Fishery Management Report No. 16-32

Sport Fisheries in the Lower Cook Inlet Management Area, 2014–2016, with Updates for 2013

by

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and

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November 2016

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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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.

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ABSTRACT

This report provides a detailed summary of the sport fisheries in the Lower Cook Inlet Management Area for the years 2014 to 2016, with estimates of angler effort, catch, and harvest updated for 2013. Included for each sport fishery are a description and historical overview, current management strategies, and performance for 2014 to 2016. The sport fisheries comprise saltwater fisheries including terminal saltwater fisheries, freshwater fisheries, groundfish fisheries, shellfish fisheries, and educational fisheries. Updates on access projects are discussed as well.

Key words: Lower Cook Inlet Management Area, sport fisheries, Alaska Board of Fisheries, Chinook salmon, coho salmon, steelhead, Dolly Varden, Pacific halibut, rockfish, lingcod, razor clam, hardshell clam, Tanner crab, Dungeness crab, terminal fisheries, educational fisheries

INTRODUCTION

This fisheries management report provides information regarding the Lower Cook Inlet Management Area (LCIMA). The LCIMA report series is updated every 3 years and is provided for the Alaska Board of Fisheries (BOF), Fish and Game Advisory Committees (ACs), the general public, and other interested parties. It presents fisheries assessment information and management strategies that are developed from that information. In addition, this report includes a description of the fisheries regulatory process, the geographic and regulatory boundaries, funding sources, and other information concerning Division of Sport Fish management of programs within the area.

The goals of the Division of Sport Fish (SF) of the Alaska Department of Fish and Game (ADF&G) are to protect and improve the state's sport fisheries resources by managing for sustainable yield of wild stocks of sport fish, providing diverse sport fishing opportunities, and providing information to assist the BOF in optimizing social and economic benefits from sport fisheries. In order to implement these goals, ADF&G has a fisheries management process in place. A regional review is conducted annually, during which the status of important area fisheries is considered and research needs are identified. Fisheries stock assessment projects are developed, scheduled, and implemented to meet information needs identified by fisheries managers. Projects are planned within a formal operational planning process. Biological information gathered from these research projects is combined with effort information and input from user groups to assess the need for and development of fisheries management plans and to propose regulatory strategies. SF management and research activities are funded by ADF&G and Federal Aid in Fisheries Restoration funds. ADF&G funds are derived from the sale of state fishing licenses. Federal aid funds are derived from federal taxes on fishing tackle and equipment that were established by the Federal Aid in Sport Fish Restoration Act (also referred to as the Dingell–Johnson Act or D–J Act). D–J funds are provided to states at a match of up to 3-to-1 with state funds. Additional funding, specified for providing, protecting, and managing access to fish and game, is provided through a tax on boat gas and equipment and was established by the Wallop–Breaux (W–B) Act. Other peripheral funding sources for research needs of LCIMA fisheries may include contracts with various government agencies and the private sector.

This area management report provides information regarding the LCIMA and its fisheries from 2014 to 2016 with updates on angler effort, catch, and harvest for 2013. The information contained is meant to inform the BOF, ACs, and the public about the current status of the fisheries and to facilitate discussions of the fisheries for subsequent BOF meetings.

The LCIMA includes the freshwater drainages on the west side of the Kenai Peninsula south of the Kasilof River drainage to Gore Point, the freshwater drainages on the west side of Cook Inlet

from the south end of Chisik Island to Cape Douglas, and the marine waters and beaches of Cook Inlet bounded by these landmarks (Figure 1).

LCIMA is divided into 4 areas for the purpose of managing sport fisheries for salmon and resident species. These areas include portions of the Upper Cook Inlet and West Cook Inlet regulatory areas and are distinguished as follows: LCIMA–Upper Cook Inlet (LCIMA–UCI), which is north of Bluff Point but south of the Kasilof River drainage and contains the Kenai Peninsula roadside streams; LCIMA–Lower Cook Inlet (LCIMA–LCI), which is south of Bluff Point and west of Kachemak Bay; Kachemak Bay, which is east of a line from Bluff Point to Seldovia; and LCIMA–West Cook Inlet (LCIMA–WCI), which consists of the freshwaters along western Cook Inlet within the LCIMA boundary. These area descriptions differ for groundfish fisheries (see Groundfish Fisheries section). Area management biologists for the LCIMA and the SF Region II groundfish biologist are located in Homer.

The LCIMA supports saltwater and freshwater sport and personal use fisheries. In the LCIMA, SF is responsible for managing the freshwater sport fisheries and a single freshwater personal use fishery (PU). Management of the LCIMA saltwater sport and personal use fisheries falls primarily under the jurisdiction of SF; however, Pacific halibut fisheries are managed by the National Oceanic and Atmospheric Administration (NOAA), and 1 PU salmon fishery is managed by the Division of Commercial Fisheries (CF), and except for residency requirements, most shellfish PU fisheries are indistinguishable from sport fisheries and essentially fall within SF jurisdiction.

ALASKA BOARD OF FISHERIES

The BOF is a 7-member board that sets fishery regulations and harvest levels, allocates fishery resources, and approves or mandates fishery conservation plans for the State of Alaska. BOF members are appointed by the governor for 3-year terms and must be confirmed by the legislature. Under the current operating schedule, the BOF considers fishery issues for regulatory areas or groups of regulatory areas on a 3-year cycle. Proposals to create new or modify existing regulations and management plans are submitted by ADF&G and the public (any individual can submit a proposal to the BOF) for evaluation by the BOF. During its deliberations, the BOF receives input and testimony through oral and written reports from ADF&G staff, members of the general public, representatives of local ACs, and special interest groups such as fishing associations and clubs. Members of the public provide their input concerning regulation changes and allocation by submitting written proposals and testifying directly to the BOF, by participating in local AC meetings, or by becoming members of local ACs.

ADVISORY COMMITTEES

Local ACs have been established throughout the State of Alaska to assist BOF and Board of Game members in assessing fisheries and wildlife issues and proposed regulation changes. AC meetings allow opportunity for direct public interaction with ADF&G staff attending the meetings to answer questions and provide clarification of proposed regulatory changes regarding resource issues of local and statewide concern. Within the LCIMA, there are 3 ACs: Homer AC, Seldovia AC, and Central Peninsula AC. ACs outside the LCIMA occasionally comment on proposals concerning LCIMA fisheries.

RECENT BOARD OF FISHERIES ACTIONS

The BOF meets annually, but deliberates on each individual regulatory area on a 3-year cycle. The most recent BOF meetings for the LCIMA occurred in December 2013 to deliberate on proposals during the Lower Cook Inlet Finfish meeting and in March 2014 to deliberate on proposals during the Statewide King and Tanner Crab and Supplemental Issues meeting. The following are lists of regulatory changes that came out of those meetings.

Lower Cook Inlet Finfish Board of Fisheries Meeting

Saltwater Fisheries

1) From 1 April to 30 June, the "closed area" marker south of the Anchor River was relocated to the Anchor Point Light (lat 59°46.14′N) (Alaska Administrative Code 5 AAC 58.036[d][3]).
2) During the China Poot personal use sockeye salmon dip net fishery, both lobes of the tail fin must be clipped before concealing the fish from plain view or transporting the fish from the area open to personal use fishing (5 AAC 77.545 [b]).
3) Sport caught pink salmon may be used as bait in the sport, personal use, or subsistence saltwater fisheries (5 AAC 58.025).
4) The third youth-only sport fishery scheduled for the third Saturday in August at the Nick Dudiak Fishing Lagoon was eliminated because late-run silver salmon will no longer be stocked (5 AAC 58.025[b][2][C]).

Freshwater Fisheries

1) For the Ninilchik River, the Chinook salmon bag and possession limit was reduced to 1 Chinook salmon, 20 inches or greater in length, during the 3 weekend openings beginning Memorial Day weekend and during the hatchery-only Chinook salmon fishery that begins 1 July (5 AAC 56.122 [6][D][ii]).
2) During the May and June openings, after harvesting a Chinook salmon 20 inches or greater in length in the Ninilchik River, Deep Creek, or Anchor River, a person may not fish for any species of fish in any of these drainages on that same day (5 AAC 56.122 [2][E], 5 AAC 56.122 [5][D], 5 AAC 56.122 [6][D][i]).
3) During the July Ninilchik Chinook salmon fishery, after harvesting a Chinook salmon 20 inches or greater in length, a person may not fish for any species of fish in the Ninilchik River on that same day (5 AAC 56.122 [6][D][ii]).
4) From 1 to 15 July, anglers may only use 1 unbaited, single-hook, artificial lure on the Anchor River, Deep Creek, or Stariski Creek (5 AAC 56.122 [2][A], 5 AAC 56.122 [5][A], 5 AAC 56.122 [10][A]).

Statewide King and Tanner Crab Board of Fisheries Meeting:

1) The opening date for the Kachemak Bay noncommercial Tanner crab fishery was changed to 1 September (Subsistence: 5 AAC 02.325 [1], Sport: 5 AAC 58.022 [a][11], Personal Use: 5AAC 77.516 [1]).
2) The Registration H Tanner Crab Harvest Strategy 5AAC 35.408 (d) was changed to use a 3-year average of legal male abundance instead of a 5-year average from the Kachemak Bay and Kamishak Bay surveys to determine if threshold levels have been achieved.

ADF&G EMERGENCY ORDER AUTHORITY

ADF&G has emergency order (EO) authority (5 AAC 75.003) to modify time, area, and bag and possession limit regulations. EOs are implemented to address conservation issues for resident species. EOs are also implemented as a tool for inseason management of fisheries. Inseason management is usually in accordance with a fisheries management plan approved by the BOF. EOs issued under this authority for the LCIMA are summarized in Appendix A1.

SPORT FISH GUIDE LICENSING AND LOGBOOK PROGRAM

Beginning in 1995, ADF&G required sport fishing guide businesses and guides to register before fishing in Alaska. Since 1998, the Division of Sport Fish (SF) has operated a program to register and license both sport fishing guides and sport fishing guide businesses, and to collect information on sport fishing participation, effort, and harvest by saltwater and freshwater guided clients (Sigurdsson and Powers 2009). In 1998, the BOF adopted statewide sport fishing guide regulations (5 AAC 75.075) that required all sport fishing guides and businesses to register annually with ADF&G. At this time, the BOF also adopted statewide regulations that required logbooks for saltwater charter vessels. The logbooks collected information on charter activity (location, effort, and harvest) that was necessary for the BOF for allocation and management decisions specific to Chinook salmon (*Oncorhynchus tshawytscha*), rockfish (*Sebastes* spp.), and lingcod (*Ophiodon elongates*), and for the North Pacific Fishery Management Council (NPFMC) for allocation of Pacific halibut (*Hippoglossus stenolepis*).

In 2004, the Alaska Legislature adopted House Bill 452, which established licensing requirements for sport fishing guide business owners and sport fishing guides on a statewide basis (effective 2005). This legislation also required logbook reporting for all freshwater guiding businesses in addition to the existing saltwater reporting requirements. The logbook data provides location of fishing effort, level of participation, and number of species kept and released by clients. This information is used for the regulation, development, and management of fisheries and has been published annually since 2009 (data since 2006) in a Fishery Data Series report (Sigurdsson and Powers 2009-2014).

STATEWIDE HARVEST SURVEY

The LCIMA provides fishing opportunities for local residents, Alaska residents, and nonresidents. Fishing-directed tourism is a major segment of the economic base of the LCIMA. Since 1977, sport angler effort and harvest in the LCIMA have been estimated using the Statewide Harvest Survey (SWHS) (e.g., Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, 2011a-b, 2015). The SWHS is a mail survey that is used to estimate annual sport fishing effort and harvest. Final estimates are available during the summer of the following year. The survey is designed to estimate effort in angler-days and the number of fish caught and harvested by location. Beginning in 1990, the survey was modified to also estimate catch (number of fish released plus number of fish harvested) by location. Although harvest and catch are estimated for individual species, the SWHS is not designed to estimate directed effort towards individual species. The precision of the SWHS estimates is related to the number of household respondents who reported participating in those fisheries. For any given fishery, SWHS estimates based on fewer than 12 household respondents are not used. Estimates based on 12 or more but less than 30 household respondents can be useful for detecting relative trends. Estimates based on 30 or more respondents generally represent fishing effort, catch, and harvest levels (Mills and Howe 1992). Creel surveys have been

used periodically for specific fisheries when more detailed information is needed for inseason management and to validate the SWHS for a given fishery.

REPORT STRUCTURE

This report provides a description, management objectives, and recent performance of the sport fisheries in the LCIMA for 2014–2016. Historical monitoring is presented in both the fisheries descriptions and management objectives. Management objective sections include regulations and management plans, emergency order actions, historical regulation changes, and historical monitoring and data associated with each fishery. The recent performance sections for each fishery provide a general overview of the fishery in the last 3 years, including the fishing conditions encountered by anglers when participating in the fishery and any management actions that occurred. Monitoring data for the last 3 years are also presented in the recent fisheries performance sections and are considered preliminary. Most of the data used in this report will be finalized in other reporting series: Statewide Harvest Survey annual reports; Charter Logbook annual reports; Anchor River Chinook salmon escapement project annual reports; and reports titled *Ninilchik River stock assessment and supplementation*, *A review of escapement goals in Lower Cook Inlet*, *Eastside Cook Inlet razor clam assessment*, *Characteristics of the sport rockfish* Sebastes *harvest in Southcentral Alaska*, *Composition of the lingcod sport harvest in Southcentral Alaska*, and *Genetic mixed-stock assessment of Chinook salmon harvested in the Cook Inlet marine sport fishery*. All historical data used in this report are published in their respective reports. Because SWHS estimates for the most recent year are not available until the following year, fisheries performance estimates presented here use a 3-year average for 2013–2015 as an approximate comparison to the historical averages. In this report, information on 2016 fisheries performances are presented without effort or harvest data and are considered qualitative.

LOWER COOK INLET MANAGEMENT AREA

DESCRIPTION

Easy access to salt water and popular salmon streams combined with proximity to major population centers attracts large numbers of anglers to the diverse sport and personal use fishing opportunities of the LCIMA (Figure 1). Most of the overall fishing effort occurs from April to September; however, winter fisheries from October through March consistently support stable fishing effort.

In the LCIMA, anglers can target 5 species of North Pacific salmon: pink salmon (*Oncorhynchus gorbuscha*), coho salmon (*O. kisutch*), sockeye salmon (*O. nerka*), chum salmon (*O. keta*), and Chinook salmon (*O. tshawytscha*). Sport fisheries for these species occur in fresh and salt water. Personal use fisheries occur in fresh water for sockeye salmon and in salt water for coho salmon. The major salmon sport fisheries harvest Chinook and coho salmon near shore in LCIMA–UCI and adjacent freshwater tributaries, in Kachemak Bay, and in the salt waters extending to the west in LCIMA–LCI. In Kachemak Bay, the Nick Dudiak Fishing Lagoon (NDFL) is stocked with salmon by the Alaska Department of Fish and Game (ADF&G), Division of Sport Fish (SF) and is a focal point for anglers fishing from shore. A popular sport fishery occurs on LCIMA's anadromous and resident stocks of Dolly Varden (*Salvelinus malma*), and steelhead or rainbow trout (*O. mykiss*) support popular catch-and-release sport fisheries in roadside streams on the Kenai Peninsula. In salt waters, the LCIMA accounts for the largest annual landings of sport-

caught Pacific halibut (*Hippoglossus stenolepis*) in Alaska; rockfish species (*Sebastes* spp.) and lingcod (*Ophiodon elongates*) are also harvested.

A variety of shellfish populations have supported sport and personal use fisheries. The state's largest sport and personal use Pacific razor clam (*Siliqua patula*) fishery historically occurred along a 50-mile area of beach between the Kasilof and Anchor rivers on the east side of Cook Inlet, but was closed in 2014 because of low stock abundance. With the closure, the razor clam sport and personal use fishery along the west side of Cook Inlet has grown. The largest hardshell clam (Pacific littleneck [*Protothaca staminea*] and butter clam [*Saxidomus giganteus*]) fishery in Southcentral Alaska occurs in Kachemak Bay. A Tanner crab (*Chionoecetes bairdi*) fishery periodically opens in Kachemak and Kamishak bays but has remained closed since 2012. Red king crab (*Paralithodes camtschaticus*), Dungeness crab (*Cancer magister*), and shrimp (*Pandalus* spp.) are all indigenous to the area, but fisheries for these species are all closed because of low stock abundance. Shrimp and Dungeness crab sport fisheries have been closed since the late 1990s.

Tributaries of the LCIMA–WCI support coho and chum salmon stocks. The sport fishing effort is low on these remote streams due to limited access. LCIMA–WCI also hosts small fisheries for Pacific halibut, salmon, and a growing razor clam fishery.

This report discusses the major sport and personal use fisheries in the LCIMA. It provides sport angler effort, harvest, and catch trends in the LCIMA based on SWHS estimates. There may be some small differences in reported estimates when compared to previous reports as the data summaries are updated and corrected.

MANAGEMENT PLANS

The regulations governing the sport fisheries of the LCIMA are found in Alaska statute and administrative codes. Kenai Peninsula freshwater sport regulations are found in 5 AAC 56.000, Cook Inlet saltwater sport regulations are found in 5 AAC 58.000, Western Cook Inlet fresh water sport regulations are found in 5 AAC 62.000, Statewide sport provisions and definitions are found in 5 AAC 75.000, Personal use fishery regulations are found in 5 AAC 77.000, and Educational Fisheries are found in 5 AAC 93.000. Management plans that specifically affect LCIMA sport fisheries are as follows: *Upper Cook Inlet Salt Water Early-Run Chinook Salmon Management Plan* (5 AAC 58.055), *Kenai River Late-Run Chinook Salmon Management Plan* (Kenai Late-Run Plan; 5 AAC 21.359), *Lower Cook Inlet Winter Salt Water Chinook Salmon Sport Fishery Management Plan* (Winter King Plan; 5 AAC 58.060), *Criteria for Establishing Special Management Areas for Trout* (5 AAC 75.013), *Sport Shark Fishery Management Plan* (5 AAC 75.012), *Southern District Hardshell Clam Fishery Management Plan* (5 AAC 38.318), and *Registration Area H Tanner crab harvest strategy* (5 AAC 35.408).

AREA EFFORT OVERVIEW

The LCIMA supports the second highest sport fishing effort in Alaska after the Upper Kenai Peninsula Management Area. From 1977 through 2012, LCIMA accounted for an average of 13% of the total statewide sport fishing effort (Table 1). Since 2013, average annual participation in LCIMA sport fisheries has been 10% of statewide effort (Table 1) and average effort (~225,000 angler-days) has dropped about 16% below the historical average for the LCIMA.

Historically, approximately 66% of the finfish sport fishing effort in LCIMA occurred in salt water (calculated from Table 1). Both freshwater finfish and shellfish fisheries contributed roughly equal portions to the total LCIMA effort. In 2013–2015, significant declines in effort occurred in the freshwater and shellfish fisheries in the LCIMA.

Historically, the UCI portion accounted for about 56% of the total LCIMA effort and Lower Cook Inlet–Kachemak Bay for about 45% of the area effort. In the LCIMA–UCI, average effort from 2013 to 2015 was below this historical average (calculated from Table 1). The reduced effort was primarily in response to closure of the razor clam fishery and restrictions to roadside streams. In 2013–2015, the increased effort in the LCI–Kachemak Bay saltwater finfish fishery was primarily attributed to the year-round Chinook salmon fishery.

The saltwater finfish fishery has primarily focused on Pacific halibut and to a lesser extent on salmon. Freshwater and shellfish fisheries contribute less sport fishing effort in Lower Cook Inlet and Kachemak Bay compared to Upper Cook Inlet. Overall, only a small portion of the LCIMA sport fishing effort occurs in the West Cook Inlet portion (LCIMA–WCI). Historically, that effort was equally split between salt- and freshwater fisheries. Beginning in 2012, SWHS estimates of harvest from West Cook Inlet saltwater fisheries were incorporated into Upper and Lower Cook Inlet fisheries to align better with charter logbook data.

AREA HARVEST OVERVIEW

The Chinook salmon sport fisheries are an important LCIMA fishery. The 2013–2015 average harvest of Chinook salmon from saltwater fisheries accounts for about 14% of the 2013–2015 average statewide saltwater Chinook salmon harvest (calculated from Table 2 and data from the Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish [cited October 2016]. Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/). Historically, the saltwater fisheries have accounted for most of the area Chinook salmon harvest. From 1977 to 2012, saltwater fisheries accounted for 68% of LCIMA Chinook salmon harvest and increased to 97% in recent years (2013–2015) (Tables 2 and 3). The increased saltwater harvest of Chinook salmon was primarily attributed to a combination of the low Chinook salmon harvest, increased harvest of nonlocal stocks in the saltwater fishery, and increased harvest of Chinook salmon in terminal fisheries in 2014 and 2015 (see Terminal Salmon Fisheries section).

In terms of numbers of fish, coho salmon are the predominant salmon species harvested in the LCIMA. However, coho salmon harvested in the LCIMA only contribute a small percentage of the statewide harvest. Harvests of coho salmon were stable from 1977 through 1988 and increased sharply in 1989 as stocked coho salmon from a new stocking program began returning to the Nick Dudiak Fishing Lagoon (NDFL) on the Homer Spit (Table 4). Harvests rose sharply again in 1993 and continued to increase through 2004, when a record of nearly 54,000 coho salmon were harvested. Relatively large harvests during the years 2001–2005 are the result of good survival from 2001 through 2004 of Cook Inlet coho salmon stocks and additional stocked fish returning to the NDFL. The decline in coho salmon harvests since 2006 was partly the result of poor runs of stocked coho salmon to the NDFL (see Terminal Salmon Fisheries section).

The LCIMA steelhead fishery occurs primarily along roadside streams. The fishery has been catch-and-release only since 1989. More steelhead are caught in the Anchor River than in other LCIMA streams. Catches can be quite variable from year to year and from stream to stream and can be influenced by differences in abundance, river conditions, and changes in effort.

Dolly Varden are commonly harvested from the LCIMA. Of the combined (fresh and salt waters) Dolly Varden harvest, the 2013–2015 average decreased by about 52% from the historical average (Table 5; see Dolly Varden Fisheries with an Emphasis on Roadside Fisheries section).

More Pacific halibut are harvested in the LCIMA than any other fish species. Pacific halibut harvests for the area have increased since 1977 (Table 6). The 2013–2015 average Pacific halibut harvest (188,184 fish) was approximately 34% higher than the 1977–2012 average (140,803 fish).

Diverse shellfish fisheries occur in LCIMA. The LCIMA has the largest sport fishery for razor clams in Alaska (Table 7) and also supports the largest hardshell clam fisheries north of Southeast Alaska. The tanner crab fishery was reopened in 2008 but then was closed in 2011 (Table 8).

SALTWATER SALMON FISHERIES

AREAWIDE FISHERY DESCRIPTION

Cook Inlet salt waters support a diversity of year-round salmon sport fishing opportunities. Although Chinook and coho salmon are primarily targeted, all salmon species are intercepted by sport anglers as they migrate through Cook Inlet to their spawning locations. Chinook salmon support year-round fisheries whereas coho, pink, sockeye, and chum salmon are caught from late June into September. Mature (spawning) Chinook salmon are caught April through August while "feeder" (immature) Chinook salmon are caught year-round. Chinook, coho, pink, and sockeye salmon are stocked into terminal fisheries within the LCIMA. In some years, these stockings have contributed significantly to the harvest of that species in LCIMA salt waters.

Chinook and coho salmon saltwater sport fisheries in the LCIMA are primarily boat-based troll fisheries with the exception of the stocked terminal fisheries. Primary access to these waters occurs at tractor launch facilities on the Deep Creek and Anchor Point beaches (May through August) and year-round from the Homer harbor. Small boats may also be self-launched from any beach from the Homer Spit north through Ninilchik. Residents from the south side of Kachemak Bay (Bear Cove to Port Graham) also participate in these fisheries.

In LCIMA, Chinook and coho salmon saltwater fisheries are primarily monitored with SWHS data, charter logbook data, and periodic dock sampling. Angler effort towards saltwater Chinook and coho salmon has not been quantified due to limitations with SWHS data and because anglers routinely fish for multiple species on a given trip in LCIMA salt waters. Anglers also shift their efforts towards more productive fisheries when conditions change.

CHINOOK SALMON

Areawide

Fishery Description

Cook Inlet salt waters support a diversity of Chinook salmon sport fishing opportunities. In the LCIMA–UCI (salt waters north of Bluff Point), Chinook salmon are primarily harvested in nearshore waters from Bluff Point north to Deep Creek. In Lower Cook Inlet and Kachemak Bay (salt waters south of Bluff Point), Chinook salmon are harvested both in terminal fishery locations and by trolling in nearshore and offshore waters. Feeder (immature), spawner (mature),

and stocked (Cook Inlet hatchery-reared) Chinook salmon support the harvest in both LCIMA–UCI and LCIMA–LCI.

Feeder Chinook salmon are harvested year-round while stocked and spawner Chinook salmon are harvested April through August. Cook Inlet stocks migrating through the LCIMA with early-run timing (April through mid-July) include the lower Kenai Peninsula drainages (Anchor River, Deep Creek, Ninilchik River, and Stariski Creek) and upper Kenai Peninsula drainages (Kenai and Kasilof rivers) and northern Cook Inlet (Susitna River). Cook Inlet stocks with late-run timing (late June through August) include the Kenai River and to a lesser extent the Kasilof River.

There are 5 primary Chinook salmon sport fisheries that occur in Cook Inlet salt waters. In Upper Cook Inlet, Chinook salmon sport fisheries are defined as early-run (1 April–30 June) and late-run (1 July–30 September). In Lower Cook Inlet, Chinook salmon sport fisheries are defined as the Kachemak Bay Terminal Fishery and the Summer Fishery south of Bluff Point from 1 April through 30 September. In both Lower and Upper Cook Inlet between Bluff Point and Anchor Point Light, the Winter Fishery occurs from 1 October through 31 March. Chinook salmon sport fishing effort north of the Anchor Point Light during the winter fishery is unknown but assumed to be low. Feeder Chinook salmon are harvested in all fisheries except in the Kachemak Bay Terminal Fishery. The Winter Fishery harvest is assumed to be composed of only feeder Chinook salmon. Spawner Chinook salmon are primarily harvested in Upper Cook Inlet in both the early-run and late-run fisheries and with a smaller portion in the Lower Cook Inlet Summer Fishery. Stocked Chinook salmon are harvested in all fisheries. Within Lower Cook Inlet, Chinook salmon are stocked at the Kachemak Bay Terminal Fishery locations at the Nick Dudiak Fishing Lagoon on the Homer Spit, Halibut Cove Lagoon, and Seldovia Slough. These fish are harvested in their stocking location but may also support the Lower Cook Inlet Summer Fishery as they return.

The sport fishery targets a mixture of Chinook salmon stocks found in Cook Inlet salt waters. Coded wire tag recovery and maturity data indicate that the high interception of Cook Inlet stocks is not focused on a few selected stocks (McKinley 1999; Begich 2007a; R. Begich, Fishery Biologist, ADF&G Sport Fish, Soldotna, personal communication). Rather, tag–recovery data indicate the origin of harvested mature fish are of broader Cook Inlet distribution composed of numerous individual stocks, none of which make up a large component. By far the most abundant stocks in Cook Inlet are those returning to the Susitna River drainage; therefore, it is reasonable to assume that their contribution to the LCIMA–UCI fishery is proportionate to their abundance in Cook Inlet. A majority of mature spawning fish sampled during the 1996–2002 study were harvested within three-quarter miles of shore. The majority of fish taken more than three-quarter miles from shore were immature fish (nonspawners or feeder Chinook salmon). It is probable that the proportion of immature Chinook salmon in the harvest continues to vary annually as anglers change fishing locations between nearshore and offshore areas to maximize fishing success.

Management and Objectives

Since the closure of Chinook salmon sport fishing in all Cook Inlet waters from 1964 to 1966, sport fishing regulations for Chinook salmon have evolved through the Alaska Board of Fisheries (BOF) process to protect Cook Inlet stocks. There was an initial recording requirement for Chinook salmon in salt water corresponding to the freshwater opening for Chinook salmon

from 1967 to 1978. Once the 5-Chinook salmon annual limit for Cook Inlet waters was implemented in 1979, the recording of Chinook salmon was required for all anglers. In 1988, the BOF revised the Chinook salmon annual limit and applied it only to Cook Inlet waters north of the line from Cape Douglas to Point Adam from 1 April through 30 September. In 1990, the BOF reduced the bag and possession limit to 1 Chinook salmon of any size north of Bluff Point, but maintained the limit of 2 Chinook salmon of any size south of Bluff Point from 1 January to 31 December.

In November 2001, the BOF adopted a regulation that created an annual limit of 5 Chinook salmon 20 inches or longer for all Cook Inlet waters from 1 January to 31 December. In 2002, the BOF exempted Chinook salmon from the annual limit from 1 October to 31 March south of Bluff Point. In 2010, the BOF moved the northern boundary of the winter Chinook salmon fishery from Bluff Point to the Anchor Point Light (navigational marker).

The Chinook salmon saltwater sport fisheries are regulated under the general Cook Inlet–Resurrection Bay saltwater regulations (Alaska Administrative Code 5 AAC 58.001) and under 3 management plans: the *Upper Cook Inlet Salt Water Early-Run Chinook Salmon Management Plan* (Early-Run Plan; 5 AAC 58.055), *the Kenai River Late-Run Chinook Salmon Management Plan* (Kenai Late-Run Plan; 5 AAC 21.359), and the *Lower Cook Inlet Winter Salt Water Chinook salmon Sport Fishery Management Plan* (Winter King Plan; 5 AAC 58.060). The first two plans are described below in the Upper Cook Inlet Section, and the last plan is described below in the Lower Cook Inlet Section.

The SWHS provides estimates of Chinook salmon catch and harvest by location (Upper or Lower Cook Inlet within the LCIMA), fishery, guided and unguided, and by residency. The SWHS has apportioned LCIMA Chinook salmon harvest by guided and unguided anglers since 1986. Historically, the majority of Chinook salmon harvest in all fisheries is by unguided anglers (Table 9). The Chinook salmon harvest in the LCIMA–LCI Winter Fishery is primarily by unguided anglers. Approximately half of the LCIMA-LCI Summer Fishery harvest is from guided anglers.

Charter Logbook data provide guided Chinook salmon catch and harvest by statistical area and date for each trip. Since 1998, SWHS estimates of saltwater guided angler Chinook salmon harvest reported in the LCIMA can be compared to the reported Chinook salmon harvest in charter logbooks (Table 10). It is assumed that the Charter Logbook harvest is precise and accurate because it is required by regulation for guides to complete a log for each trip. Overall, there is fair agreement when comparing the Charter Logbook and SWHS Chinook salmon harvests for each year.

Chinook salmon have been stocked in Kachemak Bay since the mid-1980s at the Nick Dudiak Fishing Lagoon (NDFL), Seldovia, and Halibut Cove Lagoon. Harvests have been assessed by the SWHS continuously since the inception of the stocking program at the NDFL and these harvests historically accounted for approximately 44% of the total Lower Cook Inlet and Kachemak Bay saltwater harvest.

Recent Fisheries Performance

In LCIMA salt waters, on average 1,117 fewer Chinook salmon were caught from 2013 to 2015 than from 1990 to 2012 (Table 11), while on average, 492 more Chinook salmon were harvested from 2013 to 2015 (14,257) than from 1990 to 2012 (13,765) (Table 2). In 2013–2015, LCIMA-

LCI accounted for about 76% of the total LCIMA area catch and 77% of the area harvest. Estimates of annual effort towards Chinook salmon in Cook Inlet salt waters are not available because the SWHS does not apportion effort by fisheries within Cook Inlet salt waters.

The 2015 LCIMA Chinook salmon catch was the highest since 2005 and harvest was the highest since 1995 (Tables 11 and 2). Beginning in 2013, trends of increased harvest were observed in the LCIMA–LCI Summer and Winter fisheries. The increasing trends can be attributed primarily the following: 1) shifts in effort from the LCIMA–UCI early-run fishery to the LCIMA–LCI fisheries resulting from EOs restricting the UCI fisheries, 2) good success on feeder Chinook salmon in the Summer and Winter fisheries, 3) increased number of days of favorable weather, 4) improved runs of stocked Chinook salmon to terminal fisheries in 2014 and 2015, and 5) improved runs of local stocks in 2015. The successful harvest of feeder Chinook salmon that began in 2015 continued in 2016.

In 2014, the BOF implemented a saltwater Chinook salmon sport fishery genetic stock identification study. This program was intended to estimate the Chinook salmon harvest contribution of 4 genetic reporting groups (*outside Cook Inlet*, *West Cook Inlet–Susitna*, *Kenai River*, and *Cook Inlet other*) within the Early-run, Late-run, Summer, and Winter fisheries. This program collected genetic and associated biological and effort data, assessed maturity, and collected coded wire tags (CWT) from heads of adipose finclipped fish. Preliminary results obtained from the collection of biological data for this study are presented below in the appropriate sections. Given the results obtained during the 2014 season, ADF&G developed a new statistical reporting chart for salmon sport fisheries in Cook Inlet in order to better align data collection with management needs (Figure 2). Preliminary genetic results will be detailed in a memo due out in November 2016, with full results available upon completion of the project in 2017.

Upper Cook Inlet in the LCIMA

Fisheries Description

Most of the Chinook salmon sport harvest in the LCIMA–UCI is taken along the beach area (approximately 30 miles) between Bluff Point and Deep Creek (Figure 3) during April through August. This sport fishery is essentially the first harvest of early- and late-run Chinook salmon returning to Cook Inlet tributaries. Many anglers fish for halibut as well as Chinook salmon. For the Upper Cook Inlet commercial salmon fishery, only drift gillnet fishing is allowed south of Ninilchik. The commercial drift gillnet fishery does not occur until late June when interception of early-run Chinook salmon is minimal.

The contribution of Deep Creek and Ninilchik River hatchery-reared Chinook salmon to the LCIMA–UCI saltwater harvest was estimated for years when all returning age classes were tagged. Results of these coded-wire-tagging studies estimate an annual harvest of fewer than 300 Deep Creek stock and fewer than 200 hatchery-reared Ninilchik River stock (Deep Creek 1998–2000, Ninilchik River 1996–2002; McKinley 1999; Begich 2007a; R. Begich, Fishery Biologist, ADF&G Sport Fish, Soldotna, personal communication). Deep Creek Chinook salmon composed 3.2% (1999) and 1.6% (2000) of the LCIMA-UCI saltwater harvest. Hatchery-reared fish of Ninilchik River origin were between 0.3% and 3.9% of the saltwater harvest from 1996 to 2000 and averaged 1.7% (Szarzi and Begich 2004a; Begich 2007a). The variation in the contribution of Ninilchik River hatchery-reared Chinook salmon is partly due to the reduction in stocking levels in 1995. The contribution of the 3 other wild LCIMA stocks (Anchor River,

Stariski Creek, and Ninilchik River wild Chinook salmon) is unknown but was probably low due to similar run sizes and fishing regulations.

Management Objectives

In 1996, the BOF adopted the *Upper Cook Inlet Salt Water Early-Run Chinook Salmon Management Plan* (5 AAC 58.055; Early-Run Plan) in response to the expansion of the saltwater fishery in the early 1990s and concerns about the impact on Cook Inlet Chinook salmon stocks, particularly those originating from the Anchor River, Deep Creek, Ninilchik River, and Stariski Creek (roadside streams), and the Kenai River (Szarzi and Begich 2004a).

The Early-Run Plan applies from 1 April through 30 June and designates salt waters from Bluff Point north to the mouth of the Ninilchik River and within 1 statute mile of shore as the early-run Chinook salmon Special Harvest Area (Figure 3; SHA). In the SHA, guides may not fish while accompanying paid clients (except to provide assistance to a disabled client), and anglers may not continue to fish for any species on the same day after taking a Chinook salmon 20 inches or longer. The plan also creates 3 conservation zones within the SHA: 1) south of the latitude of the Ninilchik River to 2 statute mile south of Deep Creek, 2) 1 statute mile north and south from Stariski Creek, and 3) 1 statute miles north and three-quarters statue mile south of the Anchor River. The conservation zones are closed to sport fishing from 1 April to 30 June except that sport fishing is allowed from shore south of the latitude of the Ninilchik River to Deep Creek on Memorial Day weekend and the following 2 weekends including the Monday following each of those weekends.

