,588	495,487
1975	28,219	17,705	225,308	915	110,576	382,723
1976	49,262	14,636	231,877	39,998	112,130	447,903
1977	58,256	18,621	298,959	434	263,727	639,997
1978	63,194	13,734	282,044	61,968	247,271	668,211
1979	53,314	39,463	297,167	574	308,683	699,201
1980	48,599	42,213	560,943	30,306	327,878	1,009,939
1981	79,377	105,940	485,653	463	278,551	949,984
1982	79,816	97,716	326,481	18,259	567,452	1,089,724
1983	93,676	90,834	306,554	379	248,389	739,832
1984	74,017	81,304	488,480	23,902	826,774	1,494,477
1985	74,083	121,221	224,680	111	382,096	802,191
1986	44,972	142,029	349,269	16,561	736,910	1,289,741
1987	65,558	170,849	603,274	163	478,594	1,318,438
1988	74,563	149,949	1,443,953	37,645	623,733	2,329,843
1989	67,003	82,628	802,199	819	556,312	1,508,961
1990	84,449	203,918	520,885	16,082	443,783	1,269,117
1991	48,170	202,441	502,187	522	556,818	1,310,138
1992	67,597	192,341	436,506	85,978	772,449	1,554,871
1993	26,636	167,235	94,937	71	686,570	975,449
1994	27,345	191,169	360,893	84,870	856,100	1,520,377
1995	72,352	198,045	707,212	318	555,539	1,533,466
1996	22,959	122,260	301,975	1,663	1,099,853	1,548,710
1997	47,990	123,002	67,200	7	166,648	404,847
1998	44,192	129,449	267,059	2,720	311,910	755,330
1999	25,019	81,201	72,659	2	32,251	211,132
2000	26,115	109,939	49,573	17	307,439	493,083
2001	14,384	59,545	21,893	0	220,804	316,626
2002	12,531	24,190	34,951	0	113,199	184,871
2003	16,014	63,646	36,225	0	346,555	462,440
2004	30,332	63,682	51,935	0	541,894	687,843
2005	31,014	120,379	85,236	19	205,762	442,410
2006	24,860	148,784	94,981	1	224,905	493,531

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	Commercial harvest					
Year	Chinook	Sockeye	Chum	Pink	Coho	Total
2007	22,878	153,812	79,864	6	189,456	446,016
2008	23,958	112,581	98,239	15	259,681	494,474
2009	22,093	170,370	185,099	18	161,073	538,653
2010	18,721	201,869	227,441	7	76,621	524,659
2011	18,226	76,613	236,466	2	119,938	451,245
2012	8,576	91,192	150,822	0	143,123	393,713
Average 2002–2011	22,063	113,593	113,044	5 [b]	223,908	472,614

[a] Includes harvests from District 3.

[b] Even years only.

Appendix A5.–Estimated exvessel value of the commercial salmon harvest and permits fished, Kuskokwim Management Area, 1987–2012.

	District 1		District 2		District 4		District 5			
Year	Value of catch	Permits fished [a]	Value of catch	Permits fished [a]	Value of catch	Permits fished [a]	Value of catch	Permits fished [a]	Total value	Total permits
1987	$4,893,016	705	$139,049	29	$858,818	310	$572,293	116	$6,463,176	800
1988	$10,060,427	745	$246,069	29	$1,381,661	289	$1,038,041	125	$12,480,129	813
1989	$3,883,321	743	$131,168	30	$746,071	227	$378,962	88	$5,008,354	824
1990	$3,385,636	742	$121,329	22	$1,013,472	390	$361,203	82	$4,760,311	823
1991	$2,971,767	749	$111,651	23	$592,436	346	$273,795	72	$3,837,998	819
1992	$3,764,804	741	$147,992	22	$993,664	349	$439,331	111	$5,197,799	814
1993	$2,533,895	737	$90,906	20	$898,255	408	$440,955	114	$3,873,105	804
1994	$3,559,114	706	$129,555	17	$837,157	307	$591,903	116	$4,988,174	793
1995	$2,776,677	712	$107,913	21	$1,047,188	382	$287,599	87	$4,111,464	798
1996	$2,108,418	620	$11,015	8	$534,726	218	$222,388	54	$2,865,532	714
1997	$430,614	604	$2,944	4	$497,071	289	$121,973	53	$1,049,658	702
1998	$982,791	615	$617	3	$467,843	203	$184,060	50	$1,634,694	707
1999	$170,278	509	$0	0	$279,092	218	$102,803	73	$552,173	604
2000	$509,594	532	$3,039	4	$466,560	230	$212,336	46	$1,188,490	623
2001	$429,534	412	$0	0	$228,615	159	$98,458	32	$756,607	514
2002	$127,208	318	$0	0	$167,748	114	$28,703	30	$323,659	407
2003	$453,187	359	$0	0	$304,553	114	$135,287	34	$893,027	438
2004	$943,767	390	$0	0	$405,344	116	$135,246	29	$1,484,357	467
2005	$448,853	403	$0	0	$571,965	145	$134,295	29	$1,155,113	484
2006	$451,390	373	$0	0	$551,182	132	$141,235	24	$1,143,807	453
2007	$380,842	366	$0	0	$660,865	125	$223,329	28	$1,265,036	456
2008	$538,310	374	$0	0	$750,731	146	$198,070	25	$1,487,111	462
2009	$502,848	342	$0	0	$747,325	179	$192,031	39	$1,442,204	434
2010	$765,606	433	$0	0	$1,655,321	241	$473,661	48	$2,894,588	530
2011	$764,358	413	$0	0	$1,176,435	219	$346,022	48	$2,286,815	510
2012	$597,998	379	$0	0	$824,435	179	$617,766	58	$2,040,199	477
Average 2002–2011	$537,637	377	$0	0	$699,147	153	$200,788	33	$1,437,572	464

[a] Number of permits that made at least 1 delivery.

Appendix A6.–Commercial salmon average mean weights and prices paid, Kuskokwim Area, 1967–2012.

	Average weight (lb)					Average price ($)				
Year	Chinook	Sockeye	Chum	Pink	Coho	Chinook	Sockeye	Chum	Pink	Coho
1967	27.8	7.4	7.0	[a]	5.9	0.13	0.05	0.04	[a]	0.09
1968	23.8	6.2	7.9	4.0	7.2	0.16	0.10	0.04	0.05	0.09
1969	19.6	6.2	5.8	3.6	7.3	0.19	0.15	0.07	0.06	0.10
1970	18.9	5.4	6.1	3.3	7.3	0.20	0.21	0.08	0.08	0.14
1971 [b]	26.2	6.9	6.4	[a]	6.1	0.17	0.10	0.08	[a]	0.13
1972	24.7	[a]	6.5	[a]	6.4	0.20	[a]	0.08	[a]	0.16
1973	26.7	[a]	6.8	[a]	5.8	0.25	[a]	0.19	[a]	0.26
1974	17.1	6.3	6.8	4.1	7.5	0.46	0.34	0.25	0.23	0.27
1975	14.9	[a]	6.4	[a]	8.2	0.54	[a]	0.26	[a]	0.31
1976 [c]	17.0	6.7	7.0	3.5	7.8	0.64	0.43	0.27	0.25	0.40
1977	22.7	8.3	7.3	3.9	7.8	1.15	0.45	0.45	0.25	0.65
1978	24.2	6.5	8.9	3.9	7.1	0.50	0.49	0.32	0.12	0.40
1979	16.6	6.9	7.0	3.9	7.9	0.66	0.53	0.37	0.11	0.75
1980	14.1	6.7	6.4	3.6	6.9	0.47	0.31	0.24	0.12	0.64
1981	17.8	7.2	7.5	3.5	6.4	0.84	0.61	0.23	0.11	0.63
1982	19.3	7.2	7.3	3.6	7.3	0.82	0.41	0.22	0.05	0.53
1983	18.8	6.8	7.4	3.5	6.8	0.54	0.51	0.33	0.05	0.39
1984	16.4	6.6	6.7	3.2	7.7	0.89	0.52	0.28	0.07	0.55
1985	17.0	7.0	7.1	3.6	7.5	0.71	0.59	0.25	0.05	0.51
1986	17.0	7.2	6.8	3.4	6.4	0.80	0.70	0.25	0.05	0.60
1987	15.2	7.5	6.8	3.7	7.2	1.10	1.30	0.27	0.10	0.73
1988	14.1	7.3	6.9	3.4	7.2	1.30	1.42	0.40	0.15	1.25
1989	16.6	7.2	6.8	3.4	7.3	0.75	1.20	0.26	0.05	0.55
1990	15.1	6.7	6.9	3.2	6.5	0.56	1.05	0.26	0.12	0.62
1991	15.3	6.9	6.3	3.4	6.5	0.56	0.67	0.31	0.12	0.45
1992	13.4	7.0	6.8	3.9	7.3	0.66	0.90	0.32	0.06	0.45
1993	14.3	7.1	6.5	3.4	6.6	0.62	0.70	0.40	0.25	0.58
1994	15.6	6.9	6.6	3.6	7.6	0.51	0.53	0.21	0.08	0.57
1995	17.3	6.9	6.9	3.7	7.2	0.60	0.71	0.18	0.12	0.41
1996	15.7	7.2	7.2	3.8	8.0	0.26	0.40	0.11	0.12	0.25
1997	16.2	7.1	7.3	2.7	7.5	0.28	0.42	0.12	0.10	0.33
1998	14.2	6.8	6.9	3.8	7.8	0.27	0.53	0.13	0.10	0.32
1999	15.5	6.5	7.3	3.0	6.6	0.32	0.58	0.10	0.05	0.32
2000	15.6	6.8	7.6	3.2	6.9	0.39	0.55	0.10	0.10	0.28
2001	20.0	7.6	7.5	[a]	7.7	0.36	0.35	0.10	[a]	0.28
2002	13.9	6.7	7.9	[a]	7.9	0.35	0.35	0.10	[a]	0.20
2003	13.6	7.3	8.0	[a]	6.9	0.35	0.44	0.21	[a]	0.10
2004	12.1	6.6	6.9	[a]	6.9	0.35	0.35	0.08	[a]	0.32
2005	14.5	6.7	6.7	3.7	7.4	0.59	0.55	0.05	0.05	0.27
2006	13.9	6.4	6.9	4.0	6.3	0.54	0.48	0.05	0.25	0.33
2007	14.1	6.6	6.8	[a]	7.2	0.59	0.53	0.05	[a]	0.38
2008	12.9	6.7	7.1	4.2	7.1	0.73	0.58	0.05	0.06	0.43
2009	13.1	6.5	6.9	3.5	7.6	0.71	0.56	0.15	0.00	0.35
2010	13.1	6.8	6.9	2.8	7.1	1.60	1.13	0.26	0.00	1.01
2011	12.5	6.5	6.4	4.0	7.1	0.85	0.86	0.68	0.00	0.75
2012	15.3	6.8	6.6	0.0	6.1	0.85	0.85	0.77	0.00	0.73
10 yr Avg	13.4	6.7	7.1	3.2	7.1	0.7	0.6	0.2	0.1	0.4

[a] Information unavailable.

[b] Information on price per pound was not available for District 5.

[c] Information was not available for District 4.

Appendix A7.–Commercial salmon fishery entry permits by location, Kuskokwim Area, 1994–2012.

Village	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Akiachak	64	64	64	66	67	67	67	67	68	67	69	70	70	69	71	72	75	76	73
Akiak	24	24	23	23	24	23	23	23	24	24	21	21	20	20	21	18	18	19	18
Aniak	10	11	10	11	11	11	11	11	11	10	10	9	8	8	8	7	7	5	6
Atmautluak	27	28	28	28	27	26	27	27	26	26	23	22	22	21	19	16	17	16	17
Bethel	163	164	157	162	168	167	161	165	173	172	168	165	165	161	155	152	155	158	157
Chefornak	6	5	2	2	2	2	2	2	2	2	2	2	3	3	3	2	2	2	2
Chuathbaluk	2	2	2	2	2	2	1	2	2	2	0	1	0	0	0	0	0	0	0
Eek	39	39	40	37	37	36	39	38	39	36	37	37	38	37	37	38	39	39	37
Goodnews Bay	28	29	27	26	28	28	26	26	26	25	22	21	21	22	22	22	22	23	24
Hooper Bay	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
Kalskag	2	2	2	1	1	1	2	1	1	2	2	2	2	2	2	2	2	1	1
Kasigluk	41	45	44	44	43	44	44	45	42	42	41	41	39	39	38	36	34	32	32
Kipnuk	17	18	17	16	15	15	15	14	14	13	13	11	11	11	9	9	10	10	9
Kongiganak	20	21	21	21	19	20	18	16	15	14	13	12	13	13	13	12	13	13	14
Kwethluk	62	57	58	57	55	56	57	55	49	48	48	49	51	49	47	48	48	46	47
Kwigillingok	20	20	18	19	18	19	19	17	17	15	15	15	13	12	11	11	12	12	11
Mekoryuk	1	2	2	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Napakiak	41	37	39	39	39	39	38	38	35	33	32	34	33	33	32	36	35	33	31
Napaskiak	34	33	35	36	36	34	33	33	34	33	30	28	28	29	28	27	26	26	25
Newtok	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nunapitchuk	47	46	48	48	46	46	46	46	46	44	45	43	43	42	41	41	38	38	38
Oscarville	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Platinum	3	5	4	4	4	4	5	4	4	3	3	4	4	4	3	4	6	6	6
Quinhagak	76	79	83	82	83	82	84	82	83	82	83	80	77	78	81	81	80	80	80
Sleetmute	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Toksook Bay	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Tuluksak	27	27	27	27	27	27	27	27	28	26	25	23	23	24	23	22	22	22	21
Tuntutuliak	43	43	44	44	43	42	42	43	43	41	41	38	38	41	40	41	44	45	46
Tununak	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1
Kuskokwim Area subtotal	801	805	800	800	800	794	789	785	786	764	747	731	725	721	708	700	708	704	697

-continued-

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Village	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Anchorage	10	8	12	11	11	13	16	16	16	17	18	17	18	20	21	19	17	15	13
Anchor Point	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
Atqasuk	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1
Big Lake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Dillingham	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1
Fairbanks	2	3	2	2	1	1	1	1	1	1	1	1	2	2	2	2	1	0	0
Juneau	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	1	0	0	0
Kenai	0	0	0	0	0	1	1	2	1	1	1	1	0	0	0	0	0	0	0
Manokotak	2	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Noorvik	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Palmer	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	1	1
Saint Mary's	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sitka	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1
Stebbins	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Togiak	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Twin Hills	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2
Unalaska	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0
Wasilla	0	0	0	0	1	1	1	1	1	0	1	1	1	1	2	2	2	0	0
Nonlocal AK resident subtotal	16	15	18	16	15	20	23	25	23	24	24	25	28	31	33	31	25	22	19
California		2	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0
Oregon		1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
Washington		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Residents of other states		3	3	3	3	3	3	2	2	2	2	4	4	4	5	4	5	6	6
Non-resident subtotal	0	7	6	6	6	7	6	5	5	5	5	7	6	5	6	5	6	7	7
Total number of permits	817	827	824	822	821	821	818	815	814	793	776	763	759	757	747	736	739	733	723

Appendix A8.–Salmon assessment programs, Kuskokwim Area, 2012.