Stipulations of the Early-Run Plan remained unchanged until 2007, when the BOF reduced the closed area north and south of the Anchor River mouth from 2 miles to 1 mile in response to large run sizes of Anchor River Chinook salmon (Szarzi et al. 2010b). In 2010, BOF modified the plan in response to smaller run sizes of Anchor River Chinook salmon, reinstating the closed area 2 miles north and south of the Anchor River mouth. Since 2009, the management plan has been modified inseason in response to low run sizes in the LCIMA and generally paired with restrictions to the inriver fisheries (Appendix A1). In 2013, the BOF simplified regulations by moving the Anchor River southern boundary to the easily identifiable navigational marker at the Anchor Point Light. This change reduced the closed area surrounding the Anchor River mouth by one-quarter statute mile.

In 1999, the BOF adopted the Kenai Late-Run Plan, stipulating that if the projected inriver run of Kenai River late-run Chinook salmon is less than 17,800, ADF&G shall prohibit sport fishing for Chinook salmon in the salt waters of Cook Inlet north of the latitude of Bluff Point. In fall 2012, BOF changed the plan for the projected late-run Chinook salmon escapement to less than 15,000.

Recent Fisheries Performance

The LCIMA–UCI combined harvest during the early-run and late-run fisheries shifted from a high annual harvest from 1985 to 2007 (range from 3,795 to 11,540 Chinook salmon) to a lower harvest from 2008 to 2014 (range from 1,408 to 3,054) (Table 2). The LCIMA-UCI 2013–2015 average Chinook salmon harvest was 41% below the historical average (1977–2012; Table 2). The 2015–2015 early-run harvest was 46% below the historical average and the late-run harvest was 25% below the historical average. The 2013–2015 early-run Chinook salmon average catch was 9% below the historical average and the late-run catch was 44% below the historical average (from Table 11). During these recent years, approximately half of the harvest was guided and

half unguided for both the early- and late-run fisheries (Table 9). The 2013–2015 average guided early-run harvest was about 800 fish below the historical average and the guided late-run harvest was close to the historical average. Early-run harvest fell well below the guideline harvest level of 8,000 Chinook salmon. From 2013 to 2015, peak harvest occurred in 2015 for both the early-run and late-run fisheries. The increased harvest in 2015 in the early-run and late-run fisheries is attributed to improved run sizes of local stocks and increases in the number of feeder Chinook salmon in UCI waters.

During 2013–2015, the early-run fishery was conservatively managed using EO authority to restrict the fishery in response to the below-average outlooks of Chinook salmon abundance in roadside streams (see Roadside Stream section). During these years, the fisheries were restricted preseason by establishing a combined annual limit of 2 Chinook salmon between the roadside streams fishery and early-run fishery (Appendix A1). Subsequent EOs restricted the 2013 and 2014 fisheries further, whereas in 2015, the preseason EO restrictions were rescinded. In 2013, because escapement of Anchor River Chinook salmon lagged and was projected to fall below escapement needs, the SHA was closed to Chinook salmon anglers through 15 July. In 2014, the SHA was closed again through 30 June due to the below-average run strength of early-run Chinook salmon stocks. In 2015, due to a strong run of Chinook salmon to the Anchor River, UCI saltwater restrictions were rescinded. In 2016, no EOs were issued.

In 2014, for the second time since the Late-Run Plan was adopted, the Chinook salmon fishery was closed north of the latitude of Bluff Point. The saltwater fishery was closed from 26 to 31 July because the Kenai River late run was projected to fall below 15,000 Chinook salmon.

In 2014, a genetic stock assessment and monitoring project for Chinook salmon harvested from the LCIMA saltwater sport fisheries and some preliminary summary results are available for data collected through September 2016. Over 1,600 genetic samples were collected from the LCIMA–UCI fisheries (Table 12). The percentage of mature Chinook salmon in the LCIMA–UCI harvest that could be examined was consistently higher in all years (2014 to 2016) than the percentage of mature fish in the LCIMA–LCI harvest that could be examined (Table 13). From 2014–2016, the early-run fishery exhibited maturity rates of 11.7–34.3%, and the late-run fishery exhibited maturity rates of 11.4–42.7%. In general, Chinook salmon harvested in the LCIMA–UCI, regardless of fishery, were larger than fish harvested in LCIMA–LCI fisheries (Table 14). As of September 2016, 182 CWT heads have been collected of which 66 (36%) contained coded wire tags (calculated from Table 15). Nearly the same numbers of fish of known origin came from British Columbia as from other Pacific Northwest locales (Table 16). It should be noted that in recent years, Cook Inlet hatchery fish have been adipose finclipped but not coded-wire-tagged, so these fish would appear to samplers as CWT fish, but they would not contain a coded wire tag and thus would not appear as a either Alaska or Cook Inlet fish in the CWT data. Fish harvested during 2014–2016 in LCIMA–UCI of known Alaskan origin were all from outside of Cook Inlet. Coded-wire-tagging of Cook Inlet hatchery fish resumed in 2015 and these fish are expected to be seen in the saltwater sport harvest beginning in 2017.

Lower Cook Inlet and Kachemak Bay in the LCIMA

Fisheries Description

Since the 1960s or earlier, anglers have trolled for feeder Chinook salmon in the LCIMA–LCI and Kachemak Bay throughout the year. In addition to the stocked terminal fisheries (see below), there are 2 saltwater fisheries: Summer and Winter. Participation in the winter Chinook salmon

fishery is dependent on weather conditions and the size of boat that anglers use to access the fishery. Most of the effort occurs near Bluff Point and the south side of Kachemak Bay from Point Pogibshi east to Chugachik Island.

Information about the origin, age, length, sex, and sexual maturity of the LCI and Kachemak Bay Chinook salmon harvest has been collected during formal ADF&G sampling programs that collect and analyze the heads of harvested fish missing their adipose fins (fleshy fins on the back immediately preceding the tail; a missing fin indicates the fish might be tagged with a coded wire tag). Chinook salmon are sampled from salmon derbies and from sport anglers voluntarily returning the heads of fish missing their adipose fins. Sport harvested Chinook salmon caught by boat anglers were sampled by ADF&G personnel during the off-season (prior to May and after July) from 1994 through 1996, and during both early-run (May through 24 June) and late-run (25 June through mid-July) summer harvests in 1997 and 1998, and only during early-run harvests from 1999 through 2002 (R. Begich, Fishery Biologist, ADF&G Sport Fish, Soldotna, personal communication). Formal sampling of the summer Chinook salmon fishery in the LCI then ended, but ADF&G staff continued to encourage anglers to voluntarily turn in heads of Chinook salmon missing their adipose fins. Staff also sampled Chinook salmon when harvested salmon are weighed-in during the Winter Chinook salmon Fishing Derby sponsored by the Homer Chamber of Commerce that is held at the end of March.

Coded wire tags recovered during the Summer and Winter fisheries indicate a mixture of nonlocal stocks in the harvest. Tagged fish of non-Cook Inlet origin recovered in LCI and Kachemak Bay have been mainly from hatcheries in British Columbia, Washington, and Oregon, with some from Southeast Alaska.

Management Objectives

In 1988, BOF revised the annual limit of 5 Chinook salmon for the salt waters of Cook Inlet–Resurrection Bay and the freshwaters of Cook Inlet to only the Cook Inlet waters north of the line from Cape Douglas to Point Adam from 1 April through 30 September with no annual limit from 1 October to 31 March. During this period, the Cook Inlet bag and possession limits remained at 2 Chinook salmon of any size.

In 1990, the BOF reduced the bag and possession limits north of Bluff Point to 1 Chinook salmon of any size year round, but maintained the 2 Chinook salmon limit south of Bluff Point. The bag limit reduction north of Bluff Point was intended to reduce the impact of the sport fishery in those waters where early- and late-run Kenai River Chinook salmon stocks are harvested (Nelson 1990).

In November 2001, the BOF set an annual limit of 5 Chinook salmon for all Cook Inlet waters. The regulation became effective on 18 March 2002. The BOF cited increasing fishing effort and harvest and the unknown origin of stocks as reasons for the regulatory change. Public opposition to the regulation prompted the BOF to form a Local Area Management Plan committee charged with developing a regulatory alternative to slowing the growth of the winter Chinook salmon harvest during the spring of 2002. In 2002, the BOF established the Winter King Plan based upon a proposed plan submitted by the Local Area Management Plan committee.

Stipulations of the Winter King Plan applied to the fishery 1 October through 31 March and encompassed salt waters south of the latitude of Bluff Point, including all of Kachemak Bay, to the latitude of Cape Douglas and east to the longitude of Gore Point. During this period, the bag

and possession limits were changed to 2 Chinook salmon of any size per day. There was no recording requirement during this period and harvested Chinook salmon did not count against the Cook Inlet annual limit. The management plan included a sport guideline harvest level of 3,000 Chinook salmon for the salt water area south of Bluff Point.

At the 2010 BOF meeting, the Winter King Plan was modified by moving the Bluff Point boundary north to the Anchor Point Light. Reasons cited for moving the boundary included harvests that were below the guideline harvest limit (GHL), the expectation that increasing the area would not result in harvest exceeding the GHL, and that the Bluff Point land marker was difficult to distinguish. Also, because access is limited north of the Anchor Point Light during the fall and winter months, most effort would occur south of the Anchor Point Light. The SWHS questionnaire was not adjusted to estimate the Chinook salmon harvest from Bluff Point to the Anchor Point Light because anglers typically trolling the Bluff Point area (including north of Bluff Point) were likely to report their harvest as Bluff Point rather than north or south of Bluff Point.

The current regulations (5 AAC 58.022[a][1]) apply to salt waters south of Bluff Point from 1 April through 30 September. These regulations stipulate that the harvest of Chinook salmon 20 inches in length or longer must be recorded and do apply to the annual limit of 5 Chinook salmon for all Cook Inlet waters. However, additional opportunity is afforded to fisheries south of Bluff Point by maintaining the daily limit of 2 Chinook salmon; this is more liberal than the 1990 limit of 1 Chinook salmon north of Bluff Point. Waters in LCI and Kachemak Bay are also open by regulation to snagging on 24 June, except in the vicinity of NDFL on the Homer Spit (see Stocked Chinook Salmon Fisheries section).

Recent Fisheries Performance

The Chinook salmon 2013–2015 average harvest in LCIMA-LCI was approximately twice the historical 1977-2012 average and catch was 25% above average (from Tables 2 and 11). Increased Chinook salmon harvest during the Summer and Winter fisheries was observed beginning in 2013. In 2015, the combined Summer and Winter harvests reached a record high when 13,494 Chinook salmon were harvested (Table 2). The increased harvest is attributed to multiple factors that include a shift in angler effort during the summer months from UCI to LCI as a result of EOs restricting the UCI fisheries (see UCI section), improved runs of enhanced Chinook salmon to terminal stocking locations in 2014 and 2015 (see stocking section), and the high abundance of nonlocal stocks using the area to feed year-round combined with an increased number of days with favorable weather conditions for anglers and the growing popularity of the fishery.

The Summer Fishery accounted for 63% of the average combined Summer and Winter harvests from 2013 to 2015. On average, unguided anglers accounted for about half of the LCIMA–LCI Summer harvest (Table 9). During the Winter Fishery from 1 October to 31 March, Chinook salmon harvest exceeded the guideline of 3,000 Chinook salmon in 2014 and 2015 (Table 2). Most of the Winter harvest was taken by unguided anglers. From 2002 to 2015, guided anglers accounted for approximately 19% of the Winter Chinook salmon fishery harvest (calculated from Table 9).

No EOs, restrictions, or liberalizations were issued for LCI salt water Chinook salmon sport fisheries from 2014 through 2016.

In 2014, a genetic stock assessment and monitoring project for Chinook salmon harvested in the LCIMA sport fisheries and some preliminary summary results are available for data collected through September 2016. Over 8,300 genetic samples were collected from the LCIMA–LCI fisheries (Table 12). The percentage of mature Chinook salmon in the LCIMA–LCI harvest that could be examined was consistently lower in all years (2014–2016) than the percentage of mature fish that could be examined in the LCIMA–UCI fisheries (Table 13). The Summer Fishery exhibited observed maturity rates of 8.9–11.0%. Fish maturity is not sampled in the Winter Fishery. In general, LCI Chinook salmon, regardless of fishery, were smaller on average in all sampling years than fish harvested in UCI fisheries (Table 14). Since September 2016, 1,397 CWT heads have been collected in the LCIMA–LCI of which 522 (37%) contained coded wire tags (Table 15). Nearly twice as many heads from fish of known origin came from U.S. Pacific Northwest locales as from British Columbia (Table 16). It should be noted that in recent years, Cook Inlet hatchery fish were adipose finclipped but not coded-wire-tagged, so these fish would appear to samplers as a CWT fish but would not contain a coded wire tag and thus would not appear as a either Alaska or Cook Inlet fish in the CWT data. Fish harvested during 2014–2016 in LCIMA–LCI of known Alaskan origin were all from outside of Cook Inlet. Coded-wire-tagging of Cook Inlet hatchery fish resumed in 2015, and these fish are expected to be seen in the saltwater sport harvest beginning in 2017.

COHO SALMON

Areawide Fisheries Description

The saltwater fishery for coho salmon occurs throughout the LCIMA, but most effort that occurs is in a troll fishery along the southern shore of Kachemak Bay from Seldovia west to the Chugach Islands and in offshore waters near the mouth of Kachemak Bay. Anglers commonly catch other salmon species including feeder Chinook salmon while targeting coho salmon in LCIMA salt waters. There is also some effort in the salt waters along the eastern Cook Inlet shoreline near stream mouths because of easy access from the road system to harvestable numbers of fish. There are also shore- and boat-based efforts for coho salmon along the Homer Spit. These fish are probably composed of wild stocks returning to the Fox River system at the head of Kachemak Bay and stocked terminal coho salmon from the NDFL (see Terminal Fisheries section).

Coho salmon headed for Cook Inlet tributaries are first encountered by anglers fishing the salt waters off the southern tip of the Kenai Peninsula in early July. These early arrivals are thought to be destined for tributaries in Northern Cook Inlet (NCI). Local stocks arrive near the mouths of roadside streams and begin their spawning migrations in mid- to late July. The migration generally peaks from mid-August to early September and is mostly over by mid-September. Coho salmon spawning migrations into Kachemak Bay tributaries are thought to be a little later than the run timing of the roadside stream stocks. Coho salmon tend to hold in the salt water near natal stream mouths or in the lower reaches of streams until rain raises the stream water level, then they tend to immigrate en masse. Peak daily fish counts at the Anchor River weir have exceeded 4,000 during high water.

Areawide Fisheries Management Objectives

There are no biological or sustainable escapement goals (BEG or SEG) for any coho salmon stocks in the LCIMA. The sport fisheries are managed through sport fishery regulations that

specify seasons, gear, open areas, and bag and possession limits. In 1999, to protect coho salmon stocks after low runs throughout Cook Inlet, the BOF reduced the bag and possession limits for coho salmon for all Cook Inlet fresh waters from 3 to 2 fish and for all Cook Inlet salt waters from 6 to 2 fish. The exceptions were fresh waters south of the West Foreland, including the west side of the LCIMA, where bag and possession limits remained at 3 coho salmon.

Areawide Recent Fisheries Performance

During the 2013–2015 seasons, coho salmon harvests in LCIMA salt waters were near to well above the historical average (1977–2012). The 2013–2015 average saltwater harvest was 123% greater than the historical average (Table 4). The increase is attributed to strong runs of Cook Inlet coho salmon in 2014 and 2015. Both Upper and Lower Cook Inlet had similar trends in saltwater coho salmon harvest for 2013 through 2015. On average, the 2013–2015 coho salmon saltwater harvest in Lower Cook Inlet and Kachemak Bay composed 78% of the overall LCIMA saltwater harvest. Approximately 84% of the coho salmon harvested in the LCIMA occurred in salt water on average for 2013–2015.

There were no regulatory changes or inseason management actions for this fishery in 2014–2016. In 2014 and 2015, anglers focused their efforts in offshore waters in Cook Inlet commonly referred to as "Silver Ridge." Coho salmon along with feeder Chinook salmon were concentrated in Silver Ridge in catchable numbers from late July into September for both 2014 and 2015. In 2016, due to poor fishing, there were no concentrations of anglers in any particular location. Boat-based anglers shifted their efforts towards feeder Chinook salmon along the tip of the Homer Spit and the southern shore of Kachemak Bay. Shore-based fishing along the Homer Spit was popular in 2014–2016. In the waters outside of the Nick Dudiak Fishing Lagoon, some anglers purposely snagged coho salmon.

TERMINAL FISHERIES

Areawide Fisheries Description

In LCIMA, Chinook, coho, sockeye, and pink salmon are stocked at terminal fishery locations. Chinook and coho salmon are stocked by the ADF&G Division of Sport Fish to provide an alternative to heavily fished local stocks and to provide additional fishing opportunities. Cook Inlet Aquaculture Association (CIAA) stocks sockeye and pink salmon in several terminal fishery locations in the LCIMA for the purposes of commercial fishing, but these stockings also support sport and personal use fisheries in their terminal locations. These "terminal" fisheries are fisheries of returning salmon that will not naturally reproduce because there is no spawning area in the saltwater location where released smolt imprint. As such, these stocked sport fisheries are managed so that all returning fish are harvested. ADF&G has strategically selected saltwater locations where returning adult salmon can be vulnerable to anglers fishing from shore or a small boat.

Chinook and Coho Salmon Fisheries Description

Hatchery-reared early-run Chinook salmon have been stocked in Halibut Cove Lagoon since 1974, the Nick Dudiak Fishing Lagoon (NDFL) on the Homer Spit since 1984, and Seldovia Bay since 1987. At NDFL, late-run Chinook salmon were stocked to produce significant harvests from 1996 to 2001. Early-run and late-run coho salmon have also been stocked in NFDL. Late-run coho salmon stocking was discontinued after 2012 (Kerkvliet et al. 2013).

All early-run Chinook and coho salmon smolt were produced by the ADF&G hatchery program. As such, the smolt were thermal marked to produce banding patterns on their otoliths. Salmon smolt stocked in Kachemak Bay have a particular banding pattern that indicates they were stocked in Cook Inlet, but the banding is not specific to any particular release location.

The size of Chinook salmon smolt at stocking was reduced in 2001 to reduce the number of ocean-age-1 "jacks" in the runs to these stocked locations. Anecdotal reports of fewer returning jacks were not confirmed by ADF&G in the years after smolt size was reduced. The run timing of early-run Chinook salmon for the stocked fisheries is from approximately early May through mid-July, with a peak in mid-June. Chinook salmon have been sighted in Bradley River, Humpy Creek, and Seldovia River, streams not known to have had wild Chinook salmon stocks prior to the stocking program. Otoliths extracted from 3 Chinook salmon caught by ADF&G staff in the Seldovia River in 2006 were banded with the pattern of Cook Inlet hatchery-reared Chinook salmon, indicating they had strayed in 2004 from a Cook Inlet stocking program.

Chinook and coho salmon are harvested in sport fisheries at these terminal locations and additionally in commercial and personal use set gillnet fisheries, and a sport troll fishery that occurs in Kachemak Bay. In Halibut Cove Lagoon, returning salmon are primarily harvested from boats, whereas at the NDFL and Seldovia, salmon are harvested from shore and from boats.

Release methods vary by location but historically, Chinook salmon smolt were held in net pens for 5 days prior to release at the terminal fisheries locations. It was assumed that a 5-day holding period improved imprinting to the stocking location. NDFL has no freshwater inputs, HCL has a small second-order stream approximately 0.2 km west of the stocking location, and the slough feeding into the Seldovia Harbor has several freshwater streams. Smolt were also fed twice each day while being held in the net pens. The benefits of holding and feeding have not been tested.

Since 2009, the holding of salmon smolt at NDFL and HCL has been complicated by harmful algal blooms, specifically the diatom *Chaetoceros* spp. These diatoms are found as either individual cells or long chains of individuals linked together. Each individual has long spines that can lacerate the gill filaments of fish. Chinook salmon smolt held in pens are more susceptible to the harmful effects of *Chaetoceros* spp. because avoidance of the blooms by the fish is prevented. *Chaetoceros* spp. concentrations as low as 5,000 cells/L can be lethal to salmon held in net pens (Yang and Albright 1994). Plankton blooms are hard to predict but generally blooms are influenced by amount of sunlight and inputs of inorganic nutrients such as nitrate and phosphate[1]. *Chaetoceros* spp. concentrations can increase quickly to levels unsafe to hold fish (>10,000 cells/L) and then to bloom-like levels (≥1,000,000 cells/ L). Data collected in 2012–2013 indicate that the concentration of *Chaetoceros* spp. is consistently above 10,000 cells/L at the saltwater stocking locations in Kachemak Bay from April through June (stocking season).

Nick Dudiak Fishing Lagoon

Early-run Chinook salmon have been stocked by ADF&G in the NDFL since 1984 (Table 17). From 1984 until 1993, the broodstock for the early run came from Crooked Creek, a tributary to the Kasilof River. Between 1993 and 1999, adults were collected from the NDFL and spawned in the Anchorage hatchery to produce the smolt stocked back in the NDFL. Since 2000, Chinook salmon from the Ninilchik River have been used as broodstock to produce the early run to the

[1] NOAA (National Oceanic and Atmospheric Administration). 2010. Harmful algal blooms and biotoxins: phytoplankton- algal bloom dynamics. http://www.nwfsc.noaa.gov/hab/habs_toxins/phytoplankton/algal_dynamics.html (Accessed November 2013).

NDFL. The goal is to stock 210,000 early-run Chinook salmon smolt to produce 6,500 returning adults, all of which would be available for harvest in the sport fishery.

Late-run Chinook salmon smolt were stocked from 1992 through 1999 by ADF&G. The original brood stock for the late run was Kasilof River Chinook salmon, but the program was discontinued in 1999 when insufficient numbers of sexually mature adults were available for egg takes (Szarzi and Begich 2004a).

The first significant harvest of stocked early-run Chinook salmon occurred in 1987 (Table 18). Annual early-run Chinook salmon harvests from shore during 1996 through 2009 have ranged from 710 to 4,068. Below average harvests in 2008 and 2009 are attributed to poor runs partly because of low survival of stocked fish caused by a loss of heated water at Division of Sport Fish (SF) hatcheries and additionally to ocean conditions that resulted in below-average runs to many Cook Inlet tributaries. More fish returned in 2010 than in 2008 or 2009, but the run was lower than expected, suggesting that the SF hatchery and ocean-rearing conditions continued to impact Chinook salmon runs. The contribution to the harvest of anglers fishing from boats near the Homer Spit shoreline is difficult to assess because the reporting of harvest location is imprecise.

From 1988 through 2002, Bear Lake coho salmon were stocked in the NDFL. This late-run stock first arrived at the NDFL near the first of August and the run continued into October. In 2001, ADF&G began stocking early-run coho salmon to provide fishing opportunity during the peak tourist season. Early-run coho salmon began arriving to the NDFL in late July. In 2003, because of the limited rearing capacity of the ADF&G hatcheries, ADF&G stopped producing late-run coho salmon smolt for stocking at the NDFL. However, from 2003 through 2009, stocking of late-run coho salmon at the NDFL continued by means of private funds to purchase late-run coho salmon from CIAA. CIAA could not supply late-run coho salmon smolt for the 2010 stocking. With the advent of the new William Jack Hernandez Sport Fish Hatchery (WJHSFH), rearing capacity increased, and ADF&G began producing late-run Bear Lake coho salmon smolt to stock the NDFL in 2011 and 2012. In 2013, use of late-run Bear Lake coho salmon ceased per a change in ADF&G stocking policies.

The NDFL has been maintained and modified since the establishment of the terminal fishery. An expansion of the NDFL, from 2.3 to 3.8 acres, occurred in 1994 to sculpt the basin into its current hourglass configuration. Two years later, the toll of tidal forces and seasonal storm surges on the inlet berms of the fishing lagoon had become readily apparent. Mitigation was necessary and a local company was contracted for repair work in 1996. This proved to be a temporary fix and further investment became necessary to strengthen the fishing hole a few years later. In January 1998, bidding went out to excavate the silted material inside the fishing hole and place stockpiled gravel into the containment berms. The project was completed in April 1998 and was funded for under $16,000 in conjunction with another excavation project on the Homer Spit. In 1999, a project to construct 3 groins, reinforced by riprap and cobble, on the east side, and to construct access ramps, paved parking, and walkways on the west side was funded by a cooperative venture between the City of Homer, Alaska Department of Transportation, and ADF&G for $400,000. The final ramp was poured in August 1999. In 2006, 350 cubic yards of a silt bar were removed because it had materialized on the inside of the NDFL. In November of 2012, the City of Homer funded $467,000 to dredge the entire lagoon and removed 32,000 cubic yards of gravel, sand, and organic material.

Halibut Cove Lagoon

Halibut Cove Lagoon is formerly the site of the Halibut Cove Lagoon Saltwater Rearing Facility, established in 1973 by the former Fisheries Rehabilitation, Enhancement, and Development Division (FRED) of ADF&G, where all 5 species of Pacific salmon were reared experimentally for varying periods of time. Since 1979, the lagoon has served as a Chinook salmon imprinting, rearing, and release site. From 1986 to 1992, 3–6 million pink salmon fry that had been incubated at the Tutka Lagoon Hatchery were imprinted and released annually into Halibut Cove Lagoon. Access to fisheries in the lagoon is via boat. It provides fishing opportunities in a beautiful and remote setting. Anglers fish from the Alaska State Park (ASP) dock or from anchored vessels near the dock. A limited amount of trolling occurs in greater Halibut Cove at the mouth of the lagoon channel.

To produce a run of approximately 3,000 adult fish, the annual stocking goal through 2006 was 105,000 early-run Chinook salmon smolt. From 2001 to 2006, the number of stocked fish averaged about 109,000 (calculated from Table 17). The stocking goal was reduced to 50,000 smolt in 2007. The reduction was the result of reallocation of SF Anchorage hatchery rearing space from Chinook salmon to rainbow trout after loss of the heat source resulted in longer use of hatchery space for trout rearing. The stocking goal returned to 105,000 in 2010 when transition to the new William Jack Hernandez Sport Fish Hatchery began.

Sport effort, harvest, and catch in Halibut Cove Lagoon have not been estimated with the SWHS since 2000 because of the uncertainty caused by anglers who were misreporting their fishing location as the lagoon when they fished elsewhere (halibut were reported harvested in the lagoon, which is unlikely because of the shallow entrance and limited presence of prey species). The Chinook salmon terminal fishery is relatively small, with harvests probably fewer than 1,000 fish in most years. Chinook salmon runs in 2008 and 2009 were lower than expected and few fish were reported seen at Halibut Cove Lagoon in 2010. Stocking rates that are half the historical amount, the low survival of stocked fish from the loss of heated water at SF hatcheries, and ocean conditions that resulted in below-average runs to many Cook Inlet tributaries are the likely causes of the poor runs in 2008–2013.

This stocked run is subject to a commercial set gillnet fishery adjacent to the lagoon from the first Monday in June until 30 September. Since 1969, the commercial set gillnet fishery harvest of Chinook salmon in the Halibut Cove Subdistrict ranged from 0 in 1970 to 962 in 1988, averaging 327 fish annually since 1969 (Fish Ticket Database, Alaska Department of Fish and Game, Division of Commercial Fisheries. (Accessed October 2016) [URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests]. This database is referred to as the ADF&G Fish Ticket Database throughout this report).

Seldovia

Seldovia is located approximately 15 miles southwest of the Homer Spit across Kachemak Bay (Figure 2). Chinook salmon smolt were first released in the Seldovia Harbor in 1987 to create a new sport fishery. The release site was moved in 2000 to a site upstream of a reservoir in Fish Creek, a small tributary to Seldovia Slough, to increase the fidelity of fish to the release location (Szarzi and Begich 2004a). This is a terminal harvest fishery where all fish are intended for harvest and none spawn at the stocking location. In 2012, the stocking location was changed to the head of Seldovia Lagoon Slough and smolt were released directly. The slough has several

small freshwater inputs and has enough water that allows smolt to emigrate to the harbor even at low tide.

To produce a run of approximately 3,000 adult fish, the annual stocking goal through 2006 was 105,000 early-run Chinook salmon smolt. The number of stocked smolt averaged about 102,000 from 2001 to 2006 (Table 17). For the same reason that stocking was reduced at Halibut Cove Lagoon (a reallocation of hatchery space to rainbow trout rearing) the stocking goal for Seldovia was reduced to 50,000 smolt in 2007. Like Halibut Cove Lagoon, this reduction was temporary and the stocking goal returned to 105,000 in 2010 as the transition to the new WJHSF hatchery got underway.

The SWHS discontinued estimation of sport angler participation, harvest, and catch in Seldovia in 2001. Prior to 2001, the largest reported harvest was 600 in 2000. Estimates were thought to be conservative because fewer than 30 respondents to the survey reported fishing in Seldovia in some years, rendering the estimates imprecise.

Like other locations around Kachemak Bay and Cook Inlet, runs to Seldovia have been reported to be poor since 2008. The reasons for reportedly below-average runs were probably similar to that of the Halibut Cove Lagoon runs: stocking rates were half the historical amount, there was low survival of stocked fish from loss of heated water at SF hatcheries, and poor ocean conditions. In addition, the low survival was also attributed to high mortality and bird predation when smolt were stocked in the Fish Creek reservoir.

A subsistence set gillnet fishery for salmon was created in Seldovia Bay by the BOF during its 1995 meeting. The harvest of Chinook salmon was limited to 200 fish to avoid impacting the stocked Chinook salmon fishery in Seldovia Bay. The annual possession limit is 20 Chinook salmon per household. The fishery is opened for two 48-hour periods per week from 1 April to 30 May and one 36-hour period each of the first 2 weekends in August. At its February 1998 meeting, the BOF adopted a proposal extending the April-May period by 10 days to 30 May. The highest reported subsistence harvest was 189 Chinook salmon in 2000 and the lowest was 3 reported in 2011 (ADF&G Fish Ticket Database).

A commercial set gillnet fishery harvests Chinook salmon in Seldovia Bay. Much of this harvest is probably composed of enhanced Chinook salmon returning to Seldovia. Commercial harvests averaged 31 fish prior to stocking from 1969 through 1988 (ADF&G Fish Ticket Database). Since 1991, when the run consisted of all age classes of stocked fish, the average annual commercial harvest has been 203 and ranged from 5 in 2012 to 770 in 1991 (ADF&G Fish Ticket Database).

In November of 2004, the BOF changed the start of the commercial set gillnet fishery season in the Southern District from the first Monday in June to a start date no earlier than 1 June, to be opened by EO. The BOF directed ADF&G to establish the start of the season so that no change in allocation between the commercial and sport fisheries would occur compared to preceding years. Since the 2005 fishing season, commercial harvests of Chinook salmon in Seldovia Bay have been below the 1991–2004 average of 330 and commercial fishery regulations have not been adjusted (Schroeder and Morrison 1989, 1990; Bucher and Morrison 1990; Bucher and Hammarstrom 1993a, 1993b, 1994-1999; Hammarstrom 2000; Hammarstrom and Dickson 2001-2007; Hammarstrom and Ford 2008-2011; L. Hammarstrom, Commercial Fisheries Biologist, ADF&G, Homer, personal communication).

Chinook and Coho Salmon Fisheries Management Objectives

ADF&G outlines future 5-year stocking objectives for Kachemak Bay annually in the "Statewide Stocking Plan for Sport Fisheries" (Stocking Plan) (http://www.adfg.alaska.gov/index.cfm?adfg=fishingsportstockinghatcheries.stockingplan accessed October 2016). Before the Stocking Plan is finalized, it is open to public comment. Only fish stocking activities specifically initiated for improving sport fisheries are included in the plan. Fish stockings initiated by CIAA to benefit common property fisheries that may also benefit sport anglers or personal use fisheries are not included in the plan. However, details of CIAA stockings can be found at http://www.ciaanet.org/hatcheries.html (accessed October 2016).

The SWHS is used to measure the effectiveness of the Kachemak Bay stocking program; however, because the low number of household respondents in the SWHS for Halibut Cove Lagoon and Seldovia is too low to produce precise harvest estimates, only harvest estimates from the NDFL are used.

Sport fishing regulations that apply to the terminal Chinook salmon fisheries have evolved. However, terminal fishery regulations are consistent with LCI saltwater regulations South of Bluff Point, which state that between 1 April and 30 September there is a daily bag limit of 2 Chinook salmon of any size. Chinook salmon 20 inches or longer must be recorded and counted as part of the Cook Inlet annual limit of 5 Chinook salmon. For NDFL, coho salmon bag and possession limits are 6 per day. Besides the NDFL terminal fishery regulation, there are area restrictions in Tutka Bay Lagoon and the China Poot personal use fishery outlined below.

Regulations that prohibit snagging east of the Anchor Point to Point Pogibshi line from 1 January to 16 June began in 1983. Although snagging techniques were found to be very effective in allowing for a complete harvest of the enhanced early-run Chinook salmon, approximately 50% of the Chinook salmon returned to the Homer Spit after this date. As a result, conflicts arose between anglers who wished to continue harvesting Chinook salmon by nonsnagging methods and those who wished to snag. Concerns also included the safety and aesthetics of the fishery. In 1988, the BOF removed the NDFL waters from the waters open to snagging, including the waters from the Homer City Dock near the entrance to the Homer Boat Harbor northwest along the east side of the Homer Spit to the ADF&G marker placed approximately 200 yards northwest of the entrance to the Fishing Lagoon, to a distance of 300 feet from the shore. However, the BOF did provide that ADF&G could open the NDFL waters to snagging by EO when staff observed that surplus fish were available and that these fish could no longer be harvested by nonsnagging methods (Appendix A2).

Snagging concerns in the NDFL were brought up by the public to the BOF at the November 2007 meeting. Anglers had developed a technique using a weight or bobbers following a single hook, referred to as "tight lining," that was technically legal but resulted in fish being snagged in the mouth, as well as in other body parts. The technique increased the incidence of snagging-related complaints by the public and snagging citations by enforcement personnel. The BOF passed a public proposal intended to eliminate the practice of snagging fish by tight lining and bobber snagging by prohibiting the use of any gear following the hook in NDFL waters.

In April 2004, the Alaska Legislature passed HB 98, giving the BOF authority to establish restricted seasons and areas necessary for persons less than 16 years of age to participate in sport fishing. At its November 2004 meeting, the BOF passed a public proposal to allow only youths under 16 years of age to fish along an area designated by ADF&G in the NDFL on the third

Saturday in June and the first and third Saturdays in August (Szarzi et al. 2007). After late-run coho salmon were no longer stocked in the NDFL, the BOF omitted the third Saturday in August youth fishery.

Chinook and Coho Salmon Recent Fisheries Performance

There was a significant increase in the harvest of enhanced Chinook and coho salmon in 2014 and 2015 (Table 18). Following the dredging of the NDFL in 2012, anglers tended to spread out more evenly around the lagoon. In 2013, the NDFL Chinook and coho salmon harvest and effort were low and similar to other recent years. Poor runs were attributed to low productivity in salt water for both Chinook and coho salmon and difficulties in stocking because of *Chaetoceros* spp. blooms.

The Chinook salmon runs improved in 2014 and continued to improve through 2016. In 2014 and 2015, the early-run Chinook salmon harvest at the NDFL was still below the historical average, but the trend suggested continued improvement. For the first time since 2007, the NDFL opened for 3 days for snagging during the Chinook salmon fishery in 2015 (Appendix A2). Snagging was opened again in 2016 for 3 days during the Chinook salmon fishery. In 2016, anglers reported outstanding fishing for Chinook salmon. From 2014 to 2016, anglers reported some small schools of Chinook salmon in Halibut Cove Lagoon, but fishing reports were nominal. From 2014 to 2016, Seldovia residents were encouraged by increased numbers of small sized Chinook salmon arriving to the lagoon in 2013. Numbers of Chinook salmon continued to improve. In 2016, residents reported good fishing and the mayor of the City of Seldovia issued a proclamation to ADF&G for continuing to support the Seldovia stocking program.

Coho salmon harvest improved more quickly in the NDFL than Chinook salmon following the 2012 dredging. The 2014 early-run coho salmon harvest was well above the historical average and the NDFL was opened to snagging for the first time since 2008 (Table 18 and Appendix A2). The historical average includes both early-run and late-run coho salmon. The 2015 coho salmon harvest in the NDFL was similar to early-run harvests in the early to mid-2000s. In 2016, although coho salmon fishing slowed, fishing success was similar to, if not better than, other Cook Inlet fisheries.