Project name: Salmon management

Location: Kuskokwim Area

Duration: All year

Agencies and responsibilities: ADF&G CF and Subsistence (all aspects), OSM (monitor regulations, inseason actions), KRSMWG (make recommendations)

Primary objective(s):

- Develop a comprehensive plan for managing salmon stocks of the Kuskokwim Area.
- Define goals and objectives.
- Identify potential opportunities and concerns.
- Recommend appropriate procedures.
- Evaluate priorities.
- Provide sustained yield fishery management.

Project name: Postseason subsistence catch and effort assessment

Location: Kuskokwim Area

Duration: Postseason

Agencies and responsibilities: ADF&G CF all aspects, KNA and ONC survey crew, and OSM funding for Bethel and Aniak

Primary objective(s):

- Document and estimate the catch and associated effort of the subsistence salmon fisheries via interviews, catch calendars, mail-out questionnaires and telephone interviews.
- Household surveys in Bethel.
- Household surveys in Aniak.

Project name: Age, sex, and length (ASL) processing and reporting

Location: Kuskokwim Area

Duration: All year

Agencies and responsibilities: ADF&G CF all aspects and OSM funding

Primary objective(s):

- Scale aging, sample processing, and reporting of salmon age, sex, and length information of Chinook, sockeye, chum, and coho salmon from escapement and commercial and subsistence fisheries.

Project name: Subsistence ASL Sampling

Location: Lower Kuskokwim

Duration: June to September

Agencies and responsibilities: ADF&G CF all aspects, ONC all aspects in Bethel, and OSM funding in Bethel

Primary objective(s):

- Sample collection for age, sex, and length information from subsistence Chinook salmon harvest.
- Agency staff recruit and train subsistence fishermen to sample their own catches.

-continued-

Project name: Aerial surveys

Location: Kuskokwim area

Duration: July to August

Agencies and responsibilities: ADF&G CF all aspects

Primary objective(s):

- Index relative abundance of Chinook salmon spawning escapement in selected streams throughout the Kuskokwim Area.
- Index relative abundance of sockeye salmon spawning escapement in the Kanektok and Goodnews rivers.

Project name: Sport catch, harvest, and effort assessment.

Location: Kuskokwim area

Duration: Postseason

Agencies and responsibilities: ADF&G SF all aspects

Primary objective(s):

- Statewide mail out survey to estimate sport catch, harvest, and effort.

Project name: Commercial catch and effort assessment

Location: Districts 1, 2, 4, and 5

Duration: June to September

Agencies and responsibilities: ADF&G CF all aspects

Primary objective(s):

- Document and estimate the catch and associated effort of the commercial salmon fishery via receipts (fish tickets) of commercial sales and dock side sampling.

Project name: Commercial catch ASL sampling

Location: Districts 1, 4, and 5

Duration: June to August

Agencies and responsibilities: ADF&G CF all aspects

Primary objective(s):

- Determine age, sex, and length of salmon harvested in the commercial fisheries.

Project name: Kuskokwim River inseason subsistence harvest monitoring

Location: Lower Kuskokwim River

Duration: June to August

Agencies and responsibilities: ADF&G CF all aspects, ONC all aspects in Bethel, OSM funding

Primary objective(s):

- Weekly interviews with subsistence fishermen in lower Kuskokwim River to assess adequacy and quality of harvest.

-continued-

Project name: Kuskokwim River mark–recapture

Location: RM 179

Duration: June 10 to July 31

Agencies and responsibilities: ADF&G CF all aspects, KNA crew support, and AKSSF funding

Primary objective(s):

- Spaghetti tags were deployed on sockeye salmon caught using fish wheels near Kalskag in the mainstem Kuskokwim River and recovered upstream at several tributaries to determine stock-specific run timing, stock-specific travel speed, and to estimate total sockeye salmon run abundance using a 2 sample mark–recapture design.

Project name: Bethel test fishery

Location: Bethel Area RM 80

Duration: June to August

Agencies and responsibilities: ADF&G CF all aspects

Primary objective(s):

- Index relative run abundance of Chinook, sockeye, chum, and coho salmon using CPUE derived from drift gillnet catches.

Project name: Kwethluk River weir

Location: Kwelthluk River RM 99

Duration: June to September

Agencies and responsibilities: USFWS all aspects, ADF&G CF inseason data management, OVK crew support, and OSM funding

Primary objective(s):

- Estimate daily escapement of Chinook, sockeye, chum, coho, and pink salmon into the Kwethluk River.
- Estimate age, sex and length composition of Chinook, chum, and coho salmon escapement.
- Collect environmental/habitat information.

Project name: Tuluksak River weir

Location: Tuluksak River RM 136

Duration: June to September

Agencies and responsibilities: USFWS all aspects, ADF&G CF inseason data management, TUTC crew support, and OSM funding

Primary objective(s):

- Estimate daily escapement of Chinook, sockeye, chum, coho, and pink salmon into the Tuluksak River.
- Estimate age, sex, and length composition of Chinook, chum, and coho salmon escapement.
- Collect environmental/habitat information.

-continued-

Project name: George River weir

Location: George River RM 309

Duration: June to September

Agencies and responsibilities: KNA all aspects, ADF&G CF all aspects, and OSM funding

Primary objective(s):

- Estimate daily escapement of Chinook, sockeye, chum, pink, and coho salmon into the George River.
- Estimate age, sex, and length composition of Chinook, chum, and coho salmon escapement.
- Collect environmental/habitat information.

Project name: Kogrukluk River weir

Location: Holitna River drainage RM 335

Duration: June to September

Agencies and responsibilities: ADF&G CF all aspects

Primary objective(s):

- Estimate daily escapement of Chinook, sockeye, chum, and coho salmon into the Kogrukluk River.
- Estimate age, sex, and length composition of Chinook, chum, and coho salmon escapement.

Project name: Tatlawiksuk River weir

Location: Tatlawiksuk River RM 383

Duration: June to September

Agencies and responsibilities: KNA all aspects, ADF&G CF all aspects, and OSM funding

Primary objective(s):

- Estimate daily escapement of Chinook, sockeye, chum, pink, and coho salmon into the Tatlawiksuk River.
- Estimate age, sex and length composition of Chinook, chum, and coho salmon escapement.
- Collect environmental/habitat information.

Project name: Takotna River weir

Location: Takotna River RM 507

Duration: June to September

Agencies and responsibilities: TTC all aspects, ADF&G CF planning and supplies, CVRF funding, and OSM funding

Primary objective(s):

- Estimate daily escapement of Chinook, chum, and coho salmon into the Takotna River.
- Estimate age, sex, and length composition of Chinook, chum, and coho salmon escapement.
- Collect environmental/habitat information.

-continued-

Project name: Telequana River weir

Location: Outlet of Lake Stony River RM 756

Duration: July to August

Agencies and responsibilities: NPS co-managed and ADF&G CF co-managed

Primary objective(s):

- Estimate daily escapement of sockeye salmon into the Telaquana River.
- Estimate age, sex, and length composition sockeye salmon escapement.
- Drainagewide genetic and tagging mark and recapture estimates.
- Collect environmental/habitat information.

Project name: Kanektok River weir

Location: Mile 13 Kanektok River, Kuskokwim Bay

Duration: June to September

Agencies and responsibilities: ADF&G CF all aspects, NVK crew support, OSM funding, and CVRF funding

Primary objective(s):

- Estimate daily escapement of Chinook, sockeye, chum, pink, and coho salmon into the Kanektok River.
- Estimate age, sex, and length composition of Chinook, sockeye, and chum salmon escapement.

Project name: Middle Fork Goodnews River weir

Location: Mile 5 Middle Fork Goodnews River, Kuskokwim Bay

Duration: June to September

Agencies and responsibilities: ADF&G CF all aspects, USFWS crew support, and OSM funding – coho assessment

Primary objective(s):

- Estimate daily escapement of Chinook, sockeye, chum, pink, and coho salmon into the Middle Fork Goodnews River.
- Estimate age, sex, and length composition of Chinook, sockeye, chum, and coho salmon escapement

Note: ADF&G/CF = Division of Commercial Fisheries, Alaska Department of Fish and Game

ADF&G/SF = Division of Sport Fish, Alaska Department of Fish and Game

KNA = Kuskokwim River Native Association

NPS = National Park Service

NVK = Native Village of Kwinhagak

ONC = Orutsararmuit Native council

OSM = Federal Office of Subsistence Management

OVK = Organized Village of Kwethluk

TTC = Takotna Tribal Council

TUTC = Tuluksak Traditional Council

USFWS = U.S. Fish and Wildlife Service

Appendix A9.–Salmon spawning escapement goals, Kuskokwim Area, 2012.

Area	Chinook		Sockeye		Coho		Chum	
	Goal	Enumeration method	Goal	Enumeration method	Goal	Enumeration method	Goal	Enumeration method
Kuskokwim River								
Kwethluk River	6,000–11,000	Weir	–	–	>19,000	Weir	–	–
Kisaralik River	400–1,200	Aerial survey	–	–	–	–	–	–
Salmon River (Aniak)	330–1,200	Aerial survey	–	–	–	–	–	–
Aniak River	1,200–2,300	Aerial survey	–	–	–	–	210,000–480,000	Sonar
George River	3,100–7,900	Weir	–	–	–	–	–	–
Holitna River	970–2,100	Aerial survey	–	–	–	–	–	–
Kogrukluk Weir	5,300–14,000	Weir	4,400–17,000	Weir	13,000–28,000	Aerial survey	15,000–49,000	Weir
Cheneetnuk River	340–1,300	Aerial survey	–	–	–	–	–	–
Tuluksak River	1,000–2,100	Weir	–	–	–	–	–	–
Gagaraya River	300–830	Aerial survey	–	–	–	–	–	–
Pitka Fork (Salmon River)	470–1,600	Aerial survey	–	–	–	–	–	–
Kuskokwim Bay								
Kanektok River to Kagati Lake	3,500–8,000	Aerial survey	14,000–34,000	Aerial survey	–	–	>5,200	Aerial survey
Goodnews River (mainstem)	640–3,300	Aerial survey	5,500–19,500	Aerial survey	–	–	–	–
Middle Fork Goodnews River	1,500–2,900	Weir	18,000–40,000	Weir	>12,000	Weir	>12,000	Weir

Source: Volk et al. 2009.

Note: En dashes indicate goal not established. All goals are sustainable escapement goals except for biological escapement goals established for Chinook and sockeye salmon at Middle Fork Goodnews River.

Appendix A10.–Estimated number of Chinook salmon harvested for subsistence in the Kuskokwim area, 2002–2012.

Community	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	5 Yr Avg	10 Yr Avg[a]
Kongiganak	1,349	2,003	2,663	1,536	***1,729***	1,984	2,086	1,148	1,470	1,208	***571***	1,579	1,718
N. Kuskokwim Bay	1,349	2,003	2,663	1,536	1,729	1,984	2,086	1,148	1,470	1,208	571	1,579	1,718
Tuntutuliak	3,907	2,657	3,912	4,545	4,469	***4,614***	4,341	3,067	3,205	3,032	1,123	3,652	3,775
Eek	2,514	2,075	2,954	***3,133***	***2,700***	***2,635***	2,877	1,812	1,761	1,378	1,004	2,093	2,384
Kasigluk	***4,470***	4,212	***7,859***	***4,488***	***4,304***	***5,350***	2,928	2,341	3,020	2,823	552	3,292	4,180
Nunapitchuk	4,503	3,179	4,921	4,103	4,121	***4,661***	4,296	3,320	2,548	3,559	845	3,677	3,921
Atmautluak	1,479	547	2,153	***1,927***	1,422	***1,890***	1,737	1,581	1,091	1,236	234	1,507	1,506
Napakiak	2,702	2,438	2,839	3,060	5,125	3,245	2,165	2,335	1,640	1,963	457	2,270	2,751
Napaskiak	3,922	3,390	4,058	4,485	5,877	6,392	4,425	5,170	4,313	3,360	1,108	4,732	4,539
Oscarville	1,115	1,153	1,325	1,069	1,052	1,360	1,351	754	618	694	51	955	1,049
Bethel	22,892	24,584	29,443	28,293	27,805	30,422	35,205	26,302	24,973	25,093	7,321	28,399	27,501
Kwethluk	6,880	4,206	7,157	6,089	7,258	6,466	8,209	6,409	4,445	2,467	1,709	5,599	5,959
Akiachak	6,946	2,493	7,131	5,411	5,561	7,621	9,509	7,078	4,470	3,852	2,862	6,506	6,007
Akiak	3,390	3,905	3,775	3,860	4,423	4,297	3,784	3,247	3,625	2,455	***856***	3,482	3,676
Tuluksak	2,860	3,286	3,766	2,655	***2,372***	3,886	3,374	3,212	2,110	1,230	651	2,762	2,875
Lower Kuskokwim	67,580	58,125	81,293	73,118	76,488	82,839	84,201	66,628	57,819	53,142	18,773	68,926	70,123
Lower Kalskag	1,535	1,556	1,991	1,417	3,494	1,937	2,442	2,525	1,030	1,260	459	1,839	1,919
Upper Kalskag	1,545	1,328	2,498	2,533	1,569	1,383	2,368	1,696	1,500	1,772	562	1,744	1,819
Aniak	4,576	1,837	3,022	1,977	2,412	3,417	3,252	2,062	2,212	2,214	993	2,631	2,698
Chuathbaluk	505	405	1,460	913	***887***	1,007	772	877	551	409	103	723	779
Middle Kuskokwim	8,161	5,126	8,971	6,840	8,362	7,744	8,834	7,160	5,293	5,655	2,117	6,937	7,215
Crooked Creek	859	582	946	948	***736***	734	573	608	240	402	124	511	663
Red Devil	293	31	156	181	232	301	177	258	33	186	225	191	185
Sleetmute	604	600	906	522	750	861	668	723	272	242	132	553	615
Stony River	415	118	***688***	***325***	***278***	561	699	704	189	134	***212***	457	411
Lime Village	206	34	***69***	***176***	***125***	***120***	***57***	***100***	***81***	***120***	29	96	109
McGrath	970	395	***587***	882	689	495	619	593	257	829	68	559	632
Takotna	***10***	0	***16***	9	***0***	***12***	***4***	***11***	0	0	***0***	5	6
Nikolai	535	120	493	553	696	504	184	298	402	450	276	368	423
Telida	–	–	–	–	–	–	–	–	–	–	–	–	–
Upper Kuskokwim	3,892	1,880	3,861	3,596	3,506	3,588	2,982	3,295	1,474	2,363	1,066	2,740	3,044
Kuskokwim R[b]	80,982	67,134	96,788	85,090	90,085	96,155	98,103	78,231	66,056	62,368	22,527	80,183	82,099
Quinhagak	2,649	2,563	4,563	3,505	5,163	4,686	3,923	2,976	2,692	2,588	2,396	3,373	3,531
Goodnews Bay	723	807	863	869	***713***	647	1,012	585	480	834	389	712	753
Platinum	154	45	122	74	***45***	66	42	61	14	62	24	49	69
S. Kuskokwim Bay	3,526	3,415	5,548	4,448	5,921	5,399	4,977	3,622	3,186	3,484	2,809	4,134	4,353
Total estimated harvest	84,508	70,549	102,336	89,538	96,006	101,554	103,080	81,853	69,242	65,852	25,336	84,316	86,452

Source: Shelden et al. 2014.

Note: En dashes indicate harvest was not estimated. Bold italic indicates Bayesian imputed estimates.

[a] Five- and ten-year averages do not include the current year.

[b] Kuskokwim River total includes the Lower, Middle, and Upper Kuskokwim areas and North Kuskokwim Bay.

Appendix A11.–Estimated number of sockeye salmon harvested for subsistence in the Kuskokwim area, 2002–2012.

Community	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	5 Yr Avg[a]	10 Yr Avg[a]
Kongiganak	1,347	929	1,809	1,103	1,464	***1,083***	1,347	830	1,842	1,266	***1,211***	1,274	1,302
N. Kuskokwim Bay	1,347	929	1,809	1,103	1,464	1,083	1,347	830	1,842	1,266	1,211	1,274	1,302
Tuntutuliak	1,045	1,148	1,620	2,145	1,834	1,763	***2,418***	932	2,068	1,274	1,516	1,691	1,625
Eek	759	586	567	1,033	***673***	***663***	***739***	1,019	1,241	664	1,490	865	794
Kasigluk	***1,537***	***1,683***	1,668	***1,273***	***1,926***	***1,635***	***1,230***	945	1,448	1,269	1,451	1,305	1,461
Nunapitchuk	1,500	1,714	1,659	1,821	1,871	2,147	***2,331***	1,484	1,902	2,223	2,396	2,017	1,865
Atmautluak	1,150	679	1,103	1,444	***1,011***	1,041	***1,381***	628	735	827	1,623	922	1,000
Napakiak	1,688	1,453	1,351	2,122	1,845	1,962	1,625	917	1,187	1,351	1,141	1,408	1,550
Napaskiak	1,296	1,643	1,148	1,344	1,784	1,738	2,505	1,523	1,979	1,587	2,065	1,866	1,655
Oscarville	400	806	436	278	778	712	677	334	250	228	323	440	490
Bethel	8,850	12,198	11,679	14,297	12,816	13,902	18,016	11,329	10,662	16,946	18,282	14,171	13,070
Kwethluk	2,100	1,903	3,302	2,457	2,770	3,536	5,097	2,183	2,571	2,357	2,884	3,149	2,828
Akiachak	2,507	1,607	3,109	2,372	2,661	3,269	4,731	2,408	2,433	2,647	3,443	3,098	2,774
Akiak	1,214	995	1,258	1,920	2,000	3,695	2,644	1,290	1,161	2,576	***1,820***	2,273	1,875
Tuluksak	1,205	875	1,670	987	2,247	***2,021***	2,276	1,691	2,534	1,699	1,380	2,044	1,720
Lower Kuskokwim	25,251	27,290	30,570	33,493	34,215	38,084	45,670	26,683	30,171	35,648	39,814	35,251	32,708
Lower Kalskag	347	515	775	439	1,434	780	1,736	1,044	507	802	891	974	838
Upper Kalskag	508	431	686	945	563	417	996	369	465	938	770	637	632
Aniak	1,059	756	996	1,015	692	1,261	1,796	941	1,055	1,168	1,375	1,244	1,074
Chuathbaluk	313	274	526	369	508	***523***	363	564	403	300	297	431	414
Middle Kuskokwim	2,227	1,976	2,983	2,768	3,197	2,981	4,891	2,918	2,430	3,208	3,333	3,286	2,958
Crooked Creek	449	571	732	693	544	***604***	754	329	302	243	234	446	522
Red Devil	109	309	88	272	510	318	475	477	475	502	511	449	354
Sleetmute	706	504	980	673	1,181	1,303	1,111	707	1,024	693	715	968	888
Stony River	602	158	896	***709***	***853***	***1,085***	1,759	977	372	303	***398***	899	771
Lime Village	***1,176***	374	874	***1,377***	***1,182***	***1,495***	***1,315***	***967***	***796***	***745***	780	1,064	1,030
McGrath	407	112	194	***481***	149	375	1,392	984	622	630	233	801	535
Takotna	0	***2***	0	***1***	0	***1***	***2***	***3***	***4***	0	***2***	2	1
Nikolai	22	16	1	19	20	10	13	66	65	13	0	33	25
Telida	–	–	–	–	–	–	–	–	–	–	–	– –	
Upper Kuskokwim	3,471	2,046	3,765	4,225	4,439	5,192	6,821	4,510	3,660	3,129	2,873	4,662	4,126
Kuskokwim River[b]	32,296	32,241	39,127	41,589	43,315	47,339	58,729	34,941	38,103	43,251	47,231	44,472	41,093
Quinhagak	909	805	1,375	1,745	3,128	1,755	2,692	1,744	1,671	1,582	2,015	1,889	1,741
Goodnews Bay	855	705	873	1,213	995	***880***	2,225	908	1,093	1,328	1,197	1,287	1,107
Platinum	257	64	183	90	63	***118***	156	186	175	135	173	154	143
S. Kuskokwim Bay	2,021	1,574	2,431	3,048	4,186	2,753	5,073	2,838	2,939	3,045	3,385	3,330	2,991
Total estimated harvest	34,317	33,815	41,558	44,637	47,501	50,092	63,802	37,779	41,042	46,296	50,616	47,802	44,084

Source: Shelden et al. 2014.

Note: En dashes indicate harvest was not estimated. Bold italic indicates Bayesian imputed estimates.

[a] Five- and ten-year averages do not include the current year.

[b] Kuskokwim River total includes the Lower, Middle, and Upper Kuskokwim areas and North Kuskokwim Bay.

Appendix A12.–Estimated number of chum salmon harvested for subsistence in the Kuskokwim area, 2002–2012.

Community	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	5 Yr Avg[a]	10 Yr Avg[a]
Kongiganak	3,247	897	2,958	1,960	2,420	***2,158***	1,592	1,307	2,513	2,809	***1,901***	2,076	2,186
N. Kuskokwim Bay	3,247	897	2,958	1,960	2,420	2,158	1,592	1,307	2,513	2,809	1,901	2,076	2,186
Tuntutuliak	4,150	1,288	2,546	3,568	4,024	3,350	***4,416***	3,330	2,439	1,865	2,614	3,080	3,098
Eek	1,228	578	688	**877**	***1,256***	***803***	***761***	696	721	486	1,552	693	809
Kasigluk	***5,783***	***2,733***	5,064	***3,413***	***4,958***	***4,292***	***1,677***	1,648	2,403	2,029	3,261	2,410	3,400
Nunapitchuk	8,002	2,865	5,053	4,167	5,150	**6,619**	***4,726***	3,468	3,223	4,257	5,312	4,459	4,753
Atmautluak	2,514	849	2,271	1,940	***2,664***	2,193	*2,207*	1,673	1,406	1,864	2,701	1,869	1,958
Napakiak	3,421	1,560	2,328	3,238	8,143	3,628	1,811	1,679	1,766	1,546	1,711	2,086	2,912
Napaskiak	4,010	2,061	2,705	2,205	4,323	3,032	2,638	1,410	3,110	1,783	3,216	2,395	2,728
Oscarville	1,319	804	828	686	1,151	932	836	534	352	402	599	611	784
Bethel	17,731	11,452	13,448	14,273	20,953	16,540	18,660	10,480	10,986	15,324	26,872	14,398	14,985
Kwethluk	8,019	2,294	4,288	4,328	6,328	6,291	5,935	3,331	3,082	3,484	3,849	4,425	4,738
Akiachak	5,173	2,650	3,880	2,428	4,333	4,782	4,043	2,844	2,856	3,205	4,150	3,546	3,619
Akiak	2,571	2,928	3,499	3,528	3,095	4,141	3,184	1,350	1,163	2,421	***2,416***	2,452	2,788
Tuluksak	3,719	894	2,433	2,183	3,094	***3,204***	4,005	1,570	3,249	2,697	2,585	2,945	2,705
Lower Kuskokwim	67,640	32,956	49,031	46,834	69,472	59,807	54,899	34,013	36,756	41,363	60,838	45,368	49,277
Lower Kalskag	1,445	1,087	1,316	997	4,703	1,997	2,030	930	691	1,643	3,284	1,458	1,684
Upper Kalskag	2,460	516	1,656	1,201	2,469	294	1,829	329	393	1,599	1,930	889	1,275
Aniak	4,367	820	2,535	2,952	3,722	4,108	2,839	2,626	2,538	2,391	5,667	2,900	2,890
Chuathbaluk	1,458	2,502	2,352	530	1,451	***1,741***	593	937	535	686	796	898	1,278
Middle Kuskokwim	9,730	4,925	7,859	5,680	12,345	8,140	7,291	4,822	4,157	6,319	11,677	6,146	7,127
Crooked Creek	1,417	750	1,583	1,064	1,513	***853***	930	519	539	862	610	741	1,003
Red Devil	384	63	135	214	41	186	188	244	122	434	516	235	201
Sleetmute	1,293	468	1,054	422	1,475	818	358	388	524	689	1,004	555	749
Stony River	696	361	754	***523***	***727***	***535***	1,470	771	338	516	***619***	726	669
Lime Village	***817***	110	199	***609***	***320***	***437***	***495***	***430***	***277***	***504***	419	429	420
McGrath	969	513	290	***525***	999	464	1,352	841	482	476	885	723	691
Takotna	1	***0***	0	*5*	0	***1***	***4***	***0***	***0***	0	***0***	1	1
Nikolai	187	124	277	178	308	204	54	300	440	349	1,044	269	242
Telida	–	–	–	–	–	–	–	–	–	–	–.	–	–
Upper Kuskokwim	5,764	2,389	4,292	3,540	5,384	3,498	4,851	3,493	2,722	3,830	5,097	3,679	3,976
Kuskokwim River[b]	86,381	41,167	64,140	58,013	89,620	73,603	68,633	43,635	46,148	54,321	79,513	57,268	62,566
Quinhagak	2,011	559	1,383	994	2,754	2,249	1,795	1,297	1,376	1,255	2,001	1,594	1,567
Goodnews Bay	349	200	240	192	555	*307*	643	141	324	349	322	353	330
Platinum	95	19	42	21	108	*28*	106	28	37	70	76	54	55
S. Kuskokwim Bay	2,455	778	1,665	1,207	3,417	2,584	2,544	1,466	1,737	1,674	2,399	2,001	1,953
Total estimated harvest	88,836	41,945	65,805	59,220	93,037	76,187	71,177	45,101	47,885	55,995	81,912	59,269	64,519

Source: Shelden et al. 2014.

Note: En dashes indicate harvest was not estimated. Bold italic indicates Bayesian imputed estimates.

[a] Five- and ten-year averages do not include the current year.

[b] Kuskokwim River total includes the Lower, Middle, and Upper Kuskokwim areas and North Kuskokwim Bay.

Appendix A13.–Estimated number of coho salmon harvested for subsistence in the Kuskokwim area, 2002–2012.

Community	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	5 Yr Avg[a]	10 Yr Avg[a]
Kongiganak	1,138	236	937	740	657	883	***551***	588	390	613	***458***	605	673
N. Kuskokwim Bay	1,138	236	937	740	657	883	551	588	390	613	458	605	673
Tuntutuliak	1,239	2,092	1,189	1,074	948	703	1,495	***359***	698	250	565	701	1,005
Eek	821	747	1,018	378	652	***389***	***815***	***176***	315	280	612	395	559
Kasigluk	3,494	***1,505***	***5,034***	1,906	***3,008***	***2,826***	***917***	***628***	1,078	430	303	1,176	2,083
Nunapitchuk	821	627	555	807	692	1,752	483	***286***	195	407	319	625	662
Atmautluak	612	283	744	530	500	***424***	280	***68***	36	263	383	214	374
Napakiak	793	992	1,648	742	2,363	1,244	1,375	428	884	927	402	972	1,140
Napaskiak	717	983	655	602	1,640	639	816	755	1,015	471	269	739	829
Oscarville	161	19	304	60	175	180	62	67	12	43	38	73	108
Bethel	15,489	15,062	17,040	12,994	18,810	12,972	16,998	13,037	19,000	18,141	13,280	16,030	15,954
Kwethluk	2,706	1,787	3,430	3,048	1,245	1,624	6,867	4,044	1,527	1,097	1,013	3,032	2,738
Akiachak	1,690	1,627	2,397	1,817	1,714	2,355	4,132	1,593	1,181	1,440	714	2,140	1,995
Akiak	1,136	1,094	1,342	1,847	379	1,325	1,260	661	475	505	***433***	845	1,002
Tuluksak	1,349	921	1,007	484	498	1,401	***777***	857	337	163	341	707	779
Lower Kuskokwim	31,028	27,739	36,363	26,289	32,624	27,835	36,277	22,959	26,753	24,417	18,672	27,648	29,228
Lower Kalskag	281	314	368	319	1,415	515	95	318	96	684	1,107	342	441
Upper Kalskag	1,069	462	1,500	594	1,799	381	2,063	181	93	998	360	743	914
Aniak	3,737	1,164	2,355	2,032	1,018	3,003	3,013	2,264	2,472	2,215	3,365	2,593	2,327
Chuathbaluk	610	259	284	346	727	498	***525***	96	76	109	179	261	353
Middle Kuskokwim	5,697	2,199	4,507	3,291	4,959	4,397	5,696	2,859	2,737	4,006	5,011	3,939	4,035
Crooked Creek	440	375	713	312	401	392	***1,788***	283	87	297	149	569	509
Red Devil	499	351	65	331	171	193	452	126	88	130	238	198	241
Sleetmute	806	731	505	581	671	360	218	397	458	426	784	372	515
Stony River	662	214	679	534	***456***	***434***	***546***	634	201	333	***372***	430	469
Lime Village	706	***46***	231	383	***169***	***450***	***792***	***237***	***171***	***596***	117	449	378
McGrath	1,508	997	1,228	736	***894***	279	90	1,246	1,053	1,331	2,257	800	936
Takotna	25	10	***51***	10	***0***	9	***0***	***29***	***33***	3	***22***	15	17
Nikolai	93	361	171	171	407	102	53	203	135	20	214	103	172
Telida	–	–	–	–	–	–	–	–	–	–	–	–	–
Upper Kuskokwim	4,739	3,085	3,643	3,058	3,169	2,217	3,939	3,155	2,226	3,136	4,153	2,935	3,237
Kuskokwim River[b]	42,602	33,259	45,450	33,378	41,408	35,332	46,463	29,561	32,106	32,172	28,294	35,127	37,173
Quinhagak	1,719	1,133	1,868	1,435	1,558	1,315	1,550	2,217	1,703	1,547	1,369	1,666	1,605
Goodnews Bay	548	198	1,228	1,542	634	605	***497***	961	268	319	259	530	680
Platinum	118	96	144	266	223	116	***102***	114	81	197	143	122	146
S. Kuskokwim Bay	2,385	1,427	3,240	3,243	2,415	2,036	2,149	3,292	2,052	2,063	1,771	2318.3694	2430.1847
Total estimated harvest	44,987	34,686	48,690	36,621	43,823	37,368	48,612	32,853	34,158	34,235	30,065	37,445	39,603

Source: Shelden et al. 2014.

Note: En dashes indicate harvest was not estimated. Bold italic indicates Bayesian imputed estimates.

[a] Five- and Ten-year averages do not include the current year.

[b] Kuskokwim River total includes the Lower, Middle, and Upper Kuskokwim areas and North Kuskokwim Bay.

Appendix A14.–Commercial freshwater finfish harvest, Kuskokwim Area, 1977–2012.