The adaptive stocking methods implemented at NDFL in 2013 were successfully continued through 2016. From 2013 to 2016, in the NDFL, smolt were directly released into net pens during the day and then released that night to reduce bird predation. Stocking at Halibut Cove Lagoon has been problematic in recent years due to the unavailability of barge operators willing to transport the stocking truck to the stocking location. In 2015, smolt were transported in a fish hold of a tender instead of a landing craft. The stocking was successful, but the morning after directly releasing the smolt, they were not observed in the lagoon again. In 2016, the smolt were transported with a landing craft and again they were not observed following release. It should be noted that surveillance of smolt in Halibut Cove Lagoon is minimal and is primarily restricted to the release site. From 2013 to 2016, smolt were directly released in Seldovia Lagoon. Each stocking has been coordinated with Seldovia residents who play an active role in the stocking. In 2015, the stocking occurred on 25 June during a period of warm sunny weather, low tidal exchanges, and lack of freshwater input from dried-up streams. An estimated 30% of the smolt died, probably due to poor water quality conditions within the slough. In 2016, the Seldovia stocking was scheduled earlier in the season and for better tidal exchanges. In the days leading

up to the Seldovia stocking, Seldovia residents provided water quality information. No mortality was observed in 2016.

In 2016, the residual depth of the NDFL was assessed to quantify how much the lagoon has filled with sediment since the last dredging in 2012. At low tide, data were collected by boat using a standard surveyors' pole and a *Trimble Ag132*[2] GPS unit to acquire submeter georeferenced depths at various locations throughout the lagoon. As depths and locations were measured, they were entered into an *Allegro Cx* portable field computer. The perimeter of the lagoon was delineated in a similar manner with a reference depth of 0 feet. Data were imported into ArcGIS and projected into the *NAD 1983 State Plane Alaska 4 FIPS 5004 Feet* coordinate system. An inverse distance weighted (IDW) interpolation was used to infer the remaining unmeasured depths within the lagoon. The interpolated depths were classified by 2-foot depth increments and rendered accordingly. Total surface area of each depth class was determined by enumerating the rasterized cells by depth class and multiplying by the raster cell size. Raster cell volume was estimated by using the interpolated depths of each cell multiplied by cell area. Total lagoon volume was estimated as a summation of all raster cell volumes.

It is estimated that when the bathymetry study was performed in 2011, NDFL held 420,000 ft^3 at residual tide. After the 2012 dredging operation, residual volume was estimated to be 1,030,000 ft^3. With the most recent measurements, residual volume was estimated to be 800,000 ft^3 in 2016. If the dredged volume is taken to be ideal, the lagoon was functioning at 41% and 78% of its intended capacity in 2011 and 2016, respectively. Depths greater than 8 feet were estimated at 6.8% of the lagoon surface area in 2011, 59.7% in 2012, and 33.4% in 2016.

Sockeye and Pink Salmon Fisheries Description

China Poot Sockeye Salmon

Leisure Lake, also known as China Poot Lake, is located across Kachemak Bay in a southeasterly direction from the Homer Spit and is stocked with sockeye salmon by CIAA (Figure 4). The lake was first stocked in 1976 (Kyle 1994) and with the exception of 1979, 1994, and 2016 has been stocked annually with an average of 1.6 million juvenile sockeye salmon fry to supplement commercial catches in Kachemak Bay (Lee Hammarstrom, Commercial Fisheries Biologist, ADF&G, Homer, personal communication). The project was initiated by ADF&G, but was transferred to CIAA in 1996 (Bucher and Hammarstrom 1997). Due to the presence of barrier falls upstream from the intertidal area of China Poot Creek, adult sockeye salmon returning to Leisure Lake are harvested in a terminal fishery. The terminal harvest area has provided excellent opportunities for anglers and personal use dipnetters. A personal use fishery occurs along 200 yards of state land along China Poot Creek between the intertidal area and the barrier falls (Szarzi et al. [2007] describes the history of the land ownership changes near the fishery). The sport fishery occurs along an expanse of intertidal mud flats in China Poot Bay. The sport and personal use fisheries each have a bag limit of 6 sockeye salmon. A person may harvest a bag limit of sockeye salmon in the China Poot personal use dipnet fishery in addition to harvesting a bag limit of sport-caught sockeye salmon. The personal use harvest reported in the SWHS peaked at 8,605 in 1995, the last year that information is available. Annual sport harvests from China Poot Bay reported in the SWHS are fewer than 1,200 and average 250 (Szarzi and Begich 2004a).

[2] Product names used in this publication are included for completeness but do not constitute product endorsement.

Tutka Bay Pink and Sockeye Salmon

Tutka Bay Lagoon, located across Kachemak Bay approximately 9 miles south of Homer Spit (Figure 4), is the site of Tutka Bay Lagoon Hatchery (TBLH). The stocking of pink salmon to enhance commercial fisheries began in 1976 with the development of the state-owned TBLH. Chum salmon enhancement projects occurred from 1979 to 1990. Operation of the TBLH was transferred to Cook Inlet Aquaculture Association (CIAA) in 1996. Pink salmon enhancement was suspended at the TBLH from 2005 to 2010. In 1996, CIAA began releasing sockeye salmon in Tutka Bay Lagoon. In 2011, CIAA resumed pink salmon enhancement, which resulted in both enhanced pink and sockeye salmon returning to Tutka Bay Lagoon (Hollowell et al. 2012).

A small sport fishery evolved in Tutka Bay near the mouth of the lagoon and in Tutka Bay Lagoon itself around the hatchery-reared pink salmon that returned there until 2006. The small, 35 acre lake-like lagoon is only accessible to incoming salmon through a narrow intertidal channel during the high tide period. Pink salmon entered Tutka Lagoon and staged for several weeks prior to moving into Tutka Bay Lagoon Creek to spawn. This staging period offered an excellent opportunity to sport fish for pink salmon. As many as 40 boats and 150 anglers could be observed fishing in the lagoon during a single high tide period at the peak of the migration. All intercepting fisheries were closed during years of low returns to ensure sufficient numbers of fish were available to provide broodstock for the hatchery. In 1987, due to low stock levels, both the commercial and sport fisheries were closed by EO (Nelson 1995). The sport fishery was liberalized inseason to take advantage of a surplus of stocked pink salmon in 1997 (Szarzi and Begich 2004a).

Estimated sockeye salmon runs to Tutka Bay Lagoon were 8,200 in 2007; 20,104 in 2008; and 15,559 in 2009 (Gary Fandei, CIAA Executive Director for 2007 and Caroline Cherry, CIAA Hatchery Operations Coordinator for 2008 and 2009, personal communication). A few anglers took advantage of the first small run of enhanced sockeye salmon to Tutka Bay Lagoon in 2007. At a meeting in 2007, BOF passed a proposal closing 100 yards around the Tutka Bay Lagoon net pens to sport fishing to protect holding broodstock from disturbance. Since 2007, more anglers have utilized the sockeye salmon run to Tutka Bay Lagoon each year, contributing to an increase in the estimated average annual sockeye salmon harvest from Kachemak Bay from 1,796 during the years 1988–2006 to 4,946 during the years 2007–2009 (Szarzi et al. 2010b).

Pink and Sockeye salmon Fisheries Management Objectives

Fisheries for pink, chum, and sockeye salmon are managed by regulation. Inseason regulation changes to sport fisheries on these stocks are rare, and have occurred in association with stocking projects to achieve broodstock goals for pink salmon at Tutka Bay Lagoon Hatchery or to harvest surplus enhanced pink salmon. The personal use dip net fishery in China Poot Bay has been extended in the past to harvest surplus sockeye salmon before the season was lengthened by regulation by the BOF in 1995.

Until 1995, the personal use season was 1 July through 31 July. In some years, sockeye salmon continued to enter China Poot Creek after the close of the season. Harvest of these fish was accomplished by extending the fishery by EO through early August. The decision to extend the season was determined by index counts of sockeye salmon present in the stream in late July. Openings for personal use dipnetting were extended by EO from ADF&G in August during the years 1983–1985, 1989, and 1994 to completely harvest fish that had entered China Poot Creek. The BOF extended the season through 7 August in 1995 to maximize the opportunity to harvest

stocked sockeye salmon while minimally impacting wild pink salmon that spawn in China Poot Creek; no inseason extensions have been required since.

When changes were made to the Cook Inlet personal use regulations in 1995, the prohibition on the harvest of other salmon species in the China Poot personal use dip net fishery was erroneously deleted (Szarzi and Begich 2004a). At its November 2001 meeting, the BOF reinstated the regulation that only sockeye salmon may be possessed or retained. In 2009, the public reported that numerous salmon were holding in China Poot Creek after the 7 August regulatory closure and asked for a fishery extension. ADF&G foot surveys found low numbers of fish in the creek, and the fishery was not extended.

At a meeting in 2007, BOF passed a proposal closing 100 yards around the Tutka Bay Lagoon net pens to sport fishing to protect holding broodstock from disturbance. Since 2007, more anglers have utilized the sockeye salmon run to Tutka Bay Lagoon each year, contributing to an increase in the estimated average annual sockeye salmon harvest from Kachemak Bay from 1,796 during the years 1988–2006 to 4,946 during the years 2007–2009 (Szarzi et al. 2010b).

Conflicts occasionally occur in both China Poot Bay and Tutka Bay Lagoon between commercial seiners, harvesting sockeye and pink salmon for cost recovery, and sport anglers. SF regulation summary publications and weekly fishing reports contain advisories to anglers to yield to commercial cost-recovery operations.

Pink and Sockeye Salmon Recent Fisheries Performance

In 2014–2016, the sockeye salmon runs to China Poot Bay continued to be similar to other recent years and were well below historical runs (Hollowell et al. 2016). Although the 2014–2016 runs were weak, they still supported some harvest in both the sport and personal use fisheries.

In 2014–2016, Tutka Bay pink and sockeye salmon runs were robust and supported sport fishing opportunities. In 2014–2016, because of increased pink salmon production in Tutka Bay Lagoon, anglers' ability to specifically target sockeye salmon was limited due to the large number of pink salmon present. The pink salmon run into Tutka Bay Lagoon was well above average in 2015. Despite an overall decline in pink salmon throughout Southcentral Alaska in 2016, there was a fair run to Tutka Bay Lagoon.

FRESHWATER FISHERIES

FISHERIES DESCRIPTION

The LCIMA has a diversity of freshwater sport fishing opportunities. The Kenai Peninsula roadside streams support the majority of freshwater catch, harvest, and effort in the LCIMA. LCIMA–WCI has several robust coho salmon stocks, but they support small fisheries due to limited access. In LCIMA–LCI, sport anglers can target pink, chum, and some small coho salmon stocks. Most of the freshwater effort targets Chinook salmon in the Anchor and Ninilchik rivers and Deep Creek. These streams continue to support coho salmon, steelhead trout, and Dolly Varden fisheries throughout the remainder of the season. The Anchor River supports the largest road accessible steelhead trout stock in the state. Dolly Varden are found in fresh waters throughout the LCIMA but they primarily are targeted in the Anchor River.

Guided catch and harvest by species and effort data in LCIMA fresh waters is available from the Charter Logbooks since 2006. Guided catch, harvest, and effort are only a small portion of the

overall catch, harvest, and effort in the Kenai Peninsula roadside streams. Comparisons between SWHS effort, catch, and harvest estimates and the Charter Logbook data allows for an assessment of the guided contributions in these streams. Annually for the Anchor River since 2006, less than 1% of the effort and catch of Chinook and coho salmon is guided. From 2006 through 2015, on average 1% of the steelhead catch is by guided anglers in the Anchor River. Both the Ninilchik River and Deep Creek guided effort, catch, and harvest generally follow the same patterns as the Anchor River with slightly higher but still low levels of contribution to the overall effort, catch, and harvest. Approximately 3–4% of the annual effort in Deep Creek and the Ninilchik River is guided. Chinook salmon catch by guided anglers in these streams is roughly 4% of the overall annual catch. Approximately 6–7% of the coho salmon catch in the Ninilchik River and Deep Creek are by guided anglers. Less than 3% of the annual steelhead catch in these streams is by guided anglers.

Since 2006, general trends in guided catch and harvest of Chinook and coho salmon, steelhead, and Dolly Varden follow similar annual trends in the roadside streams. On average, roughly 30% of the Chinook salmon caught by guided anglers are harvested in these streams. In most years, the vast majority (72% on average) of the Chinook salmon caught by guided anglers in these streams occurs in the Ninilchik River. On average, approximately 63% of coho salmon caught by guided anglers are harvested in these streams, with most of the catch in the Anchor River. Guided steelhead catch in the roadside streams occurs mostly in the Anchor River and Deep Creek while only 15% of the steelhead catch occurs in the Ninilchik River. Dolly Varden are primarily caught in the Anchor River and few of the Dolly Varden caught by guided anglers are harvested.

CHINOOK SALMON FISHERIES

Fisheries Description

LCIMA freshwater Chinook salmon fisheries occur in Anchor River, Deep Creek, and Ninilchik River (roadside streams), all accessible from the Sterling Highway (Figure 5). The Ninilchik River wild Chinook salmon run has been supplemented with stocked fish since 1987. Stariski Creek, also accessible from the Sterling Highway, has Chinook salmon but has been closed to sport fishing due to the small run size. Chinook salmon enter Bradley River, Humpy Creek, and Seldovia River on the south side of Kachemak Bay, but successful spawning has only been documented in Bradley River. Chinook salmon in streams on the south side of Kachemak Bay are thought to be strays from marine stocking programs within Kachemak Bay or to have originated from stray stocked fish from outside Kachemak Bay. Few Chinook salmon are harvested in LCIMA–WCI streams (Table 3).

Chinook salmon return to these streams from approximately early May through late July, with a peak in early June, and these fish are classified as early-run Chinook salmon. The Anchor River has the largest wild Chinook salmon run, followed by Deep Creek, and finally, the Ninilchik River. The Ninilchik River is also stocked with hatchery-reared Chinook salmon. The Sterling Highway crosses the lower reaches of the streams and developed access and camping facilities are located on or near each river. Anglers can access the entire 2-mile area open to fishing. Chinook salmon spawning occurs above the fishery from mid-July through August in these streams.

The Anchor River, Deep Creek, and Ninilchik River Chinook salmon fisheries are conservatively managed through limited time, area, bag and possession limits, and annual limits. A sustainable

escapement goal (SEG) for each stream is reviewed every 3 years and the fisheries are managed to their SEG. Inseason escapement monitoring of Anchor River Chinook salmon is used to manage the sport fisheries in these streams inseason. ADF&G has used its EO authority to restrict these sport fisheries preseason and inseason to achieve the SEG in these streams in years of low productivity.

In the early 1970s, the Anchor River, Deep Creek, and Ninilchik River were the major Chinook salmon fisheries in Southcentral Alaska. The only other Southcentral Chinook salmon fishery of consequence occurred in the saltwaters waters adjacent to Deep Creek. In the late 1970s and early 1980s, other Chinook salmon fisheries developed in the Kenai and Kasilof rivers, and in the Susitna River drainages, and effort in LCIMA freshwaters declined (Figure 6). Historically, the streams have been opened to harvest of wild Chinook salmon on weekends and the Mondays following those weekends in late May to mid-June. The Anchor River is also open to sport fishing for 5 Wednesdays as well. Additional fishing opportunity has occurred on the Ninilchik River through EO and BOF process to increase the harvest of hatchery-reared Chinook salmon.

During the Chinook salmon sport fishing season, the roadside streams have variable water levels and clarity due to the amount of snowmelt runoff and drainage morphology that includes cutbanks of loose substrate. Harvest success is related to these water conditions during fishery openings. Generally the Ninilchik River is the first stream to have improved conditions during the season. Typical spring conditions find both Deep Creek and Anchor River high and muddy for the first and second Chinook salmon fishery openings, respectively, and generally flow subsides and clarity improves throughout the remainder of the season.

Since 1977, Chinook salmon harvest from the Anchor River, Deep Creek, and Ninilchik River has been monitored with the SWHS. The average and range of the historical Chinook salmon harvest has varied within and between streams (Table 19). Harvest variations between streams are attributed to differences in abundance and stream conditions. Harvest variation within a given stream is primarily attributed to changes in productivity, angler effort, river conditions, and fishing regulations. Harvest success is related to run timing and stream conditions.

From 1992 to 1994, the combined Chinook salmon inriver harvest peaked near 8,600 fish (Table 19). The peak harvest was the result of efforts to increase fishing opportunity in Anchor River and Deep Creek; in 1989, a fifth 3-day Chinook salmon opening was added, and in 1991, the first major year class of stocked fish to Ninilchik River bolstered harvest and effort there. The increased Chinook salmon harvest in both the freshwater and the nearby saltwater sport fisheries in the early 1990s (Tables 2 and 19) coincided with a decrease in escapements to Deep Creek and the Anchor River, which caused concerns that Anchor River and Deep Creek Chinook salmon were being overharvested. In 1996, BOF adopted freshwater restrictions in the Anchor River and Deep Creek that included a reduction of the combined annual limit from 5 to 2 fish from the 2 streams and a reduction of Deep Creek openings to three 3-day weekends. These restrictions reduced and stabilized the Chinook salmon harvest. The combined inriver harvests were fairly stable from 1998 through 2008. In 2009, harvest dropped substantially to a record low and was attributed to low runs. Low productivity continued through 2013.

From 1988 to 1994, to provide additional sport fishing opportunity, the Ninilchik River was stocked by SF with an annual average of 182,000 Chinook salmon smolt. To prevent unsustainable wild Chinook salmon harvests, negative hatchery versus wild smolt interactions, straying of hatchery fish, and “recycling” of hatchery-reared fish during Chinook salmon egg

takes, stocking levels were reduced to 50,000 smolt in 1995. The inriver run timing of hatchery fish estimated from harvest sampling is variable. The peak escapement to the egg-take weir, located approximately 5 miles upstream from the river mouth, is approximately 7 days later for hatchery fish than wild fish.

Anchor River

From 2009 to 2013, EO restrictions due to low productivity contributed to the historically lowest Chinook salmon harvest since 1977 (Table 20).

Historically (1977–2007), the Chinook salmon harvest has ranged from 578 to 2,787; the lowest harvest was in 1989 and the highest was in 1993 (Table 20). Annual harvest numbers were influenced by the number of days that the sport fishery was open. From 1978 to 1987, when the inriver fishery was open four 3-day weekends with an annual limit of 5 Chinook salmon, the average harvest was 1,121. From 1988 to 1995 and 2004, when there were five 3-day weekend fishery openings and the seasonal limit was 2 in combination with Deep Creek, the average harvest of Chinook salmon increased to 1,563. In 2002 and 2003, when there were four 3-day weekends and the seasonal limit was 2 in combination with Deep Creek, the average harvest dropped to 1,029 Chinook salmon. Beginning in 2005, a fifth 3-day weekend opening was added before the traditional Memorial Day weekend opening. Harvest averaged 1,636 from 2005 to 2007.

The most liberal Anchor River sport fishery since 1977 took place in 2008 when the fishery was allowed 20 opening days, Wednesdays were added, and the seasonal limit was 5 Chinook salmon. Despite these liberalizations, the 2008 Chinook salmon harvest (1,486) was only slightly higher than the historical 1977–2007 average (1,328). Since 2003, the inriver exploitation of the Anchor River stock has been less than 22% annually (see Historical Escapement section).

Deep Creek

From 2009 to 2013, EO restrictions due to low productivity contributed to the historically lowest Chinook salmon harvest since 1977 (Table 21). Historically (1977–2007), the Chinook salmon harvest has ranged from less than 100 to over 2,500; the peak harvest was 2,503 in 1993 (Table 21). From 1978 to 1987, when the inriver fishery was open four 3-day weekends with an annual limit of 5 Chinook salmon, the harvest averaged 680. From 1988 to 1995 and 2004, when the number of fishery openings increased to five 3-day weekends and the seasonal limit was reduced 2 in combination with the Anchor River, the average Chinook salmon harvest increased to 1,450. From 1996 to 2000 and from 2002 to 2007, when fishery was open for three 3-day weekends and the seasonal limit was 2 in combination with the Anchor River, the average harvest dropped to 743 Chinook salmon. In 2008 and 2009, when the Deep Creek seasonal limit was no longer tied to the Anchor River seasonal limit, the average harvest dropped to 363 Chinook salmon.

Ninilchik River

From 2009 to 2013, EO restrictions due to low productivity contributed to the historically lowest Chinook salmon harvest since 1977 (Table 22). Prior to stocking (1978–1990), the average harvest from the Ninilchik River was 976 Chinook salmon (Table 22). During this period, the inriver fishery was open three 3-day weekends, the daily bag and possession limits were 1 Chinook salmon, and the seasonal limit was 5. From 1991 to 1997, three- to 14-day fishery extensions were issued to target the runs of hatchery-reared Chinook salmon from high stocking years. These extensions increased the average annual Chinook salmon harvest to 3,414 fish,

which was a threefold increase. In 1995, stocking was reduced to 50,000 smolt and annual harvest stabilized to slightly higher than prestocking years.

The SWHS does not differentiate between wild and hatchery-reared Chinook salmon. Estimates of hatchery contribution to the Ninilchik River harvest from sport fishery sampling were 77% in 1991, 57% in 1992, and approximately 50% in other years of sampling from 1993 to 1996 and 2001 to 2002 (Boyle et al. 1993; Balland et al. 1994; Balland and Begich 2007; Marsh 1995; Begich 2006b, 2007b). In 2006, sampling from the 3 regulatory weekend openings, but not the EO fishery, which lasted 31 days, indicated that hatchery-reared Chinook salmon composed a minimum of 39% of the harvest (Booz and Kerkvliet 2011a).

Historical Escapement

In the 1960s through the 1980s, Chinook salmon escapement in the Lower Kenai Peninsula roadside streams was indexed with a 1-day aerial survey. Prior to 1974, fixed-wing aircraft were used in tandem with foot surveys. Surveys were conducted in each stream where the majority of spawning was thought to occur. A standard section of each river was flown and a subsection of the flight path was counted by foot. If foot survey counts were higher than aerial counts in the subsection, the aerial count for the entire stream was expanded by the difference in the subsection count; otherwise, the aerial count for the entire stream section was used. After 1973, helicopters replaced fixed-wing aircraft.

Starting in late 1980s, a broodstock weir was also used to index Ninilchik River Chinook salmon escapement. In the 2000s dual frequency identification (DIDSON) sonar and a floating weir have been used to estimate Anchor River Chinook salmon escapement. An instream video system has been used with the floating weir on the Anchor River since 2011. An attempt to assess Chinook salmon escapement using a weir on Deep Creek from 1997 through 2000 was unsuccessful. Chinook salmon escapement in Deep Creek is still indexed with a 1-day aerial survey.

The purpose of the Ninilchik River weir was to collect broodstock for the stocking program and not necessarily to monitor escapement. Initially, the weir was only operated for a few weeks in July (during peak spawning) and its location provided road access to mature Chinook salmon. A significant number of Chinook salmon migrate past this weir location prior to and after operation, and based on aerial survey data, roughly 35% spawn downstream. In the mid-1990s there was a shift from monitoring escapement using aerial surveys to using counts from the broodstock weir that was operated for most of July; however, the transition is not well documented. Of the 3 streams, the Ninilchik River is the most difficult to survey from air due to lack of water clarity and the nature of the stream topography. In 2001, the Ninilchik River aerial survey was discontinued and Chinook salmon escapement was indexed using weir counts. No relationship was found between the weir and aerial survey index counts. Starting in 2003, Chinook salmon escapement in the Anchor River was monitored with a combination of sonar and weirs (Kerkvliet et al. 2008; Kerkvliet and Burwen 2010; Kerkvliet and Booz 2012; Kerkvliet et al. 2012). Aerial surveys were continued through 2008 to compare trends between the 2 escapement monitoring methods. No relationship was found, and the Anchor River aerial survey was discontinued in 2009. In 1999 and 2000, an attempt was made to install a weir on Deep Creek but high water during spring runoff prevented weir installation until after a significant number of Chinook salmon had escaped past the weir site.

Of the 3 streams, Deep Creek is the most suitable stream for using aerial surveys to index Chinook salmon escapement and for this river, it is the current monitoring method.

In 2003, an escapement monitoring location was selected upstream of the fishery and just downstream of the confluence of the north and south forks of the Anchor River. At first, dual-frequency identification sonar (DIDSON) was used to monitor Chinook salmon escapement over most of the run to test its utility for estimating escapement. The 2003 Anchor River Chinook salmon DIDSON escapement estimate was higher than previously suggested from aerial index counts. Beginning in 2004, field operations were extended to monitor Chinook salmon over the entire run using DIDSON during high spring flows in May and June. Once stream flows were lower, a floating weir was installed and escapement was censused. In 2009, the DIDSON was not required because low water levels allowed for the installation of the floating weir prior to the run, which provided the first complete census of Anchor River Chinook salmon escapement. During the periods when the escapement was monitored using DIDSON, escapement was estimated from the net upstream fish passage (upstream count minus downstream count). The estimate was considered conservative because all fish passing upstream or downstream of the sonar beam were counted as Chinook salmon even though a small but unknown percentage of the downstream moving fish were post-spawning steelhead trout emigrating to saltwater (Kerkvliet et al. 2008). Since 2011, a motion-sensing instream video system has been used during the floating weir operation. In 2013, after a series of floods rendered the mainstem monitoring site unusable, the DIDSON was relocated approximately 300 m downstream and used to monitor escapement during high flow. During low flows, weirs were installed upstream on each fork to continue escapement monitoring.

Estimated Chinook salmon annual escapements for the Anchor River from 2003 to 2007 were near or above the estimated carrying capacity of 10,000 Chinook salmon based on spawner-recruit analysis. During the low production years from 2009 through 2013, Chinook salmon average escapement was well below the 2003–2008 average (Table 23).

The historical (1976–2012) Deep Creek annual aerial index has averaged roughly 600 Chinook salmon (Table 24).

From 1999 to 2005, the Ninilchik River egg-take weir operation was extended to enumerate the entire escapement. On average during these years, 65% of the total wild Chinook salmon weir escapement was counted during the current index monitoring period from 3 to 31 July. Since 2006, the weir has been operated from at least 3 to 31 July but with additional operation in many years as well. The escapement of wild Chinook salmon in the Ninilchik River has been near the lower bound of the SEG goal of 550 since 2007. The collection of broodstock during years of low runs increases the probability of not achieving the escapement goal because variability in run timing makes it difficult to predict if the goal will be met until late in weir operation after some egg takes have already been conducted (Kerkvliet 2008; Kerkvliet and Booz 2010; Booz and Kerkvliet 2011a, 2011b, 2011c, 2012).

From 1999 to 2005, the average escapement of Ninilchik River Chinook salmon during the SEG period (3–31 July) was over 900 wild fish (Table 25). No broodstock was collected in 2010 because production was being shifted to the new William Jack Hernandez Sport Fish Hatchery (WJHSFH) in Anchorage. Broodstock goals were not achieved in 2012 and 2013.

Fisheries Management Objectives

The overall management objective for the LCIMA freshwater Chinook salmon fisheries is to provide sustainable and predictable fisheries via regulation of the wild Chinook salmon stocks of

the Anchor River, Deep Creek, and the Ninilchik River. Specific objectives have been established for these stocks.

Anchor River:

1) Determine the SEG that is predicted to maintain the population to ensure sustained yield.

Deep Creek:

1) Ensure through appropriate management and research programs that the spawning escapement index does not decline below levels predicted to ensure sustained yield. This number is the SEG, which is 350–800 Chinook salmon for Deep Creek.

Ninilchik River:

1) Ensure that annual wild Chinook salmon escapement upstream of the egg-take weir falls within SEG range, which was established in 2007 as 550–1,300 Chinook salmon during 3–31 July.
2) Stock up to 150,000 Chinook salmon smolt originating from Ninilchik River stock back into the Ninilchik River.

Regulation changes have been modified as more information has prompted modification of escapement goals. Chinook salmon biological escapement goals (BEGs) were first adopted in 1993 for Anchor River (1,790), Deep Creek (950), and Ninilchik River (830), and were defined as the average of the expanded aerial index surveys (1962–1993). Foot surveys were discontinued after 1995 because trends in foot survey counts mirrored trends in aerial counts, and because foot survey counts added an additional source of variability in estimating the true escapement. In 1998, the BEGs were rescaled based on historical aerial survey counts alone and the relationship of the aerial survey counts to sport fishing harvests. The BEG ranges for the Anchor River (1,050–2,200), Deep Creek (400–950), and the Ninilchik River (500–900) were the 40th and 80th percentiles of aerial helicopter counts conducted from 1976 to 1997 (Szarzi and Begich 2004a).

Escapement goals for salmon stocks in Cook Inlet were reevaluated in 2001[3] after the *Policy for Management of Sustainable Salmon Fisheries* (5 AAC 39.222) and the *Policy for Statewide Salmon Escapement Goals* (5 AAC 39.223) were adopted into regulation by the BOF in 2000. A set of standard criteria were developed to set escapement goals for stocks where total returns cannot be enumerated, based on the performance of salmon stock dynamics where total returns are known. The 25th to 75th percentiles of annual 1976–2000 helicopter aerial escapement counts for Anchor River (750–1,500) and Deep Creek (350–800) were established as the new SEG ranges for those streams. Ninilchik River aerial counts were too poor in quality to base management decisions on because of limited stream visibility. The Ninilchik River Chinook salmon SEG range (400–850) was changed to the 1994–2000 15th percentile and the maximum observed wild Chinook salmon escapement to the egg-take weir during July 8–24.

The management approaches for wild Chinook salmon sport fisheries in the Anchor River, Deep Creek, and Ninilchik River have consistently been heavily restricted throughout most of their history. The dates for the open season in May and June for Chinook salmon fisheries in roadside

[3] Bue, B. G., and J. J. Hasbrouck. *Unpublished.* Escapement goal review of salmon stocks of Upper Cook Inlet. Alaska Department of Fish and Game, Report to the Alaska Board of Fisheries, November 2001 (and February 2002), Anchorage.

streams were based on creel survey results from the early 1960s. Results reported that catch rates increased on the Memorial Day weekend, and that the run was virtually over by the first of July. In 1962, the sport fisheries were open from 7 May to 8 July and then were closed in 1964 and 1965. In 1966, BOF left Stariski Creek fishery closed, but opened the Anchor River, Deep Creek, and Ninilchik River to sport fishing for Chinook salmon. The fisheries were limited to May and June beginning Memorial Day.

Since 1971, until the Anchor River sonar–weir project began estimating Chinook salmon escapement in 2003, most changes to Chinook salmon regulations were made postseason through the BOF because timely inseason escapement data were not available. However, changes were made inseason in 1988, when a fifth 3-day opening weekend was added by EO to the Anchor River and Deep Creek fishery because of lost fishing opportunity earlier in the season due to high water conditions, and inseason changes were made in the years 1991–1996 when the Ninilchik River Chinook salmon fishery was extended by EO based on inseason foot survey counts upstream of the fishery when large numbers of stocked fish returned. Deep Creek was liberalized by EO in 2001 by adding a 3-day weekend after high water had discouraged anglers from fishing during all 3 open weekends.

In 1996, the inriver Chinook salmon fisheries were restricted in concert with adoption of the Early-Run Plan in response to concerns over the high harvest of LCIMA Chinook salmon stocks. The areas upstream of the 2-mile markers on the Anchor River, Deep Creek, Ninilchik River, and Stariski Creek were permanently closed to salmon fishing. The restrictions also reduced the Deep Creek fishery to three 3-day weekend openings, and in the Anchor River and Deep Creek combined fishery, an angler could no longer fish for the remainder of the day after harvesting a Chinook salmon 20 inches in length or longer. The annual limit in the Anchor River and Deep Creek combined was reduced from 5 to 2 Chinook salmon over 16 inches in length.

Anchor River

In 2001, the Anchor River stock was classified as a stock of "management concern" in response to the guidelines established in the *Policy for Management of Sustainable Salmon Fisheries* (5 AAC 39.222 [f] [21]) with 4 of 6 escapement index counts from 1996 to 2001 below the SEG (Szarzi and Begich 2004a-b; Table 24). This triggered a series of regulatory changes. At the fall 2001 BOF meeting, the fifth 3-day weekend was closed, resulting in four 3-day weekends. In 2003, once escapement reflected large run sizes, the fishery was progressively liberalized through 2009 (Table 23). In 2004, the fifth 3-day weekend opening was reinstated by EO and the SEG based on aerial index counts was discontinued. At the 2004 fall BOF meeting, the management concern listing was rescinded, and a public proposal was adopted to add a fifth 3-day weekend opening before the Memorial Day weekend (Appendix A1).

The SEG for Anchor River Chinook salmon has been refined as annual escapement data have become available. In 2004, an SEG based on aerial index counts was discontinued. From 2005 to 2007, Anchor River Chinook salmon were managed without an escapement goal. In fall 2007, ADF&G conducted a spawner–recruit analysis using all available data and established a lower bound SEG of 5,000 for Anchor River Chinook salmon (Szarzi and Begich 2004b). A lower bound rather than a range was selected because the small amount of total escapement data resulted in uncertainty about what the SEG range should be. In 2010, ADF&G updated the spawner–recruit model with escapement and harvest data and modified the goal to an SEG of 3,800–10,000 Chinook salmon. The lower end of the SEG is the point estimate for maximum

sustained yield and the upper bound is the estimated carrying capacity. The range minimizes the risk of overfishing and allows for liberalization of the harvest when escapements are large (Szarzi et al. 2010b). In 2013, the Anchor River SEG was not evaluated using the 2011–2013 spawner–recruit data because the data only contained returns from high escapement years. Without data on low escapement years as well, the accuracy of the SEG was highly uncertain.

In 2007, in response to a series of years with high annual escapement and low exploitation, BOF adopted a suite of regulations that further liberalized the Anchor River sport fishery: adding Wednesdays following each of the five 3-day weekend openings for a total of 20 opening days and increasing the annual limit from 2 to 5 Chinook salmon 20 inches or longer. Wednesday openings proved to be popular fishing days. Beginning in 2009 and annually thereafter, in response to low Anchor River Chinook salmon escapements, ADF&G has issued EOs restricting the inriver and nearby marine fisheries (Appendix A1). The 2009 fishery was closed by EO and the opening was reduced from 20 to 14 days. In addition, the conservation zone surrounding the Anchor River mouth was increased. In 2010, following the EO that prohibited bait, fishing pressure dropped. In 2011, bait was prohibited by EO starting on the fourth weekend opening but the fishing was described as good; the fishery was closed on the fifth Wednesday opening. In late June, large numbers of Chinook salmon were observed holding in the lower reaches, and it was unlikely the escapement goal would be reached. To reduce the catch rates of Chinook salmon holding in the lower sections of the Anchor River, gear was restricted to 1 unbaited single hook when the sport fishery for species other than Chinook salmon was opened on 1 July. In 2011, 22% of the escapement was counted from 1 July to 31 July. In 2012, a preseason EO restricted the fishery by closing the 5 Wednesday openings and by extending the closed area downstream of the Anchor River sonar–weir site by 1,000 feet to protect holding Chinook salmon. Because escapement was projected to fall below the SEG, an inseason EO was issued restricting gear to 1 unbaited single-hook artificial lure on the third weekend and then the fishery was closed on the fourth weekend (9 June) through 15 July. The July fishery was closed to protect holding Chinook salmon from hooking mortality for the reasons stated above. Of the total 2012 escapement, 30% was counted from 1 July to 30 July, of which 11% was counted from 1 July to 15 July. In 2013, the preseason EOs were designed to provide more days of fishing opportunity and reduce inseason disruptions to the fishery. Preseason EOs closed the 5 Wednesday openings; extended the closed area downstream of the Anchor River sonar–weir site 1,000 feet; set a combined annual limit at 2 Chinook salmon for the Anchor River, Deep Creek, and Ninilchik River, and the saltwater areas between the latitude of Bluff Point and the mouth of the Ninilchik River; restricted gear to 1 unbaited single-hook artificial lure; and required anglers to stop fishing after harvesting a Chinook salmon on the Anchor River, Deep Creek, or Ninilchik River. An inseason EO closed the fifth opening weekend through 15 July. Of the total 2013 escapement, 31% was counted from 1 July to 30 July, of which 23% was counted from 1 July to 15 July.

Anchor River Chinook salmon failed to achieve the SEG in 2009 through 2011 despite EO restrictions. The SEG (3,800 fish lower bound) was achieved in 2012 and 2013 with preseason and inseason EO restrictions.

Deep Creek

The Deep Creek aerial escapement SEG (350–800 Chinook salmon) has remained unchanged since 2001. In 2013, the SEG was reanalyzed with the aerial survey data from 1976 through 2013 and results suggested there should be no change in the SEG range. Since 2001, aerial index

counts have fallen within the SEG range except for the 2008 count (Table 24). Index counts since 2006 reflect lower run sizes compared to the 2003–2005 counts.