Year	Number of fishermen[b]	Number caught[a]		Total weight (lb)		Total value ($)		
		Whitefish[c]	Burbot	Whitefish	Burbot	Whitefish	Burbot	Total
1977	3	718	0	[d]	0	952	0	952
1978	[b]	1,735	0	6,017	0	[d]	0	[d]
1979	[b]	3,219	0	11,211	0	[d]	0	[d]
1980	4	603	0	2,173	0	830	0	830
1981	4	1,197	0	4,620	0	2,310	0	2,310
1982	5	1,512	0	6,219	0	2,856	0	2,856
1983	0	0	0	0	0	0	0	0
1984	2	0	651	0	[d]	0	[d]	[d]
1985	5	555	1,829	2,275	2,016	1,137	455	1,592
1986	3	0	0	0	3,428	0	857	857
1987	4	417	0	1,260	0	1,008	0	1,008
1988	3	[d]	[d]	2,588	7	1,991	3	1,994
1989	7	178	282	583	270	501	597	1,098
1990	11	1,664	[d]	5,502	10	5,166	5	5,171
1991	5	1,413	41	2,442	256	2,412	197	2,609
1992	6	2,124	18	6,309	86	6,285	43	6,328
1993	5	2,509	0	5,208	0	4,898	0	4,898
1994	3	2,393	0	4,905	0	4,345	0	4,345
1995	1	[d]	0	2,363	0	2,507	0	2,507
1996	2	3,139	0	4,915	0	4,776	0	4,776
1997	14	4,447	0	5,770	0	4,832	0	4,832
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	1	193	0	339	0	339	0	339
2003	1	646	0	1,163	0	1,192	0	1,192
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0
2010	1	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0

[a] Does not include catches incidental to the commercial salmon fishery.

[b] Does not include fishermen who delivered catches incidental to the commercial salmon fishery.

[c] Includes cisco, pike, and blackfish.

[d] Data not available.

APPENDIX B: KUSKOKWIM RIVER SALMON

Appendix B1.–Districts 1 and 2 combined commercial salmon harvests, including personal use, Kuskokwim River, 1960–2012.

Year	Chinook	Sockeye	Chum	Pink	Coho	Total
1960[a]	5,969	0	0	0	2,498	8,467
1961[a]	18,918	0	0	0	5,044	23,962
1962[a]	15,341	0	0	0	12,432	27,773
1963[a]	12,016	0	0	0	15,660	27,676
1964[a]	17,149	0	0	0	28,613	45,762
1965[a]	21,989	0	0	0	12,191	34,180
1966	25,545	0	0	0	22,985	48,530
1967	29,986	0	148	0	56,313	86,447
1968	34,278	0	187	0	127,306	161,771
1969	43,997	322	7,165	0	83,765	135,249
1970	39,290	117	1,664	44	38,601	79,716
1971	40,274	2,606	68,914	0	5,253	117,047
1972	39,454	102	78,619	8	22,579	140,762
1973	32,838	369	148,746	33	130,876	312,862
1974	18,664	136	171,887	84	147,269	338,040
1975	22,135	23	184,171	10	81,945	288,284
1976	30,735	2,971	177,864	133	88,501	300,204
1977	35,830	9,379	248,721	203	241,364	535,497
1978	45,641	733	248,656	5,832	213,393	514,255
1979	38,966	1,054	261,874	78	219,060	521,032
1980	35,881	360	483,211	803	222,012	742,267
1981	47,663	48,375	418,677	292	211,251	726,258
1982	48,234	33,154	278,306	1,748	447,117	808,559
1983	33,174	68,855	276,698	211	196,287	575,225
1984	31,742	48,575	423,718	2,942	623,447	1,130,424
1985	37,889	106,647	199,478	75	335,606	679,695
1986	19,414	95,433	309,213	3,422	659,988	1,087,470
1987	36,179	136,602	574,336	43	399,467	1,146,627
1988	55,716	92,025	1,381,674	10,825	524,296	2,064,536
1989	43,217	42,747	749,182	464	479,856	1,315,466
1990	53,502	84,414	459,974	3,397	409,053	1,010,340
1991	37,778	108,946	431,802	378	500,935	1,079,839
1992	46,872	92,218	344,603	7,451	666,170	1,157,314
1993	8,735	27,008	43,337	64	610,739	689,883
1994	16,211	49,365	271,115	30,949	724,689	1,092,329
1995	30,846	92,500	605,918	93	471,461	1,200,818
1996	7,419	33,878	207,877	1,621	937,299	1,188,094
1997	10,441	21,989	17,026	2	130,803	180,261
1998	17,359	60,906	207,809	92	210,481	496,647
1999	4,705	16,976	23,006	2	23,593	68,282
2000	444	4,130	11,570	7	261,379	277,530
2001	90	84	1,272	0	192,998	194,444
2002	72	84	1,900	0	83,463	85,519
2003	158	282	2,764	0	284,064	287,268
2004	2,305	8,532	20,150	0	435,407	466,394
2005	4,784	27,645	69,139	0	142,319	243,887
2006	2,777	12,618	44,152	1	185,636	245,184
2007	179	703	10,783		141,049	152,714
2008	8,865	15,601	30,798	15	142,877	198,156
2009	6,664	25,673	76,956	18	104,552	213,863
2010	2,732	22,433	93,917	7	58,031	177,120
2011	747	13,497	118,316	2	74,123	206,685
2012	365	2,857	65,195		86,394	154,811
Average 2002–2011	2,928	12,707	46,888	5	[b] 165,152	227,679

[a] Includes harvests from District 3.

[b] Even years only.

Appendix B2.–Commercial salmon harvest and exvessel value, District W-1, Kuskokwim River, Kuskokwim Management Area,1993–2012.

	Chinook		Sockeye		Chum		Pink		Coho		Total	
Year	Number	Value	Number	Value	Number	Value	Number	Value	Number	Value	Number	Value
1993	8,735	$ 72,659	27,008	$ 140,000	43,337	$ 112,756	64	$59	610,739	$ 2,535,321	689,883	$2,860,795
1994	16,211	$ 126,892	49,365	$ 188,691	271,115	$ 381,639	30,930	$ 8,967	724,689	$ 2,875,803	1,092,310	$3,581,992
1995	30,846	$ 280,287	92,500	$ 448,530	605,918	$ 724,273	335	$50	471,461	$ 1,313,742	1,201,060	$2,766,882
1996	7,419	$ 23,665	33,878	$ 97,176	207,877	$ 170,977	1,621	$744	937,299	$ 1,824,683	1,188,094	$2,117,245
1997	10,441	$ 36,843	21,989	$ 64,922	17,026	$ 19,509	2	$1	130,803	$ 2,167,491	180,261	$2,288,766
1998	17,359	$ 74,387	60,906	$ 209,860	207,809	$ 183,307	92	$55	210,481	$516,024	496,647	$ 983,633
1999	4,705	$ 22,266	16,976	$ 86,442	23,006	$ 16,428	2	$ –	23,593	$44,633	68,282	$ 169,769
2000	444	$ 3,044	4,130	$ 14,272	11,570	$ 7,967	7	$3	261,379	$489,644	277,530	$ 514,930
2001	90	$534	84	$265	1,272	$827	–	$ –	192,998	$422,573	194,444	$ 424,199
2002	72	$212	84	$196	1,900	$ 1,190	–	$ –	83,463	$124,763	85,519	$ 126,361
2003	158	$846	282	$803	2,764	$ 1,087	–	$ –	284,064	$450,451	287,268	$ 453,187
2004	2,305	$ 9,815	8,532	$ 19,549	20,150	$ 6,611	–	$ –	435,407	$907,791	466,394	$ 943,766
2005	4,784	$ 29,040	27,645	$ 109,063	69,139	$ 23,115	–	$ –	142,319	$287,635	243,887	$ 448,853
2006	2,777	$ 16,192	12,618	$ 41,891	44,070	$ 14,988	1	$1	185,598	$378,318	245,064	$ 451,390
2007	179	$ 1,607	703	$ 2,411	10,763	$ 3,033	–	$ –	141,049	$373,789	152,694	$ 380,840
2008	8,865	$ 70,988	15,601	$ 59,777	30,516	$ 11,212	15	$4	142,862	$396,329	197,859	$ 538,310
2009	6,664	$ 61,452	25,673	$ 101,445	76,790	$ 76,494	2	$ –	104,546	$263,457	213,675	$ 502,848
2010	2,731	$ 53,134	22,428	$ 167,575	93,148	$ 162,445	–	$ –	58,031	$382,452	176,338	$ 765,606
2011	49	$411	13,482	$ 79,370	118,256	$ 350,124	1	$ –	74,108	$334,452	205,896	$ 764,357
2012	14	$225	2,857	$ 16,154	65,171	$ 257,932	–	$0	86,389	$323,687	154,431	$ 597,998
Average 2002–2011	2,858	24,370	12,705	58,208	46,750	65,030	2	0	165,145	389,944	227,459	537,552

Appendix B3.–Chinook salmon utilization, Kuskokwim River, Kuskokwim Area, 1990–2012.

	Harvest				
Year	Commercial [a]	Subsistence	Test fish [b]	Sport	Total
1990	53,504 [c]	109,778	257	394	163,933
1991	37,778 [c]	74,820	149	401	113,148
1992	46,872 [c]	82,654	518	367	130,411
1993	8,735 [c]	87,674	2,515	587	99,511
1994	16,211 [c]	103,343	1,850	1,139	122,543
1995	30,846 [c]	102,110	1,001	541	134,498
1996	7,419 [c]	96,413	247	1,432	105,511
1997	10,441 [c]	79,381	332	1,227	91,381
1998	17,359 [c]	81,213	210	1,434	100,216
1999	4,705	72,775	98	252	77,830
2000	444	67,620	60	105	68,229
2001	90	78,009	0	290	78,389
2002	72	80,982	0	319	81,373
2003	158	67,134	0	401	67,693
2004	2,305	96,788	19	857	99,969
2005	4,784	85,090	2	572	90,448
2006	2,777	90,085	0	444	93,306
2007	179	96,155	0	1,478	97,812
2008	8,865	98,103	0	708	107,676
2009	6,664	78,231	0	904	85,799
2010	2,731	66,056	0	354	69,141
2011	49	62,368	0	579	62,996
2012	14	22,527	0	0	22,541
Avg 2002–2011	2,858	82,099	2	662	85,621

[a] Not including personal use.

[b] Test fish sales only, does not include donations.

[c] Districts 1 and 2.

Appendix B4.–Sockeye salmon utilization, Kuskokwim River, Kuskokwim Area, 1990−2012.

	Harvest				
Year	Commercial [a]	Subsistence	Test fish [b]	Sport fish	Total
1990	84,414 [c]	45,897	456	61	130,372
1991	108,946 [c]	47,370	383	38	156,354
1992	92,218 [c]	43,514	1,264	131	135,863
1993	27,008 [c]	51,616	4,706	348	78,972
1994	49,365 [c]	42,362	2,561	359	92,086
1995	92,500 [c]	30,905	1,992	95	123,500
1996	33,878 [c]	40,591	623	315	74,784
1997	21,989 [c]	38,744	584	423	61,156
1998	60,906	36,103	625	178	97,187
1999	16,976	47,360	562	54	64,390
2000	4,130	45,942	410	46	50,118
2001	84	53,245	510	231	54,070
2002	84	32,296	0	42	32,422
2003	282	32,241	0	140	32,663
2004	8,532	39,127	44	400	48,103
2005	27,645	41,589	7	636	69,877
2006	12,618	43,315	0	231	56,164
2007	703	47,339	4	322	48,368
2008	15,601	58,729	0	273	74,603
2009	25,673	34,941	0	162	60,776
2010	22,428	38,103	0	419	60,950
2011	13,482	43,251	0	98	56,831
2012	2,857	47,231	1	196	50,285
Avg 2002–2011	12,705	41,093	6	272	54,076

[a] Not including personal use.

[b] Test fish sales only, does not include donations.

[c] Districts 1 and 2.

Appendix B5.–Chum salmon utilization, Kuskokwim River, Kuskokwim Area, 1990–2012.

	Harvest				
Year	Commercial [a]	Subsistence	Test fish [b]	Sport	Total
1990	459,974 [c]	153,825	1,650	533	615,982
1991	431,802 [c]	87,237	1,014	378	520,431
1992	344,603 [c]	116,391	12,409	608	474,011
1993	43,337 [c]	59,797	8,365	359	111,858
1994	271,115 [c]	76,937	11,637	1,280	360,969
1995	605,918 [c]	70,977	16,241	226	693,362
1996	207,877 [c]	100,913	2,864	280	311,934
1997	17,026 [c]	37,366	790	86	55,268
1998	207,809 [c]	61,732	1,140	291	270,972
1999	23,006	44,242	363	180	67,791
2000	11,570	56,499	1,033	26	69,128
2001	1,272	56,005	19	112	57,408
2002	1,900	86,381	7	53	88,341
2003	2,764	41,167	0	53	43,984
2004	20,150	64,140	113	84	84,487
2005	69,139	58,013	96	500	127,748
2006	44,070	89,620	0	13	133,703
2007	10,763	73,603	53	391	84,810
2008	30,516	68,633	0	121	99,270
2009	76,790	43,635	0	285	120,710
2010	93,148	46,148	0	85	139,381
2011	118,256	54,321	0	83	172,660
2012	65,171	79,513	93	93	144,870
Avg 2002–2011	46,750	62,566	27	167	109,509

[a] Not including personal use.

[b] Test fish sales only, does not include donations.

[c] Districts 1 and 2.

Appendix B6.–Coho salmon utilization, Kuskokwim River, Kuskowkwim Management Area, 1990−2012.

	Harvest				
Year	Commercial [a]	Subsistence	Test fish [b]	Sport fish	Total
1990	409,053 [c]	57,560	1,279	581	468,473
1991	500,935 [c]	39,252	1,188	1,003	542,378
1992	666,170 [c]	52,299	10,109	1,692	730,270
1993	610,739 [c]	28,485	8,084	980	648,288
1994	724,689 [c]	36,609	7,854	1,925	771,077
1995	471,461 [c]	36,823	6,620	1,497	516,401
1996	937,299 [c]	43,173	3,013	3,423	986,908
1997	130,803 [c]	29,816	1,103	2,408	164,130
1998	210,481 [c]	24,667	607	2,419	238,174
1999	23,593	27,409	343	1,998	53,343
2000	261,379 [c]	42,341	2,818	1,689	308,227
2001	192,998	31,089	1,530	1,204	226,821
2002	83,463	42,602	680	2,030	128,775
2003	284,064	33,259	570	3,244	321,137
2004	435,407	45,450	464	4,996	486,317
2005	142,319	33,378	454	3,539	179,690
2006	185,598	41,408	169	1,474	228,649
2007	141,049	35,332	446	2,355	179,182
2008	142,862	46,463	0	3,755	193,080
2009	104,546	29,561	0	3,257	137,364
2010	58,031	32,106	0	1,482	91,619
2011	74,108	32,172	0	896	107,176
2012	86,389	28,294	151	1,752	116,586
Avg 2002–2011	165,145	37,173	278	2,703	205,299

[a] Not including personal use.

[b] Test fish sales only, does not include donations.

[c] Districts 1 and 2.

Appendix B7.–Bethel test fishery harvest donations and sales, Kuskokwim River, Kuskowkwim Management Area, 1990−2012.

	Chinook			Sockeye			Chum			Coho		
Year	Donated [a]	Sales [b]	Total	Donated [a]	Sales [b]	Total	Donated [a]	Sales [b]	Total	Donated [a]	Sales [b]	Total
1990 [c]	255	257	512	–	456	–	457	1,650	2,107	–	1,279	–
1991	0	149	149	–	383	–	0	1,014	1,014	–	1,188	–
1992 [d]	862	518	1,380	–	1,264	–	2,921	12,409	15,330	–	10,109	–
1993 [d]	0	2,515	2,515	–	4,706	–	86	8,365	8,451	–	8,084	–
1994 [d]	87	1,850	1,937	–	2,561	–	361	11,637	11,998	–	7,854	–
1995 [d]	420	1,001	1,421	–	1,992	–	1,232	16,241	17,473	–	6,620	–
1996	0	247	247	–	623	–	0	2,864	2,864	–	3,013	–
1997	0	332	332	–	584	–	0	790	790	–	1,103	–
1998	0	210	210	–	625	–	0	1,140	1,140	–	607	–
1999	0	98	98	–	562	–	199	363	562	0	343	343
2000	4	60	64	–	410	–	5	1,033	1,038	10	2,818	2,828
2001	86	0	86	0	510	510	1,724	19	1,743	193	1,530	1,723
2002	288	0	288	228	0	228	2,659	7	2,666	1,804	680	2,484
2003	409	0	409	0	0	0	1,713	0	1,713	0	570	570
2004	672	19	691	698	44	742	1,697	113	1,810	1,795	464	2,259
2005	555	2	557	1,055	7	1,062	4,363	96	4,459	1,045	454	1,499
2006	352	0	352	519	0	519	3,547	0	3,547	1,017	169	1,186
2007	305	0	305	484	4	488	3,184	53	3,237	1,111	446	1,557
2008	420	0	420	584	0	584	2,472	0	2,472	2,984	0	2,984
2009	470	0	470	515	0	515	2,741	0	2,741	2,394	0	2,394
2010	292	0	292	495	0	495	2,872	0	2,872	1,020	0	1,020
2011	337	0	337	380	0	380	2,289	0	2,289	1,207	0	1,207
2012	321	0	321	398	1	399	2,637	93	2,730	1,104	151	1,255
Avg 2002–2011	410	2	412	496	6	501	2,754	27	2,781	1,438	278	1,716

Note: En dashes indicate no information available.

[a] Test fish donations are included in postseason subsistence salmon harvest survey estimates.

[b] Test fish sales are not included in commercial harvest tables.

[c] Includes Eek test fishery.

[d] Includes Eek and Aniak test fisheries.

Appendix B8.–Chinook salmon escapements at weir projects, Kuskokwim River, Kuskokwim Management Area, 2002–2012.

	Chinook salmon escapement						
Year	Kwethluk	Tuluksak	George	Kogrukluk	Tatlawiksuk	Takotna	Salmon
2002	8,502	1346	2,444	10,105	2,237	316	[a]
2003	14,474	1,064	4,693	11,771	1,683	378	[a]
2004	28,605	1,475	5,207	19,651	2,833	461	[a]
2005	[a]	2,653	3,845	22,000	2,918	499	[a]
2006	17,619	1,043	4,357	19,414	1,700	539	[a]
2007	13,267	374	4,883	13,029	2,061	418	6,220
2008	5,312	701	2,698	9,730	1,071	413	2,376
2009	5,710	362	3,663	9,702	1,071	311	[a]
2010	1,693	201	1,500	5,690	567	178	[a]
2011	4,079	288	1,571	6,891	1,012	134	[a]
2012	[a]	560	2,302	[a]	1,116	228	[a]
SEG	6,000–11,000	1,000–2,100	3,100–7,900	5,300–14,000			
Avg 2002–2011	11,029	951	3,486	12,798	1,715	365	4,298

[a] Weir did not operate or counts were incomplete.

Appendix B9.–Chinook salmon spawning aerial survey index estimates, Kuskokwim River drainage, Kuskokwim Management Area, 2002–2012.

	Lower Kuskokwim River [a]				Middle Kuskokwim River [a]						Upper Kuskokwim River [a]		
Year	Eek	Kwethluk Canyon C.	Kisaralik	Tuluksak	Aniak	Kipchuk	Salmon	Holokuk	Oskawalik	Holitna	Gagarayah	Cheeneetnuk	Salmon (Pitka)
2002		1,795	1,727			1,615	1,236	186	295	1,578	452		1,033
2003	1,236	2,628	654	94	3,514	1,493	1,242	528	844		1,095	810	1,241
2004	4,653	6,801	5,157	1,196	5,362	1,868	2,177	306	293	4,051	670	918	1,138
2005		5,059	2,206	672		1,679	4,097	268	582	1,760	788	1,155	1,801
2006			4,734		5,639	1,618		365	386	1,866	531	1,015	862
2007			692	173	3,984	2,147	1,458	146			1,035		943
2008		487	1,074		3,222	1,061	589	190	213		177	290	1,305
2009								390	379		303	323	632
2010			235					108		587	62		135
2011	263		534			116	79	20	26		96	249	767
2012			610			193	49	9	51		178	229	670
SEG			400–1,200		1,200–2,300		330–1,200			970–2,100	300–830	340–1,300	470–1,600
Avg 2002–2011	2,051	3,354	1,890	534	4,344	1,450	1,554	251	377	1,968	521	680	986

[a] Estimates are from aerial surveys conducted during peak spawning periods under "good" or "fair" survey conditions.

Appendix B10.–Sockeye salmon escapements at weir projects, Kuskokwim River, Kuskokwim Management Area, 2002–2012.

	Sockeye salmon escapement							
Year	Kwethluk	Tuluksak	George	Kogrukluk	Tatlawiksuk	Takotna	Telaquana	Salmon
2002	272	82	17	4,050	1	1	[a]	[a]
2003	2,928	288	16	9,164	[a]	3	[a]	[a]
2004	3,490	136	177	6,775	10	17	[a]	[a]
2005	[a]	642	276	37,939	77	34	[a]	[a]
2006	6,732	985	164	60,807	41	59	[a]	[a]
2007	5,262	352	74	16,525	27	13	[a]	2,130
2008	2,451	188	94	19,675	39	12	[a]	1,181
2009	4,385	686	54	23,785	39	3	[a]	[a]
2010	4,242	437	115	13,995	33	8	72,021	[a]
2011	2,031	126	43	8,132	23	1	35,105	[a]
2012	[a]	187	79	[a]	9	0	22,994	[a]
SEG				4,400–17,000				
Avg 2002–2011	3,533	392	103	20,085	32	15	53,563	1,656

[a] Weir did not operate or counts were incomplete.

Appendix B11.–Chum salmon escapements at weir projects, Kuskokwim River, Kuskokwim Management Area, 2002–2012.

	Chum salmon escapement							
Year	Kwethluk	Tuluksak	George	Kogrukluk	Tatlawiksuk	Takotna	Aniak	Salmon
2002	35,854	9,957	6,544	51,570	24,542	4,408	472,346	[a]
2003	41,812	11,724	33,666	23,413	[a]	3,393	477,544	[a]
2004	38,646	11,796	14,409	24,201	21,245	1,630	672,931	[a]
2005	[a]	35,696	14,828	197,723	55,720	6,467	1,151,505	[a]
2006	47,490	25,650	41,467	180,594	32,301	12,598	1,108,626	[a]
2007	54,913	17,286	55,842	49,505	83,246	8,900	696,801	25,379
2008	20,030	12,550	29,978	44,978	30,896	5,691	427,911	9,459
2009	32,191	13,671	7,941	84,940	19,975	2,487	479,531	[a]
2010	19,242	13,042	26,154	63,583	36,701	4,057	429,643	[a]
2011	18,329	9,828	44,640	76,384	84,202	8,414	345,630	[a]
2012	[a]	16,981	34,336	[a]	44,572	6,050	[a]	[a]
SEG				15,000–49,000			222,000–480,000	
Avg 2002–2011	34,279	16,120	27,547	79,689	43,203	5,805	626,247	17,419

[a] Weir did not operate or counts were incomplete.

Appendix B12.–Coho salmon escapements at weir projects, Kuskokwim River, Kuskokwim Management Area, 2002–2012.

	Coho salmon escapement						
Year	Kwethluk	Tuluksak	George	Kogrukluk	Tatlawiksuk	Takotna	Salmon
2002	23,298	11,487	6,759	14,518	11,345	3,982	[a]
2003	107,789	41,071	33,280	74,604	[a]	7,171	[a]
2004	64,216	20,336	12,499	27,041	16,410	3,207	[a]
2005	[a]	11,324	8,200	24,116	7,495	2,216	[a]
2006	25,664	6,111	11,296	17,011	9,453	5,548	[a]
2007	20,257	2,807	29,317	27,033	8,685	2,853	[a]
2008	49,971	7,457	21,931	29,661	11,065	2,817	11,022
2009	21,911	8,137	12,573	22,981	10,148	2,708	6,391
2010	[a]	1,216	12,961	13,971	3,520	3,217	[a]
2011	[a]	[a]	30,028	24,174	12,928	4,063	[a]
2012	19,960	4,407	15,272	13,697	8,070	1,838	[a]
SEG	>19,000			13,000–28,000			
Avg 2002–2011	44,729	12,216	17,884	27,511	10,117	3,778	8,707

[a] Weir did not operate or counts were incomplete.

APPENDIX C: DISTRICT 4 SALMON

Appendix C1.–Commercial salmon fishing periods, hours, and permits fished, District 4 Quinhagak, Kuskokwim Bay, 1980–2012.

Year	Number of periods	Fishing hours	Permits fished[a]
1980	36	432	169
1981	33	396	186
1982	34	408	177
1983	28	318	226
1984	33	396	263
1985	23	276	300
1986	29	348	324
1987	19	216	310
1988	32	384	288
1989	29	348	227
1990	30	444	390
1991	31	372	346
1992	34	420	349
1993	32	384	409
1994	32	384	308
1995	35	414	382
1996	27	298	218
1997	31	372	289
1998	34	408	203
1999	19	228	218
2000	27	324	230
2001	20	231	159
2002	24	294	114
2003	24	288	114
2004	24	288	116
2005	23	276	145
2006	29	348	132
2007	33	396	125
2008	31	372	146
2009	29	342	179
2010	24	312	241
2011	26	312	219
2012	22	264	179
Average 2002–2011	27	323	153

[a] Permits that made at least 1 delivery during the year.

Appendix C2.–Commercial salmon harvest, including personal use, District 4, Quinhagak, Kuskokwim Bay, 1960–2012.

Year	Chinook	Sockeye	Chum	Pink	Coho	Total
1960	0	5,649	0	0	3,000	8,649
1961	4,328	2,308	18,864	90	46	25,636
1962	5,526	10,313	45,707	4,340	0	65,886
1963	6,555	0	0	0	0	6,555
1964	4,081	13,422	707	939	379	19,528
1965	2,976	1,886	4,242	0	0	9,104
1966	278	1,030	2,610	268	0	4,186
1967	0	652	8,087	0	1,926	10,665
1968	8,879	5,884	19,497	75,818	21,511	131,589
1969	16,802	3,784	38,206	953	15,077	74,822
1970	18,269	5,393	46,556	15,195	16,850	102,263
1971	4,185	3,118	30,208	13	2,982	40,506
1972	15,880	3,286	17,247	1,878	376	38,667
1973	14,993	2,783	19,680	277	16,515	54,248
1974	8,704	19,510	15,298	43,642	10,979	98,133
1975	3,928	8,584	35,233	486	10,742	58,973
1976	14,110	6,090	43,659	31,412	13,777	109,048
1977	19,090	5,519	43,707	202	9,028	77,546
1978	12,335	7,589	24,798	47,033	20,114	111,869
1979	11,144	18,828	25,995	295	47,525	103,787
1980	10,387	13,221	65,984	21,671	62,610	173,873
1981	24,524	17,292	53,334	160	47,551	142,861
1982	22,106	25,685	34,346	11,838	73,652	167,627
1983	46,385	10,263	23,090	168	32,442	112,348
1984	33,663	17,255	50,422	16,249	132,151	249,740
1985	30,401	7,876	20,418	28	29,992	88,715
1986	22,835	21,484	29,700	8,700	57,544	140,263
1987	26,022	6,489	8,557	66	50,070	91,204
1988	13,883	21,556	29,220	21,311	68,605	154,575
1989	20,820	20,582	39,395	273	44,607	125,677
1990	27,644	83,681	47,717	12,056	26,926	198,024
1991	9,480	53,657	54,493	115	42,571	160,316
1992	17,197	60,929	73,383	64,217	86,404	302,130
1993	15,784	80,934	40,943	7	55,817	193,485
1994	8,564	72,314	61,301	35,904	83,912	261,995
1995	38,584	68,194	81,462	186	66,203	254,629
1996	14,165	57,665	83,005 [a]	20	118,718	273,573
1997	35,510	69,562	38,445	5	32,862	176,384
1998	23,158	41,382	45,095	2,217	80,183	192,035
1999	18,426	41,315	38,091	0	6,184	104,016
2000	21,229	68,557	30,553	3	30,529	150,871
2001	12,775	33,807	17,209	0	18,531	82,322
2002	11,480	17,802	29,252	0	26,695	85,229
2003	14,444	33,941	27,868	0	49,833	126,086
2004	25,462	34,627	25,820	0	82,398	168,307
2005	24,195	68,801	13,529	19	51,708	158,252
2006	19,184	106,308	39,151	0	26,831	191,474
2007	19,573	109,343	61,228	0	34,710	224,854
2008	13,812	69,743	57,033	0	94,257	234,845
2009	13,920	112,153	91,158	0	48,115	265,346
2010	14,230	138,362	106,610	0	13,690	272,892
2011	15,387	38,543	104,959	0	30,457	189,346
2012	6,675	37,688	61,140	0	31,214	136,717
Average 2002–2011	17,169	72,962	55,661	2	45,869	191,663

[a] Estimate of chum salmon roe included.

Appendix C3.–Commercial salmon fishing exvessel value, District 4, Quinhagak, Kuskokwim Bay, 1990–2012.

Year	Chinook	Sockeye	Chum	Pink	Coho	Total
1990	$253,562	$542,485	$89,343	$4,146	$123,936	$1,013,472
1991	$94,950	$246,734	$106,321	$52	$144,379	$592,436
1992	$166,471	$368,310	$139,268	$15,875	$303,740	$993,664
1993	$143,506	$402,763	$105,236	$4	$246,746	$898,255
1994	$67,584	$253,922	$84,395	$10,454	$420,802	$837,157
1995	$418,067	$323,104	$104,523	$81	$201,413	$1,047,188
1996	$61,004	$165,100	$61,686	$6	$246,930	$534,726
1997	$171,688	$204,190	$29,609	$0	$91,584	$497,071
1998	$82,168	$150,631	$36,497	$871	$197,676	$467,843
1999	$94,880	$140,846	$28,368	$0	$14,997	$279,091
2000	$131,351	$249,382	$23,929	$1	$31,898	$436,561
2001	$93,697	$89,334	$13,007	$0	$32,577	$228,615
2002	$56,356	$40,368	$23,374	$0	$47,651	$167,749
2003	$69,201	$107,287	$19,261	$0	$108,804	$304,553
2004	$107,700	$77,394	$18,372	$0	$201,879	$405,345
2005	$221,854	$241,478	$6,853	$4	$101,776	$571,965
2006	$147,802	$327,917	$14,030	$0	$61,433	$551,182
2007	$163,248	$374,004	$21,044	$0	$102,569	$660,865
2008	$140,580	$272,427	$20,581	$0	$317,143	$750,731
2009	$130,561	$384,209	$95,993	$0	$136,562	$747,325
2010	$294,163	$1,049,395	$194,105	$0	$117,658	$1,655,321
2011	$166,606	$207,642	$603,855	$0	$198,333	$1,176,436
2012	$85,934	$208,023	$362,840	$0	$167,638	$824,435
Average 2002–2011	$149,807	$308,212	$101,747	$0	$139,381	$699,147

Appendix C4.–Chinook salmon total utilization, District 4 Quinhagak, Kuskokwim Bay, 1990–2012.