Deep Creek Chinook salmon regulations have received little modification since the restrictions of 1996, aside from the addition of a 3-day weekend opening by EO in 2001 in response to poor fishing conditions throughout the regulatory openings. At the 2007 BOF meeting, the combined annual limit with the Anchor River was separated, which left Deep Creek with an annual limit of 2 Chinook salmon. In 2010, the use of bait was prohibited by EO for the third regulatory weekend opening of the Chinook salmon sport fishery. This restriction reduced the transferred effort resulting from restrictions on the Kenai and Kasilof rivers and the low Anchor River escapement. At the 2010 fall BOF meeting, the Deep Creek annual limit of 2 Chinook salmon was recombined with the Anchor River. In 2012, Deep Creek was restricted by EO to restrict the use of bait and limited gear to single hook. In 2013, a series of preseason and inseason restrictions were placed on the Deep Creek Chinook salmon sport fishery. Gear was restricted to single hook, and bait was prohibited for all weekends. The annual limit of 5 Chinook salmon was reduced to 2 and combined with Chinook salmon harvest in Deep Creek, Anchor River, and the marine waters north of Bluff Point.

Ninilchik River

Emergency orders increased the number of open fishing days for all Chinook salmon on the Ninilchik River during the years 1991–1996 and in 2001 (Appendix A1) to maximize the harvest of hatchery-reared Chinook salmon.

Comparison of escapement counts for the entire run (May–August) to index counts during weir operation for egg takes (July) led to revision of the SEG range in 2007 to 550–1,300 Chinook salmon. The 2007 SEG was determined by the 15th percentile and the maximum wild Chinook salmon escapement upstream of the egg-take weir during 3–31 July each year from 1999 to 2007 (Table 25). The change was meant to represent a greater proportion of the wild escapement, encompass more of the variability in run timing, and reduce the likelihood of mistaking low escapements for late run timing. In 2013, the assessment of the SEG with the inclusion of the 2008–2013 escapement counts suggested there should be no change to the Ninilchik River wild Chinook salmon SEG.

Since 2007, smaller run sizes have compromised our ability to simultaneously meet the SEG and spawn enough fish for stocking the Ninilchik River and Kachemak Bay saltwater terminal fisheries. Wild Ninilchik River Chinook salmon escapements have been near the lower bound of the SEG goal since 2007. The collection of broodstock during years of low runs increases the probability of not achieving the escapement goal (as occurred in 2007) because variability in run timing makes it difficult to predict if the goal will be met until late in weir operation after some egg takes have already been conducted. The competing requirements of fish needed for escapement versus stocking during poor runs has highlighted the need to evaluate the role of stocking and taking eggs from the Ninilchik River in the future.

During the years 2002–2004 and 2006–2007, EOs increased the number of days when hatchery fish could be targeted. In fall 2004, the BOF adopted a regulation to maximize the hatchery-reared harvest while protecting wild fish, which increased the daily bag limit of Chinook salmon from 1 to 2, of which no more than 1 fish could be a wild Chinook salmon.

During the years 2006–2007, EOs again increased the number of days when hatchery fish could be targeted. In fall 2007, the BOF allowed anglers to harvest hatchery-reared fish after 1 July through 31 December to further increase the harvest of hatchery-reared fish.

In 2010, the use of bait was prohibited by EO for the third regulatory weekend opening of the Chinook salmon sport fishery. This restriction was meant to reduce transferred effort resulting from restrictions on the Kenai, Kasilof, and Anchor rivers. There were 2 EOs that affected the Chinook salmon sport fishery in 2012: the first restricted bait and limited gear to single hook for the second and third regulatory weekend openings and the second closed the hatchery-reared Chinook salmon fishery that started in July. In 2013, a series of preseason and inseason restrictions were placed on the Ninilchik River Chinook salmon sport fishery. Gear was restricted to single hook, and bait was prohibited for all weekends. The annual limit of 5 Chinook salmon was reduced to 2 and combined with Chinook salmon harvest in Deep Creek, Anchor River, and the marine waters north of Bluff Point. The daily bag limit was reduced to 1 Chinook salmon regardless whether wild or hatchery-reared. The hatchery-reared Chinook salmon fishery was closed from 1 July through 31 October.

Recent Fisheries Performance

In 2014 through 2016, the Anchor River, Deep Creek, and Ninilchik River experienced a significant shift in Chinook salmon production. Angler effort and harvest were at historical lows on all 3 streams in 2014 but improved in both 2015 and 2016. Below-average Chinook salmon runs led to preseason and inseason EO restrictions for 2014 and preseason restrictions in 2015. The 2015 preseason restriction that closed the Anchor River Chinook salmon fishery was later rescinded (in concert with the nearby saltwater restrictions; see Upper Cook Inlet in the LCIMA in the saltwater fisheries section) due to the strong run. In 2014, a wild fire near Soldotna on Funny River road resulted in evacuations and an air quality advisory by 21 May for the Kenai Peninsula, which had an effect of hampering angler travel to the roadside streams to fish. In 2014 through 2016, water conditions were better earlier than usual for all 3 streams and provided more opportunity for harvesting Chinook salmon.

Anchor River

The 2013–2015 estimates of days fished were less than half the historical (1977–2012) average but were improved from those during 2011–2012 (Table 19). The average Chinook salmon harvest from 2013 to 2015 (215) was 82% below the historical average harvest (1,199). The average catch from 2013 to 2015 (836) was 79% below the historical average (3,948). Exploitation rates ranged from 2.2% to 7.5% for these years (Table 23). Starting in 2014, escapement monitoring permanently transitioned to monitoring at sites on both the North Fork and the South Fork. The north fork location is approximately 1.5 RKM upstream of the 2003–2012 mainstem monitoring site. The conditions on the North Fork allow for an instream video weir to be installed at the start of monitoring. The site on the South Fork is approximately 0.4 RKM upstream of the 2003–2012 mainstem monitoring site. A combination of DIDSON and instream video weir was used on the South Fork. Little Chinook salmon spawning occurs between the mainstem and forks monitoring sites. The escapement count used to assess the SEG is the combination from both the North and South forks. The SEG (3,800–10,000 Chinook salmon) was not reached in 2014, was exceeded in 2015, and was achieved in 2016 (Table 23).

Starting in 2014, after harvesting a Chinook salmon 20 inches or longer, anglers were required to stop fishing in all roadside streams for the remainder of the day. Preseason EO restrictions as

well as inseason EOs were used in both 2014 and 2015. No EO restrictions were issued in 2016. The 2014–2015 preseason EOs were designed to provide more days of fishing opportunity and to reduce inseason disruptions to the fishery. Preseason EOs closed the 5 Wednesday openings, extended the closed area downstream of the Anchor River sonar–weir site 1,000 feet, set a combined annual limit at 2 Chinook salmon for the Anchor River, Deep Creek, and Ninilchik River, and the saltwater areas between the latitude of Bluff Point and the mouth of the Ninilchik River, and restricted gear to an unbaited single-hook artificial lure. In 2014, an EO closed the Anchor River to sport fishing for the 4th and 5th weekends. In 2015, an EO was issued inseason to remove the preseason restriction that prevented fishing on the 5th weekend and 5th Wednesday while all other preseason restrictions remained in effect.

In 2014, the Anchor River had good water conditions for the 1st and 3rd weekends and high and turbid water conditions on the 2nd weekend of the fishery. Effort was low for the entire season and can be attributed in part to the Funny River wildfire. Chinook salmon catch improved over the 2012 and 2013 seasons with improved water conditions, but later-than-average run timing and poor run size limited the fishery. Success improved on the 3rd weekend prior to the EO closure. In 2014, the low water conditions allowed instream video weirs to be installed on both forks of the Anchor River at the start of monitoring. The 2014 Chinook salmon escapement estimate was 2,497 and was the lowest observed escapement since the inception of DIDSON–weir monitoring (Table 23).

In 2015, fishing conditions were good throughout the season. Effort was low but anglers were more successful than in other recent years (2012–2014). Effort increased throughout the run and was more similar to historical effort on the last Wednesday of the 2015 season. The Chinook salmon catch in 2015 was the highest since 2011 (Table 19). Chinook salmon harvest remained low, probably due to the preseason restrictions. In 2015, the low water conditions allowed instream video weirs to be installed on both forks of the Anchor River at the start of monitoring. The 2015, Chinook salmon escapement was 10,048 and exceeded the upper end of the SEG (Table 23).

In 2016, fishing conditions were good throughout the season. Effort increased and was more similar to historical average effort based on observations. Although the Chinook salmon catch and harvest estimates are not available yet, but fishing success was reportedly good. In 2016, DIDSON was used at the start of monitoring on the South Fork. The preliminary 2016 Chinook salmon escapement estimate was 7,146 and achieved the SEG (Table 23).

Deep Creek

The 2013–2015 estimates of days fished were less than half the historical average but slightly improved from the 2011–2012 average (Table 19). The average Chinook salmon harvest from 2013 to 2015 was 77% below the historical average harvest. The average catch from 2013 to 2015 (572) was 76% below the historical average. The 2014 and 2015 aerial index counts fell within the SEG range of 350–800 Chinook salmon (Table 24). In 2016, no survey was flown due to poor survey conditions throughout spawning season.

Starting in 2014, regulations required that after harvesting a Chinook salmon 20 inches or longer, anglers must stop fishing in all roadside streams for the remainder of the day. Preseason EO restrictions were also used in 2014 and 2015. Preseason EOs set a combined annual limit at 2 Chinook salmon for the Anchor River, Deep Creek, and Ninilchik River, and the saltwater areas

between the latitude of Bluff Point and the mouth of the Ninilchik River; and restricted gear to an unbaited single-hook artificial lure. In 2016, no EO restrictions were issued for Deep Creek.

In 2014, Deep Creek had good water conditions for 1st and 3rd weekends and high and turbid water conditions on the 2nd weekend of the fishery. Effort was low for the entire season. The Chinook salmon catch had improved from the 2012 and 2013 seasons with improved water conditions. Effort shifted from Ninilchik River to Deep Creek for the 1st and 3rd weekends and probably increased the SWHS estimate for number of days fished (Table 21). Aerial survey conditions were described as optimal and the survey was timed well with peak spawning.

In 2015, Deep Creek had good water conditions for all 3 weekends the fishery was open. Effort was low for the entire season. Overall, the fishery was similar to 2014. Aerial survey conditions were excellent above the north fork but poor to fair below to the Sterling Highway Bridge. There were several landslides, possibly caused by a recent earthquake, that were depositing mud into the river. The aerial escapement count met the SEG but was probably conservative (Table 24).

In 2016, Deep Creek had good water conditions for all 3 weekends. Effort was low for the entire season based on observations. Although the Chinook salmon catch and harvest estimates are not available yet, overall, the fishery was similar to 2014 and 2015. The aerial survey was canceled after several rainstorms had kept the stream conditions high and turbid throughout the spawning season.

Ninilchik River

The 2013–2015 estimates of days fished were well below the historical average and the 2013 effort (1,232 days fished) was the lowest estimate since the inception of the SWHS (Table 19). It is likely the significant declines in effort can be attributed to a combination of low Chinook salmon production, poor runs of hatchery-reared Chinook salmon in recent years, EO restrictions, and shifts in effort from the Ninilchik River to the other roadside streams. Additionally, EO restrictions to the razor clam fishery on the Ninilchik beaches probably reduced the number of anglers traveling to Ninilchik during the Chinook salmon fishing season. Many anglers participate in both fisheries in a weekend. The average Chinook salmon harvest from 2013 to 2015 was 92% below the historical average harvest. The average catch from 2013 to 2015 (706) was 81% below the historical average (Table 22).

In 2014 through 2016, the wild Ninilchik River Chinook salmon escapement counts (891, 874, and 572, respectively; Table 25) met the SEG (550–1,300 Chinook salmon). These runs marked an improvement in escapement counts of both wild and hatchery-reared Chinook salmon during the SEG period (Table 25). In 2016, an instream video system was used in June at the weir site to monitoring the entire Chinook salmon run and proved to be a cost-effective way to shift escapement monitoring to the entire run. Approximately 52% of the wild and 52% of the hatchery-reared run passed the broodstock weir prior to the SEG index monitoring period (3–31 July). Broodstock collection goals were met all 3 years as well. The runs of hatchery-reared fish from WJHSFH have also provided more fish for broodstock collection in recent years. In 2016, the use of Ovaplant, a stimulating hormone to accelerate maturation, was met with some success. Injected fish were held in an aluminum raceway within the holding area to prevent them from escaping back into the wild. Significant numbers of ocean-age-1 hatchery-reared Chinook salmon were culled from the run in 2014 and 2015. Starting in 2014, the stocking location was moved approximately 18 RKM further upstream to increase freshwater rearing time and to have most of the hatchery-reared Chinook salmon migrate to the weir site when they return. Starting

in 2015, the stocking level was increased from 50,000 to 150,000 to provide to provide sufficient broodstock collection, to provide additional harvest opportunities, and to buffer the harvest of wild Chinook salmon during years of poor runs.

Starting in 2014, the bag and possession limits were reduced to 1 Chinook salmon 20 inches or greater in total length and after harvesting a Chinook salmon of that size, anglers were required to stop fishing in all roadside streams for the remainder of the day. During the July hatchery-only fishery, anglers were required to stop fishing in just the Ninilchik River after harvesting a Chinook salmon 20 inches or greater. These regulation changes were adopted by the BOF in December 2013. Preseason EO restrictions were used in 2014 and 2015. Preseason EOs set a combined annual limit at 2 Chinook salmon for the Anchor River, Deep Creek, and Ninilchik River, and the saltwater areas between the latitude of Bluff Point and the mouth of the Ninilchik River, and restricted gear to an unbaited single-hook artificial lure. In 2016, an EO was issued to open the Ninilchik River starting 18 June (instead of 1 July) for hatchery only Chinook salmon, because an ADF&G survey in 14 June of the lower 2 miles of the river found that 60% of the Chinook salmon were hatchery-reared. Gear was restricted to a single unbaited hook through 15 July.

In 2014, the Ninilchik River had good water conditions for all 3 weekends. Low flows on the 3rd weekend may have influenced the catchability of Chinook salmon for that fishery. Effort was extremely low during the weekend fisheries. A fire occurred on the Kenai Peninsula prior to the first weekend opening and may have reduced the number of anglers traveling to the Kenai Peninsula for the Memorial Day weekend. The second weekend opening provided good fishing compared to the Anchor River and Deep Creek. There was also low effort during the opening few days of the July hatchery-only fishery. Based on a beach seine survey conducted on 24 June in the sport fishery area, very few hatchery-reared Chinook salmon greater than 20 inches were present and most Chinook salmon were mature. The SWHS estimate for the number of days fished for the Ninilchik River increased in 2014 but this was probably due to increased effort during the coho salmon season (see Coho Salmon Fisheries in the freshwater fisheries section). The 2014 wild Chinook salmon run to the weir met the SEG on 15 July and provided sufficient broodstock to meet the goal by 31 July. Approximately 69% of the hatchery-reared run to the weir was ocean-age-1 males and most were culled from the escapement.

In 2015, the Ninilchik River had good water conditions for all 3 weekends although low flows may have influenced the catchability of Chinook salmon for the entire season. Effort was low during the weekend fisheries but improved from 2014. Chinook salmon harvest was low for the first weekend but improved during the season. Based on a beach seine survey conducted on 23 June in the sport fishery area, there was an increase in the number of hatchery-reared Chinook salmon greater than 20 inches and most were in good condition. There was also low effort during the opening few days of the July hatchery-only fishery. The water levels had recently risen just prior to 1 July, providing good fishing conditions for anglers harvesting surplus hatchery-reared Chinook salmon. The 2015 wild Chinook salmon run to the weir met the SEG on 23 July and was sufficient to meet the broodstock goal. Maturation in fish held for broodstock was delayed, probably due to above-average water temperatures. Weir operation was extended to 2 August to meet the broodstock goal. The year 2015 marked the first year with a run containing a full complement of broods reared at WJHSFH. Hatchery-reared Chinook salmon contributed 28% of the broodstock goal. Approximately 58% of the hatchery-reared run to the weir was ocean-age-1 males and most were culled from the escapement.

In 2016, the Ninilchik River had good water conditions for all 3 weekends although low flows may have influenced the catchability of Chinook salmon for the entire season. Effort increased from 2014 and 2015 but was still well below the average historical effort based on observations. Chinook salmon harvest was highest for the first weekend and decreased as the season progressed. Based on a beach seine survey conducted on 14 June in the sport fishery area, there were sufficient numbers of hatchery-reared Chinook salmon greater than 20 inches to justify an EO opening the hatchery-only fishery earlier than 1 July. There was also low effort during this opening but more effort than the July fishery in 2014 and 2015. Approximately 52% of the wild run passed the weir during the instream video weir monitoring period which limited meeting the SEG and broodstock goal. The 2016 wild Chinook salmon run to the weir met the SEG on 31 July. Similar to 2015, maturation was delayed on fish held for broodstock and this was probably due to above-average water temperatures. Weir operation was extended to 7 August to meet the broodstock goal. Hatchery-reared Chinook salmon contributed over 50% of the broodstock goal, which was an increase over recent years. The hatchery-reared run to the weir was composed of 29% ocean-age-1 males, which was a large decrease from 2012–2015. These fish marked the start of the return of fish from the increased stocking level.

COHO SALMON FISHERIES

Fisheries Description

Coho salmon are harvested throughout the LCIMA in fresh waters including Kenai Peninsula roadside streams, West Cook Inlet (WCI) streams, and Kachemak Bay and Lower Cook Inlet (LCI) streams. LCIMA stocks begin their spawning migrations in mid- to late July. The migration peaks in mid- to late August and the migration is mostly over by mid-September. Coho salmon spawning migrations into Kachemak Bay tributaries are thought to be a little later than the run timing of roadside stream stocks. Coho salmon tend to hold in the salt water near their natal stream mouths or in the lower reaches of streams until rain raises the stream water level, then they tend to immigrate en masse. Peak daily fish counts at the Anchor River weir have exceeded 4,000 during high water.

The Anchor and Ninilchik rivers, and Deep and Stariski creeks all support popular coho salmon fisheries. The Sterling Highway crosses the lower reaches of the Anchor River, Ninilchik River, Deep Creek, and Stariski Creek, and developed access and camping facilities are located on or near each river. Anglers can easily access the entire 2-mile open fishing area. Fishing success varies by time of day and river levels. In general, successful anglers fish the relatively brief periods immediately after sunrise and just before darkness. During peak flows, angler success in the Anchor River and Deep Creek is generally low because the rivers are muddy. Of the 4 watersheds, Stariski Creek is the smallest (draining approximately 52 square miles with about 30 river miles as habitat for anadromous fish). The upper Stariski Creek drainage forms long meanders as it flows through low lying wetlands, straightens as it gets closer to the intertidal area, then forms long meanders again as it runs parallel to the shore before flowing into Cook Inlet. The Anchor River, Deep Creek, and the Ninilchik River watersheds are described in the Chinook Salmon Fisheries freshwater fisheries section. Historically, the roadside streams (in NCIMA–UCI fresh waters) supported over 50% of the area's coho salmon harvest most years until 1990, when the coho salmon from the first full stocking of NDFL returned as adults (calculated from Table 4). These streams contributed only 23%, on average, to the area harvest

when stocked returns were peaking from 2001 through 2005. Since 2006, they have contributed an average of 29% to the area-wide harvest.

Coho salmon are widely distributed in NCIMA–WCI fresh waters. The small fisheries that do occur are remote and have low yield, and it is expensive to participate in them. Access is by plane, helicopter, or boat, and anglers are typically guided. In the fisheries south of Chinitna Bay, participants are mostly guided anglers flown in and out on a daily basis from the Lake Iliamna area. The largest coho salmon sport fisheries occur in Silver Salmon Creek and the Kamishak River. Silver Salmon Creek is located midway between Tuxedni and Chinitna bays (Figure 1). The drainage is contained within the borders of Lake Clark National Park except where it abuts private lodge-owner properties. Access is by airplane or boat. Most anglers are housed in 1 of 2 sport fishing lodges that are located in the vicinity of the mouth of Silver Salmon Creek. Additional day-use access to the fishery occurs via private planes and a regular commercial air service from the communities of Soldotna and Homer that lands on the beach adjacent to the creek. The Kamishak River flows into the southern end of Kamishak Bay. Several sport fishing operations from the Lake Iliamna area moor boats in the Kamishak River and fly clients in and out of the Kamishak drainage on a daily basis. Guides transport clients by jetboat up the Kamishak River or to the Little Kamishak River and nearby Strike Creek to fish. Other fisheries in tributaries to Kamishak Bay, Amakdedori Creek, and the Douglas River, are accessed most commonly by plane or helicopter. Anglers have been observed fishing in these remote rivers, but runs in these locations are thought to be relatively minor in size compared to the run to Kamishak River. Clearwater and Shelter creeks are small tributaries to Chinitna Bay where sport fishing for coho salmon occurs regularly. The number of encampments that house anglers fluctuates; up to 4 have been active over the years, but none have been in place since 2005.

Coho salmon harvest in LCIMA–LCI fresh waters is relatively small in comparison to Kenai Peninsula roadside streams (LCIMA–UCI). The Fox River, at the head of Kachemak Bay, is thought to be the major producer of wild coho salmon in LCI. The Fox River is remote and access is difficult. Other coho salmon runs are small. Sport fishing has historically occurred on Clearwater Slough, a small tributary to the Fox River, Silver Creek, a tributary to China Poot Bay, the Seldovia River, and Port Graham River, along with several other small tributaries that enter the south side of Kachemak Bay.

Fisheries Management Objectives

There are no biological or sustainable escapement goals (BEG and SEG) for any coho salmon stock in the LCIMA. Coho salmon escapement has been monitored in the Kenai Peninsula roadside streams to assess exploitation. A weir was operated on the Anchor River for 12 years (Table 26). Escapements were highly variable and generally with modest annual exploitation rates. A weir has been operated on Deep Creek for 6 years (Table 27). Over monitored years, there was less range in coho salmon escapement counts on Deep Creek compared to the Anchor River. Exploitation rates were higher than the Anchor River but still at a moderate rate. On both streams, the exploitation rate was higher in years with smaller run sizes.

The sport fisheries are managed through sport fishery regulations that specify seasons, gear, open areas, and bag and possession limits. In 1999, to protect coho salmon stocks after low runs throughout Cook Inlet, the BOF reduced the bag and possession limits for coho salmon for all Cook Inlet fresh waters from 3 to 2 fish The exceptions were fresh waters south of the West

Foreland, including the west side of the LCIMA, where the bag and possession limits remained at 3 coho salmon.

The only inseason management action for wild coho salmon occurred in 1997 and restricted the daily bag and possession limits temporarily in the freshwaters of UCI from 3 to 1 fish per day. Late-season coho salmon numbers increased in roadside streams and the EO was rescinded (Appendix A1).

Recent Fisheries Performance

During 2013–2015, the overall freshwater coho salmon harvest in the LCIMA was below the 1977–2012 historical average (Table 4). For these more recent years, below average harvest occurred in the Kenai Peninsula roadside streams, and the WCI and LCI portions of LCIMA. The overall LCIMA 2013 freshwater coho salmon harvest was one of the lowest since the inception of the SWHS. The 2014 SWHS coho salmon harvest estimate for WCI fresh waters of LCIMA was one of the lowest estimates. In LCI and the roadside streams (LCIMA–UCI), the 2014 and 2015 fresh water coho salmon harvests were below the historical average despite above-average harvest in adjacent salt waters (Table 4).

Based on SWHS estimates, below-average coho salmon harvest occurred in the roadside streams from 2013 through 2015. In the Anchor River, the 2013–2015 average annual coho salmon harvest was below the 1977–2012 historical average although the 2015 catch estimate was similar to the historical average catch (Table 20). In Deep Creek, the 2013 coho salmon harvest was one of the lowest estimates since the inception of the SWHS (Table 21). The 2014 coho salmon harvest was above the historical average despite a below-average catch. In the Ninilchik River, coho salmon harvest trends were similar to the other roadside streams with the exception of an improved harvest in 2014 (Table 22). The 2013–2015 effort and coho salmon catch and harvest averages were below the 1983–2012 historical averages for Silver Salmon Creek in LCIMA–WCI (Table 28). Since 2011, there have been low numbers of responses in the SWHS for Silver Salmon Creek, which limits the effectiveness of comparing recent and historical trends. The 2013 coho salmon harvest estimate for Silver Salmon Creek is the lowest estimate since the inception of the SWHS. During 2013 through 2015, guided effort and coho salmon harvest and catch on the Kamishak River was similar to the 2005–2012 historical average based on data from the Charter Logbook Database (Table 29).

No inseason management actions occurred with LCIMA fresh water coho salmon fisheries in 2014–2016. Generally anglers experienced good water conditions in 2014 and 2015. In 2016, there was an above-average amount of precipitation that caused the Kenai Peninsula roadside streams to remain high and turbid for several days at a time. Based on Anchor River weir run timing (2004–2011) most of the coho salmon migrated through the sport fishery during the higher water levels instead of holding in the nearby salt water or in the lower sections of these streams.

STEELHEAD AND RAINBOW TROUT FISHERIES

Fisheries Description

Steelhead and rainbow trout are the same species of fish but with different life histories. Steelhead are anadromous, and rainbow trout are freshwater residents. Steelhead and rainbow trout are not physically different, but look subtly different at various times during their life cycles. Juvenile steelhead change appearance from rainbow trout just prior to becoming smolt

and just prior to migrating from freshwater, when they lose their parr marks and become silvery. Adults returning to freshwater are initially more silver than resident rainbow trout, but quickly lose their sheen and are indistinguishable from rainbow trout in color, although they are generally are more fusiform in shape. In the LCIMA, adult steelhead overwinter in freshwater streams and spawn in April and May. Unlike salmon, steelhead can spawn more than once. The presence of steelhead and rainbow trout in LCIMA fresh waters has been confirmed only in the Anchor and Ninilchik rivers, and Deep and Stariski creeks.

The LCIMA steelhead and rainbow trout fisheries have been catch-and-release only since 1989. Effort towards steelhead is focused on the Kenai Peninsula roadside streams, but there may be a small run into English Bay Lakes system in Lower Cook Inlet. Most of the steelhead fishery occurs in the fall when fish return to the streams to overwinter and continues until the rivers freeze up in late October or until the fishery is closed by regulation on 31 October. Some anglers fish for emigrating steelhead in the spring, but most are incidentally hooked by anglers fishing for Chinook salmon.

The historical harvests from 1977 through 1988 ranged from 18 (1988 in Stariski Creek, Table 30) to 2,305 (1978 in the Anchor River; Table 20). The Anchor River average annual harvest was approximately 1,119 steelhead during these years (from Table 20). Ninilchik River and Deep Creek average annual harvests were about 300 steelhead each during these years (Tables 21 and 22) and for Stariski Creek, the average annual harvest was about 100 steelhead (Table 30).

Little information is known about the abundance of steelhead in LCIMA streams. Although steelhead have been counted at weir projects on the Anchor and Ninilchik rivers and Deep Creek, no complete assessment has been made because of the late fall run timing of steelhead trout entering these streams. However, the 1989 weir operation on the Anchor River at river mile 1 counted 769 steelhead through 11 November. Overall, run sizes to these streams are likely to be between hundreds to up to several thousand fish.

Fisheries Management Objectives

Steelhead management is guided by the *Criteria for Establishing Special Management Areas for Trout* (5 AAC 75.013). The criteria were adopted by ADF&G in 1986 to provide future BOFs, fisheries managers, and the sport fishing public with the following: 1) management policies and implementation directives for area rainbow trout and steelhead fisheries, 2) a systematic approach to developing sport fishing regulations that includes a process for rational selection of waters for special management codified in 5 AAC 75.013, and 3) recommended research objectives. These criteria were adopted by the BOF in October 1998 and became effective in spring 1999. There are no special management areas or management plans for steelhead and rainbow trout in the LCIMA. The regulatory framework for the roadside stream steelhead fishery evolved over a period of nearly 2 decades. Since 1989, retention has been prohibited and fish may not be removed from the water prior to release. Since 1991, only unbaited, single-hook, artificial lures have been allowed beginning 1 September. From 1996 to 2010, each stream was opened to fishing through 31 December. In 2010, the BOF closed the roadside streams to fishing after 31 October to reduce potential release mortality of steelhead trout.

No inseason management of steelhead and rainbow trout has occurred in the LCIMA. Steelhead and rainbow trout populations are managed by regulation. In all fresh waters of the LCIMA north of the latitude of Point Adam (Figure 1) the annual limit for steelhead and rainbow trout is 2 fish.

The freshwater daily bag and possession limits for steelhead and rainbow trout are 2 in flowing waters or 5 in ponds and lakes; only 1 fish may be longer than 20 inches. The Anchor and Ninilchik rivers, and Deep and Stariski creek drainages are exceptions to these regulations where steelhead and rainbow trout may not be retained.

Recent Fisheries Performance

Annual steelhead catch fell within the historic range from 2012 to 2015 for the years when the streams closed on 31 October (Table 31). Based on SWHS estimates, (1989–2010) steelhead trout catch was variable and ranged from about 3,000 to 14,000 fish for years when the streams were open through 31 December.

From 2013 to 2015, the Anchor River average annual steelhead catch was below the historical (1977–2012) average although the 2014 catch estimate was similar to the historical average catch (Table 20). In Deep Creek, the 2013–2015 steelhead trout catch (725 fish) was 43% below the historical average (Table 21). In the Ninilchik River, the trend in steelhead trout catch was similar to the other roadside streams (Table 22). The 2013–2015 SWHS steelhead trout catch estimates for Stariski Creek (38, 9, and 33, respectively) were below the historical (1977–2012) average (Table 30).

No inseason management actions occurred with LCIMA freshwater steelhead trout fisheries in 2014–2016. Generally anglers experienced good water conditions in 2014–2016. The streams remained ice free through the close of the season on 31 October.

DOLLY VARDEN FISHERIES

Fisheries Description

Dolly Varden are the most common, widely distributed, and complex sport fish in the LCIMA. They spawn during autumn and overwinter in numerous drainages. Adults that survive spawning return to Cook Inlet during spring and forage in salt water before returning to fresh water during midsummer. Adults exhibit intertributary spawning as well as overwintering behavior; i.e., a fish may spawn and overwinter in the Anchor River one year and spawn and overwinter in another freshwater system the next year. Juveniles become smolt and migrate to Cook Inlet to forage and often return to a different drainage during midsummer, where they remain to overwinter. Their prolonged freshwater residence makes them available to sport anglers throughout much of the year.

Peak harvest typically occurs during July to mid-August. This period coincides with the return of Dolly Varden to fresh water as they follow salmon upstream to feed on eggs and overlaps with the migration period of abundant pink and chum salmon. Dolly Varden run timing occurs between runs of Chinook salmon and coho salmon, and provides opportunity in roadside streams with small pink and chum salmon runs. Incidental harvest of Dolly Varden occurs in the Cook Inlet marine sport Chinook salmon fishery during June through early July, and in nearly all freshwater salmon sport fisheries of the LCIMA. Hence, Dolly Varden are important to the LCIMA because they add diversity to the fishing experience by being available concurrent with fisheries for other species, and because they provide directed sport fishing opportunity when little opportunity is available.

Historically, the Anchor River has supported the largest Dolly Varden fishery in the LCIMA, with other roadside systems, including Deep Creek, Ninilchik River, and Stariski Creek also

supporting large fisheries. Declines in harvest at the Anchor River from 21,364 fish in 1979 to just 2,735 in 1987 were mirrored by declines in harvest at the other streams (Tables 20–22 and 30). Declines in harvest were assumed to reflect stock abundance declines. From 1978 through 1981, a creel census was conducted from June through September to assess Dolly Varden harvest. The results reported little fishing effort until mid-July; most effort that is directed toward Dolly Varden occurred from mid-July to mid-August. In 1987, a study was initiated in the Anchor River to 1) assess Dolly Varden abundance by counting fish at a weir, 2) identify overwintering areas through tagging and recapture, and 3) determine the age structure of the population. The weir was operated approximately 1 mile upstream of the mouth from 1987 to 1995 beginning the first week of July. Weir counts of Dolly Varden at the Anchor River declined from 19,062 in 1987 to 10,427 by 1990 (Table 32). Other major findings of the study indicated that immediate stock concerns were best served by controlling harvests targeting individual spawning stocks and by protecting overwintering populations. Furthermore, due to the multifaceted life history behavior of the species, it was thought that low inriver abundance could result from numerous out-of-system factors. Management goals, therefore, focused on mitigating the decline in the number of returning Dolly Varden to the Anchor River, maintaining fishing opportunities for Dolly Varden, and meshing regulations for Dolly Varden with concurrent fisheries of other species. Consequently in 1990, BOF adopted a proposal by ADF&G to reduce the Dolly Varden daily bag and possession limits from 5 to 2 fish.

Since 1991, Dolly Varden harvest has stabilized under the lower bag limit. From 1991 to 2009, Anchor River harvest averaged 1,300 fish (range 662 to 2,532 fish) and from 1977 to 1990 harvest averaged 9,202 fish (range 1,476 to 21,364 fish; Table 20). A comparison between the catch and harvest information from 2007 to 2009 indicates that LCIMA roadside Dolly Varden fisheries had become a popular catch-and-release fishery (Table 33). Catch-and-release mortality of Dolly Varden in LCIMA tributaries is not known. Production of roadside stocks is probably commensurate with the existing habitat. Overexploitation of these stocks is not likely under the current regulations. Dolly Varden in Southeast Alaska and Kodiak Island show an affinity to overwinter in freshwater systems containing lakes (Armstrong 1965, 1984; Sonnichsen 1990). Tributaries of the LCIMA with headwater lakes that are in relatively close proximity to roadside Dolly Varden populations are few, and include Packers Lake, English Bay lakes, and Tustumena Lake. It is not known to what extent local roadside stocks use these systems for spawning and overwintering. The extent of the coastal distribution of Dolly Varden originating in local roadside tributaries remains unknown.

Fisheries Management Objectives

The Anchor River, Deep Creek, and Ninilchik River fisheries are open in May and June during the Chinook salmon weekend openings from the river mouths to approximately 2 miles upstream where regulatory markers are posted (see Freshwater Chinook Salmon Fisheries section). On 1 July, the fishery opens again in the lower 2 miles of the Anchor River, Ninilchik River, and Deep Creek, and on Stariski Creek upstream to the Sterling Highway Bridge (approximately 1 mile). On 1 August, the upstream areas of the rivers are open for the rest of the season. The daily bag and possession limits are 2 Dolly Varden. Beginning 1 September, only unbaited, single hook, artificial lures are allowed.

A proposal by the public to open the Anchor River upstream of the forks to fishing with barbless hooks on 15 July was not passed by the BOF at its meeting in November 2004 to protect spawning Chinook salmon.

In fall 2010, BOF adopted a public proposal to close sport fishing on the Anchor River, Deep Creek, Ninilchik River, and Stariski Creek on 1 November to 31 December. The proposal was adopted to reduce catch-and-release mortality on steelhead during cold temperatures.

Recent Fisheries Performance

During 2013–2015, the overall freshwater Dolly Varden harvest in LCIMA was below the historical (1977–2012) average but was similar to harvests since the late 1980s (Table 5). During 2013–2015, harvests were similar throughout the LCIMA–UCI roadside streams and LCI. Above average harvest occurred in LCIMA–WCI in 2013.

On average from 2013 to 2015, harvested Dolly Varden were a low percentage of those that were caught. On the Anchor River, about 9% were harvested, on Deep Creek about 3% were harvested and the Ninilchik River about 18% were harvested (Table 33). In the Anchor River, the 2013–2015 annual Dolly Varden catches and harvests were well above those in 2010–2012 (Table 20). The 2014 and 2015 Dolly Varden catches were some of the highest estimates for the Anchor River and the 2015 catch on Deep Creek was the highest since 2004 (Table 21). The Ninilchik River had low catches in 2013 and 2014. The 2015 catch increased was near the 1991–2012 average (Table 33). Stariski Creek had low catches and no harvests for recent years compared to historical catches and harvests (since the late 1980s) (Tables 33).

Starting in 2014, sport fishing gear in the Anchor River, Deep Creek, and Stariski Creek was limited to an unbaited single hook lure during 1–15 July. This regulation change was adopted by the BOF in an attempt to reduce illegal Chinook salmon fishing in the roadside streams. Ninilchik River was not included because of the hatchery-only Chinook salmon fishery. Based on the SWHS catch estimates, this regulation change did not affect the fishery. No inseason management actions occurred for LCIMA fresh water Dolly Varden fisheries in 2014–2016. Generally anglers experienced good water conditions in 2014–2016. In 2016, the immigration of Dolly Varden into the roadside streams was noticeably earlier than in other years. Escapement monitoring in the Anchor and Ninilchik rivers corroborated this. The streams remained ice free through the close of the season on 31 October.

GROUNDFISH FISHERIES

Fishery Description

In the LCIMA, groundfish fisheries are divided into areas based on ports of landing: Central Cook Inlet (CCI; fish landed in communities from Anchor Point north) and Lower Cook Inlet (LCI; fish landed in communities south of Anchor Point) and will be referred to in this way for all groundfish fisheries in this report (all other fisheries are listed by area as defined in the Introduction). The main access points in CCI include boat ramps and beach launch sites at Deep Creek, Ninilchik, and Anchor Point. The CCI fleet fishes primarily the east side and central portion of Cook Inlet about as far south as the latitude of the Homer Spit. Harvest of Pacific halibut has also been reported as far north as Bishop Creek and the mouth of the Kenai River, but the harvest is negligible north of Ninilchik. There is also a small harvest on the west side of Cook Inlet, mostly from charter boats originating on the east side or from lodges on the west side. The Homer harbor is the major access point for the LCI groundfish fisheries, with a smaller numbers of boats originating from Seldovia and numerous private docks and clusters of vacation and permanent homes on the south side of Kachemak Bay. Boats based in Homer fish primarily in outer Kachemak Bay, in the central waters of Cook Inlet, sometimes overlapping with the CCI

fleet, south to the Barren Islands and Shuyak Island, and east to Port Dick. Vessels making overnight trips may venture farther to the east or south. Most of the Cook Inlet harvest occurs from May to September, with the CCI fishery waning by late August.

The LCIMA offers saltwater sport fishing opportunities for a variety of groundfish species though anglers primarily target Pacific halibut, lingcod, and available rockfish species. These fisheries are accessed both from shore and through small boat harbors (Homer and Seldovia), tractor launch facilities (Anchor Point and Deep Creek marine access areas), self-launching off accessible beaches, and numerous private docks on the south side of Kachemak Bay. Over half of the angler-days of effort in the LCIMA can be attributed to saltwater anglers targeting finfish species (Table 1). This area has supported over 40% (range 40–69%) of the statewide sport harvest of halibut since 1977 (Table 6). The rockfish season is open year-round, halibut can be harvested 1 February–31 December, and the lingcod season opens 1 July through 31 December annually. Both SWHS and charter logbook catch and harvest data are available for LCIMA groundfish fisheries. Charter logbook data provides guided groundfish catch and harvest for each trip by species and statistical area (Figure 7).

PACIFIC HALIBUT FISHERIES

Fishery Description

The Pacific halibut sport fishery is vital to the economy in the Cook Inlet area. Pacific halibut fishing draws vast numbers of tourists, and local derbies raise money for community projects and organizations (Denny 1990). In 1986, guided and unguided anglers spent an estimated $18.5 million in Southcentral Alaska (excluding Kodiak area waters) in pursuit of Pacific halibut, and indicated a willingness to pay an additional $25 million to ensure the continued availability of Pacific halibut fishing opportunity (Jones & Stokes 1987). In a separate study, the Homer Pacific halibut charter fishery generated an estimated $9.1 million in gross income and the equivalent of 64 year-round jobs in the Homer economy in 1986 (Coughenower 1986). The most recent estimates specific to Pacific halibut indicate that about $19.3 million was spent in Alaska by Cook Inlet halibut charter boat clients in 1998, with $15 million of that spent in the Cook Inlet area (NPFMC 2001: page 71). An economic study of sport fishing in Alaska in 2007 estimated that nearly $733 million was spent by anglers in the Cook Inlet region during that year, but contained no further breakdown as to target species or waters (Southwick Associates Inc. et al. 2008).

Historical Harvest and Abundance

The Statewide Harvest Survey (SWHS) is used as the basis of all charter and private sport harvest estimates presented in this report for Pacific halibut. Pacific halibut harvest data were also required to be reported in charter logbooks from 1998 through 2001, but there were discrepancies between logbook harvest data and SWHS estimates of charter harvest on the order of 12–42% each year (harvests reported in the logbooks were greater). As a result of these discrepancies, ADF&G discontinued collection of Pacific halibut data in charter logbooks beginning in 2002. Beginning in 2006, it was once again a requirement of the saltwater logbook program to record the number of halibut kept and released. Harvest by charter and noncharter anglers has been estimated by the SWHS since 1986 for all Kenai Peninsula fisheries, but not for the west side of Cook Inlet. Since 1995, harvest in the WCI reporting area has been estimated by user group and merged with the CCI and LCI estimates.

Collectively, the Cook Inlet fisheries constitute the largest discrete Pacific halibut sport fishery in the world. Estimated harvest increased in stair-step fashion from 13,466 fish in 1977 to 253,265 fish in 2007, the highest harvest on record for Pacific halibut in the LCIMA (Table 6). Cook Inlet fisheries have accounted for 61–82% of the total Southcentral Alaska Pacific halibut sport harvest since 1990, and 40–60% of the statewide sport harvest (in number of fish) during the period 1990–2015. In 2015, the estimated Cook Inlet sport harvest was 179,766 fish (Table 6).

Growth in the CCI Pacific halibut fishery during the late 1980s and early 1990s was due largely to an increase in the guided component. In the late 1980s, the CCI fishery was dominated by noncharter anglers (Table 34). The charter harvest component increased from 9% to 50% during the period 1989–1994 as many Kenai River guides moved to the Deep Creek–Ninilchik area when restrictions were placed on the Kenai River early-run Chinook salmon fishery. In addition, the CCI saltwater fishery offered opportunities to harvest halibut as well as Chinook salmon, and catch rates were reportedly high (Nelson 1995). From Anchorage, Ninilchik is about an hour less driving time than Homer, and the boat ride to the fishing grounds is often shorter or smoother. Development of beach access during the early 1990s and use of tractors to launch boats at any tide stage also facilitated development of the guided fishery during that period.

Harvest in the LCI fishery has consistently exceeded that of the CCI fishery. Harvest has been quite variable but averaged about 95,000 fish per year from 1990 until 2003 when it began to gradually climb to a record harvest in 2007 (156,085 fish; Table 6). The charter portion of the harvest has remained relatively stable at about 60–65% most years.

Halibut management agencies typically describe halibut fishery removals using net weight (headed and gutted) in pounds as the standard unit (net weight = 0.75 round weight). Harvest in pounds, or harvest biomass, is estimated by multiplying numbers of fish by estimates of average weight for each user group obtained through sampling of the sport harvest. Average weight is estimated from length measurements using a length-weight relationship (Clark 1992). For 2011–2014, the most recent years for which final estimates are available, these estimates ranged from 0.81 to 1.14 million lb for CCI and approximately 1.11–1.64 million lb for LCI.

Harvest estimates do not include catch-and-release mortality. Sport anglers in Cook Inlet have released 37–55% of the Pacific halibut they caught during the period 2005–2014. The International Pacific Halibut Commission (IPHC) assumes a mortality rate of 3.5% for Pacific halibut caught on longline gear using circle hooks and released in excellent condition (Kaimmer and Trumble 1998). Circle hooks are the predominant terminal gear in the Cook Inlet sport fishery. Not all sport-caught halibut are released in excellent condition, but unlike commercial gear, there is no soak time (time in which halibut are hooked, but not brought to the surface) associated with sport gear. Release mortality estimates are now provided to the IPHC annually.

Since 1982, the IPHC has been estimating stock size using an age-structured model. Each year the IPHC updates the time series of commercial catch, survey catch, age composition, and other data to reassess the stock. There have been numerous changes to the model since the mid-1990s, mostly dealing with specification of survey selectivity (based on length or age). The changes were made in response to a long term decline in growth rate that reduced vulnerability to harvest and caused underestimation of recruitment. With each succeeding year, changes in the assessment model resulted in increased estimates of historical biomass. An entirely new model was developed for the 2003 assessment that modeled abundance by sex, parameterized selectivity differently, and accounted for changes in the ageing method (Clark and Hare 2006).

In December 2006, the IPHC announced that recent information from tagging programs indicated that the halibut stock was more migratory than previously assumed. As a result, they assessed the stock using a coastwide model, and apportioned the overall biomass among regulatory areas based on relative catch rates in the longline survey weighted by the area of bottom habitat (Clark and Hare 2007). The coastwide assessment and apportionment was not used to set catch limits for 2007, largely because of objections to assumptions of the apportionment method. The IPHC began apportioning the overall biomass using relative catch rates when setting catch limits for the 2008 season. Recent additions and changes to the model include corrections for hook competition by species other than halibut and adjustments for harvest taken prior to the mean survey date. The coastwide assessment indicated an exploitable biomass in IPHC Regulatory Area 3A at the beginning of 2016 of just under 58 million lb. The biomass has been on a downward trajectory since the late 1990s, the result of relatively weak recruitments and lower growth rates, but the exploitable biomass appears to be stabilizing (Stewart and Martell 2014).

Fishery Management and Objectives

Pacific halibut are managed in state and federal waters primarily by the IPHC (international agency) and the North Pacific Fishery Management Council (NPFMC, federal agency). The IPHC was established in 1923 by a convention between Canada and the United States. The IPHC conducts research on halibut biology and population dynamics throughout the range of the stock, determines the harvest strategy, and sets allowable levels of harvest annually in each of 10 regulatory areas. The 1953 Halibut Convention, as amended by the 1979 Protocol, mandates that the IPHC manage the stock on the basis of optimum yield (McCaughran and Hoag 1992). The term "optimum yield" is not explicitly defined in the Halibut Convention, but is commonly interpreted to imply consideration of food production, sport opportunity, protection of the ecosystem, and other social and economic benefits. In addition to the management goal of optimum yield, the IPHC strives to maintain high, stable yields with a low risk of stock collapse (IPHC 1987: page 40).

The NPFMC is one of 8 regional fishery councils created under the *Magnuson Fisheries Conservation and Management Act* of 1976. The NPFMC is responsible for allocation of the halibut resource in state and federal waters among competing user groups. Although the State of Alaska does not have direct management authority for halibut, the state has an active role in the Council process. The Magnuson-Stevens Fisheries Conservation and Management Act, as amended in 1996, provides that the Commissioner of ADF&G (or designee) is a voting member of the NPFMC.

Other agencies are involved in halibut management. The National Marine Fisheries Service (NMFS) writes regulations to convert council motions to law, and is responsible for implementation and enforcement of federal regulations. The BOF can adopt federal halibut regulations, and can also adopt state regulations that may impact halibut fisheries as long as those regulations are not specifically for halibut and do not conflict with federal regulations.

ADF&G SF collects information on the sport harvest and provides it to federal management agencies. This is done through a region-wide halibut and groundfish harvest monitoring (port sampling) program that was begun in 1991 (e.g., Meyer et al. 2008). Sampling of the sport harvest and interviews with anglers and charter captains in the LCIMA are conducted in the

Homer harbor and at Anchor Point and at Deep Creek beaches from mid-May through the end of August or early September.

The ADF&G objective with respect to Pacific halibut management is to provide the agencies (IPHC, NPFMC, and BOF) with the best possible information regarding the Pacific halibut sport fishery so that management and allocation decisions can be made that optimize the social and economic benefits of the fishery to the State of Alaska. The sport fishery is regulated throughout Alaska using daily bag and possession limits and a closed season.

The IPHC first adopted regulations for the sport fishery in 1973, at the request of the State of Alaska and NMFS. The BOF adopted the IPHC regulations for the sport fishery in 1975. Between 1975 and 1988, there were a number of changes to the regulations, including changes to the open season and bag and possession limits. In 1988, the BOF adopted an IPHC regulation that prohibits cleaning or disfiguring Pacific halibut in a manner that prevents determination of the number of fish caught or possessed. In 2008, the IPHC further restricted the cleaning or disfiguring of Pacific halibut at sea by requiring that halibut cleaned at sea may not be cut into more than four fillets (2 ventral and 2 dorsal) and 2 cheeks with skin on.

As of 2016, the sport regulations for Pacific halibut in Cook Inlet provide for an open season of 1 February–31 December. Unguided anglers have a daily bag limit of 2 halibut and possession limit of 4 halibut, and there is no size limit. Regulations for guided anglers change on an annual basis, but for 2016 included the following: a daily bag limit of 2 halibut of which 1 may be any size and the second must be less than or equal to 28 inches, an annual limit of 4 fish caught on charter vessels with a recording requirement, no retention of halibut on Wednesdays, and charter vessels are limited to 1 trip daily during which halibut are retained. Fish cleaned at sea must comply with the regulation described above. A statewide regulation prohibits taking of halibut in any manner contrary to federal regulations (5 AAC 75.067). State statutes regarding licensing for sport fishing (AS 16.05.340-430) also apply to the halibut sport fishery. Rules governing charter registration, logbooks, and vessel registration are found in the statewide sport fishing regulations 5 AAC 75.075–.077.

Over the years, the Pacific halibut sport harvest has grown unconstrained by catch quotas such as those placed on the commercial longline fishery. Individual fishing quotas (IFQs) were implemented for the commercial longline fishery in 1995, providing longliners a percentage share of the longline quota. Sport harvest was taken off the top of the total allowable harvest before the commercial quota was set. As a result, long-term increases in the sport harvest have caused allocation conflicts between commercial and sport user groups since the early 1990s.

Sport harvest of Pacific halibut in the LCIMA climbed in stepwise fashion throughout the 1990s and 2000s. The record harvest of 2007 (253,265 fish) surpassed the previous record in 2005 by about 35,000 fish (Table 6). Harvest dropped in 2008 and 2009, presumably in response to the nationwide economic downturn. From 2003 through 2011, the Southcentral Alaska charter fishery operated under a GHL of 3.65 million pounds. The declining trend in exploitable biomass in 3A impacted the GHL in 2012 dropping the GHL by regulation to the next lower level of 3.103 million pounds, and again in 2013 to the 2.734 million pound level.

Many years of deliberations among stakeholders eventually led the NPFMC to pursue the adoption of policies designed to resolve these halibut allocation conflicts on a permanent basis. Chief among these was adoption of a guideline harvest level (GHL) that went into effect in September 2003, and approval of a motion to incorporate the charter fleets in Southcentral and

Southeast Alaska into the existing IFQ program. The IFQ plan, if implemented, would have replaced the GHL. The NPFMC rescinded the IFQ motion in December 2005, largely because of concerns over recent use of the data that would be used to award quota shares. The NPFMC then passed a motion that replaced the IFQ program with a suite of alternatives for management of the charter fleet, including a moratorium, limited entry, direct allocation, and another IFQ program that incorporated recent fishery entrants. In March 2007, the NPFMC passed a motion to implement a moratorium on halibut charter boats. The proposed moratorium final rule was signed in January 2010 and the program was implemented for the 2011 charter halibut season.

In 2014, the NPFMC implemented a Catch Sharing Plan (CSP) that allocates halibut among the commercial and sport charter fleets, and include annual management measures implemented preseason to keep the charter fishery within its allocation, thereby replacing the GHL program. The plan also allows charter operators to lease commercial IFQ within a season to provide additional fishing opportunity for clients, and those fish count towards the commercial catch limit. The CSP allocates halibut between the commercial and sport charter sectors, establishes bag and size limits annually, and provides for additional harvest opportunity for the sport charter fleet through use of commercial IFQ.

Changes in Pacific halibut growth rates and exploitable biomass, changes in stock assessment procedures, and allocation conflicts all underscore the need for continued sport Pacific halibut harvest monitoring by ADF&G.

Recent Fishery Performance

In 2013, the exploitable biomass of Pacific halibut in Area 3A was believed by the IPHC to be at an intermediate level and on a downward trajectory, which was attributed to relatively weak recruitments through most of the 1990s (Stewart and Martell 2014). In 2015, the exploitable biomass for area 3A was estimated to be approximately one-third of the coastwide estimate or 60 million pounds (Stewart and Martell 2014). Growth rates are also much lower than they were 20 years ago, so fish are smaller at age and therefore less vulnerable to the fishery (Clark and Hare 2004).

Guided anglers were regulated under the GHL in 2013, with bag and possession limits equivalent to the unguided fleet. With implementation of the CSP in 2014, guided anglers were subjected to annual management measures designed to bring the sector within its federal allocation which fluctuates with levels of abundance. Charter anglers in Cook Inlet harvested approximately 63% of the Pacific halibut harvested by all charter anglers in Southcentral Alaska in 2013; they harvested 60% in 2014 and 59% (preliminary estimate) in 2015. Final 2015 harvest estimates are not yet available.

Harvest of Pacific halibut from the noncharter sector of the sport fishery has remained relatively stable in the CCI fishery, averaging approximately 34,200 fish from 2013 to 2015 (calculated from Table 34). The LCI noncharter fishery harvest peaked at just over 62,000 fish in 2007, declining to just over 57,000 fish in 2015. Predictions that the unguided sector would see a marked increase in harvest with the implementation of the halibut CSP do not appear to have happened.

ROCKFISH FISHERY

Fishery Description

Over 30 species of rockfish (genus *Sebastes*) inhabit the Gulf of Alaska. Sixteen species have been identified in the sport harvest from the LCIMA since 1991, but 4 species—black (*S. melanops*), dark (*S. ciliates*), dusky (*S. variabilis*), and yelloweye (*S. ruberrimus*) rockfish—typically make up the vast majority of the harvest. For purposes of managing the sport fishery, 2 assemblages, based on habitat preference, are defined in sport regulations (5 AAC 75.995): pelagic and nonpelagic (Table 35). The pelagic assemblage includes black, dusky, dark, widow (*S. entomelas*), yellowtail (*S. flavidus*), and blue (*S. mystinus*) rockfish, and the nonpelagic assemblage includes all other species. The State of Alaska has management authority for all sport rockfish fisheries in state waters (within 3 nautical miles of shore), as well as federal waters of the Exclusive Economic Zone (EEZ). State regulations apply in the EEZ because the NPFMC's *Gulf of Alaska Fishery Management Plan* does not address any sport groundfish fisheries. Section 306 of the *Magnuson-Stevens Fisheries Conservation and Management Act*, amended in 1996, allows the state to regulate sport vessels in federal waters in the absence of a plan for the sport fishery.

Most rockfish are caught in state waters on the east side of Cook Inlet and around the Barren Islands. The directed fishery for rockfish is relatively small; most rockfish are taken incidentally to fishing for other species or while targeting rockfish only after fishing for other species. The economic value of the rockfish sport fishery in Cook Inlet is unknown. Furthermore, both the economic value and fishing effort for rockfish are not entirely separable from Pacific halibut because most of the rockfish harvest is incidental to halibut fishing.

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Historical Harvest and Abundance

Estimates of annual harvest in Cook Inlet have risen from about 2,000–4,000 rockfish (all species) in the late 1970s to well over 10,000 fish in recent years (Table 36). Average harvest during from 2010–2012 was approximately 17,800 fish. The Cook Inlet harvest has made up 7–15% of the Southcentral Region sport rockfish harvest since 1990 (Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish [cited September 22, 2016]. Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/). In numbers of fish, the charter component has accounted for 0–96% of the CCI harvest and 26–72% of the LCI harvest since 1986 (Table 37). Black, dusky, and dark rockfish are regularly caught in outer Kachemak Bay, either as a target species or incidental to halibut or salmon fishing. All species regularly occurring in the LCIMA are taken along the outer Kenai Peninsula coast and around the Chugach Islands.

There is uncertainty regarding the accuracy of rockfish harvest estimates from the SWHS. The biggest concern is with the magnitude of estimated harvest in the CCI fishery (Anchor Point and northward). SWHS estimated annual harvest in this fishery has ranged from about 200 to 3,000

fish since 1985 (Table 36). From 1995 to 2001, however, only 1 rockfish was ever reported harvested in over 4,500 vessel-trip interviews (ADF&G unpublished data). It is unknown whether this estimated rockfish harvest was made up of other species such as sculpins or greenlings that were misidentified as rockfish, or whether rockfish that were actually taken in LCI were reported in CCI by SWHS respondents. Interview data from Anchor Point have indicated that it is only since 2002 that some anglers are harvesting rockfish from LCI waters (Meyer and Failor *In prep*).

Harvest biomass (pounds round weight) has been estimated for the pelagic and nonpelagic management groups since 1991 by integrating SWHS and port sampling data from Homer (Table 38). Estimates are computed as the product of SWHS estimates of the number of fish harvested, the proportion of harvest, and average weight by species. Species composition and average weight are obtained from port sampling in Homer. Total harvest has ranged from about 19,000 lb in 1991 to nearly 121,000 lb in 2015 (Table 38). Pelagic species accounted for most of the increase in harvest; harvest of nonpelagic species was relatively stable.

Because rockfish are caught incidentally to other fisheries, most of them are released. The numbers of rockfish released each year in Cook Inlet generally exceeded the number retained through 2008 (Figure 8). From 2009 to present, anglers generally retained more fish than they released. The magnitude of the release component is important because of the potential for high immediate or delayed mortality. Release mortality has not been estimated in Cook Inlet fisheries but is believed to be higher for nonpelagic species than for pelagic species, primarily because pelagic species generally inhabit shallower waters and are more often caught in salmon troll fisheries. Port sampling interview data collected in Homer since 1995 show that pelagic species made up 29–100% of the rockfish released each year (Meyer and Failor *In prep*). Due to the unvented nature of their swim bladders, rockfish brought to the surface from depths in excess of 20 meters often suffer from decompression trauma (Parker et al. 2006; Hannah and Matteson 2007; Jarvis and Lowe 2008; Pribyl et al. 2009; Wilde 2009). Most species are believed to suffer mortality rates approaching 100% if released at the surface as is the general practice of most anglers. However, ADF&G research by Hochhalter and Reed (2011) suggests that release at depth of capture (recompression) can substantially improve survival rates of yelloweye rockfish.

Fishery Management and Objectives

ADF&G manages the sport rockfish fishery in state and federal waters on the constitutionally mandated sustained yield principle. Within this principle, SF seeks to optimize social and economic benefits, and where possible, to provide expanded opportunity to participate in diverse fisheries. ADF&G and the BOF have attempted to take a conservative approach to management of rockfish fisheries in Cook Inlet and the rest of Alaska. Sport bag limits have been reduced regionwide in recognition of the failure of other Pacific rockfish fisheries (see below) and the life history variables that make rockfish susceptible to overharvest. More restrictive bag limits have been set for the longer-lived and less productive nonpelagic species to discourage targeted harvest while still allowing for retention of incidental catch. Seasons or size limits for rockfish have not been implemented because of concerns regarding mortality from decompression trauma. Along with regulation changes, efforts have been made to educate anglers regarding the risks and consequences of rockfish overharvest, and to foster fishing practices that avoid incidental catch and waste in the sport fishery.

The sport rockfish fishery in Cook Inlet was unregulated until 1973 when the BOF adopted limits of 10 fish daily and 10 in possession for the Cook Inlet–Resurrection Bay Saltwater Area. In 1989, the BOF revised the Cook Inlet–Resurrection Bay Area bag limit to 5 rockfish per day, 10 in possession. In 1995, the BOF approved an ADF&G proposal to limit harvest of nonpelagic (demersal and slope) species, recognizing the relative difference in productivity between these groups. Even though increasingly conservative steps have been taken to curtail harvest and manage incidental catch and waste, it is unknown whether these efforts are providing optimum yield or adequately protecting rockfish populations.

The current regulations, effective since 1996, include a year-round season, a daily bag limit of 5 rockfish per day, and a possession limit of 10 rockfish, of which no more than 1 daily and 2 in possession may be nonpelagic species. Bag and possession limits, special restrictions, and state authority in the EEZ are found in area regulations in 5 AAC 58. The terms "rockfish," "nonpelagic rockfish," and "pelagic rockfish" are defined in statewide regulations, 5 AAC 75.995. Charter operators are required to report the numbers of pelagic, yelloweye, and other rockfish kept and released daily by each angler in logbooks. Logbook requirements are outlined in AS 16.40.280 and 5 AAC 75.076.

The status of rockfish stocks in Cook Inlet is for the most part unknown. Because this is mostly an incidental fishery, little has been invested by SF in rockfish research in the LCIMA. Virtually nothing is known of fish movement or stock structure, no analytical stock assessment has yet been done, there is substantial uncertainty in the harvest estimates, and catch-and-release mortality is unknown. An index of relative abundance, such as catch per unit effort (CPUE), has not yet been developed using fishery data. This is partly because fishery CPUE for rockfish tends to be hyperstable, or remain high as the stock declines, and partly because most rockfish are taken incidentally, so there is no measurement of effective effort. No surveys have been conducted in Cook Inlet in order to obtain a fishery-independent estimate of relative abundance. Information on locations and quantity of rockfish habitat, and spatial or depth distribution by species are also lacking.

There are, however, rudimentary indicators of the condition of the rockfish stock(s). Despite a steady growth in sport harvest, there is no obvious trend in the average length or average weight of black, dusky, or yelloweye rockfish harvested in the sport fishery that might indicate a lack of recruitment if there is a shift to older (larger) fish (Figure 9). In addition, there is broad representation of ages in the black and yelloweye rockfish harvest, and no obvious truncation of these distributions due to excessive harvest over time (Figures 10 and 11). Therefore, if past levels of harvest have exceeded surplus production, they have not done so by a large amount.

If harvest is representative, age composition data do show, however, that relatively large year classes are the exception. The 1991 year class of black rockfish was relatively large, but the preceding recruitment of another large year class occurred at least 10 years earlier. Recruitment variability is common in rockfish and reinforces the principle that allowable levels of harvest have to take natural variability into account, and that fisheries should be managed to maintain a diversity of age groups in the population in order to buffer the natural variability in production.

Overfishing is by far the primary management concern for rockfish. This concern is largely based on rockfish life history characteristics such as extreme longevity, high site fidelity, relatively late age at maturity, high recruitment variability, and susceptibility to mortality from decompression trauma (Leaman and Beamish 1984; Munk 2001a; Parker et al. 2000). Many

species recruit to the fishery before reaching sexual maturity, and fisheries develop on the standing stock rather than on the surplus production. Removal of the older spawning stock reduces spawning biomass, further inhibiting population recovery.

Cost effective, fishery independent surveys for rockfish in the LCIMA and the Gulf of Alaska are not presently available. Instead, the fishery-dependent SWHS has been used since 1977 to estimate the sport harvest, catch, and effort for the primary species of interest, including rockfish. Sport harvest biomass (pounds round weight) has also been estimated since 1991 by integrating SWHS estimates of the number of fish taken and estimates of species composition and average weight by species assemblage from port sampling (Table 38).

Recent Fishery Performance

Interview data gathered in CCI and LCI during the 3-year period 2013–2015 show that nearly all pelagic and nonpelagic rockfish were harvested by anglers that reported targeting halibut, groundfish, or groundfish and salmon (Table 39).

In 2013, rockfish harvest from LCI was 16,151 fish, about 100 fish less than the previous year but well within the range of recent historical harvest (Table 36). In the CCI fishery, rockfish harvest was 1,942 fish in 2013, slightly higher than the previous year (Table 36). This level of harvest was within the observed range for that fishery but the second highest on record until then.

In 2014, the estimated rockfish was 19,578 fish in LCI and the second highest harvest on record for the area and a 3,400 fish increase from the previous season (Table 36). While halibut was the primary target for the majority of those anglers, the harvest of rockfish, both targeted and incidental, can be attributed to more angler-days of effort. Additionally, with harvest restrictions on guided halibut harvest, anglers may be shifting to retaining rockfish that otherwise may have gone unharvested. A substantial increase in harvest was also observed in the CCI fishery, although total harvest was still only a modest 3,044 fish (Table 36).

There was an increase in the total rockfish harvest in both the CCI and LCI fisheries in 2015. The 2015 LCI rockfish harvest exceeded the previous season with the highest harvest on record of 22,862 fish (Table 36). The 2015 CCI sport harvest of rockfish was estimated to be 3,326 fish, also the highest on record for CCI, only 11% of which was harvested by noncharter anglers (from Table 37). The 2015 CCI harvest was over 2 times the average number of rockfish harvested in this area during the preceding 10 years.

LINGCOD FISHERY

Fishery Description

Lingcod are distributed from the Alaska Peninsula south to Baja California (Cass et al. 1990). In Cook Inlet, they are common along the outer Kenai Peninsula from Gore Point to the Chugach Islands and around the Barren Islands, and occasionally juveniles are found in Kachemak Bay and as far north as Anchor Point. While adult lingcod can be found to depths of 1,200 ft, they more typically inhabit nearshore rocky reefs from 30 to 300 ft in depth (Cass et al. 1990).

The sport fishery is the primary source of harvest in the LCIMA. Most lingcod are caught in state waters, around the Barren Islands and along the Kenai Peninsula coast south of Point Pogibshi. Sublegal-sized fish are also occasionally reportedly caught by salmon trollers in portions of Kachemak Bay and in Cook Inlet near Anchor Point. Very few anglers target lingcod

exclusively, and as with rockfish, most lingcod are taken by anglers targeting other species or targeting lingcod in conjunction with other species. The economic value of the lingcod sport fishery in Cook Inlet is unknown. As with rockfish, the economic value of lingcod is not separable from Pacific halibut because most of the harvest is incidental to Pacific halibut fishing.

The status of the lingcod population in Cook Inlet is unknown. There is no stock assessment, no proven index of abundance, and considerable uncertainty regarding the sport harvest estimates. Some basic fishery information may provide clues to stock status, however. The estimated average weight increased from about 23 lb in 1993, the first year with a minimum size limit, to over 30 lb in the early 2000s (Table 40). Average weight has declined to about 23 lb in recent years following the declining contribution of a strong 1997 year class as it aged (Figure 12). The strong 1989 year class continued to contribute to the harvest even as 23-year-olds in 2012. It appears there has been a broad range of age classes represented in the harvest and periodic recruitment.

Harvest estimates from the SWHS are available since 1990. Annual lingcod sport harvest in Cook Inlet ranged from a low of about 1,100 fish in 1995 to a high of about 7,500 fish in 2011 (Table 41). From 1993 until 2003, the harvest was variable, averaging around 1,700 fish per year. Although variable since 2003, total lingcod sport harvest has substantially increased. For the period from 2004 through 2006, the average harvest was around 3,200 fish, nearly double the previous 10-year average (from Table 41). Then from 2007 to 2009, the average harvest again nearly doubled to approximately 6,300 fish.

As with rockfish, there is uncertainty with certain aspects of the lingcod sport harvest estimates from the SWHS. Concerns center on potential misreporting of other species as lingcod, and misreporting the area of harvest. According to the SWHS, CCI has accounted for up to 40% of the total Cook Inlet harvest (Table 41), but very few lingcod have been documented by ADF&G port samplers or creel survey crews stationed at Deep Creek and Anchor Point during May–August every year since 1994. The SWHS is believed to overestimate the percentage of lingcod harvest taken by unguided anglers in LCI. For the period 1995–2015, SWHS estimates show that nonchartered anglers accounted for an annual average of 28% of the LCI harvest (from Table 42). On the other hand, the estimate from port sampling interview data from the same time period is only 5% (B. Failor, Sport Fish Biologist, ADF&G, Homer, unpublished data). Part of the problem may be that anglers are reporting charter harvest in the unguided section of the SWHS questionnaire. Anglers may also be confusing Pacific cod (*Gadus macrocephalus*) with lingcod. It is unknown to what extent the problems are caused by misidentification or misreporting of the area fished.

The current harvest assessment program at Southcentral Alaskan ports is effective at characterizing the lingcod harvest in the sport fishery and provides a basis for evaluating the effects of regulatory proposals (e.g., Stock and Meyer 2005). Primary objectives for this program include estimation of age, length, and sex composition, as well as spatial distribution of effort and harvest.

Abundance data are needed. Data sources are being gathered and summarized to begin the process of developing a standardized index of abundance. Several potential data sources for this index should be evaluated, including interview data, charter logbook data, IPHC longline survey data, and National Marine Fisheries Service (NMFS) trawl survey data. The assessment should include summaries of sport and commercial removals, spatial distribution of harvest, and age,

length, and sex composition of the harvest. Existing information can be analyzed to estimate growth, natural mortality, and other assessment inputs.

The effectiveness of the current 35-inch minimum size limit should be evaluated. The size limit concentrates harvest on the largest, and thus most fecund females, and was implemented without a thorough analysis of long-term effects on population dynamics. This may require a field project to estimate maturity as a function of age and size.

As with rockfish, there is considerable uncertainty regarding the sport harvest estimates. The SWHS estimates should be evaluated using all available data to either justify them or make recommendations for improvement.

A fishery-independent index of abundance, such as that from a survey, is highly desirable. A reliable index could be used for management in the absence of a stock assessment, or could be used to tune an age- or size-structured assessment model. Because lingcod do not move much and are generally found in easily-identified rocky habitat, the fishery can maintain stable catch rates even as abundance declines. Work is needed to develop survey methods that provide for an unbiased index of abundance. The minimum size limit of 35 inches also precludes the use of fishery data as an index of recruitment and no data are available on the sizes of released fish. A survey would provide catch data on the sublegal portion of the population, data that may give insight on future recruitment.

As with rockfish, estimates of lingcod habitat are needed to evaluate spatial harvest data and may be helpful for interpreting stock assessment results, modeling alternative harvest strategies, and designing future research.

Fishery Management and Objectives

ADF&G manages the lingcod sport fishery in state and federal waters on the constitutionally-mandated sustained yield principle. Within this principle, SF seeks to optimize social and economic benefits, and where possible, expand opportunities to participate in diverse fisheries. Lacking a comprehensive stock assessment, ADF&G and the BOF have adopted a precautionary approach for management of the lingcod sport fishery. In Cook Inlet, the approach includes a conservative bag limit, a minimum size limit designed to allow fish to spawn prior to harvest, and closed seasons to protect spawners and nest-guarding males. ADF&G hopes to incorporate the available time series of harvest information from sport and commercial fisheries, including age and size data, in working toward a comprehensive stock assessment for lingcod that will provide estimates and strategies for optimizing harvest.

The Cook Inlet lingcod sport fishery was unregulated before 1987. In that year, the BOF established a daily bag and possession limit of 2 lingcod for the Cook Inlet–Resurrection Bay Saltwater Regulatory Area in response to concerns over increased harvest, mainly in the Seward area. In 1992, the BOF adopted a suite of regulatory measures for the entire Cook Inlet–Resurrection Bay Regulatory Area, again largely in response to declining recruitment of lingcod in the North Gulf fishery (Meyer 1992; Vincent-Lang and Bechtol 1992). Changes that applied to the Cook Inlet portion (waters west of Gore Point) included the following: 1) establishing a closed season of 1 January–30 June to protect spawning and nest-guarding lingcod, 2) establishing a minimum size limit of 35 inches total length, and 3) specifying that lingcod may only be landed by hand or with a landing net.

In 1995, the State of Alaska extended its regulatory authority for sport fisheries into federal waters of the EEZ off Alaska through an emergency regulation. Section 306 of the Magnuson-Stevens Fisheries Conservation and Management Act, amended in 1996, allows the state to regulate sport vessels in federal waters in the absence of a federal plan for the sport fishery. In 2003, the restriction on the use of gaffs for lingcod was lifted with passage of a statewide gaffing regulation.

The current regulations for lingcod were put into place during the early 1990s as a precautionary approach. In the LCIMA, the open season is 1 July–31 December, the daily bag and possession limits are 2 lingcod, and there is a minimum size limit of 35 inches (28 inches with the head removed). Only marine fishes not regulated by bag or size limits may be used for live bait. Anglers may gaff only legal-sized lingcod that they intend to harvest during the open season. Charter operators are required to report the number of lingcod kept and released daily in logbooks. Bag and possession limits, special restrictions, and state authority in the EEZ are found in area regulations in 5 AAC 58. Regulations outlining ADF&G EO authority, gaffing and waste, and the charter logbook program are outlined in 5 AAC 75.

Given the lack of stock status information, management concerns center around whether current levels of harvest are sustainable, whether the current regulations represent an optimal harvesting policy, and the potential effects of other fishery changes on future lingcod harvest.

Recent Fishery Performance

Lingcod was not the target species for any of the 1,142 vessel-trip interviews from Homer during the period 2013–2015. All of the lingcod harvest landed in Homer was by anglers targeting Pacific halibut or groundfish, and 92% of that harvest was taken by charter anglers.