	Harvest			
Year	Commercial [a]	Subsistence [b]	Sport fish	Total
1990	27,644	3,881	503	32,028
1991	9,480	3,753	316	13,549
1992	17,197	4,394	656	22,247
1993	15,784	3,634	1,006	20,424
1994	8,564	3,977	751	13,292
1995	38,584	2,864	739	42,187
1996	14,165	3,506	689	18,360
1997	35,510	3,186	1,632	40,328
1998	23,158	3,774	1,475	28,407
1999	18,426	2,815	854	22,095
2000	21,229	3,053	833	25,115
2001	12,775	3,177	947	16,899
2002	11,480	2,649	779	14,908
2003	14,444	2,563	323	17,330
2004	25,465	4,563	228	30,256
2005	24,195	3,505	520	28,220
2006	19,184	5,163	754	25,101
2007	19,573	4,686	633	24,892
2008	13,812	3,923	220	17,955
2009	13,920	2,976	400	17,296
2010	14,230	2,692	552	17,474
2011	15,387	2,588	925	18,900
2012	6,675	2,396	591	9,662
Average 2002–2011	17,169	3,531	533	21,233

[a] Does not include personal use.

[b] Subsistence harvest by the community of Quinhagak.

Appendix C5.–Sockeye salmon total utilization, District 4 Quinhagak, Kuskokwim Bay, 1990–2012.

Year	Harvest			
	Commercial [a]	Subsistence [b]	Sport fish	Total
1990	83,681	1,710	462	85,853
1991	53,657	1,818	88	55,563
1992	60,929	1,448	66	62,443
1993	80,934	1,228	331	82,493
1994	72,314	962	313	73,589
1995	68,194	597	148	68,939
1996	57,665	499	335	58,499
1997	69,562	460	607	70,629
1998	41,382	1,368	942	43,692
1999	41,315	1,433	496	43,244
2000	68,557	1,368	694	70,619
2001	33,807	1,054	83	34,944
2002	17,802	909	73	18,784
2003	33,941	805	107	34,853
2004	34,627	1,375	112	36,114
2005	68,801	1,745	156	70,702
2006	106,308	3,128	523	109,959
2007	109,343	1,755	385	111,483
2008	69,743	2,692	654	73,089
2009	112,153	1,744	75	113,972
2010	138,362	1,671	404	140,437
2011	38,543	1,582 [c]	429	40,554
2012	37,688	2,015 [c]	157	39,860
Average 2002–2011	72,962	1,741	292	74,995

[a] Does not include personal use.

[b] Subsistence harvest by the community of Quinhagak.

Appendix C6.–Chum salmon total utilization, District 4 Quinhagak, Kuskokwim Bay, 1990–2012.

	Harvest			
Year	Commercial [a]	Subsistence [b]	Sport fish	Total
1990	47,717	3,161	202	51,080
1991	54,493	1,631	80	56,204
1992	73,383	2,287	251	75,921
1993	40,943	1,053	183	42,179
1994	61,301	1,401	156	62,858
1995	81,462	669	213	82,344
1996	83,005 [c]	943	200	84,148
1997	38,445	572	212	39,229
1998	45,095	1,375	213	46,683
1999	38,091	1,587	293	39,971
2000	30,553	895	231	31,679
2001	17,209	808	43	18,060
2002	29,252	2,011	446	31,709
2003	27,868	559	14	28,441
2004	25,820	1,383	33	27,236
2005	13,529	994	108	14,631
2006	39,151	2,754	145	42,050
2007	61,228	2,249	15	63,492
2008	57,033	1,795	48	58,876
2009	91,158	1,297	44	92,499
2010	106,610	1,376	44	108,030
2011	104,959	1,255	271	106,485
2012	61,140	2,001	249	63,390
Average 2002–2011	55,661	1,567	117	57,345

[a] Does not include personal use.

[b] Subsistence harvest by the community of Quinhagak.

[c] Estimate of chum salmon roe included.

Appendix C7.–Coho salmon total utilization, District 4 Quinhagak, Kuskokwim Bay, 1990–2012.

	Harvest			
Year	Commercial [a]	Subsistence [b]	Sport fish	Total
1990	26,926	3,799	644	31,369
1991	42,571	3,230	358	46,159
1992	86,404	3,291	275	89,970
1993	55,817	2,029	734	58,580
1994	83,912	2,544	675	87,131
1995	66,203	2,480	970	69,653
1996	118,718	1,734	875	121,327
1997	32,862	1,105	1,220	35,187
1998	80,183	1,537	751	82,471
1999	6,184	1,781	1,091	9,056
2000	30,529	1,042	799	32,370
2001	18,531	1,719	2,448	22,698
2002	26,695	1,133	1,784	29,612
2003	49,833	1,868	1,076	52,777
2004	82,398	1,435	1,362	85,195
2005	51,708	1,558	1,006	54,272
2006	26,831	1,315	1,742	29,888
2007	34,710	1,550	1,087	37,347
2008	94,257	2,217	1,541	98,015
2009	48,115	1,703	876	50,694
2010	13,690	1,547	1,280	16,517
2011	30,457	1,369	1,287	33,113
2012	31,214	1,380	2,596	35,190
Average 2002–2011	45,869	1,570	1,304	48,743

[a] Does not include personal use.

[b] Subsistence harvest by the community of Quinhagak.

Appendix C8.–Salmon spawning escapement, Kanektok River, Kuskokwim Bay, 1996−2012.

Year	Operating period [a]	Chinook	Sockeye	Chum	Pink [b]	Coho
Counting Tower						
1996	7/2–7/13; 7/20–7/25	[c]	[c]	[c]		
1997	6/11–8/21	16,731	96,348	51,180	7,872	[c]
1998	7/23–8/17	[c]	[c]	[c]	[c]	[c]
1999						
2000						
Weir						
2001	8/10–10/03	132 [c]	739 [c]	1,056 [c]	19	35,650
2002	7/01–9/20	5,343 [d]	58,326 [d]	42,009 [d]	87,031	24,840
2003	6/24–9/18	8,231	127,471	40,066	2,443	72,448
2004	6/29–9/20	19,528	102,867	46,444	98,060	87,828
2005	6/25–9/18	14,331	242,208	53,580	3,530	26,343 [e]
2006						
2007	6/19–9/18	14,120	307,750	133,215	3,075	30,471
2008	7/17–8/21	6,578 [d]	141,388 [e]	54,024 [d]	142,430	24,490 [d]
2009	7/05–8/11	6,841	272,483 [d]	51,652 [d]	1,246	2,336 [c]
2010	6/28–8/05	5,800	202,643	62,567	114,074	344 [c]
2011	6/27–8/15	5,032	84,805	50,908	491	5,779 [c]
2012	7/06–8/15	1,568 [a]	88,800 [e]	24,173 [a]	62,141	4,248 [c]

Note: No operations in 1999, 2000, and 2006.

[a] The operational period is inclusive of days when passage was estimated; unless noted otherwise, less than 20% of the total annual escapement is estimated.

[b] Pink salmon numbers represent actual counts. No estimates of missed escapement, due to picket spacing allowing small pink salmon to pass unmonitored.

[c] Field operations were incomplete and total annual escapement was not estimated.

[d] Field operations were incomplete; sum of daily counts is an underestimate of total escapement but considered reasonable. Additional estimates were not made.

[e] Field operations were incomplete; more than 20% of the total estimate is based on daily passage estimates.

Appendix C9.–Salmon spawning aerial survey index estimates, Kanektok River, Kuskokwim Bay drainage, 1962–2012.

Year	Chinook	Sockeye	Chum	Coho
1962	935	43108	[a]	[a]
1963	[a]	[a]	[a]	[a]
1964	[a]	[a]	[a]	[a]
1965	[a]	[a]	[a]	[a]
1966	3,718	[a]	[a]	28,800
1967	[a]	[a]	[a]	[a]
1968	4,170	8,000	[a]	14,000
1969	[a]	[a]	[a]	[a]
1970	3,112	[a] 11,375	[a]	[a]
1971	[a]	[a]	[a]	[a]
1972	[a]	[a]	[a]	[a]
1973	814	[a]	[a]	[a]
1974	[a]	[a]	[a]	[a]
1975	[a]	6018	[a]	[a]
1976	[a]	22936	[a]	8697
1977	5,787	7,244	[a]	32,157
1978	19,180	44,215	[a]	229,290 [b]
1979	[a]	[a]	[a]	[a]
1980		[a]	[a]	[a]
1981	6,172	113,931	69,325	25,950
1982	15,900	49,175	[a]	71,840
1983	8,142	55,940	[a]	[a]
1984	8,890	2,340	[a]	9,360
1985	12,182	30,840	46,830	53,060
1986	13,465	16,270	[a]	14,385
1987	3,643	14,940	[a]	16,790
1988	4,223	51,753	20,056	9,420
1989	11,180	30,440	[a]	20,583
1990	7,914	14,735	[a]	6,270
1991	2,563	32,082	[a]	2,475
1992	2,100	44,436	4,330	[a]
1993	3,856	14,955	[a]	25,675
1994	4,670	23,128	[a]	1,285
1995	7,386	30,090	[a]	10,000
1996	6,107	22,020	23,656 [a]	[a]
1997	[a]	[a]	[a]	[a]
1998	[a]	[a]	[a]	[a]
1999	[a]	[a]	[a]	[a]
2000	[a]	[a]	[a]	[a]
2001	6,483	38,610	[a]	11,440
2002	[a]	[a]	[a]	[a]
2003	6,206	21,335	[a]	[a]
2004	28,375	78,380	[a]	[a]
2005	14,202	110,730	[a]	[a]
2006	8,433	382,800	[a]	[a]
2007	[a]	[a]	[a]	[a]

-continued-

Year	Chinook	Sockeye	Chum	Coho
2008	3,659	38,900	[a]	[a]
2009	[a]	[a]	[a]	[a]
2010	1,228	16,950	[a]	[a]
2011	[a]	[a]	[a]	[a]
2012	[a]	[a]	[a]	[a]
SEG	3,500-8,000	14,000-34,000		>5,200

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

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

[b] Chum salmon count excluded from escapement objective calculation due to exceptional magnitude.

APPENDIX D: DISTRICT 5 SALMON

Appendix D1.–Commercial salmon fishing periods, hours, and permits fished, District 5, Goodnews Bay, Kuskokwim Bay, 1980–2012.

Year	Number of periods	Fishing hours	Permits fished[a]
1980	38	456	48
1981	34	492	48
1982	34	540	48
1983	28	336	79
1984	31	372	77
1985	22	264	69
1986	30	360	86
1987	21	252	69
1988	30	360	125
1989	28	336	88
1990	28	396	82
1991	27	432	72
1992	26	396	111
1993	28	336	114
1994	32	432	116
1995	25	396	118
1996	21	247	53
1997	23	276	54
1998	29	348	50
1999	20	240	73
2000	25	300	46
2001	16	183	32
2002	12	144	30
2003	23	216	34
2004	21	252	29
2005	21	252	29
2006	27	324	24
2007	33	396	28
2008	30	360	25
2009	26	306	39
2010	22	260	48
2011	21	252	48
2012	28	336	58
Average 2002–2011	24	276	33

[a] Permits that made at least 1 delivery during the year.

Appendix D2.–Commercial salmon harvests, including personal use, District W-5 Goodnews Bay, Kuskokwim Bay, 1968–2012.

Year	Chinook	Sockeye	Chum	Pink	Coho	Total
1968	[a]	[a]	[a]	[a]	5,458	5,458
1969	3,978	6,256	5,006	298	11,631	27,169
1970	7,163	7,144	12,346	12,183	6,794	45,630
1971	477	330	301	0	1,771	2,879
1972	264	924	1,331	66	925	3,510
1973	3,543	2,072	15,781	324	5,017	26,737
1974	3,302	9,357	8,942	16,373	21,340	59,314
1975	2,156	9,098	5,904	419	17,889	35,466
1976	4,417	5,575	10,354	8,453	9,852	38,651
1977	3,336	3,723	6,531	29	13,335	26,954
1978	5,218	5,412	8,590	9,103	13,764	42,087
1979	3,204	19,581	9,298	201	42,098	74,382
1980	2,331	28,632	11,748	7,832	43,256	93,799
1981	7,190	40,273	13,642	11	19,749	80,865
1982	9,476	38,877	13,829	4,673	46,683	113,538
1983	14,117	11,716	6,766	0	19,660	52,259
1984	8,612	15,474	14,340	4,711	71,176	114,313
1985	5,793	6,698	4,784	8	16,498	33,781
1986	2,723	25,112	10,356	4,439	19,378	62,008
1987	3,357	27,758	20,381	54	29,057	80,607
1988	4,964	36,368	33,059	5,509	30,832	110,732
1989	2,966	19,299	13,622	82	31,849	67,818
1990	3,303	35,823	13,194	629	7,804	60,753
1991	912	39,838	15,892	29	13,312	69,983
1992	3,528	39,194	18,520	14,310	19,875	95,427
1993	2,117	59,293	10,657	0	20,014	92,081
1994	2,570	69,490	28,477	18,017	47,499	166,053
1995	2,922	37,351	19,832	39	17,875	78,019
1996	1,375	30,717	11,093	22	43,836	87,043
1997	2,039	31,451	11,729	0	2,983	48,202
1998	3,675	27,161	14,155	411	21,246	66,648
1999	1,888	22,910	11,562	0	2,474	38,834
2000	4,442	37,252	7,450	7	15,531	64,682
2001	1,519	25,654	3,412	0	9,275	39,860
2002	979	6,304	3,799	0	3,041	14,123
2003	1,412	29,423	5,593	0	12,658	49,086
2004	2,565	20,523	5,965	0	24,089	53,142
2005	2,035	23,933	2,568	0	11,735	40,271
2006	2,899	29,858	11,678	0	12,438	56,873
2007	3,126	43,766	7,853	6	13,697	68,448
2008	1,281	27,237	10,408	0	22,547	61,473
2009	1,509	32,544	16,985	0	8,406	59,444
2010	1,759	41,074	26,914	0	4,900	74,647
2011	2,092	24,573	13,191	0	15,358	55,214
2012	1,536	50,647	24,487	0	25,515	102,185
Average 2002–2011	1,966	27,924	10,495	1	12,887	53,272

[a] No harvest information available.

Appendix D3.–Commercial salmon fishing exvessel value, District W-5 Goodnews Bay, Kuskokwim Bay, 1990–2012.

Year	Chinook	Sockeye	Chum	Pink	Coho	Total
1990	$32,135	$263,598	$25,767	$254	$38,910	$360,664
1991	$8,370	$187,622	$31,394	$14	$47,519	$274,919
1992	$30,688	$257,457	$39,111	$2,913	$75,278	$405,447
1993	$21,351	$296,437	$28,304	$0	$95,043	$441,135
1994	$21,732	$309,577	$41,309	$5,442	$271,687	$649,747
1995	$31,339	$175,552	$21,427	$19	$58,061	$286,398
1996	$5,952	$87,427	$9,015	$4	$120,191	$222,589
1997	$10,867	$93,146	$9,358	$0	$9,497	$122,868
1998	$13,685	$100,171	$11,133	$174	$59,102	$184,265
1999	$9,020	$78,800	$8,327	$0	$7,515	$103,662
2000	$25,614	$146,708	$6,001	$2	$34,689	$213,014
2001	$10,496	$68,678	$2,586	$0	$17,089	$98,849
2002	$343	$15,846	$2,979	$0	$5,634	$24,802
2003	$6,461	$95,818	$3,883	$0	$28,945	$135,107
2004	$10,857	$49,741	$4,244	$0	$70,404	$135,246
2005	$16,696	$91,135	$1,454	$0	$25,010	$134,295
2006	$21,314	$87,996	$4,368	$0	$27,587	$141,265
2007	$23,951	$156,802	$2,781	$0	$38,796	$222,330
2008	$13,181	$104,296	$3,910	$0	$76,683	$198,070
2009	$13,333	$134,244	$18,998	$0	$25,456	$192,031
2010	$44,910	$334,366	$46,679	$0	$44,706	$470,661
2011	$19,224	$141,347	$78,980	$0	$106,471	$346,022
2012	$20,509	$299,187	$147,401	$0	$15,668	$482,765
Average 2002–2011	$17,027	$121,159	$16,828	$0	$44,969	$199,983

Appendix D4.–Chinook salmon total utilization, District W-5 Goodnews Bay, Kuskokwim Bay, 1990–2012.

	Harvest			
Year	Commercial [a]	Subsistence [b]	Sport fish	Total
1990	3,303	560		3,863
1991	912	872	26	1,810
1992	3,528	615	23	4,166
1993	2,117	665	81	2,863
1994	2,570	746	163	3,479
1995	2,922	813	41	3,776
1996	1,375	433	157	1,965
1997	2,039	455	86	2,580
1998	3,675	792	431	4,898
1999	1,888	828	223	2,939
2000	4,442	663	243	5,348
2001	1,519	920	147	2,586
2002	979	877	224	2,080
2003	1,412	852	10	2,274
2004	2,565	985	100	3,650
2005	2,035	943	0	2,978
2006	2,892	758	79	3,729
2007	3,112	713	177	4,002
2008	1,281	1,054	78	2,413
2009	1,509	646	31	2,186
2010	1,752	494	0	2,246
2011	2,092	896	51	3,039
2012	1,531	413	41	1,985
Average 2002–2011	1,963	822	75	2,860

[a] Does not include personal use.

[b] Subsistence harvest by the communities of Goodnews Bay and Platinum.

Appendix D5.–Sockeye salmon total utilization, District W-5 Goodnews Bay, Kuskokwim Bay, 1990–2012.

	Harvest			
Year	Commercial [a]	Subsistence [b]	Sport fish	Total
1990	35,823	1,145		36,968
1991	39,838	1,195	63	41,096
1992	39,194	1,531	8	40,733
1993	59,293	781	53	60,127
1994	69,490	736	70	70,296
1995	37,351	234	34	37,619
1996	30,717	443	87	31,247
1997	31,451	623	61	32,135
1998	27,161	578	502	28,241
1999	22,910	821	561	24,292
2000	37,252	1,139	82	38,473
2001	25,654	991	108	26,753
2002	6,304	1,112	149	7,565
2003	29,423	769	42	30,234
2004	20,523	1,056	0	21,579
2005	23,933	1,303	0	25,236
2006	29,857	1,058	98	31,013
2007	43,716	998	84	44,798
2008	27,236	2,381	104	29,721
2009	32,544	1,094	111	33,749
2010	41,074	1,268	15	42,357
2011	24,573	1,463	733	26,769
2012	50,635	1,370	286	52,291
Average 2002–2011	27,918	1,250	134	29,302

[a] Does not include personal use.

[b] Subsistence harvest by the communities of Goodnews Bay and Platinum.

Appendix D6.–Chum salmon total utilization, District W-5 Goodnews Bay, Kuskokwim Bay, 1990–2012.

	Harvest			
Year	Commercial [a]	Subsistence [b]	Sport fish	Total
1990	13,194	349		13,543
1991	15,892	140	189	16,221
1992	18,520	1,448	0	19,968
1993	10,657	177	156	10,990
1994	28,477	457	15	28,949
1995	19,832	143	0	19,975
1996	11,093	223	0	11,316
1997	11,729	135	24	11,888
1998	14,155	306	50	14,511
1999	11,562	265	47	11,874
2000	7,450	333	12	7,795
2001	3,412	247	21	3,680
2002	3,799	444	99	4,342
2003	5,593	219	14	5,826
2004	5,965	282	0	6,247
2005	2,568	213	0	2,781
2006	11,568	663	0	12,231
2007	7,519	335	0	7,854
2008	10,340	749	26	11,115
2009	16,985	169	22	17,176
2010	26,914	361	0	27,275
2011	13,191	419	0	13,610
2012	24,487	398	51	24,936
Average 2002–2011	10,444	385	16	10,846

[a] Does not include personal use.

[b] Subsistence harvest by the communities of Goodnews Bay and Platinum.

Appendix D7.–Coho salmon total utilization, District W-5 Goodnews Bay, Kuskokwim Bay, 1990–2012.

	Harvest			
Year	Commercial [a]	Subsistence [b]	Sport fish	Total
1990	7,804	1,725		9,529
1991	13,312	1,740	297	15,349
1992	19,875	1,961	138	21,974
1993	20,014	1,145	189	21,348
1994	47,499	515	170	48,184
1995	17,875	279	114	18,268
1996	43,836	371	466	44,673
1997	2,983	403	855	4,241
1998	21,246	390	574	22,210
1999	2,474	568	789	3,831
2000	15,531	480	795	16,806
2001	9,275	666	822	10,763
2002	3,041	294	429	3,764
2003	12,658	1,372	42	14,072
2004	24,089	1,808	622	26,519
2005	11,735	857	1,046	13,638
2006	12,436	721	553	13,710
2007	13,689	599	211	14,499
2008	22,547	1,075	220	23,842
2009	8,406	349	284	9,039
2010	4,900	516	597	6,013
2011	15,358	402	733	16,493
2012	25,515	506	624	26,645
Average 2002–2011	12,886	799	474	14,159

[a] Does not include personal use.

[b] Subsistence harvest by the communities of Goodnews Bay and Platinum.

Appendix D8.–Salmon spawning escapement, Middle Fork Goodnews River, Kuskokwim Bay drainage, 1981–2012.

Year	Operating period [a]	Chinook	Sockeye	Chum	Pink [b]	Coho
Middle Fork Goodnews River						
BEG:		1,500–2,900	18,000–40,000			
SEG:				>12,000		>12,000
Counting Tower						
1981	06/13 to 08/15	3,688	49,108	21,827	1,327	[c]
1982	06/23 to 08/03	1,395	56,255	6,767	13,855	[c]
1983	06/11 to 07/28	6,027	25,816	15,548	102	[c]
1984	06/15 to 07/31	3,260	32,053	19,003	13,744	[c]
1985	06/27 to 07/31	2,831	24,131	10,367	144	[c]
1986	06/16 to 07/24	2,080	51,069	14,764	8,134	[c]
1987	06/22 to 07/30	2,272	28,871	17,517	71	[c]
1988	06/23 to 07/30	2,712	15,799	20,799	6,781	[c]
1989	06/29 to 07/31	1,915	21,186	10,380	246	[c]
1990	06/19 to 07/24	3,636	31,679	6,410	3,378	[c]
Weir						
1991	06/29 to 08/24	1,952	47,397 [d]	31,644	1,694	[c]
1992	06/29 to 08/25	1,905 [d]	27,268	22,023	22,155	[c]
1993	06/22 to 08/18	2,349	26,452 [e]	14,952	318	[c]
1994	06/23 to 08/08	3,856	50,801	34,849 [d]	38,710	[c]
1995	06/19 to 08/28	4,836	39,009	33,699	322	[c]
1996	06/19 to 08/23	2,931 [d]	58,290	40,450 [d]	20,105	[c]
1997	06/11 to 09/17	2,937	35,530	17,369	970	13,413
1998	07/04 to 09/13	4,584	49,513 [d]	28,832	10,376	36,596
1999	06/26 to 09/26	3,221	48,205	19,513	914	11,545
2000	07/02 to 09/22	3,295 [e]	32,341 [e]	13,791 [e]	2,529	13,907 [e]
2001	06/26 to 09/30	5,391 [e]	21,024 [e]	26,829 [e]	1,328	19,626 [e]
2002	06/22 to 09/18	3,085	22,101	30,300	3,034	27,364
2003	06/18 to 09/18	2,389	44,387	21,637	1,881	52,810
2004	06/21 to 09/20	4,388	55,926	31,616	21,633	47,916
2005	06/26 to 09/20	4,633	113,809	26,690	5,926	15,683
2006	06/26 to 09/18	4,559	126,772	54,699	18,432	15,969
2007	06/25 to 09/19	3,852	72,282	48,285	4,919	20,975 [d]
2008	07/02 to 09/16	2,158	51,763 [d]	44,310 [d]	9,807	36,663
2009	06/28 to 09/22	1,630	25,465	19,715	767	19,992
2010	06/25 to 09/18	2,244	35,762	26,687	3,444	23,898 [d]
2011	06/24 to 09/18	1,861	17,946	19,974	1,394	23,826
2012	06/29 to 09/03	513 [d]	30,472 [a]	10,723 [d]	6,316	13,679 [a]

Note: BEG = biological escapement goal; SEG = sustainable escapement goal.

[a] The operational period is inclusive of days when passage was estimated; unless noted otherwise, less than 20% of the total annual escapement is estimated.

[b] Pink salmon passage is not estimated because they are small enough to pass between weir pickets.

[c] Field operations were incomplete and total annual escapement was not estimated.

[d] Field operations were incomplete; more than 20% of the total annual escapement is based on daily passage estimates.

[e] Field operations were incomplete; sum of daily counts is an underestimate of total escapement but is considered reasonable. Additional estimates were not made.

Appendix D9.–Salmon spawning aerial survey index estimates, Goodnews rivers and lakes, Kuskokwim Bay drainage, 1980–2012.

	Goodnews rivers and lakes			Middle Fork Goodnews rivers and lakes		
Year	Chinook	Sockeye	Chum	Chinook	Sockeye	Chum
1980	1,228	75,639	1,975	1,164	18,926	3,782
1981	[a]	[a]	[a]	[a]	[a]	[a]
1982	1,990	19,160	9,700	1,546	2,327	6,300
1983	2,600	9,650	[a]	2,500	5,900	[a]
1984	3,235	9,240	17,250	2,020	12,897	9,172
1985	3,535	2,843	4,415	2,050	5,470	3,593
1986	1,068	8,960	11,850	1,249	16,990	7,645
1987	2,244	19,786	12,148	2,222	24,505	9,789
1988	[a]	[a]	[a]	[a]	[a]	[a]
1989	[a]	[a]	[a]	[a]	[a]	[a]
1990	658	27,689	[a]	[a]	[a]	[a]
1991	[a]	[a]	[a]	[a]	[a]	[a]
1992	875	10,397	1,950	1,012	7,200	3,270
1993	[a]	[a]	[a]	[a]	[a]	[a]
1994	[a]	[a]	[a]	[a]	[a]	[a]
1995	3,314	[a]	[a]	[a]	[a]	[a]
1996	[a]	[a]	[a]	[a]	[a]	[a]
1997	3,611	12,610	[a]	1,447	19,843	[a]
1998	578	3,497	2,743	731	11,632	3,619
1999	[a]	[a]	[a]	[a]	[a]	[a]
2000	[a]	[a]	[a]	[a]	[a]	[a]
2001	3,561	29,340	7,330	2,799	12,383	6,945
2002	1,470	3,475	3,075	1,195	2,626	1,208
2003	3,935	50,140	[a]	2,131	29,150	[a]
2004	7,462	31,695	[a]	2,617	33,670	[a]
2005	[a]	[a]	[a]	[a]	[a]	[a]
2006	4,159	78,100	[a]	[a]	[a]	[a]
2007	[a]	[a]	[a]	[a]	[a]	[a]
2008	2,155	32,500	[a]	2,190	13,935	[a]
2009	[a]	[a]	[a]	[a]	[a]	[a]
2010	[a]	[a]	[a]	[a]	[a]	[a]
2011	853	14,140	[a]	[a]	[a]	[a]
2012	382	16,700	[a]	380	6,933	[a]
SEG	640–3,300	5,500–19,500	[b]	[b]	[b]	[b]

Note: SEG = sustainable escapement goal.

[a] Survey was either not flown or not rated as acceptable.

[b] Aerial survey escapement goal was discontinued in 2004.

APPENDIX E: HERRING

Appendix E1.–Commercial harvest, effort and value of Pacific herring in Kuskokwim Area fishing districts, Alaska, 1981–2012.

Year	District	Harvest (st)	Number of permits	Hours fished	CPUE (st)	Estimated value [a]	Average income per permit
2012	Security Cove	0	0	0		$0	$0
	Goodnews Bay	0	0	0		$0	$0
	Cape Avinof	0	0	0		$0	$0
	Nelson Is.	0	0	0		$0	$0
	Nunivak Is.	0	0	0		$0	$0
2011	Security Cove	0	0	0		$0	$0
	Goodnews Bay	0	0	0		$0	$0
	Cape Avinof	0	0	0		$0	$0
	Nelson Is.	0	0	0		$0	$0
	Nunivak Is.	0	0	0		$0	$0
2010	Security Cove	0	0	0		$0	$0
	Goodnews Bay	0	0	0		$0	$0
	Cape Avinof	0	0	0		$0	$0
	Nelson Is.	0	0	0		$0	$0
	Nunivak Is.	0	0	0		$0	$0
2009	Security Cove	0	0	0		$0	$0
	Goodnews Bay	0	0	0		$0	$0
	Cape Avinof	0	0	0		$0	$0
	Nelson Is.	0	0	0		$0	$0
	Nunivak Is.	0	0	0		$0	$0
2008	Security Cove	0	0	0		$0	$0
	Goodnews Bay	0	0	0		$0	$0
	Cape Avinof	0	0	0		$0	$0
	Nelson Is.	0	0	0		$0	$0
	Nunivak Is.	0	0	0		$0	$0
2007	Security Cove	0	0	0		$0	$0
	Goodnews Bay	0	0	0		$0	$0
	Cape Avinof	0	0	0		$0	$0
	Nelson Is.	0	0	0		$0	$0
	Nunivak Is.	0	0	0		$0	$0
2006	Security Cove	64	2	156		$7,878	$3,939
	Goodnews Bay	64	5	96		$8,935	$1,787
	Cape Avinof	0	0	0		$0	$0
	Nelson Is.	262	25	169		$53,225	$2,129
	Nunivak Is.	0	0	0		$0	$0
2005	Security Cove	2,031	30	198		$317,153	$10,572
	Goodnews Bay	49	6	123		$4,321	$720
	Cape Avinof	149	14	160		$37,631	$2,688
	Nelson Is.	665	27	277		$119,193	$4,415
	Nunivak Is.	0	0	0.0		$0	$0
2004	Security Cove	0	0	0		$0	$0
	Goodnews Bay	34	10	96.0		$3,600	$360
	Cape Avinof	63	23	288.5		$10,900	$474
	Nelson Is.	825	39	194.5		$165,300	$4,238
	Nunivak Is.	0	0	816.0		$0	$0
2003	Security Cove	0	0	0		$0	$0
	Goodnews Bay	36	12	50.5		$4,600	$383
	Cape Avinof	176	22	74.5		$36,100	$1,641
	Nelson Is.	816	44	78.0		$187,500	$4,261
	Nunivak Is.	229	19	204.0	[b]	$7,200	$379