The average harvest over the most recent 3-year period (2013–2015) has declined slightly to about 4,300 fish (from Table 42). Harvest of lingcod in Cook Inlet in 2013 (about 5,600 fish) was below the previous 3-year average of approximately 6,000 fish, and continued declining in 2014 and 2015. The 2015 harvest estimate of 2,908 fish is the lowest since 2004 (Table 42). Cook Inlet has accounted for 15–32% of the total Southcentral Region lingcod harvest since 1991 (Mills 1992-1994; Howe et al. 1995, 1996; Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/). Charter anglers have accounted for an estimated 6–97% (1990–2015 average 61%) of the CCI harvest (in numbers of fish) and 36–82% (1990–2015 average 68%) of the LCI harvest each year (from Table 42).

Harvest biomass (pounds round weight) was estimated for the sport fishery by multiplying average weight estimates from harvest samples at Homer by the SWHS estimates for all of Cook Inlet. Harvest biomass ranged from about 66,000 to 144,000 pounds during the period 2013–2015 (Table 40).

Most of the lingcod caught in Cook Inlet are released, either because they are not a species of interest, they are sublegal-sized fish, or the season is closed. The number of lingcod released annually from 2013 to 2015 in Cook Inlet ranged from 3,900 to 5,600 fish, representing 32–38% of the catch (Figure 13).

EDUCATIONAL FISHERIES

FISHERY DESCRIPTION

The objectives for educational fisheries are specified in 5 AAC 93.235 as "educating persons concerning historic, contemporary, or experimental methods for locating, harvesting, handling, or processing fishery resources." Standards, general conditions, and requirements of the educational fishery program are outlined in 5 AAC 93.200-235. A federal court initially ordered educational fisheries while litigation was underway regarding issues surrounding rural preference for subsistence uses in Alaska and in Cook Inlet. Nelson et al. (1999) outline the legal and political events surrounding conflicts over subsistence rights in Alaska that pertain to the creation of educational fisheries on the Kenai Peninsula.

The submission deadline for an education fishery permit application is 120 days before the date of the proposed fishery. The application is first reviewed by the local area manager then forwarded to the regional office where the permit is reviewed. If further revisions are necessary, they are revised with the area manager and regional office. Once the final draft is approved, it goes to the ADF&G Commissioner's Office for signature. Finalized permits are then mailed to the permitee as well as to the Division of Commercial Fisheries, the Division of Subsistence, and the Alaska Department of Public Safety.

The terms of each permit require that an agent or employee of the organization be present at the educational fishery site at all times while the fishery is being conducted. Gear is specified for each education fishery and a harvest quota, season, and reporting requirement is specified for each permit. Weekly reporting requirements are used by the area manager to track the harvest quota.

Beginning in 2012, the educational fishery reporting section was updated and a fishing schedule notification requirement was added to the permit. This change was made to help ADF&G and Alaska Wildlife Troopers better monitor fishing activity and to ensure the terms of the permit are followed. In addition, a logging requirement was added requiring that fish be recorded immediately upon harvest and marked before concealing the salmon from plain view.

MANAGEMENT AND OBJECTIVES

Ninilchik Permits

The first educational fishery permit granted in the LCIMA was issued to the Ninilchik Traditional Council (NTC) in 1993 (Nelson et al. 1999). The goal of the NTC educational fishery was to teach and preserve the cultural and traditional subsistence way of life as well as provide food for the Elders and others in need. They were the lone permit applicant from 1993 through 1996. Stipulations contained within the permit established harvest quotas, fishing area, season and gear, and reporting requirements. The 1993 permit stipulations allowed a saltwater harvest quota of 2,000 salmon, of which no more than 100 could be Chinook salmon and 250 coho salmon (Table 43). In addition, only 50 Chinook salmon could be taken prior to 21 July; 50 more Chinook salmon could be taken beginning 21 July if the Chinook salmon spawning escapement to the Kenai River was projected to be above 22,300 fish. The fishing area extended north 1 mile from near the Ninilchik River and one-quarter mile from shore. Gear was limited to a single 10-fathom gillnet. Harvest reporting was required along with a season summary 10 days after the completion of the season. Virtually the same permit requirements were in place in 1994 through

1997 with a few alterations. Beginning in 1996, 100 Chinook salmon could be taken prior to 21 July and 50 thereafter if the Kenai River escapement goal was met. In 1995, a limited freshwater fishery using traditional methods was also permitted on the Ninilchik River downstream of the Sterling Highway Bridge. The freshwater harvest quota was limited to no more than 20 Chinook salmon and 30 coho salmon. The annual harvest in the educational fishery is reported in Table 44.

In 1998, a group of NTC members formed a new organization called the Ninilchik Native Descendents (NND) and requested a separate permit with similar goals of passing on traditional knowledge and providing food for needy tribal members. Initially, 1 permit was granted to both organizations jointly with the same stipulations as in the past. This was not acceptable to the NTC. The NND fished upon receiving the joint permit while the NTC members did not fish until they were granted a separate permit. Because the 2 groups represented the same constituents that had been served in the past by 1 permit, 2 permits were issued and the allocation normally granted to NTC was divided in half between them. Each permit was allowed a harvest quota of 1,000 salmon of which no more than 50 could be Chinook salmon and no more than 125 coho salmon. In addition, only 25 Chinook salmon could be harvested before 21 July. Each permit allowed a freshwater harvest quota of 15 Chinook salmon and 10 coho salmon. The remaining terms of the permits were the same as in the past. Each permitee was allowed its own net.

After the 1998 permits had been issued, NTC members requested an additional 20 Chinook salmon, which was the number caught by NND before separate permits were issued. This increased the NTC quota to 70 Chinook salmon prior to 21 July. The NTC permit was then amended to allow the taking of 18 additional Chinook salmon because the NTC had taken 52, which was 2 more than the amount allotted to them at the time of their request for additional fish. Members of the NTC also requested an additional 25 coho salmon, but were refused. Their coho salmon allocation was thought to achieve the educational purposes stipulated in the permit; coho salmon harvests in previous years had not exceeded 119 in total. The educational fishery was closed 28 July through 2 August because sockeye salmon runs to the Kenai River were projected to be under the escapement goal.

In 1999, NTC and NND both received permits, and the stipulations were the same as in 1998. After NTC reached their 50 Chinook salmon harvest quota 25 May, they made an inseason request for 50 more Chinook salmon. Their request was approved to allow NTC to meet their educational goals and because the increased harvest was not thought to negatively impact the Chinook salmon resource or other fisheries. By early July, NTC and NND had exceeded their Chinook salmon quotas and were instructed to cease their harvest of Chinook salmon until after 20 July. No further Chinook salmon were reported harvested.

In 2000, the NTC and NND permits contained the same stipulations and quotas as initially granted in 1998, and the fishery proceeded without inseason changes. In 2001, NTC requested that they be allowed to use 2 gillnets instead of 1 to increase their harvest of sockeye salmon and to better achieve their educational goals. Use of a second gillnet was then permitted after 10 June. In anticipation of increased participation in the NND educational fishery, NND requested that their harvest quota be increased to 75 Chinook salmon prior to 21 July. As a result, the quota was increased to 75 Chinook salmon prior to 21 July for both the NND and NTC educational fisheries.

In 2002, despite requests from NTC and NND to increase harvest quotas, the quotas remained at 75 Chinook salmon prior to 21 July and 25 thereafter if the Kenai River spawning escapement goal was projected to be met, the coho salmon quota remained at 125, and the total salmon quota remained at 1,000 for each group. The freshwater quota from the Ninilchik River also remained at 0 Chinook salmon and 15 coho salmon taken over four 3-day periods. Salmon harvests were below harvest quotas.

In 2003, a third educational fishery was established for the Ninilchik saltwater area after Ninilchik Emergency Services (NES) requested that they conduct classes from 1 July through 15 August. The NES quota was set at 250 salmon, of which no more than 25 could be Chinook salmon and no more than 50 could be coho salmon. Also, Chinook salmon could only be taken after 20 July if the Kenai River Chinook salmon escapement projection was above the spawning escapement goal. As a result of the third educational fishery, the salmon quotas for the NTC and NND were decreased to 850 for each group to accommodate the NES quota. In addition, of the 850 salmon in the quotas for NTC and NND, no more than 100 could be Chinook salmon and no more than 100 could be coho salmon. Harvest stipulations for Chinook salmon after 20 July and freshwater stipulations and quotas were not changed.

In 2003, NND's educational fishery permit was modified to permit an educational fishery in April to use a 20-foot long gillnet with a mesh size not to exceed 2 inches to catch no more than 1,000 herring (*Clupea pallasi*) or eulachon (*Thaleichthys pacificus*).

The educational fisheries permits issued to NTC, NND, and NES from 2004 through 2006 were very similar to the 2003 permits issued for each group. In 2006, the NND eulachon quota was removed and herring were no longer permitted because opportunity to harvest herring was provided in Cook Inlet personal use regulations. NES did not fish in 2006 or 2007 (Tables 43 and 44).

In 2007, NTC and NND received increased Chinook and coho salmon saltwater quotas. NTC also received an educational fishing permit for the Kasilof River saltwater area. NTC received a harvest quota of 50 Chinook salmon and 200 coho salmon for the Kasilof River, but did not fish the area for the first year. Through their misinterpretation of the individual quotas and stipulations for the Kasilof River and the Ninilchik River and their late reporting, their harvest quota for coho salmon was exceeded for the Ninilchik area fishery.

In 2008, the NTC and NND Chinook salmon harvest quotas were reduced for the Ninilchik area because the added harvest could negatively impact the Ninilchik River Chinook salmon escapement and sport fishery. To mitigate the reduced Ninilchik area quota, NTC received an increased quota for the Kasilof River area fishery that maintained the overall 300 Chinook salmon and 500 coho salmon harvest quotas. In 2009, the NTC and NND Chinook salmon quotas were reduced again because of continued low Chinook salmon escapement to the Ninilchik River and have remained the same since then. Also, their coho salmon quotas were reduced because of continued above-average harvest by all user groups. NES did not request a permit from 2008 to 2011 (Table 44).

In 2012, NTC, NND, and NES were issued permits. The 2012 open area was reduced by 100 yards at the north end to help reduce potential conflict with commercial setnets fishing at the marker while still maintaining adequate educational opportunity. Permits were modified twice following sport fishing restrictions on the Ninilchik River to conserve Chinook salmon. The harvest of Chinook salmon was prohibited in the saltwater fishery beginning 1 July unless the

fish was too significantly injured to allow a reasonable chance of survival. Modifications also closed the 2 inriver educational fisheries. Even before these modifications, NND and NES voluntarily began releasing wild Chinook salmon. In total, they released 14 wild Chinook salmon. All 3 educational fisheries fell within their respective harvest quotas for the total number of salmon allowed. NTC exceeded their harvest quota for coho salmon by 15 fish.

In 2013, NTC was permitted to fish the beach section on the south side of the Ninilchik River from 15 June to 15 September. The preseason quotas were unchanged. In May, a mud slide blocked access to the beach section north of the Ninilchik River where the educational fisheries were traditionally allowed. In response, NTC and NND requested and their permits were modified to allow fishing on the south side of the Ninilchik River through 20 May. In response to sport fishing restrictions, all 3 permits were modified to prohibit harvest of Chinook salmon from 15 June to 15 July in saltwater. All 3 educational fisheries fell within their respective harvest quotas for the total number of salmon allowed. NTC exceeded their harvest quota for coho salmon by 10 fish.

In 2011, NTC and NND received educational fishery permits and harvest quotas remained the same as the 2010 quotas; harvests fell within their quotas (Tables 43 and 44).

Seldovia Village Tribe Permit

In 2004, a permit was issued to the Seldovia Village Tribe (SVT) for a fishery in Seldovia during a youth camp from 15 through 21 July. Standard gillnet gear was permitted and the harvest limit was 70 salmon of which no more than 50 pink salmon, 20 chum salmon, and 20 sockeye salmon could be harvested. The harvest of 15 Dolly Varden was permitted. The permit required that all released Chinook salmon be reported. Permits were granted in 2005 and 2006 with the same stipulations except for date changes (see Table 45 for fishing periods).

A permit was issued to the SVT in 2008 for 18–22 August with the same quotas as 2007. A fishery was not authorized during the requested period of 27–31 May because a subsistence fishery was already opened on the dates requested and was expected to serve the needs. Members of SVT later relayed that they lacked funding for their cultural camp and could not participate in the educational fishery. A permit was granted in 2009 and 2010 with the same 2007 harvest quotas but no educational fisheries were conducted. Starting in 2011, SVT stopped requesting a permit.

Anchor Point Veterans of Foreign Wars Post 10221 Permit

The Anchor Point Veterans of Foreign Wars Men's Auxiliary Post 10221 (APVFW) received educational fisheries permits from 2007 to 2010 to conduct an educational fishery approximately 1.5 miles north of the Anchor River (Table 46). The gear specifications were the same as for Ninilchik-area permittees. The APVFW permit included a fishing season from 15 July through 31 August and a quota of 160 salmon, no more than 80 of which could be coho salmon and no more than 80 could be sockeye salmon. The APVFW harvest quota was increased to 240 salmon in 2008, of which no more than 120 could be sockeye salmon and no more than 80 could be coho salmon. Quotas remained unchanged in 2009. The 2009 permit added explicit verbiage prohibiting retention of Chinook salmon and added a recording requirement for released Chinook salmon. In 2010, the quota was reduced to 200 salmon, of which no more than 100 could be sockeye salmon and no more than 50 could be coho salmon. The reported harvests from 2008 to 2013 fell within the permitted quotas.

Southcentral Foundation Permit

The Southcentral Foundation (SCF) was granted its first permit in 2010 to conduct an educational fishery in salt waters approximately 2 miles south of Silver Salmon Creek on the west side of Cook Inlet. The permit allowed salmon to be harvested using a set gillnet not exceeding 10 fathoms in length, 45 meshes deep, and minimum 4.5-inch to a maximum 6-inch mesh size. The permitted SCF fishing season was 1 July to 15 September on Tuesdays, Wednesdays, and Fridays–Sundays, to avoid regularly scheduled commercial fishing periods (Table 47). The 2013 permit application requested a later start date of 15 July and this was granted. The fishery was permitted to operate only during daylight hours to ensure that the net was attended to deter bears from obtaining fish from the net. The SCF permit allowed an authorized SCF representative and their students to harvest a quota of no more than 300 salmon, of which only 50 could be coho salmon. Only sockeye, chum, pink, and coho salmon harvest was allowed. No retention of Chinook salmon or steelhead trout was permitted and catches of these species had to be recorded. Stipulations for fish handling practices to reduce attraction and habituation of bears to the fishery were included in the permit. The coho salmon harvest fell within the harvest quota.

Sons of the American Legion Post 16

The Sons of the American Legion Post 16, applied for their first permit in 2011. They were granted a permit at a site approximately 1.6 miles south of the Whiskey Gulch Spur Road. The gear specifications and general stipulations for the permit were the same as the other educational fishery permits. Their fishing season was permitted 15 July–31 August with a quota of 200 salmon; no more than 50 could be coho salmon (Table 48). Their harvests fell within their quota from 2011 to 2013.

RECENT FISHERIES PERFORMANCE

Ninilchik Permits

In the Ninilchik educational fisheries, the 2014 harvest fell well within the NTC and NND quotas and NES reached their quota in 2014 (Tables 43 and 44). In 2015, because indicators suggested that Chinook salmon runs to the roadside streams were stronger than expected, the Ninilchik permits for the June fishery were modified to begin on 13 June instead of 15 June. Harvest fell within the NND and NES 2015 quotas and NTC exceeded their Chinook salmon quota by 4 fish due to a lag in harvest reporting over a weekend. Harvest fell within the NTC, NND, and NES quotas in 2016.

Seldovia Village Tribe Permit

Seldovia Village Tribe did not apply for an educational permit from 2014 to 2016 (Table 45).

Anchor Point Veterans of Foreign Wars Post 10221 Permit

Educational fishery permits were issued to the Anchor Point Veterans of Foreign Wars Post 10221 from 2014 to 2016 (Table 46). Harvest quotas have remained at 2010 levels. Harvests fell within their annual quotas.

Southcentral Foundation Permit

Educational fishery permits were issued to the Southcentral Foundation from 2014 to 2016. The 2014 permit application request of 1 July–20 September was granted (Table 47). The same dates were requested in 2015, but as a result of habitual tardiness in reporting and late application submissions, issuance of a 2015 permit was scheduled to start on 1 August. After reconsideration, the 2015 permit was later amended to start on 6 July. In 2016, a permit was issued from 1 July to 20 September. Harvests fell within the quotas from 2014 to 2016.

Sons of the American Legion Post 16 Permit

Educational fishery permits were issued to the Sons of the American Legion Post 16 from 2014 to 2016. Harvest quotas have remained at 2010 levels. Harvests fell within their annual quotas.

SHELLFISH FISHERIES

RAZOR CLAM FISHERIES

Fisheries Description

The Kenai Peninsula Pacific razor clam sport fishery occurs almost exclusively on sandy beaches stretching approximately 50 miles along the eastern side of Cook Inlet between the Kasilof and Anchor Rivers (Figure 14). This fishery constitutes the largest shellfish sport fishery in Alaska, due largely to accessibility. Historically, effort has concentrated in areas of greatest clam density at Clam Gulch and Ninilchik. Both areas have a developed access road and nearby camping facilities. Razor clams may be dug year round on any minus tide; however, tides lower than −2.0 feet are preferred and most effort occurs during these tides from May through August. There are about 60 of these tides annually.

Razor clam growth rate varies inversely with latitude along the eastern beaches and as a result, the average length-at-age increases as one moves south (Szarzi and Hansen 2009). Clams of the same age class at Ninlchik reach harvestable size a year prior to those from Clam Gulch, despite being separated by only 10 miles of beach. Razor clams live to a maximum age of approximately 18 years in Alaska. Along eastern beaches, the oldest razor clam found in hand-dug surveys by ADF&G was 15 years old at Ninilchik in 2004. By contrast, razor clam lifespan at the southern end of its range in California rarely exceeds 7 years. Relying on broadcast spawning, recruitment success is highly dependent on environmental conditions. Razor clam recruitment is highly variable between beach and year. More consistent annual recruitment occurs on the Clam Gulch beaches and less frequent, larger recruitments occur on Ninilchik beaches.

On the Kenai Peninsula, the 1970–2012 average annual effort was approximately 30,000 digger-days and annual harvest averaged roughly 0.8 million razor clams (Table 7). Participation and harvest peaked in 1994 when about 48,500 digger-days were spent digging about 1.27 million razor clams. From 2009 to 2012, average harvest had declined to about 0.37 million razor clams and 22,800 digger-days of effort.

Fisheries Management Objectives

The razor clam fishery is regulated by bag, possession, and gear limitations. Clam diggers are also required to harvest all razor clams taken. Gear is limited to the use of a shovel or clam gun, to be manipulated by hand. Bag and possession limits have changed in response to the fishery.

The razor clam bag limit was 30 from 1959 until 1962, when it was increased to 60. In 1960, a sport fishing license was required and a seasonal closure from 10 July through 31 August was implemented. The seasonal closure was repealed in 1968. Also in 1968, the bag limit was amended to the "first 60 clams dug" (D. Nelson, ADF&G, Homer, unpublished data). A possession limit was adopted in 1994, the first significant regulatory change in more than 20 years (Szarzi and Begich 2004a). In 1994, the bag limit was 60 and possession limit was 3 daily limits (180 clams). In 2000, the bag limit was lowered to 45 clams and the possession limit to 2 daily limits (90 clams) based on public reports of wastage related to the bag limit of 60. In 2003, the BOF passed a public proposal to reinstate the 60 clam daily bag limit and increase the possession limit to 2 daily bag limits (120 clams).

In 2013, the bag and possession limit was reduced to 25 by emergency order due to low abundance estimates. Clam diggers moved to more northerly beaches such as Clam Gulch Beach, Cohoe Beach, and to the WCI beaches where clams were generally bigger and in higher densities. Digging success was good at the WCI beaches as well as Clam Gulch and Cohoe beaches; there were many small clams harvested at Clam Gulch Beach and medium-sized clams harvested at Cohoe Beach. Digger success on the Ninilchik beaches was fair despite the decline, and smaller clams started showing and being harvested in late July. The smaller clams at Clam Gulch and Ninilchik beaches suggest that there was some recruitment to those beaches and this was probably more significant at Clam Gulch Beach.

Eastside Cook Inlet razor clams have been monitored primarily with the following methods: 1) periodic estimates of density and abundance of juvenile (<80 mm) and mature (≥80 mm) size razor clams at Clam Gulch, Oil Pad Access, and Ninilchik beaches; 2) beach-specific age and length composition of the razor clam harvest obtained through annual hand-dug samples; and 3) overall and beach-specific razor clam harvest and effort. Historically, creel surveys have been used to estimate razor clam harvest and assess CPUE measured in number of clams per digger per day. Since 1977, the statewide harvest survey (SWHS) has produced overall annual estimates of razor clam harvest and effort for the East Cook Inlet beaches. Aerial surveys have been conducted annually to assess digger distribution between beaches and to apportion the SWHS razor clam harvest and effort to specific beaches. In 2013, a 1-day digger success survey was conducted to improve the harvest apportionment by beach. Annually, approximately 150 razor clams are dug by hand from up to 10 different beach sections to assess the size and age structure of the harvest. Periodic abundance surveys were conducted at Ninilchik and Clam Gulch beaches from the late 1980s to 2010. From 2011 to 2013, annual abundance surveys were performed to monitor abundance.

Information about the razor clam fishery is available from the SWHS, and research and management programs conducted annually since the mid-1960s (D. Nelson, Alaska Department of Fish and Game, Homer, unpublished data; Szarzi 1991; Athons 1992; Athons and Hasbrouck 1994; Szarzi and Hansen 2009; Szarzi et al. 2010a).

In 2011, a record high abundance of mature razor clams was detected on the Ninilchik South Beach (Table 49). Most of the abundance was composed of a single age class that dropped drastically in abundance in 2013. The decline is attributed to poor recruitment to the beach and above-average natural mortality. In 2013, ADF&G issued an emergency order reducing the bag and possession limit from 60 razor clams per day, 120 in possession, to 25 per day and in possession for eastside Cook Inlet beaches. Despite the reduced limit, exploitation increased on the Ninilchik South Beach. Abundances for Clam Gulch beaches are given in Table 50.

Assessment of age and length composition of the harvest found similar trends at most eastside Cook Inlet beaches. In recent years (2009–2013), the harvest has been composed of fewer age classes, with predominate and average ages shifting toward younger clams. This has been coupled with a decline in mean length of the razor clam harvest and a decrease in the percentage of large clams (≥120 mm) in the harvest.

Recent Fisheries Performance

In 2013 and 2014, the overall effort, harvest, and CPUE (clams per digger-day) were the lowest ever observed since the inception of the SWHS (Table 7). Following the 2013 restrictions, most of the beaches within the Ninilchik Management Area were closed by EO in 2014 and bag and possession limits were reduced to 25 razor clams for all remaining management areas (see Figure 14). In 2015 and 2016, all management areas were closed to clam digging by EO.

Despite the significant decline in razor clam abundance and EO restrictions, the 2013 razor clam harvest was over 61,000 clams in the Ninilchik Management Area (Table 51). In 2013, the clam digging effort was more spread out over the management areas but Ninilchik still received the highest percentage of the effort (Table 52). The 2013 exploitation rate of razor clams on Ninilchik South Beach, led to the closure of razor clam harvest in the Ninilchik Management Area in 2014.

From 2014 to 2016, annual monitoring continued using abundance, aerial, success, and hand digging surveys. From 2014 to 2016, annual abundance surveys were performed to monitor abundance at Ninilchik and Clam Gulch. In 2015 and 2016, abundance surveys were also performed at Oil Pad Access. Aerial surveys were flown in 2014 to apportion the effort and harvest to each beach section. Aerial surveys were not flown in 2015–2016 due to the EO closure of the fishery. In 2014, a 1-day digger success survey was conducted to apportionment by beach. Approximately 150 razor clams are dug by hand from up to 10 different beach sections annually to assess the size and age structure of the harvest.

From 2014 through 2016, razor clam abundance at Ninilchik South Beach has showed a steady decline in exploitable clams (Table 49). In 2016, a new cohort of clams was detected at Ninilchik South Beach with an abundance estimate of nearly 0.85 million juvenile clams. In 2016, a large recruitment of juvenile clams was detected at Clam Gulch North Beach (Table 50). In 2016, the estimated abundance of clams less than 80 mm in length was 2.5 million. Based on aerial survey, the Clam Gulch beaches were the most popular locations with 40% of the effort in 2014. Some effort also shifted to Deep Creek as well. In the 2014 digger success survey, Cohoe Beach had the highest CPUE at 17 clams per digger. All other beaches were less than 10 clams per digger. Hand-digging surveys found fewer clams on all beaches and a continued downward shift in size and age.

HARDSHELL CLAM FISHERIES

Fisheries Description

The beaches of lower Cook Inlet (primarily within Kachemak Bay from Chugachik Island to Seldovia Bay) support commercial and noncommercial (sport, personal use, and subsistence) hardshell clam fisheries. In regulation, “hardshell” clam refers to Pacific littleneck clams (*Protothaca staminea*) and butter clams (*Saxidomus giganteus*). The commercial fishery targets primarily Pacific littleneck clams. Noncommercial diggers also target butter clams. The commercial fishery occurs on beaches certified for commercial digging by the Alaska

Department of Environmental Conservation on the south side of Kachemak Bay between Bradley River and Barabara Point (Figure 15). The subsistence fishery effort and harvest primarily occurs in Kasitsna and Jakolof bays. All beaches in LCI are open to the taking of clams for sport and personal use. However, the harvest is almost entirely from the Kachemak Bay area, and has historically been focused on China Poot, Jakolof, and Kasitsna bays; Sadie Cove; and the east side of the Homer Spit (Figure 15).

Pacific littleneck and butter clams are found in the intertidal areas (from +5 ft to −5 ft) of bays, estuaries, and open coastlines in the LCIMA. They are encountered in a variety of beach habitats and gravel sizes with Pacific littleneck clams preferring gravel beaches with more mud content. Pacific littleneck clams typically inhabit the upper 4–6 inches of the substrate and occasionally to depths of 8 inches, while butter clams are encountered to depths of 1 ft. Historically, Jakolof Bay, China Poot Bay, and Bear Cove were the primary areas for harvesting littleneck clams. Butter clams have been primarily harvested on the islands in China Poot Bay.

SWHS harvest data was reported as gallons of hardshell clams preceding 2011. Since that time, harvest has been reported as number of clams. The SWHS estimates are for a combination of littleneck and butter clams and are not apportioned by species. Conversion between gallons and numbers is difficult without species apportionment and considering the large size difference between littleneck and butter clams. Average annual harvest of hardshell clams from 1981 to 2012 was approximately 12,000 gallons.

Fisheries Management Objectives

Since 1997, sport, personal use, and commercial hardshell clam fisheries have been managed by the *Southern District Hardshell Clam Fishery Management Plan* (5 AAC 38.318). The plan limits the annual noncommercial (sport, personal use, and subsistence) and commercial harvests to 160,000 pounds and 40,000 pounds, respectively. The harvest level for the noncommercial fishery was established based on the average harvest in the fishery from 1981 to 1995. In 2007, the Alaska Board of Fisheries made a positive customary and traditional use finding for hardshell clams in LCI, established an amount reasonably necessary for subsistence use of 6,800–10,200 pounds of hardshell clams within the subsistence area, and required a harvest permit for participation in the subsistence fishery. In all fisheries, harvest may only occur by hand, or with a rake or shovel. In the commercial and noncommercial fisheries, Pacific littleneck clams must be a minimum length of 1.5 inches and 2.5 inches for butter clams. The size limits allow clams to reach reproductive maturity before harvest. Nonresidents can participate under sport fishing regulations, while residents can participate under sport, personal use, or subsistence regulations. Bag and possession limits under any type of fishery regulation cannot be added to the bag and possession limits of another type.

In 1994, bag and possession limits of Pacific littleneck and butter clams were established at 1,000 and 700 clams, respectively. The bag limits were established to facilitate enforcement of commercial closures by removing the incentive for commercial harvesters to dig during commercial closures and were not established to maintain an annual harvest below the harvest level established in the management plan.

In 2011, due to declining abundances observed in Jakolof Bay from 2001 to 2010, in China Poot Bay from 1999 to 2009, and at Chugachik Island from 1999 to 2008, ADF&G issued an EO to reduce the bag and possession limits of hardshell clams to 80 clams in combination between

Pacific littleneck and butter clams for all noncommercial fisheries. In 2012, the BOF adopted the ADF&G proposal to reduce the bag limit to 80 in combination.

Recent Fisheries Performance

The SWHS harvest estimates for 2013–2015 were reported in numbers instead of gallons so it is difficult to compare current harvest trends to historical trends (Table 8). Using the average number of clams for each species of hardshell clam and assuming 100% of the harvest was of either species, the harvest estimate in numbers can be converted to a range of gallons. For example, in 2013, 34,926 hardshell clams were harvested. By assuming 100% of the harvest was butter clams and using a 20 clam per gallon conversion, the harvest was 1,746 gallons (981 gallons for 2014, 1,519 gallons for 2015). Assuming 100% of the harvest was Pacific littleneck clams and using a 90 clam per gallon conversion, the 2013 harvest was 388 gallons (218 in 2014 and 338 in 2015). The converted 2013 harvest estimate would range from 388 to 1,746 gallons of clams, the greatest of which is less than 62% of the 2010 harvest estimate. It is likely that the actual harvest in gallons is within this range. The record low hardshell clam harvests since 2006 may reflect a decline in Pacific littleneck clam abundance (ADF&G, unpublished data) or fewer diggers may be digging, or both. Sustainable harvest rates of Pacific littleneck clams are not known for Alaska. Beaches in British Columbia sustain harvest rates from 10% to 53% (Gillespie et al. 2005). Effort is reported for all shellfish in the SWHS, but it can be assumed that most effort is concentrated on hardshell clams due to closures of other shellfish fisheries. Effort from 2013 to 2015 was relatively constant at 2,757; 2,815; and 2,033 digger-days respectively (Table 8). Comparisons to historical effort are limited due to effort in other shellfish fisheries.

TANNER CRAB FISHERIES

Fisheries Description

Tanner crabs occur throughout LCIMA but are primarily found in Kachemak and Kamishak bays. The noncommercial Tanner crab fishery occurs mainly in the deep waters of Kachemak Bay. Due to the depth where they are found (up to 1,200 feet) and size of these crabs, large heavy pots are required to harvest them, along with mechanical pullers or boats with sufficient horsepower to raise the pots. Tanner crab may live to an estimated maximum age of 14 years. Legal-sized male Tanner crab vary from 2 to 4 pounds and have a carapace width of 5.5 inches (140 mm) or greater.

Historically, Tanner crab in LCIMA supported both commercial and noncommercial fisheries. Due to low stock abundance, the commercial fisheries have been closed since 1995. The noncommercial fisheries have had periodic closures since 1989. Noncommercial harvest data are available from the Statewide Harvest Survey (SWHS) beginning in 1981 (Table 8), and from shellfish permits starting from 1996 to 2002 and from 2008 to the present (Table 8). SWHS estimates of noncommercial Tanner crab harvest in most years are much lower and more variable than estimates obtained from shellfish permits. This may be the result of imprecision in harvest estimates because of the small number of respondents to the SWHS that fished for Tanner crab. Noncommercial Tanner crab harvests reported on permits are considered to be more accurate than SWHS estimates because permit compliance is high. The average annual noncommercial harvest estimated from permits from 1996 to 2000 was approximately 15,400 crab under a bag and possession limit of 20 Tanner crab (Tables 8). A bag limit reduction to 5 Tanner crab resulted in an estimated harvest in 2001 of 6,499 crab. The fishery closed early inseason in 2002

to protect Tanner crab in Kachemak Bay from overharvest. The harvest reported on permits was 3,574 crab.

Fisheries Management Objectives

In March 2002, the Alaska Board of Fisheries (BOF) adopted the Registration Area H Tanner Crab Harvest Strategy (5 AAC 35.408) which includes Cook Inlet Area waters within the Southern, Kamishak, and Barren Island districts (Figure 16). The strategy established abundance thresholds for the commercial and noncommercial Tanner crab fisheries by district. For the commercial fishery in each district, the strategy includes thresholds of estimated abundance of legal male Tanner crab required to open the fishery, and the maximum harvest rates for a given abundance level. Additional provisions were established in the harvest strategy to close the commercial fisheries. When the estimated abundance of legal male Tanner crab is below the minimum threshold for a commercial fishery, the harvest strategy specifies that the noncommercial Tanner crab fisheries GHL may not exceed 10 percent of the recent 5-year average of legal male Tanner crab harvest (changed to a 3-year average in 2014). Also within the harvest strategy, there are provisions that close the noncommercial fishery based on the estimated abundance of legal male Tanner crab from the trawl surveys conducted in Kachemak and Kamishak bays. The noncommercial fisheries are designated by areas A–E (Figure 16). In areas A, B, and C the Tanner crab noncommercial fisheries are managed from the Kamishak Bay trawl survey. In areas D and E, the noncommercial fisheries are managed from the Kachemak Bay trawl survey. Regulation 5 AAC 35.410 ties the areas outside of Kachemak Bay (A, B, and C) together for management of the noncommercial fishery.

Other regulations for the noncommercial fisheries restricted season, established a minimum size limit and bag and possession limits, and specified legal gear. In 1993, BOF adopted a regulation that protected Tanner crab during the molting season by only allowing harvest from 15 July through 15 March, except that in Kachemak Bay east of a line from Anchor Point to Point Pogibshi, male Tanner crab may be taken from 15 July through 31 December and again from 15 January or the beginning of the commercial Tanner crab season (whichever is later) through 15 March (Figure 16). Harvest was restricted to males and the minimum size was 5.5 inches across the widest part of the shell including spines. The daily noncommercial bag and possession limits were set at 5 crab (5.5 inches or greater carapace width). No more than 2 pots could be fished per vessel. Gear restrictions were similar to those of commercial gear and were required to have escape mechanisms and be properly identified. A household permit was also required to participate in the Tanner crab noncommercial fishery. In March 2011, BOF increased the shellfish vessel pot limit in the North Gulf Coast waters east of Gore Point (Area C; Figure 16) to a maximum of 6 pots per vessel. This mainly affected participants out of Seward that have more limited opportunities due to weather and longer travel distances to fishing grounds.

In November 2007, the BOF made a positive customary and traditional use finding for all shellfish in Cook Inlet outside the Anchorage-Matsu-Kenai nonsubsistence area (5 AAC 02.311). Therefore, if ADF&G determined that there was a harvestable surplus of Tanner crab within areas subject to the customary and traditional use finding (outside the nonsubsistence area), subsistence regulations would be needed for those areas. Although all Alaskans are eligible to participate in subsistence fisheries, the Tanner crab population could not support more liberal subsistence limits. Therefore, BOF adopted regulations governing subsistence Tanner crab fishing in the areas outside the nonsubsistence area that are identical to the personal use and sport fishing regulations, except a sport fishing license is not required.

At the March 2014 meeting, BOF adopted regulations that changed the harvest strategy to manage the noncommercial fisheries based on a 3-year average instead of a 5-year average of legal male Tanner crab abundance from both the Kachemak and Kamishak trawl surveys. Additionally, a season date change was adopted for Kachemak Bay of 1 September through 31 March for the noncommercial fishery (changed from 15 July through 15 March) while maintaining the closed period of 1 January to 14 January.

Recent Fisheries Performance

Current legal male Tanner crab abundance levels have not been assessed in Kachemak Bay since 2013 and in Kamishak Bay since 2012. The fishery in Kachemak Bay has been closed since 6 September 2011 and the fishery in the remainder of the Cook Inlet Area has been closed since 15 March 2012.

The most recent 3 surveys in Kachemak Bay were conducted in 2011, 2012, and 2013. Those 3 surveys all resulted in estimates of legal male Tanner crab abundance below 50,000 crab, which is the threshold required to open the fishery in conjunction with a recent 3-year average of 100,000 crab or greater. The 2012 and 2013, abundance estimates of legal male Tanner crab (140 mm or greater) from the Kachemak Bay trawl survey (20,501 and 38,053, respectively; Table 53) were the lowest estimates of abundance in the history of the trawl survey. The most recent Kamishak Bay trawl survey in 2012 resulted in an abundance estimate of zero legal male Tanner crab.

In the 2011 and 2012 Kachemak Bay trawl surveys, a larger number than most years of less than 70-millimeter crabs (also known as pre-4 recruits that require 4 more years or molts to reach legal size) was estimated (Table 54; ADF&G unpublished data). The 2013 Kachemak Bay survey supported the prior 2 years of survey data and showed a strong pre-2 recruit class. Hopefully, these crabs will continue to grow and eventually recruit into a future fishery.

DUNGENESS CRAB FISHERIES

Fisheries Description

When the fishery was open (prior to 1999), Dungeness crab were taken in pots, primarily in Kachemak Bay east of the Homer Spit. Dungeness crab are found primarily on sandy or muddy substrates in salt or brackish water at depths usually shallower than 45 feet. Pots used to capture Dungeness crab were lightweight and could be deployed and retrieved by hand. The fishery is currently closed because low stock abundance cannot sustain harvest.

Sport and personal use shellfish harvest and effort estimates are available from the SWHS since 1981 (Table 8). Estimates of Dungeness crab harvest and effort for Kachemak Bay and Cook Inlet are also available from shellfish permits beginning in 1996 (Table 55). Although hardshell clam fishery statistics from permits are biased toward clams (see Razor Clams and Hardshell Clams sections), Dungeness crab harvests reported on permits were fairly close to harvest estimates obtained by the SWHS (Tables 8 and 55) and are therefore, assumed to be unbiased.

The sport and personal use harvest averaged nearly 21,000 crabs (44,100 pounds) through 1994 and then dropped by more than half to nearly 9,000 crabs (18,900 pounds) from 1995 until the fishery was closed in 1998 (Table 8). Most of the Dungeness crab harvest reported on permits occurred in Kachemak Bay east of the Homer Spit, fewer were caught west of the Homer Spit (Table 55), and the remainder was taken in Cook Inlet and from outer Gulf Coast waters.

Effort for all shellfish species combined in Kachemak Bay and LCI from 1981 through 1997 averaged 15,995 days of fishing (Table 8). Effort was reported on permits as trips in 1996, rather than in numbers of people who fished. A total of 2,896 trips were made for crab in 1996 (Table 55). Analysis of individual permits reveals that only Dungeness crabs were caught on 55% of those trips. Both trips and days fished were recorded on permits in 1997. Approximately 4,250 days of effort reported on permits were spent crabbing in 1997. People who caught only Dungeness crab accounted for approximately 20% of the effort for crab, whether effort was measured in days fished or trips. Approximately 15% of the effort was attributed to persons who harvested both Dungeness and Tanner crabs. The remainder (65%) was people who harvested only Tanner crab or harvested nothing. Effort directed at Dungeness crab in areas that remained open to fishing was insignificant after Kachemak Bay was closed to Dungeness crab fishing in May 1998.

Commercial harvest data for Dungeness crab are available since 1961 (Trowbridge and Goldman 2006). The commercial fishery was the primary harvester of Dungeness crab, with a historical average harvest in the Southern District of about 612,000 pounds (Trowbridge and Goldman 2006), equating to about 290,000 crab annually (the average weight of one crab is estimated to be 2.1 pounds).

ADF&G conducts periodic Dungeness crab pot surveys in the shallows (4 to 60 feet in depth) on the north side of Kachemak Bay to monitor changes in stock status (Table 56). The pot survey indexes abundance, but does not provide a means to estimate total abundance. In 1993, a dramatic decline in the ADF&G pot survey catch occurred. Fewer than 100 male crab of any size have been caught in any August Dungeness crab pot survey east of the Homer Spit since 1995. Estimates of Dungeness crab abundance from incidental catches in the ADF&G Tanner crab trawl survey have also been low, except in 2001 and 2006, when over 500 juvenile Dungeness crab were caught (R. Gustafson, Commercial Fisheries Biologist, ADF&G, Homer, personal communication). ADF&G trawl surveys have typically caught more sublegal than legal Dungeness crab. The large catches of juvenile crab in 2001 and 2006 did not persist in the surveys that followed in 2002–2003 or 2007–2008, therefore confirming that populations are at low levels over a broader range (R. Gustafson, Commercial Fisheries Biologist, ADF&G, Homer, personal communication).

A pot survey was conducted from 10 to 13 August 2009 to estimate catch per unit effort of Dungeness crab in historical survey areas east of the Homer Spit. Pots were also fished in waters adjacent to the historical index area in Mud Bay at the mouth of the Homer Boat Harbor and in the deep trench located south and southwest of the Homer Spit. Ninety pots were set in the historical survey area, and the catch was composed of 32 sublegal males (ADF&G, unpublished data). Fifteen pots were fished in Mud Bay near the harbor mouth and the catch was composed of 10 legal and 23 sublegal males, and one female. The 15 pots fished in the deep trench caught 7 females and 1 sublegal male. The pot survey indicated that the Kachemak Bay Dungeness crab population had not rebounded sufficiently to support a harvest, but the catch of sublegal males in 2009 was higher than the 1998 and 2000 catches.

Fishery Management and Objectives

Dungeness crab populations are presently at low levels of abundance in LCI, and all commercial and noncommercial fisheries are closed. The sport and personal use fisheries for Dungeness crab in LCI were closed by EO in 1991, but reopened from 1992 to 1998. During these years, there were no regulations authorizing subsistence fishing for Dungeness crab in the LCIMA. In May

1998, Kachemak Bay was closed to sport and personal use fisheries by EO because the continued poor catches of Dungeness crab in ADF&G pot surveys indicated that sport and personal use harvests could be affecting the maintenance and recovery of the stock. The fishery remained closed by EO until the BOF closed it by regulation in 2000. Prior to the closure, Dungeness crab seasons in Kachemak Bay were from 15 July through 31 December, and from 15 January or the beginning of the commercial Tanner crab season, whichever was later, through 15 March. The bag and possession limits were 5 male crab with a minimum carapace width of 6.5 inches. Pots, ring nets, diving gear, hooked or hookless hand lines, or hands were legal harvest methods in the noncommercial fishery. The commercial Dungeness crab fishery in Kachemak Bay and eastern LCI was closed by EO beginning in 1991 (C. E. Trowbridge, ADF&G, Homer, personal communication), although the remainder of Cook Inlet and the outer coast remained open. Commercial Dungeness crab fishing was closed in all Cook Inlet areas by BOF action in 1997.

In 1982, BOF closed all subsistence shellfish fisheries in LCI except for clams, because there was not a customary and traditional use finding. In November 2007, the BOF made a positive customary and tradition use determination finding for all shellfish outside the Anchorage-Matsu-Kenai nonsubsistence area (5 AAC 02.311). If the Dungeness crab stocks recover such that there is a harvestable surplus, BOF will need to adopt subsistence fishing regulations for the noncommercial Dungeness crab fishery. There is currently no management plan for Dungeness crab and no criteria for opening the noncommercial fishery.

ACCESS PROJECTS

BACKGROUND OF THE SPORT FISHING ACCESS PROGRAM

The Division of Sport Fish sport fishing access program coordinates and implements projects to improve access to fisheries by boating and nonboating anglers. Funding is derived from a combination of state and federal sources, including sport fishing license sales and a federal excise tax on sport fishing equipment and motorboat fuel. The federal funding source is the result of the Federal Aid in Sport Fish Restoration Act (also known as “Dingell-Johnson”) and the Wallop-Breaux amendment was made to the act in 1984.

The primary beneficiaries of each access project that involves Federal Aid funding must be the sport fish boater or sport fishing public. A minimum of 15% of the Federal Aid funds allocated to the state is mandated to be used for sport fish boating access projects. Federal Aid funds cannot be used for projects that support subsistence and personal use fisheries because of Alaska resident status restrictions placed on these fisheries and the type of fishing gear used (subsistence and personal use gear do not fit under the federal definition of sport fishing gear). Federal Aid funds cannot be used to support commercial user groups because commercial fishermen are exempt from the federal taxes that support the program. Federal Aid funds pay for approximately 75% of eligible access projects. The remaining 25%, called the state match, must be made up of nonfederal funds or assets.

In 1996, ADF&G cooperated with the Department of Natural Resources (DNR), Division of Parks and Outdoor Recreation (DPOR) to fund the fabrication and installation of 2 public mooring buoys in Halibut Cove Lagoon. The buoys became the property of DNR in 1999. In 1997, additional funds were added to the original agreement for construction and installation of 2 additional mooring buoys in Tutka Bay. ADF&G is no longer funding mooring-buoy projects due to liability and maintenance concerns.

Handicapped accessible ramps and landings were installed at the Nick Dudiak Fishing Lagoon (NDFL) in 1999 to allow full accessibility to the sport fishery. The parking area adjacent to the ramps and a trail to an accessible toilet facility near the lagoon were paved. DNR and Alaska Department of Transportation and Public Facilities (ADOTPF) were cooperators through grants. Also in 1999, the seaward banks of the NDFL were hardened to reduce maintenance costs and to provide winter storm protection for the upgrades inside the lagoon. Hardening of the outer banks of the NDFL and protection of the channel leading into the lagoon were accomplished with funds from the Federal Aid in Sport Fish Restoration Program and ADOTPF.

ADF&G cooperated with the City of Homer to construct an additional fish cleaning table, carcass trailer, an industrial fish waste grinder, and a building to house the grinder in the vicinity of the Homer Boat Harbor during 2000 and 2001 because the amount of fish waste being dumped by the city was exceeding United States Environmental Protection Agency (EPA) limits. The fish cleaning facility was operational beginning in June 2001 and the city is now in compliance with EPA regulations.

Construction of 3 new accessible plumbed restrooms located at the top of the load and launch ramps (2-toilet unit) and at the top of the Ramp 4 (7-toilet unit) and Ramp 6 (7-toilet unit) transient mooring floats in the Homer Boat Harbor started in late summer of 2004 and has been completed. In December of 2005, the grant agreement period for the renovation of the Ramp 4 fish cleaning tables was extended to 2007, and the funding amount was increased by about $60,000. The project was completed late in the summer of 2007 and features a roof and asphalt apron, photocell-operated lights, paint, landscaping, and plumbing. Ramp 6 was completed in the summer of 2007 with the addition of a carcass trailer and a roof with Lexan panels for natural illumination, plumbing, and painting. The City of Homer contributed additional funds (about $20,000) to complete Ramp 6 renovations and supplied city crews as a labor force for both projects.

In summer 2006, a custom fish cleaning table was constructed (about $950) in the ADF&G maintenance shop in Palmer for Halibut Cove Lagoon. Transportation and installation was coordinated with DPOR. The annual maintenance contract for a portable toilet includes about $2,181 per year for Whiskey Gulch and $10,000 for the Ninilchik Scenic Overlook Site for a cooperative project with DPOR for operations and maintenance of the site.

ADF&G sought additional public easements to eastside Cook Inlet beaches for public access to clam digging and angling north of the Ninilchik River through development of existing public easements, or lease or purchase and improvement of easements currently in private ownership. Funding is inadequate to cover the estimated costs of these alternatives.

Maintenance projects paid for by ADF&G that relate to sport fishing access include annual upkeep of the road to the beach and the camping areas at Whiskey Gulch. During summer 1999, the road was graded and brushed along the edges near the entrance, widened at the top of the bluff, and drainage culverts were installed on both sides. The existing roadbed materials were replaced with more stable roadbed materials and a drainage culvert was installed in the streambed at the base of the bluff road. Vehicles and camper trailers were found abandoned at Whiskey Gulch in 2007. While researching ADF&G's authority to penalize the owners, it was discovered that DNR is presently the official property owner. DNR is drafting a transfer document for ADF&G to become the property manager owner. During 2012, a drainage culvert was reinstalled in the streambed at the base of the bluff road by ADOTPF and ADF&G.

A request from the Kenai Peninsula Superintendent of State Parks for help with vehicle and boat trailer traffic and parking problems at the boat tractor launch at the Anchor River State Recreation Site was addressed with an ADF&G FY08 Capital Improvement Project request in fall 2006. The request included funds for improvements to the Anchor River Tractor Launch of about $250,000. The request was approved by the Statewide Access Program Coordinator and submitted to and approved by the Alaska State Legislature. This was a cooperative project between DPOR and ADF&G using access program funds for the parking lot and turn-around design and construction. This project was completed in 2012 within the proposed timeframe and budget. Relocating and improving the existing beach access ramp provides a safer and easier access to the beach and decreases the potential for damage to boat trailers and vehicles. Providing an improved road, accessible parking area, staging lane, and turnaround area helped to decrease traffic congestion and provide a safer and more convenient area for sport fish boaters and anglers to park and walk. In addition, an orientation and fee kiosk and a launch concessioner area provides a better-designed and more easily maintained facility. The sum of these improvements have increased the quality of the access site by providing a safer, more accessible and efficient facility.

Removal of the broken wire gabion “mattresses” that were originally installed for slope stabilization adjacent to the Deep Creek boat ramp, and their replacement with articulated concrete matting, was completed during spring 2002. Interpretive display signboards were also constructed and installed at the boat launch as part of this project. The ramp was completely removed by floodwaters in fall 2002 but was replaced in 2008.

In 2016, the new Homer Boat Harbor launch ramp was completed with 5 concrete plank launch ramps and 2 boarding floats in the northeast end of the harbor addressing the sport boating needs of the communities of the Kenai Peninsula, Anchorage and the Mat–Su Valley. New updated concrete launch planks and boarding floats provide better traction and new rub rails, and thus boat (and float) protection and slip-resistant surfacing. Improvements meet current ADA guidelines and will therefore provide improved accessibility for all users. This improved facility will be managed and maintained by the City of Homer per a cooperative agreement with ADF&G, DSF. The total cost of this project (Phase I & II) was approximately $4,000,000.

CURRENT PROJECTS SPORT FISHING ACCESS PROJECTS

Annual installation and pumping of 1 portable toilet at Whiskey Gulch is paid by access funds. DPOR is given $10,000 annually for operation and maintenance of the Ninilchik Scenic Overlook Wayside.

Bank improvement and stabilization needs for the Ninilchik River are being investigated and prioritized. Funding sources are also being investigated.

In 2016, construction of additional fish cleaning tables at the Nick Dudiak Fishing Lagoon. Plans include overhead protection and surrounding curtains to reduce attracting birds to the area.

LAND PURCHASES

Large sections of the watersheds of the road-accessible streams and many remote streams on the Central and Lower Kenai Peninsula are privately owned. Private land owners are becoming less tolerant of trespass, particularly as subdivision of large tracts of private property occurs and access for fishing is decreasing. ADF&G has limited options for protecting public access through

land purchase or easement dedication. Several private nonprofit organizations based on the Lower Peninsula can purchase land or protect it from development through easements. Public access for sport fishing can be an outcome of agreements between private landowners and these nonprofit agencies, but habitat protection is the priority. Access for sport fishing in the Central and Lower Kenai Peninsula will be sharply reduced in the future without further public land acquisition or easements.

ADF&G has been actively involved in land protection efforts on the Anchor River. Through the Exxon Valdez Trustee Council, the state successfully acquired a 20-acre parcel just downstream of the Sterling Highway (from previous landowner Elliot), a 60-acre parcel just upstream (from Thorne and Crowser), and 3 additional acquisitions from Knol (37 acres), Thompson (61 acres), and Nakata (5 acres). All of these parcels are managed by ADF&G. In cooperation with The Nature Conservancy, ADF&G also obtained and is administering a National Coastal Wetland Conservation Grant to purchase approximately 57 acres of estuarine wetlands and barrier beach near the mouth of the Anchor River. This purchase is expected to provide lasting benefits for Pacific salmon, steelhead trout, and Dolly Varden that migrate, spawn, and rear throughout the river. These efforts are also intended to ensure that angler access is maintained on the Anchor River, which is one of the most popular sport fishing streams in Southcentral Alaska. The purchase was completed in 2010.

REFERENCES CITED

Armstrong, R. H. 1965. Some feeding habits of the anadromous Dolly Varden *Salvelinus malma* (Walbaum) in Southeastern Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Informational Leaflet 51, Juneau., Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/afrbil.051.pdf

Armstrong, R. H. 1984. Migration of anadromous Dolly Varden charr in southeastern Alaska - A manager's nightmare. Pages 559-570 *in* L. Johnson, and B. L. Burns, editors. *Biology of the Arctic charr, Proceedings of the International Symposium on Arctic Charr; May 1981*. University of Manitoba Press, Winnipeg, Manitoba.

Athons, D. E. 1992. Harvest distribution, age composition, density and abundance of razor clams along the eastern beaches of Cook Inlet, 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-50, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds92-50.pdf

Athons, D. E., and J. J. Hasbrouck. 1994. Harvest distribution, age composition, and abundance of razor clams along the eastern beaches of Cook Inlet, 1992. Alaska Department of Fish and Game, Fishery Data Series No. 94-3, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds94-03.pdf

Balland, D. T., and R. N. Begich. 2007. Ninilchik River Chinook salmon assessment, 2001. Alaska Department of Fish and Game, Fishery Data Series No. 07-60, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/fds07-60.pdf

Balland, D. T., S. Sonnichsen, and S. L. Timmons. 1994. Contribution of stocked Chinook salmon to the Ninilchik River sport fishery, 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-25, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds94-25.pdf

Begich, R. N. 2002. Deep Creek Chinook and coho salmon escapement studies, 1999. Alaska Department of Fish and Game, Fishery Data Series No. 02-13, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds02-13.pdf

Begich, R. N. 2006a. Deep Creek coho salmon escapement studies, 2001 and 2002. Alaska Department of Fish and Game, Fishery Data Series No. 06-15, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds06-15.pdf

Begich, R. N. 2006b. Ninilchik River Chinook salmon assessment, 1999 and 2000. Alaska Department of Fish and Game, Fishery Data Series No. 06-27, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds06-27.pdf

Begich, R. N. 2007a. Contributions of coded wire tagged Chinook salmon stocks to the early-run marine sport fishery in Cook Inlet, 1999 through 2001. Alaska Department of Fish and Game, Fishery Data Series No. 07-54, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds07-54.pdf

Begich, R. N. 2007b. Ninilchik River Chinook salmon assessment, 2002 and 2003. Alaska Department of Fish and Game, Fishery Data Series No. 07-41, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds07-41.pdf

Begich, R. N., and D. G. Evans. 2005. Deep Creek Chinook and coho salmon escapement studies, 2000. Alaska Department of Fish and Game, Fishery Data Series No. 05-34, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/Fds05-34.pdf

Bendock, T. N. 1996. Marking juvenile Chinook salmon in the Kenai River and Deep Creek, Alaska, 1995. Alaska Department of Fish and Game, Fishery Data Series No. 96-33, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds96-33.pdf

Booz, M. D., and C. M. Kerkvliet. 2011a. Ninilchik River Chinook salmon stock assessment and supplementation, 2006. Alaska Department of Fish and Game, Fishery Data Series No. 11-05, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS11-05.pdf

Booz, M. D., and C. M. Kerkvliet. 2011b. Ninilchik River Chinook salmon stock assessment and supplementation, 2007. Alaska Department of Fish and Game, Fisheries Data Series No. 11-51, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS11-51.pdf

Booz, M. D., and C. M. Kerkvliet. 2011c. Ninilchik River Chinook salmon stock assessment and supplementation, 2008. Alaska Department of Fish and Game, Fishery Data Series No. 11-54, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS11-54

REFERENCES CITED (Continued)

Booz, M. D., and C. M. Kerkvliet. 2012. Ninilchik River Chinook salmon stock status assessment, 2009. Alaska Department of Fish and Game, Fishery Data Series No. 12-16, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS12-16.pdf

Boyle, L., S. Sonnichsen, and T. D. Balland. 1993. Contribution of stocked Chinook salmon to the Ninilchik River sport fishery, 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-21, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds93-21.pdf

Bucher, W. A., and L. Hammarstrom. 1993a. 1991 Lower Cook Inlet area annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A93-10, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/RIR.2A.1993.10.pdf

Bucher, W. A., and L. Hammarstrom. 1993b. 1992 Lower Cook Inlet area annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A93-11, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/RIR.2A.1993.11.pdf

Bucher, W. A., and L. Hammarstrom. 1994. 1993 Lower Cook Inlet area annual finfish management report. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 2A94-11, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/RIR.2A.1994.11.pdf

Bucher, W. A., and L. Hammarstrom. 1995. 1994 Lower Cook Inlet area annual finfish management report. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 2A95-06, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.2A.1995.06.pdf

Bucher, W. A., and L. F. Hammarstrom. 1996. 1995 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A96-14, Anchorage. www.cf.adfg.state.ak.us/FedAidpdfs/RIR.2A.1996.14.pdf

Bucher, W. A., and L. F. Hammarstrom. 1997. 1996 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A97-07, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.2A.1997.07.pdf

Bucher, W. A., and L. F. Hammarstrom. 1998. 1997 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A98-25, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.2A.1998.25.pdf

Bucher, W. A., and L. F. Hammarstrom. 1999. 1998 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A99-25, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.2A.1999.25.pdf

Bucher, W. A., and R. Morrison. 1990. Review of the 1990 Lower Cook Inlet salmon fishery, report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2H90-10, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.2H.1990.10.pdf

Cass, A. J., R. J. Beamish, and G. A. McFarlane. 1990. Lingcod (*Ophiodon elongatus*). Canadian Special Publication of Fisheries and Aquatic Sciences 109, Ottawa.

Clark, W. G. 1992. Validation of the IPHC length-weight relationship for halibut. Pages 113-116 [*In*] Report of Assessment and Research Activities 1991. International Pacific Halibut Commission, Seattle.

Clark, W. G., and S. R. Hare. 2004. Assessment of the Pacific halibut stock at the end of 2003. International Pacific Halibut Commission Report of Assessment and Research Activities. 2003:171-200.

Clark, W. G., and S. R. Hare. 2006. Assessment of the Pacific halibut: data, methods, and policy. International Pacific Halibut Commission, Scientific Report No. 83, Seattle.

Clark, W. G., and S. R. Hare. 2007. Assessment of the Pacific halibut stock at the end of 2006. International Pacific Halibut Commission Report of Assessment and Research Activities 2006:97-128.

Coughenower, D. 1986. Homer, Alaska charter fishing industry study. University of Alaska, Marine Advisory Program, Bulletin No. 22. Anchorage.

REFERENCES CITED (Continued)

Denny, C. 1990. Derby days. Alaska Business Monthly 6: 47-53.

Gillespie, G. E., W. C. Hajas, and J. S. Dunham. 2005. Evaluation of assessment and management frameworks in the British Columbia depuration fishery for intertidal clams. Science Branch, Pacific Region Marine Ecosystems and Aquaculture, Shellfish Section, Fisheries and Oceans Canada. Reseach Document 2005/052.

Hammarstrom, L. F. 2000. 1999 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A00-17, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/RIR.2A.2000.17.pdf

Hammarstrom, L. F., and M. Dickson. 2002. 2001 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A02-16, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.2A.2002.16.pdf

Hammarstrom, L. F., and M. Dickson. 2003. 2002 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A03-04, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/RIR.2A.2003.04.pdf

Hammarstrom, L. F., and M. Dickson. 2004. 2003 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A04-01, Anchorage.

Hammarstrom, L. F., and M. S. Dickson. 2001. 2000 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A01-01, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/RIR.2A.2001.01

Hammarstrom, L. F., and M. S. Dickson. 2005. 2004 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 05-29, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fmr05-29.pdf

Hammarstrom, L. F., and M. S. Dickson. 2007. 2006 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 07-42, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/fmr07-42.pdf

Hammarstrom, L. F., and M. S. Dickson. 2006. 2005 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 06-35, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fmr06-35.pdf

Hammarstrom, L. F., and E. G. Ford. 2008. 2007 Lower Cook Inlet Annual Finfish Management Report. Alaska Department of Fish and Game, Fishery Management Report No. 08-12, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/fmr08-12.pdf

Hammarstrom, L. F., and E. G. Ford. 2009. Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 9-28, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/fmr09-28.pdf

Hammarstrom, L. F., and E. G. Ford. 2010. 2009 Lower Cook Inlet Annual Finfish Management Report. Alaska Department of Fish and Game, Fishery Management Report No. 10-17, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FMR10-17.pdf

Hammarstrom, L. F., and E. G. Ford. 2011. 2010 Lower Cook Inlet annual finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 11-26, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FMR11-26.pdf

Hannah, R. W., and K. M. Matteson. 2007. Behavior of nine species of Pacific rockfish after hook-and-line capture, recompression and release. Transactions of the American Fisheries Society. 136:24–33.

Hochhalter, S. J., and D. J. Reed. 2011. The Effectiveness of Deepwater Release at Improving the Survival of Discarded Yelloweye Rockfish. North American Journal of Fisheries Management 31(5):852-860.

REFERENCES CITED (Continued)

Hollowell, G., E. O. Otis, and E. Ford. 2016. 2015 Lower Cook Inlet area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 16-19, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMR16-19.pdf

Hollowell, G., T. Otis, and E. Ford. 2012. 2011 Lower Cook Inlet area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 12-30, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FMR12-30

Howe, A. L., G. Fidler, A. E. Bingham, and M. J. Mills. 1996. Harvest, catch, and participation in Alaska sport fisheries during 1995. Alaska Department of Fish and Game, Fishery Data Series No. 96-32, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds96-32.pdf

Howe, A. L., G. Fidler, and M. J. Mills. 1995. Harvest, catch, and participation in Alaska sport fisheries during 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-24, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds95-24.pdf

IPHC (International Pacific Halibut Commission). 1987. The Pacific halibut: biology, fishery, and management. International Pacific Halibut Commission, Technical Report No. 22, Seattle.

Jarvis, E. T., and C. G. Lowe. 2008. The effects of barotrauma on the catch-and-release survival of southern California nearshore and shelf rockfishes (Scorpaenidae, Sebastes spp.). Canadian Journal of Fish. and Aquatic Science 65:1286-1296.

Jennings, G. B., K. Sundet, and A. E. Bingham. 2015. Estimates of participation, catch, and harvest in Alaska sport fisheries during 2011. Alaska Department of Fish and Game, Fishery Data Series No. 15-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS15-04.pdf

Jennings, G. B., K. Sundet, and A. E. Bingham. 2007. Participation, catch, and harvest in Alaska sport fisheries during 2004. Alaska Department of Fish and Game, Fishery Data Series No. 07-40, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds07-40.pdf

Jennings, G. B., K. Sundet, and A. E. Bingham. 2009a. Estimates of participation, catch, and harvest in Alaska sport fisheries during 2005. Alaska Department of Fish and Game, Fishery Data Series No. 09-47, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS09-47.pdf

Jennings, G. B., K. Sundet, and A. E. Bingham. 2009b. Estimates of participation, catch, and harvest in Alaska sport fisheries during 2006. Alaska Department of Fish and Game, Fishery Data Series No. 09-54, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS09-54.pdf

Jennings, G. B., K. Sundet, and A. E. Bingham. 2010a. Estimates of participation, catch, and harvest in Alaska sport fisheries during 2007. Alaska Department of Fish and Game, Fishery Data Series No. 10-02, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/Fds10-02.pdf

Jennings, G. B., K. Sundet, and A. E. Bingham. 2010b. Estimates of participation, catch, and harvest in Alaska sport fisheries during 2008. Alaska Department of Fish and Game, Fishery Data Series No. 10-22, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS10-22.pdf

Jennings, G. B., K. Sundet, and A. E. Bingham. 2011a. Estimates of participation, catch, and harvest in Alaska sport fisheries during 2009. Alaska Department of Fish and Game, Fishery Data Series No. 11-45, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS11-45

Jennings, G. B., K. Sundet, and A. E. Bingham. 2011b. Estimates of participation, catch, and harvest in Alaska sport fisheries during 2010. Alaska Department of Fish and Game, Fishery Data Series No. 11-60, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS11-60

Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. 2004. Participation, catch, and harvest in Alaska sport fisheries during 2001. Alaska Department of Fish and Game, Fishery Data Series No. 04-11, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds04-11.pdf

REFERENCES CITED (Continued)

Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. 2006a. Participation, catch, and harvest in Alaska sport fisheries during 2002. Alaska Department of Fish and Game, Fishery Data Series No. 06-34, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/fds06-34.pdf

Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. 2006b. Participation, catch, and harvest in Alaska sport fisheries during 2003. Alaska Department of Fish and Game, Fishery Data Series No. 06-44, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/fds06-44.pdf

Jones & Stokes. 1987. Southcentral Alaska sport fishing economic study. Final research report, November 1987. (JSA86-0413), Sacramento, CA. Prepared for ADF&G, Research and Technical Services.

Kaimmer, S. M., and R. J. Trumble. 1998. Injury, condition, and mortality of Pacific halibut bycatch following careful release by Pacific cod and sablefish longline fisheries. Fisheries Research 38: 131-144.

Kerkvliet, C. M. 2008. Ninilchik River Chinook salmon assessment, 2004. Alaska Department of Fish and Game, Fishery Data Series No. 08-07, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds08-07.pdf

Kerkvliet, C. M., and M. D. Booz. 2010. Ninilchik River Chinook salmon stock assessment and supplementation, 2005. Alaska Department of Fish and Game, Fishery Data Series No. 10-35, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/Fds10-35.pdf

Kerkvliet, C. M., and M. D. Booz. 2012. Anchor River Chinook and coho salmon escapement, 2009. Alaska Department of Fish and Game, Fishery Data Series No. 12-07, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS12-07

Kerkvliet, C. M., M. D. Booz, and D. L. Burwen. 2012. Anchor River Chinook and coho salmon escapement, 2007–2008. Alaska Department of Fish and Game, Fishery Data Series No. 12-59, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS12-59

Kerkvliet, C. M., M. D. Booz, and B. J. Failor. 2013. Recreational fisheries in the Lower Cook Inlet Management Area, 2011–2013, with updates for 2010. Alaska Department of Fish and Game, Fishery Management Report No. 13-42, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMR13-42.pdf

Kerkvliet, C. M., and D. L. Burwen. 2010. Anchor River Chinook and coho salmon escapement project, 2005-2006. Alaska Department of Fish and Game, Fishery Data Series No. 10-26, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/Fds10-26.pdf

Kerkvliet, C. M., D. L. Burwen, and R. N. Begich. 2008. Anchor River 2003 and 2004 Chinook salmon and 2004 coho salmon escapement. Alaska Department of Fish and Game, Fishery Data Series 08-06, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds08-06.pdf

King, B. E., and J. A. Breakfield. 1998. Coded wire tagging of coho and Chinook salmon in the Kenai River and Deep Creek, Alaska, 1996. Alaska Department of Fish and Game, Fishery Data Series No. 98-9, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds98-09.pdf

King, B. E., and J. A. Breakfield. 1999. Chinook and coho salmon coded wire tagging studies in the Kenai River and Deep Creek, Alaska, 1997. Alaska Department of Fish and Game, Fishery Data Series No. 99-11, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds99-11.pdf

King, B. E., and J. A. Breakfield. 2002. Coded wire tagging studies in the Kenai River and Deep Creek, Alaska, 1998. Alaska Department of Fish and Game, Fishery Data Series No. 02-03, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds02-03.pdf

Kyle, G. B. 1994. Nutrient treatment of 3 coastal Alaskan lakes: trophic level responses and sockeye production trends. Alaska Fishery Research Bulletin 1(2):153-167. http://www.adfg.alaska.gov/FedAidpdfs/AFRB.01.2.153-167.pdf

Larson, L. L. 1990. Statistics for selected sport fisheries on the Anchor River, Alaska, during 1989 with emphasis on Dolly Varden char. Alaska Department of Fish and Game, Fishery Data Series No. 90-57, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds90-57.pdf

REFERENCES CITED (Continued)

Larson, L. L. 1991. Statistics for Dolly Varden on the Anchor River, Alaska, during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-13, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds91-13.pdf

Larson, L. L. 1992. Stock assessment of Dolly Varden on the Anchor River, Alaska during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-14, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds92-14.pdf

Larson, L. L. 1993. Lower Kenai Peninsula Dolly Varden and steelhead trout studies during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-54, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds93-54.pdf

Larson, L. L. 1994. Lower Kenai Peninsula Dolly Varden studies during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-51, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds94-51.pdf

Larson, L. L. 1995. Lower Kenai Peninsula Dolly Varden studies during 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-44, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds95-44.pdf

Larson, L. L. 1997. Lower Kenai Peninsula Dolly Varden studies during 1995. Alaska Department of Fish and Game. Fishery Data Series No. 97-2, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds97-02.pdf

Larson, L. L., and D. T. Balland. 1988. Fisheries statistics for selected sport fisheries on the lower Kenai Peninsula, Alaska, 1987 with emphasis on Chinook salmon *Oncorhynchus tshawytscha*. Alaska Department of Fish and Game, Fishery Data Series No. 46, Juneau., Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds-046.pdf

Larson, L. L., and D. T. Balland. 1989. Statistics for selected sport fisheries on the lower Kenai Peninsula, Alaska, during 1988 with emphasis on Dolly Varden char. Alaska Department of Fish and Game, Fishery Data Series No. 101, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/fds-101.pdf

Leaman, B. M., and R. J. Beamish. 1984. Ecological and management implications of longevity in some Northeast Pacific groundfishes. International North Pacific Fisheries Commission Bulletin 42:85-97.

Marsh, L. E. 1995. Harvest of stocked Chinook salmon in the Ninilchik River sport fishery, 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-33, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds95-33.pdf

McCaughran, D. A., and S. H. Hoag. 1992. The 1979 Protocol to the convention and related legislation. International Pacific Halibut Commission, Technical Report No. 26, Seattle.

McKinley, T. R. 1999. Contributions of coded wire tagged Chinook salmon to the recreational fishery in Central Cook Inlet, Alaska, 1996. Alaska Department of Fish and Game, Fishery Data Series No. 99-2, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds99-02.pdf

Meyer, S. C. 1992. Biological characteristics of the sport harvest of marine groundfishes in Southcentral Alaska, 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-41, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds92-41.pdf

Meyer, S. C. 2000. Composition and biomass of the recreational rockfish Sebastes harvest in Southcentral Alaska, 1992-1995. Alaska Department of Fish and Game, Fishery Data Series No. 00-6, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds00-06.pdf

Meyer, S. C., M. J. Jaenicke, and B. Failor. 2008. Final Completion Report: Assessment of recreational halibut harvest in Alaska. Alaska Department of Fish and Game, Division of Sport Fish, NOAA Grant Award NA07NMF7370168, Juneau.

Meyer, S. C. and B. J. Failor. *In prep*. Characteristics of the recreational rockfish Sebastes harvest in Southcentral Alaska, 1996–2012. Alaska Department of Fish and Game, Fishery Management Report, Homer.

Mills, M. J. 1979. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1978-1979, Project F-9-11(20)SW-I-A, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/FREDf-9-11(20)SW-I-A.pdf

REFERENCES CITED (Continued)

Mills, M. J. 1980. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12(21) SW-I-A, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/FREDf-9-12(21)SW-I-A.pdf

Mills, M. J. 1981a. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/FREDf-9-13(22b)SW-I-A.pdf

Mills, M. J. 1981b. Alaska statewide sport fish harvest studies. 1979 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1980-1981, Project F-9-13(22a)SW-I-A, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/FREDf-9-13(22a)SW-I-A.pdf

Mills, M. J. 1982. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1981-1982, Project F-9-14(23)SW-I-A, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/FREDf-9-14(23)SW-I-A.pdf

Mills, M. J. 1983. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1982-1983, Project F-9-15(24)SW-I-A, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/FREDf-9-15(24)SW-I-A.pdf

Mills, M. J. 1984. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1983-1984, Project F-9-16(25)SW-I-A, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/FREDf-9-16(25)SW-I-A.pdf

Mills, M. J. 1985. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1984-1985, Project F-9-17(26)SW-I-A, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/FREDf-9-17(26)SW-I-A.pdf

Mills, M. J. 1986. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1985-1986, Project F-10-1(27)RT-2, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/FREDf-10-1(27)RT-2.pdf

Mills, M. J. 1987. Alaska statewide sport fisheries harvest report, 1986. Alaska Department of Fish and Game, Fishery Data Series No. 2, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/fds-002.pdf

Mills, M. J. 1988. Alaska statewide sport fisheries harvest report, 1987. Alaska Department of Fish and Game, Fishery Data Series No. 52, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/fds-052.pdf

Mills, M. J. 1989. Alaska statewide sport fisheries harvest report, 1988. Alaska Department of Fish and Game, Fishery Data Series No. 122, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/fds-122.pdf

Mills, M. J. 1990. Harvest and participation in Alaska sport fisheries during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-44, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds90-44.pdf

Mills, M. J. 1991. Harvest, catch, and participation in Alaska sport fisheries during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-58, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds91-58.pdf

Mills, M. J. 1992. Harvest, catch, and participation in Alaska sport fisheries during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-40, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds92-40.pdf

Mills, M. J. 1993. Harvest, catch, and participation in Alaska sport fisheries during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-42, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds93-42.pdf

Mills, M. J. 1994. Harvest, catch, and participation in Alaska sport fisheries during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-28, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds94-28.pdf

REFERENCES CITED (Continued)

Mills, M. J., and A. L. Howe. 1992. An evaluation of estimates of sport fish harvest from the Alaska statewide mail survey. Alaska Department of Fish and Game, Special Publication No. 92-02., Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/sp92-02.pdf

Munk, K. M. 2001a. Maximum ages of groundfishes in waters off Alaska and British Columbia and considerations of age determination. Alaska Fishery Research Bulletin 8(1):12-21.