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Year	District	Harvest (st)	Number of permits	Hours fished	CPUE (st)	Estimated value [a]	Average income per permit
2002	Security Cove	109	25	17.0		$10,000	$400
	Goodnews Bay	13	5	28.5		$1,000	$200
	Cape Avinof	79	37	97.0		$8,000	$216
	Nelson Is.	950	54	80.5		$101,000	$1,870
	Nunivak Is.	175	29	243.0	[b]	$19,000	$655
2001	Security Cove	1,024	56	17.5		$110,000	$1,964
	Goodnews Bay	45	23	16.0		$6,000	$261
	Cape Avinof	231	45	63.0		$23,000	$511
	Nelson Is.	678	49	25.5		$66,000	$1,347
	Nunivak Is.	0	0	0		$0	$0
2000	Security Cove	284	79	16.0		$54,386	$688
	Goodnews Bay	20	57	27.0		$3,318	$58
	Cape Avinof	366	86	59.0		$68,532	$797
	Nelson Is.	813	86	20.0		$154,280	$1,794
	Nunivak Is.	40	34	93.0	[b]	$11,880	$349
1999	Security Cove	1,072	97	9.0		$338,000	$3,485
	Goodnews Bay	1,366	94	49.0		$301,000	$3,202
	Cape Avinof	533	117	51.0		$185,000	$1,581
	Nelson Is.	1,366	94	22.0		$430,000	$4,574
	Nunivak Is.	0	0	0		$0	$0
1998	Security Cove	1,012	78	28.5		$202,340	$2,594
	Goodnews Bay	831	84	79.0		$166,220	$1,979
	Cape Avinof	656	109	44.0		$131,120	$1,203
	Nelson Is.	1,250	86	76.0		$235,900	$2,743
	Nunivak Is.	202	7	6.0		$440	$63
1997	Security Cove	892	222	10.5		$221,000	$995
	Goodnews Bay	805	139	65.0		$228,000	$1,640
	Cape Avinof	687	145	26.0		$157,000	$1,083
	Nelson Is.	778	105	10.0		$198,000	$1,886
	Nunivak Is.	0	12	70.0		$0	$0
1996	Security Cove	1,859	326	5.5		$1,252,270	$3,841
	Goodnews Bay	1,204	182	45.0		$893,900	$4,912
	Cape Avinof	820	161	57.0		$659,280	$4,095
	Nelson Is.	1,031	109	25.0		$676,624	$6,208
	Nunivak Is.	101	24	256.0		$38,234	$1,593
1995	Security Cove	1,292	106	12.0		$956,000	$9,019
	Goodnews Bay	1,054	127	56.0		$848,000	$6,677
	Cape Avinof	485	93	48.0		$363,000	$3,903
	Nelson Is.	1,113	100	28.0		$710,000	$7,100
	Nunivak Is.	41	13	387.0		$22,000	$1,692
1994	Security Cove	0	0	0		$0	$0
	Goodnews Bay	1,062	103	38.0		$391,000	$3,796
	Cape Avinof	427	85	62.0		$156,000	$1,835
	Nelson Is.	717	104	26.0		$235,000	$2,260
	Nunivak Is.	14	12	6.0		$4,000	$333
1993	Security Cove	5	9	24.5		$2,000	$222
	Goodnews Bay	954	63	123.0		$293,000	$4,651
	Cape Avinof	215	97	106.0		$75,000	$773
	Nelson Is.	739	73	63.5		$198,000	$2,712
	Nunivak Is.	0	0	0		$0	$0

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Appendix E1.–Page 3 of 3.

Year	District	Harvest (st)	Number of permits	Hours fished	CPUE (st)	Estimated value [a]	Average income per permit
1992	Security Cove	834	58	34.0		$285,000	$4,914
	Goodnews Bay	740	78	29.0		$286,000	$3,667
	Cape Avinof	452	121	12.0		$178,000	$1,471
	Nelson Is.	246	85	10.0		$78,000	$918
	Nunivak Is.	27	14	6.0		$4,000	$286
1991	Security Cove	570	52	12.0		$208,000	$4,000
	Goodnews Bay	263	103	4.0		$93,000	$903
	Cape Avinof	267	137	28.0		$94,000	$686
	Nelson Is.	0	0	0		$0	$0
	Nunivak Is.	59	17	12.0		$9,000	$529
1990	Security Cove	234	52	7.0		$94,000	$1,808
	Goodnews Bay	455	126	32.0		$314,000	$2,492
	Cape Avinof	50	101	3.0		$35,000	$347
	Nelson Is.	0	0	0		$0	$0
	Nunivak Is.	0	0	0		$0	$0
1989	Security Cove	554	104	4.0		$256,000	$2,462
	Goodnews Bay	616	138	50.0		$335,000	$2,428
	Cape Avinof	129	147	194.0		$54,000	$367
	Nelson Is.	233	162	15.0		$57,000	$352
	Nunivak Is.	116	45	186.0		$42,000	$933
1988	Security Cove	324	31	23.5		$362,000	$11,677
	Goodnews Bay	483	60	40.0		$463,000	$7,717
	Cape Avinof	348	98	88.5		$264,000	$2,694
	Nelson Is.	775	174	7.5		$713,000	$4,098
	Nunivak Is.	0	0	0		$0	$0
1987	Security Cove	313	65	13.0		$242,000	$3,723
	Goodnews Bay	321	117	11.0		$133,000	$1,137
	Nelson Is.	923	235	6.0		$661,000	$2,813
	Nunivak Is.	414	61	39.0		$231,000	$3,787
1986	Security Cove	751	88	73.0		$535,000	$6,080
	Goodnews Bay	557	104	53.0		$325,000	$3,125
	Nelson Is.	886	163	40.0		$428,000	$2,626
	Nunivak Is.	511	36	156.0		$213,000	$5,917
1985	Security Cove	733	107	125.0		$335,000	$3,131
	Goodnews Bay	724	83	130.0		$309,000	$3,723
	Nelson Is.	977	143	44.0		$527,000	$3,685
	Nunivak Is.	358	37	228.0		$146,000	$3,946
1984	Security Cove	335	38	345.0		$110,000	$2,895
	Goodnews Bay	717	130	139.0		$168,000	$1,292
1983	Security Cove	1,073	94	87.0		$443,000	$4,713
	Goodnews Bay	435	84	278.0		$185,000	$2,202
1982	Security Cove	813	107	302.0		$271,000	$2,533
	Goodnews Bay	486	84	314.0		$188,000	$2,238
1981	Security Cove	1,173	113	90.0		$347,000	$3,071
	Goodnews Bay	657	175	133.0		$196,000	$1,120

Note: ST = short ton. CPUE = catch per unit effort.

[a] Purse seine harvest is not a reflection of permit holder effort.

Appendix E2.–Herring aerial survey estimated biomass and commercial harvest, Kuskokwim Area, 1995–2012.

District	Estimated biomass (st)		Harvest					Estimated value ($1000s)	Exploitation rate (%)
			Sac roe	Bait	Waste	Total	Roe%		
2012									
Security Cove	12,193	a	0	0	0	0	0.0	0	0.0
Goodnews Bay	33,008	a	0	0	0	0	0.0	0	0.0
Cape Avinof	2,095	a	0	0	0	0	0.0	0	0.0
Nelson Is.	4,703	a	0	0	0	0	0.0	0	0.0
Nunivak Is.	2,879	a	0	0	0	0	0.0	0	0.0
Total	54,878		0	0	0	0	0.0	0	0.0
2011									
Security Cove	13,119	a	0	0	0	0	0.0	0	0.0
Goodnews Bay	36,810	a	0	0	0	0	0.0	0	0.0
Cape Avinof	2,324	a	0	0	0	0	0.0	0	0.0
Nelson Is.	5,252	a	0	0	0	0	0.0	0	0.0
Nunivak Is.	3,206	a	0	0	0	0	0.0	0	0.0
Total	60,711		0	0	0	0	0.0	0	0.0
2010									
Security Cove	13,440		0	0	0	0	0.0	0	0.0
Goodnews Bay	33,490	b	0	0	0	0	0.0	0	0.0
Cape Avinof	2,393	a	0	0	0	0	0.0	0	0.0
Nelson Is.	5,449	a	0	0	0	0	0.0	0	0.0
Nunivak Is.	3,322	a	0	0	0	0	0.0	0	0.0
Total	58,094		0	0	0	0	0.0	0	0.0
2009									
Security Cove	5,686	a	0	0	0	0	0.0	0	0.0
Goodnews Bay	6,143		0	0	0	0	0.0	0	0.0
Cape Avinof	2,251	a	0	0	0	0	0.0	0	0.0
Nelson Is.	5,152	a	0	0	0	0	0.0	0	0.0
Nunivak Is.	3,141	a	0	0	0	0	0.0	0	0.0
Total	22,373		0	0	0	0	0.0	0	0.0
2008									
Security Cove	6,442		0	0	0	0	0.0	0	0.0
Goodnews Bay	3,259		0	0	0	0	0.0	0	0.0
Cape Avinof	806		0	0	0	0	0.0	0	0.0
Nelson Is.	3,424		0	0	0	0	0.0	0	0.0
Nunivak Is.	3,688		0	0	0	0	0.0	0	0.0
Total	17,619		0	0	0	0	0.0	0	0.0
2007									
Security Cove	7,081		0	0	0	0	0.0	0	0.0
Goodnews Bay	3,683		0	0	0	0	0.0	0	0.0
Cape Avinof	878		0	0	0	0	0.0	0	0.0
Nelson Is.	3,614		0	0	0	0	0.0	0	0.0
Nunivak Is.	4,054		0	0	0	0	0.0	0	0.0
Total	19,310		0	0	0	0	0.0	0	0.0

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District	Estimated biomass (st)		Harvest Sac roe	Bait	Waste	Total	Roe%	Estimated value ($1000s)	Exploitation rate (%)
2006									
Security Cove	7,477		59	5	0	64	10.8	9	0.9
Goodnews Bay	4,111		64	0	0	64	9.8	9	1.6
Cape Avinof	702		0	0	0	0	0.0	0	0.0
Nelson Is.	3,809		262	0	0	262	11.1	53	6.9
Nunivak Is.	4,260		0	0	0	0	0.0	0	0.0
Total	20,359		385	5	0	390	10.8	71	1.9
2005									
Security Cove	18,192		2,031	0	0	2,031	10.9	317	11.2
Goodnews Bay	13,410		49	0	0	49	8.8	4	0.4
Cape Avinof	3,377		149	0	0	149	11.5	38	4.4
Nelson Is.	4,440		665	0	0	665	10.5	119	15.0
Nunivak Is.	4,782		0	0	0	0	0.0	0	0.0
Total	44,201		2,894	0	0	2,894	10.8	478	6.5
2004									
Security Cove	9,698		0	0	0	0	0.0	0	0.0
Goodnews Bay	7,744		34	0	0	34	8.9	4	0.4
Cape Avinof	3,369		63	0	0	63	15.5	11	1.9
Nelson Is.	5,085		825	0	0	825	10.9	165	16.2
Nunivak Is.	4,739		0	0	0	0	0.0	0	0.0
Total	30,635	#	922	0	0	922	11.1	180	3.0
2003									
Security Cove	10,600		0	0	0	0	0.0	0	0.0
Goodnews Bay	8,300		36	0	0	36	9.0	5	4.0
Cape Avinof	3,812		176	0	0	176	10.5	36	4.6
Nelson Is.	6,130		816	0	0	816	10.8	187	13.3
Nunivak Is.	5,182		229	0	0	229	8.4	7	4.4
Total	34,024		1,257	0	0	1,257	10.3	235	26.3
2002									
Security Cove	4,748		106	3	0	109	10.1	10	2.3
Goodnews Bay	5,529		13	0	0	13	9.7	1	0.2
Cape Avinof	3,491		79	0	0	79	9.6	8	2.3
Nelson Is.	6,130		950	0	0	950	10.4	101	15.5
Nunivak Is.	5,422		176	0	0	175	7.5	19	3.2
Total	25,320		1,324	3	0	1,326	9.9	139	5.2
2001									
Security Cove	5,206		1,024	0	0	1,024	10.7	110	19.7
Goodnews Bay	5,755		45	0	0	45	11.3	6	0.8
Cape Avinof	3,486		231	0	0	231	9.8	23	6.6
Nelson Is.	6,057		678	0	0	678	10.4	71	11.2
Nunivak Is.	5,657		0	0	0	0	0.0	0	0.0
Total	26,161		1,978	0	0	1,978	10.5	209	7.6

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District	Estimated biomass (st)	Harvest					Estimated value ($1000s)	Exploitation rate (%)
		Sac roe	Bait	Waste	Total	Roe%		
2000								
Security Cove	5,237	284	15	0	299	10.7	62	5.7
Goodnews Bay	6,348	19	1	1	20	9.2	3	0.3
Cape Avinof	3,210	370	7	0	377	9.6	71	11.8
Nelson Is.	4,672	754	52	1	807	9.8	150	17.3
Nunivak Is.	3,487	41	0	0	41	9.9	12	1.2
Total	22,954	1,468	75	2	1,544	9.9	299	6.7
1999								
Security Cove	5,261	1,016	56	1	1,072	11.0	338	20.4
Goodnews Bay	6,896	1,332	33	0	1,366	11.3	301	19.8
Cape Avinof	3,555	516	18	0	533	11.0	185	15.0
Nelson Is.	6,655	1,267	97	2	1,366	11.2	430	20.5
Nunivak Is.	3,319	0	0	0	0	0.0	0	0.0
Total	25,686	4,131	204	3	4,337	11.1	1,254	16.9
1998								
Security Cove	4,017	1,012	0	0	1,012	11.5	232	25.2
Goodnews Bay	4,064	831	0	0	831	11.3	188	20.5
Cape Avinof	4,287	656	0	0	656	11.6	152	15.3
Nelson Is.	7,136	1,250	0	0	1,250	11.8	296	17.5
Nunivak Is.	3,778	2	0	0	2	9.8	0	0.1
Total	23,282	3,751	0	0	3,751	11.6	868	16.1
1997								
Security Cove	4,640	884	3	5	892	12.5	221	19.2
Goodnews Bay	4,752	805	0	0	805	14.2	228	16.9
Cape Avinof	4,616	687	0	0	687	11.5	157	14.9
Nelson Is.	7,909	778	0	0	778	12.7	198	9.8
Nunivak Is.	3,801	0	0	0	0	0.0	0	0.0
Total	25,718	3,154	3	5	3,163	12.7	804	12.3
1996								
Security Cove	6,867	1,795	59	5	1,859	11.6	1,251	27.1
Goodnews Bay	6,315	1,191	13	0	1,204	12.5	895	19.1
Cape Avinof	4,500	820	0	0	820	13.4	659	18.2
Nelson Is.	6,638	986	44	0	1,030	11.4	679	15.5
Nunivak Is.	4,197	61	40	0	101	9.9	39	2.4
Total	28,517	4,854	156	5	5,014	12.0	3,523	17.6
1995								
Security Cove	6,702	1,292	0	0	1,292	12.3	956	19.3
Goodnews Bay	4,224	1,051	0	3	1,054	13.5	848	25.0
Cape Avinof	3,627	485	0	0	485	12.5	363	13.4
Nelson Is.	7,754	1,113	0	0	1,113	10.6	711	14.4
Nunivak Is.	4,579	33	7	0	41	11.0	22	0.9
Total	26,886	3,975	7	3	3,985	12.2	2,900	14.8

[a] Estimated biomass is the projection (in short tons [st]). Aerial surveys were inadequate or not flown.

[b] Biomass estimates from Goodnews Bay include Jacksmith Bay aerial survey estimates conducted on the same day.