Munk, K. M. 2001b. Maximum ages of groundfishes in waters off Alaska and British Columbia and considerations of age determination. Alaska Fishery Research Bulletin 8(1):12-21. http://www.adfg.alaska.gov/FedAidpdfs/AFRB.08.1.012-021.pdf

Nelson, D. 1990. The Upper Kenai Peninsula sport and personal use fisheries: a report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Division of Sport Fish, Report to the Alaska Board of Fisheries, November 1990, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/BOF.SF.UCI.1990

Nelson, D. C. 1995. Area management report for the recreational fisheries of the Kenai Peninsula, 1994. Alaska Department of Fish and Game, Fishery Management Report No. 95-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fmr95-04.pdf

Nelson, D. C., D. Athons, P. Berkhahn, and S. Sonnichsen. 1999. Area management report for the recreational fisheries of the Kenai Peninsula, 1995-1997. Alaska Department of Fish and Game, Fishery Management Report No. 99-3., Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fmr99-03.pdf

NPFMC (North Pacific Fishery Management Council). 2001. Environmental assessment/regulatory impact review/initial regulatory flexibility analysis for a regulatory amendment to incorporate the halibut charter sector into the halibut individual fishing quota program or implement a moratorium on entry into the charter fleet for Pacific halibut in Areas 2C and 3A (March 12, 2001 public review draft). North Pacific Fishery Management Council, Anchorage, AK.

Parker, S. J., S. A. Berkeley, J. T. Golden, D. R. Gunderson, J. Heifetz, M. A. Hixon, R. Larson, B. M. Leaman, M. S. Love, J. A. Musick, V. M. O'Connell, S. Ralston, H. J. Weeks, and M. M. Yoklavich. 2000. Management of Pacific rockfish. AFS Policy Statement. Fisheries 25(3): 22-30.

Parker, S. J., H. I. McElderry, P. S. Rankin, and R. W. Hannah. 2006. Buoyancy regulation and barotrauma in two species of nearshore rockfish. Transactions of the American Fisheries Society 135:1213-1223.

Pribyl, A. L., C. B. Schreck, M. L. Kent, and S. J. Parker. 2009. The differential response to decompression in three species of nearshore Pacific rockfish. North American Journal of Fisheries Management 29:1479-1486.

Schroeder, T. R., and R. Morrison. 1989. Lower Cook Inlet area annual finfish management report, 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2H89-02, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/RIR.2H.1989.01.pdf

Schroeder, T. R., and R. Morrison. 1990. 1989 Lower Cook Inlet Area annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2H90-03, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.2H.1990.03.pdf

Sigurdsson, D., and B. Powers. 2009. Participation, effort, and harvest in the sport fish business/guide licensing and logbook reporting programs, 2006-2008. Alaska Department of Fish and Game, Special Publication No. 09-11, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/SP09-11.pdf

Sigurdsson, D., and B. Powers. 2010. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2009. Alaska Department of Fish and Game, Fishery Data Series No. 10-65, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/Fds10-65.pdf

Sigurdsson, D., and B. Powers. 2011. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2010. Alaska Department of Fish and Game, Fishery Data Series No. 11-31, Anchorage. http://www.sf.adfg.alaska.gov/FedAidpdfs/FDS11-31.pdf

REFERENCES CITED (Continued)

Sigurdsson, D., and B. Powers. 2012. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2011. Alaska Department of Fish and Game, Fishery Data Series No. 12-27, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS12-27

Sigurdsson, D., and B. Powers. 2013. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2012. Alaska Department of Fish and Game, Fishery Data Series No. 13-37, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS13-37.pdf

Sigurdsson, D., and B. Powers. 2014. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2013. Alaska Department of Fish and Game, Fishery Data Series No. 14-23, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS14-23

Sonnichsen, S. 1990. Stock assessment of Dolly Varden in the Buskin River, Kodiak, Alaska 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-41, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds90-41.pdf

Southwick Associates Inc., W. J. Romberg, A. E. Bingham, G. B. Jennings, and R. A. Clark. 2008. Economic impacts and contributions of sportfishing in Alaska, 2007. Alaska Department of Fish and Game, Professional Paper No. 08-01, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/pp08-01.pdf

Stewart, I.J., and S. Martell. 2014. Assessment of the Pacific halibut stock at the end of 2014. International Pacific Halibut Commission Report of Assessment and Research Activities 2014: 161-180.

Stock, C. E., and S. C. Meyer. 2005. Composition of the recreational lingcod harvest in Southcentral Alaska, 1993-2002. Alaska Department of Fish and Game, Fishery Data Series No. 05-35, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/Fds05-35.pdf

Szarzi, N. J. 1991. Distribution and abundance of the Pacific razor clam, *Siliqua patula* (Dixon), on the east side Cook Inlet beaches. University of Alaska, Fairbanks, M.Sc. thesis, Juneau, Alaska.

Szarzi, N. J., and R. N. Begich. 2004a. Recreational fisheries in the Lower Cook Inlet Management Area, 1995-2000. Alaska Department of Fish and Game, Fishery Management Report No. 04-06, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fmr04-06.pdf

Szarzi, N. J., and R. N. Begich. 2004b. Recreational fisheries in the Lower Cook Inlet Management Area, 2001-2004: Fisheries under consideration by the Alaska Board of Fisheries 2004. Alaska Department of Fish and Game, Fishery Management Report No. 04-08, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fmr04-08.pdf

Szarzi, N. J., and P. A. Hansen. 2009. Harvest, abundance, age and length characteristics of razor clams from eastern Cook Inlet beaches 2004-2008. Alaska Department of Fish and Game, Fishery Data Series No. 09-03, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/fds09-03.pdf

Szarzi, N. J., P. A. Hansen, and J. J. Hasbrouck. 2010a. Harvest, abundance, age and length characteristics of razor clams from eastern Cook Inlet beaches, 1993-2003. Alaska Department of Fish and Game, Fishery Data Series No. 10-49, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS10-49.pdf

Szarzi, N. J., C. M. Kerkvliet, B. J. Failor, and M. D. Booz. 2010b. Recreational fisheries in the Lower Cook Inlet Management Area, 2008-2010, with updates for 2007. Alaska Department of Fish and Game, Fishery Management Report No. 10-38, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/Fmr10-38.pdf

Szarzi, N. J., C. M. Kerkvliet, C. E. Stock, and M. D. Booz. 2007. Recreational fisheries in the Lower Cook Inlet Management Area, 2005-2007, with updates for 2004. Alaska Department of Fish and Game, Fishery Management Report No. 07-55, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/fmr07-55.pdf

Trowbridge, C. E., and K. J. Goldman. 2006. 2006 review of Cook Inlet Area commercial fisheries for Dungeness crab, shrimp, and miscellaneous shellfish fisheries: A report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Special Publication No. 06-09, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/sp06-09.pdf

REFERENCES CITED (Continued)

Vincent-Lang, D., and W. Bechtol. 1992. Current status and recommendations for the future management of the lingcod stocks of the central Gulf of Alaska. A report to the Alaska Board of Fisheries, October 1992. Alaska Department of Fish and Game, Anchorage.

Wilde, G. R. 2009. Does venting promote survival of released fish? Fisheries 34(1):20-28.

Yang, C. Z., and L. J. Albright. 1994. The harmful phytoplankter *Chaetoceros concavicornis* causes high mortalities and leucopenia in Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*Oncorhynchus kisutch*). Canadian Journal of Fisheries and Aquatic Sciences. 51:2493-2500.

TABLES

Table 1.–Angler-days of effort expended by sport anglers fishing Lower Cook Inlet Management Area, 1977–2015.

	LCIMA										
	West Cook Inlet		Upper Cook Inlet			Lower Cook Inlet and Kachemak Bay					
Year	Salt water[a]	Fresh water	Saltwater finfish	Saltwater shellfish	Freshwater finfish	Saltwater finfish	Saltwater shellfish	Freshwater finfish	Total	Percent of state	Alaska total
1977			57,611[b]		55,706	46,827[b]			160,144	13.4	1,198,486
1978			64,429[b]		74,378	59,128[b]			197,935	15.4	1,286,063
1979	880		65,677[b]		77,027	64,656[b]			208,240	15.3	1,364,739
1980	928		63,481[b]		63,273	57,078[b]			184,760	12.4	1,488,962
1981	972		25,538	31,298	59,648	67,894	25,391		210,741	14.8	1,420,772
1982	1,501		29,718	31,954	49,687	61,315	15,712		189,887	11.7	1,623,090
1983	707	1,739	45,337	31,470	52,721	91,229	20,334	3,844	247,381	14.3	1,732,528
1984	1,673	652	53,955	30,013	53,320	72,441	25,162	2,243	239,459	12.8	1,866,837
1985	1,942	970	55,435	32,652	63,464	63,272	16,732	1,024	235,491	12.1	1,943,069
1986	2,562	399	66,377	33,486	63,132	74,781	21,755	2,231	264,723	12.8	2,071,412
1987	810	903	80,565	25,427	71,191	104,602	20,710	2,569	306,777	14.2	2,152,886
1988	3,989	782	54,799	30,998	50,260	127,784	13,306	2,339	284,257	12.3	2,311,291
1989	2,136	1,474	62,503	22,693	44,583	98,922	9,594	2,180	244,085	10.8	2,264,079
1990	2,406	1,140	82,881	29,427	61,718	133,938	10,342	4,068	325,920	13.3	2,453,284
1991	2,287	1,187	83,988	32,012	60,052	118,015	6,690	1,613	305,844	12.5	2,456,328
1992	2,526	989	93,175	44,537	67,710	127,971	15,727	2,575	355,210	14.0	2,540,374
1993	3,064	2,534	85,363	40,376	70,330	140,399	13,741	2,155	357,962	14.0	2,559,408
1994	4,151	900	111,560	48,546	70,085	143,033	18,187	3,071	399,533	14.7	2,719,911
1995	4,254	2,239	121,936	42,220	55,785	156,222	17,682	3,717	404,055	14.5	2,787,670
1996	2,753	1,865	73,229	29,943	37,797	116,089	11,584	802	274,062	13.7	2,006,528
1997	2,819	1,551	81,602	28,343	38,435	114,998	9,263	1,003	278,014	13.4	2,079,514
1998	2,403	937	68,967	26,636	35,766	99,481	3,926	752	238,868	12.9	1,856,976
1999	2,336	1,887	75,790	36,278	48,263	107,623	9,149	695	282,021	11.3	2,499,152
2000	3,344	1,414	84,615	37,755	48,895	122,600	11,445	1,097	311,165	11.8	2,627,805
2001	2,275	744	73,577	32,642	38,252	108,426	8,090	1,900	265,906	11.8	2,261,906
2002	2,120	1,638	65,204	34,406	38,468	120,892	7,439	644	270,811	12.0	2,259,091
2003	1,220	2,487	56,969	25,361	37,118	132,586	5,836	708	262,285	11.8	2,219,398
2004	2,304	1,619	65,968	30,211	42,392	137,910	6,641	931	287,976	11.6	2,473,961
2005	1,984	2,255	68,393	32,835	40,396	154,229	6,415	803	307,310	12.5	2,463,929

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Table 1.–Page 2 of 2.

	LCIMA										
	West Cook Inlet		Upper Cook Inlet			Lower Cook Inlet and Kachemak Bay					
Year	Salt water[a]	Fresh water	Saltwater finfish	Saltwater shellfish	Freshwater finfish	Saltwater finfish	Saltwater shellfish	Freshwater finfish	Total	Percent of state	Alaska total
2006	170	2,260	65,745	25,482	34,351	134,827	6,704	854	270,393	11.8	2,297,961
2007	74	2,121	69,304	25,170	54,678	142883	4,476	845	299,551	11.8	2,543,674
2008	83	1,226	59,799	28,806	45,082	115,164	6,240	780	257,180	11.1	2,315,601
2009	198	1,077	61,853	26,982	38,509	104,422	6,463	716	240,220	10.9	2,216,445
2010	282	1,039	56,143	19,412	29,689	111,654	4,886	674	223,799	11.2	2,000,167
2011	142	776	61,137	23,021	15,628	107,077	3,720	922	212,423	11.1	1,919,313
2012		1,333	59,139	21,872	15,622	108,853	2,194	1,997	211,010	11.2	1,885,768
2013		1,575	69,714	23,875	14,970	123,031	2,757	990	236,912	10.8	2,202,957
2014		323	63,202	7,844	20,597	132,835	2,815	779	228,395	9.9	2,309,853
2015		995	63,241	1,796	20,677	122,147	2,033	639	211,528	9.5	2,215,600
Averages											
1977–2012	1,857	1,405	68,105	31,008	50,095	106,923	11,423	1,658	267,094	13	2,115,788
2013–2015		964	65,386	11,172	18,748	126,004	2,535	803	225,612	10	2,242,803

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

[a] West Cook Inlet saltwater harvest except for shellfish is included in the Central and Lower Cook Inlet harvest starting in 2006.

[b] Includes shellfish.

Table 2.–Chinook salmon saltwater harvest in Lower Cook Inlet Management Area waters, 1977–2012.

	LCIMA–UCI [a]			LCIMA–LCI and Kachemak Bay					Remainder (unknown location)	LCIMA saltwater total
Year	Early-run [b]	Late-run [c]	Total	Summer [d]	Winter [e]	Summer + Winter total [f]	NDFL	Total		
1977	4,617	366	4,983	–	–	970	–	970	–	5,953
1978	2,669	2,693	5,362	–	–	816	–	816	–	6,178
1979	3,088	1,164	4,252	–	–	1,034	–	1,034	–	5,286
1980	521	747	1,268	–	–	431	–	431	368	2,067
1981	2,363	170	2,533	–	–	1,145	–	1,145	292	3,970
1982	2,497	1,173	3,670	–	–	1,963	–	1,963	355	5,988
1983	1,000	1,707	2,707	–	–	2,664	–	2,664	260	5,631
1984	2,386	835	3,221	–	–	1,559	–	1,559	2,077	6,857
1985	5,087	1,731	6,818	–	–	883	–	883	–	7,701
1986	2,888	1,208	4,096	–	–	439	–	439	855	5,390
1987	3,613	1,512	5,125	–	–	452	833	1,285	934	7,344
1988	4,243	1,775	6,018	–	–	1,472	5,275	6,747	3,118	15,883
1989	3,863	1,616	5,479	–	–	899	1,956	2,855	1,721	10,055
1990	4,694	1,964	6,658	–	–	1,123	2,027	3,150	1,570	11,378
1991	4,824	2,019	6,843	–	–	775	1,634	2,409	1,341	10,593
1992	5,996	2,509	8,505	–	–	2,978	1,406	4,384	1,466	14,355
1993	8,136	3,404	11,540	–	–	4,400	4,997	9,397	2,336	23,273
1994	6,850	2,296	9,146	–	–	6,154	2,607	8,761	1,832	19,739
1995	8,230	2,673	10,903	–	–	3,642	4,266	7,908	1,786	20,597
1996	4,702	2,006	6,708	–	–	3,509	2,356	5,865	1,801	14,374
1997	5,646	2,850	8,496	–	–	3,591	2,962	6,553	1,839	16,888
1998	5,783	1,680	7,463	–	–	3,417	1,856	5,273	1,064	13,800
1999	4,907	997	5,904	–	–	3,605	2,441	6,046	1,679	13,629
2000	4,773	1,026	5,799	–	–	3,628	2,012	5,640	1,384	12,823
2001	3,671	860	4,531	–	–	3,715	2,535	6,250	772	11,553
2002	3,368	427	3,795	3,877	1,423	5,300	2,621	7,921	122	11,838
2003	4,042	200	4,242	4,590	1,804	6,394	4,059	10,453	133	14,828
2004	3,880	1,539	5,419	6,034	2,069	8,103	4,068	12,171	147	17,737

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Table 2.–Page 2 of 2.

Year	LCIMA–UCI [a]			LCIMA–LCI and Kachemak Bay					Remainder (unknown location)	LCIMA saltwater total
	Early-run [b]	Late-run [c]	Total	Summer [d]	Winter [e]	Summer + Winter total [f]	NDFL	Total		
2005	3,746	1,040	4,786	8,170	2,958	11,128	2,810	13,938	126	18,850
2006	5,035	898	5,933	6,772	1,515	8,287	2,092	10,379	56	16,368
2007	4,015	797	4,829	3,959	2,011	5,970	1,757	7,727	0	12,556
2008	2,137	517	2,654	3,357	1,692	5,049	833	5,882	26	8,562
2009	1,415	256	1,671	2,444	1,696	4,140	710	4,850	25	6,546
2010	1,753	558	2,311	4,369	2,559	6,928	883	7,811	12	10,134
2011	2,201	853	3,054	3,711	2,000	5,711	418	6,129	101	9,284
2012	955	453	1,408	3,373	2,079	5,452	14	5,466	16	6,890
2013	2,027	510	2,537	5,810	2,411	8,221	95	8,316	169	11,022
2014	1,554	985	2,539	5,059	3,173	8,232	1,060	9,292	158	11,989
2015	2,658	1,528	4,186	8,030	5,137	13,494	1,766	15,260	314	19,760
Averages										
1977–2012	3,878	1,348	5,226	4,605	1,982	3,548	2,286	5,199	925	11,247
2013–2015	2,080	1,008	3,087	6,300	3,574	9,982	974	10,956	214	14,257

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– .Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: An en dash indicates no data are available.

[a] Excludes harvest from shore.

[b] Early run is 1 January to 30 June.

[c] Late run is 1 July to 31 December.

[d] Summer is 1 April to 30 September.

[e] Winter is 1 January to 31 March and 1 October to 31 December.

[f] Prior to 2002, SWHS did not estimate the Chinook salmon harvest in Lower Cook Inlet salt waters by fishery.

Table 3.–Chinook salmon harvest and catch in fresh waters of the Lower Cook Inlet Management Area, 1977–2015.

	LCIMA–UCI		LCIMA–LCI and Kachemak Bay		LCIMA–WCI		LCIMA total	
Year	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1977	2,670						2,670	
1978	4,358						4,358	
1979	4,109						4,109	
1980	1,510						1,510	
1981	3,196						3,196	
1982	2,749						2,749	
1983	3,294						3,294	
1984	2,407						2,407	
1985	1,904						1,904	
1986	2,462						2,462	
1987	2,477						2,477	
1988	2,548						2,548	
1989	2,165				58		2,223	
1990	3,583	9,342		31		8	3,583	9,381
1991	5,946	11,747					5,946	11,747
1992	8,380	18,976					8,380	18,976
1993	9,525	22,571				9	9,525	22,580
1994	8,064	13,546	29	29	19	19	8,112	13,594
1995	5,087	10,328	28	28	76	151	5,191	10,507
1996	4,770	16,554		43			4,770	16,597
1997	6,075	14,742			133	307	6,208	15,049
1998	2,775	7,294					2,775	7,294
1999	4,095	13,521					4,095	13,521
2000	4,449	12,761			207	406	4,656	13,167
2001	2,881	6,883	116	264	21	21	3,018	7,168
2002	2,384	8,892	26	26			2,410	8,918
2003	3,238	10,637	24	289	37	110	3,299	11,036
2004	3,624	11,273					3,624	11,273
2005	3,416	8,861	27	64	92	478	3,535	9,403
2006	3,174	9,484		32		16	3,174	9,532
2007	4,284	17,059					4,284	17,059
2008	3,064	7,935		116	90	315	3,154	8,366
2009	1,064	3,623			264	594	1,328	4,217
2010	971	3,068					971	3,068
2011	1,082	2,833		34	22	45	1,104	2,912
2012	87	420					87	420
2013	330	984					330	984
2014	486	3,165					486	3,165
2015	707	2,163		33			707	2,196
Averages								
1977–2012	3,552	10,537	42	87	93	191	3,587	10,686
2013–2015	508	2,104		33			508	2,115

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Catch was first reported in the SWHS during 1990.

Table 4.–Coho salmon harvest in Lower Cook Inlet Management Area waters, 1977–2015.

	LCIMA–WCI			LCIMA–LCI and Kachemak Bay				LCIMA–UCI			LCIMA		
Year	Salt water	Fresh water	Total	Nick Dudiak Lagoon	Saltwater other locations	Fresh water	Total	Salt water	Fresh water	Total	Salt waters[a]	Fresh water	Total
1977					4,749		4,749	557	1,900	2,457	5,306	1,900	7,206
1978					2,137		2,137	503	3,231	3,734	2,640	3,231	5,871
1979	50		50		2,633		2,633	387	3,707	4,094	3,070	3,707	6,777
1980	69		69		1,748		1,748	405	3,603	4,008	2,222	3,603	5,825
1981	48		48		2,149		2,149	918	4,255	5,173	3,115	4,255	7,370
1982	755		755		2,148		2,148	639	3,105	3,744	3,542		6,647
1983	62	1,872	1,934		2,408		2,408	860	2,401	3,261	3,330	4,273	7,603
1984	125	773	898		1,397		1,397	972	2,881	3,853	2,494	3,654	6,148
1985	124	747	871		1,232		1,232	734	5,262	5,996	2,090	6,009	8,099
1986	78	302	380	245	1,193		1,438	1,467	2,132	3,599	2,738	2,434	5,417
1987	127	706	833	459	994		1,453	1,986	4,111	6,097	3,107	4,817	8,383
1988	18	764	782	200	1,328		1,528	1,109	4,602	5,711	2,455	5,366	8,021
1989	251	875	1,126	1,439	1,766		3,205	888	5,682	6,570	2,905	6,557	10,901
1990	110	375	485	1,272	2,540		3,812	1,274	4,430	5,704	3,924	4,805	10,001
1991	63	1,144	1,207	3,822	3,604		7,426	1,365	5,528	6,893	5,032	6,672	15,526
1992	283	567	850	1,109	2,540		3,649	1,270	3,886	5,156	4,093	4,453	9,655
1993	177	1,579	1,756	5,823	4,186		10,009	2,190	6,962	9,152	6,553	8,541	20,917
1994	65	443	508	5,355	3,866		9,221	3,478	6,971	10,449	7,409	7,414	20,178
1995	1,018	1,979	2,997	5,367	3,418		8,785	2,020	4,786	6,806	6,456	6,765	18,588
1996	702	3,502	4,204	9,060	6,233		15,293	2,788	5,572	8,360	9,723	9,074	27,857
1997	32	722	754	6,091	4,905		10,996	2,793	3,264	6,057	7,730	3,986	17,807
1998	158	697	855	6,672	6,402		13,074	1,795	6,425	8,220	8,355	7,122	22,149
1999	235	885	1,120	3,890	5,629		9,519	2,425	7,564	9,989	8,289	8,449	20,628
2000	440	1,264	1,704	7,067	5,903		12,970	3,136	6,765	9,901	9,479	8,029	24,575
2001	483	2,232	2,715	11,015	11,273		22,288	5,301	5,766	11,067	17,057	7,998	36,070
2002	665	1,289	1,954	14,508	18,264		32,772	5,807	7,684	13,491	24,736	8,973	48,217
2003	173	2,511	2,684	18,531	10,300		28,831	2,865	8,585	11,450	13,338	11,096	42,965
2004	410	2,225	2,635	21,009	15,457		36,466	4,237	10,656	14,893	20,104	12,881	53,994
2005	182	1,845	2,027	15,075	16,187		31,262	3,541	9,234	12,775	19,910	11,079	46,064

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Table 4.–Page 2 of 2.

	LCIMA–WCI			LCIMA–LCI and Kachemak Bay				LCIMA–UCI			LCIMA		
Year	Salt water	Fresh water	Total	Nick Dudiak Lagoon	Saltwater other locations	Fresh water	Total	Salt water	Fresh water	Total	Salt waters[a]	Fresh water	Total
2006	[b]	1,667		4,450	9,975		14,425	3,418	8,278	11,696	17,843	9,945	27,788
2007	[b]	1,384		4,617	11,522		16,139	2,456	7,870	10,326	18,595	9,254	27,849
2008	[b]	573		3,767	7,859		11,626	1,902	7,396	9,298	13,528	7,969	21,497
2009	[b]	1,289		509	9,616		10,125	2,202	6,237	8,439	12,327	7,526	19,853
2010	[b]	858		1,007	6,724	51	7,731	2,375	5,257	7,632	10,106	6,166	16,221
2011	[b]	713		192	7,530	18	7,740	2,384	3,060	5,444	10,106	3,791	13,897
2012	[b]	898		58	3,584	234	3,876	3,078	3,356	6,434	6,720	4,488	11,208
2013	[b]	504		233	6,715	68	7,016	4,371	1,605	5,976	11,319	2,177	13,496
2014	[b]	300		9,418	9,038		18,456	2,582	4,412	6,994	21,038	4,712	25,750
2015	[b]	938		2,930	14,919		17,849	5,610	3,524	9,134	23,459	4,462	27,921
Averages													
1977–2012	256	1,223	1,341	5,652	5,650	101	9,896	2,098	5,345	7,442	8,345	6,465	18,549
2013–2015		581		4,194	10,224	68	14,440	4,188	3,180	7,368	18,605	3,784	22,389

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

[a] Salt waters excluding Nick Dudiak Fishing Lagoon.

[b] West Cook Inlet saltwater harvest included in Central and Lower Cook Inlet harvest.

Table 5.–Dolly Varden harvest in Lower Cook Inlet Management Area waters, 1977–2015.

Year	LCIMA–WCI			LCIMA–LCI and Kachemak Bay			LCIMA–UCI			LCIMA total
	Salt water	Fresh water	Total	Salt water	Fresh water	Total	Salt water	Fresh water	Total	
1977				4,137		4,137	603	11,437	12,040	16,177
1978				2,866		2,866	325	22,418	22,743	25,609
1979	173		173	3,218		3,218	382	27,808	28,190	31,581
1980				3,917		3,917	164	13,156	13,320	17,237
1981	57		57	4,212		4,212	313	18,403	18,716	22,985
1982				3,606		3,606	526	12,484	13,010	16,616
1983	42	42	84	3,997	1,678	5,675	493	18,871	19,364	25,123
1984		25	25	1,659	312	1,971	237	7,595	7,832	9,828
1985	381	243	624	2,324		2,324	243	8,826	9,069	12,017
1986	11	67	78	2,172	306	2,478	15	5,367	5,382	7,938
1987	91		91	1,358	380	1,738	379	3,911	4,290	6,119
1988				2,819	218	3,037	200	3,802	4,002	7,039
1989	29	114	143	2,083	343	2,426	382	1,848	2,230	4,799
1990		185	185	1,522	176	1,698	61	3,811	3,872	5,755
1991		114	114	1,393	275	1,668	246	1,983	2,229	4,011
1992	49	25	74	1,804	378	2,182	205	3,097	3,302	5,558
1993	26	181	207	1,720	172	1,892	150	1,506	1,656	3,755
1994	170	9	179	1,516	216	1,732	311	2,034	2,345	4,256
1995		218	218	737	154	891	285	2,102	2,387	3,496
1996				1,765	586	2,351	171	2,162	2,333	4,684
1997	32	119	151	1,541	706	2,247	378	2,178	2,556	4,954
1998	65	27	92	1,790	115	1,905	297	3,854	4,151	6,148
1999	33	205	238	774	209	983	288	1,671	1,959	3,180
2000		24	24	1,045	695	1,740	491	2,605	3,096	4,860
2001	66	43	109	1,019	195	1,214	422	2,131	2,553	3,876
2002	9		9	580	114	694	196	1,158	1,354	2,057
2003		20	20	1,265	289	1,554	117	1,539	1,656	3,230
2004	60	45	105	1,089	230	1,319	166	1,193	1,359	2,783
2005		67	67	524	158	682	440	945	1,385	2,134
2006				775	194	969	282	1,217	1,499	2,468
2007		183	183	661	179	840	256	1,668	1,924	2,947
2008		50	50	1,105	151	1,256	280	1,437	1,717	3,023
2009				1,685	207	1,892	156	1,407	1,563	3,455
2010		205	205	466	29	495	295	1,192	1,487	2,187
2011		10	10	277	30	307	143	583	726	1,043
2012		78	78	1,173	1,609	2,782	164	375	539	3,399
2013		179	179	1,274	174	1,448	145	2,372	2,517	4,144
2014				384	60	444	30	1,064	1,094	1,538
2015				2,311	125	2,436	245	2,971	3,216	5,652
Averages										
1977–2012	81	96	128	1,794	355	2,081	280	5,494	5,773	7,954
2013–2015		179	179	1,323	120	1,443	140	2,136	2,276	3,778

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Table 6.–Historical sport harvest of Pacific halibut in Cook Inlet waters, 1977–2015.

Year	Lower Cook Inlet [a]	Upper Cook Inlet [b]	West Cook Inlet [c]	Cook Inlet total	Statewide total
1977	9,416	4,050	[d]	13,466	23,244
1978	20,756	4,821	[d]	25,577	37,085
1979	20,479	6,518	[d]	26,997	47,705
1980	21,808	8,177	[d]	29,985	64,658
1981	29,294	9,427	[d]	38,721	74,212
1982	28,851	10,681	[d]	39,532	92,358
1983	36,623	23,503	[d]	60,126	117,042
1984	37,747	23,455	[d]	61,202	124,950
1985	41,450	21,198	510	63,158	127,634
1986	41,943	42,072	1,072	85,087	160,885
1987	44,380	33,039	869	78,288	145,829
1988	91,688	44,321	1,192	137,201	225,106
1989	73,892	51,739	1,224	126,855	229,016
1990	90,380	56,397	1,685	148,462	247,202
1991	86,405	60,423	1,576	148,404	266,523
1992	81,430	60,670	984	143,084	264,943
1993	92,057	67,826	2,507	162,390	313,147
1994	88,260	79,775	2,725	170,760	329,046
1995	86,832	81,322	[e]	168,154	325,188
1996	105,968	81,807	[e]	187,775	350,220
1997	105,646	88,270	[e]	193,916	380,256
1998	94,206	85,156	[e]	179,362	350,464
1999	86,252	69,255	[e]	155,507	332,657
2000	107,736	93,991	[e]	201,727	403,280
2001	94,864	87,618	[e]	182,482	365,539
2002	93,625	73,398	[e]	167,023	350,809
2003	112,386	77,708	[e]	190,094	402,862
2004	125,595	86,107	[e]	211,702	482,550
2005	133,147	85,548	[e]	218,585	500,048
2006	124,823	84,619	[e]	209,442	462,855
2007	156,085	97,180	[e]	253,265	584,764
2008	124,492	84,590	[e]	209,082	516,480
2009	110,092	85,202	[e]	195,294	440,255
2010	117,900	74,803	[e]	192,703	397,998
2011	122,032	81,496	[e]	203,528	393,571
2012	116,259	73,727	[e]	189,986	387,713
2013	123,200	84,282	[e]	207,482	453,594
2014	106,423	70,882	[e]	177,305	407,975
2015	109,277	70,489	[e]	179,766	420,484
Averages					
1977–2012	82,078	58,330	1,434	140,803	286,614
2013–2015	112,967	75,218		188,184	427,351

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Area designations differ from those presented in the rest of the report. See Introduction and footnotes given here.

[a] Cook Inlet salt waters east of the center of Cook Inlet, south of Anchor Point including Kachemak Bay and Gulf Coast waters west of Gore Point.

[b] Cook Inlet salt waters east of the center of Cook Inlet and north of Anchor Point.

[c] Cook Inlet salt waters west of the center of Cook Inlet and from the Susitna River south to Cape Douglas.

[d] Halibut information was not requested in the SWHS West Cook Inlet questionnaire before 1985.

[e] After 1994, the West Cook Inlet estimates were apportioned and included in the Central and Lower Cook Inlet subareas.

Table 7.–Razor clam harvest, participation, and success rates on eastside Kenai Peninsula beaches north of Anchor Point, 1969–2015.

Year	Participation (digger-days)	Harvest (number of clams)	Clams per digger day
1970	11,370	314,650	28
1971	6,800	187,760	28
1972	15,400	437,530	28
1973	23,770	682,600	29
1974	27,410	872,450	32
1975	24,260	896,080	37
1976	29,320	939,000	32
1977	25,393	871,247	34
1978	29,750	896,667	30
1979	30,323	966,677	32
1980	31,494	771,603	25
1981	31,298	829,436	27
1982	31,954	963,994	30
1983	31,470	978,720	31
1984	30,013	1,044,307	35
1985	32,652	1,070,265	33
1986	33,486	1,124,728	34
1987	25,427	979,020	39
1988	30,998	1,171,308	38
1989	22,693	832,155	37
1990	29,427	950,974	32
1991	32,012	1,166,787	36
1992	44,537	1,156,034	26
1993	40,376	947,437	23
1994	48,546	1,271,174	26
1995	42,220	1,158,107	27
1996	29,943	814,360	27
1997	28,343	829,841	29
1998	26,636	643,612	24
1999	36,278	750,447	21
2000	37,755	842,270	22
2001	32,642	640,633	20
2002	34,406	767,780	22
2003	25,361	568,662	22
2004	30,211	519,217	17
2005	32,835	427,016	13
2006	25,482	447,963	18
2007	25,170	350,224	14
2008	28,806	536,537	19
2009	26,982	501,500	19
2010	19,412	327,150	17
2011	23,021	406,430	18
2012	21,872	260,857	12
2013 [a]	23,875	174,305	7
2014 [b]	7,844	32,196	4
2015 [c]	0	0	0
Averages			
1970–2012	29,013	770,121	27
2013–2015	10,573	68,834	4

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Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

[a] Bag and possession reduced to 25 by emergency order.

[b] Ninilchik south and north subareas closed and bag and possession reduced to 25 razor clams for remaining subareas by emergency order.

[c] Entire beach closed by emergency order.

Table 8.–Lower Cook Inlet and Kachemak Bay shellfish sport and personal use fishery harvest and participation, 1981–2015.

Year	Participation all species (angler-days)	King crab (number)	Dungeness crab (number)	Tanner crab (number) [a]	Shrimp (gallons)	Hardshell clams (gallons)	Hardshell clams (number)	Razor clams (number)	Other shellfish (number)
1981	25,391	6,178	22,928	4,320	7,117	8,132			38,560
1982	15,712	1,981	9,956	4,234	5,009	5,135			1,782
1983	20,334	409	15,083	3,084	3,577	16,110			2,633
1984	25,162	62	15,113	2,332	2,419	8,891		37,476	349
1985	16,732	closed	29,530	3,502	3,260	10,334		16,205	2,982
1986	21,755	closed	34,217	7,926	4,771	20,212		40,937	128
1987	20,710	closed	51,279	8,988	7,788	23,577		25,855	9,080
1988	13,306	closed	32,053	4,669	2,090	26,597		18,374	3,474
1989	9,594	closed	10,075	closed	1,199	18,195		15,954	13,015
1990	10,342	closed	7,034	closed	2,038	11,821		21,701	11,707
1991	6,690	closed	closed	1,142	613	10,476		7,963	1,513
1992	15,727	closed	10,050	4,165	1,547	9,993		11,358	13,327
1993	13,741	closed	15,198	9,206	656	8,350		10,692	7,995
1994	18,187	closed	19,155	9,648	2,087	13,279		13,974	2,384
1995	17,682	closed	8,957	10,936	1,654	20,311		14,669	7,708
1996	11,584	closed	6,428	12,053	301	29,163		6,089	1,327
1997	9,263	closed	5,905	11,357	closed	9,426		1,997	882
1998	3,926	closed	closed	16,763	closed	12,431		4,030	
1999	9,149	closed	closed	17,045	closed	7,971		4,524	216
2000	11,445	closed	closed	19,672	closed	14,697		7,275	992
2001	8,090	closed	closed	6,499 [b]	closed	13,141		3,838	1,620
2002	7,439	closed	closed	3,574 [c]	closed	12,047		7,887	2,163
2003	5,836	closed	closed	closed	closed	10,074		7,241	1,925
2004	6,641	closed	closed	closed	closed	8,399		6,412	1,372
2005	6,415	closed	closed	closed	closed	11,625		3,677	1,874

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Table 8.–Page 2 of 2.

Year	Participation all species (angler-days)	King crab (number)	Dungeness crab (number)	Tanner crab (number) [a]	Shrimp (gallons)	Hardshell clams (gallons)	Hardshell clams (number)	Razor clams (number)	Other shellfish (number)
2006	6,704	closed	closed	closed	closed	4,210		6,529	1,108
2007	4,476	closed	closed	closed	closed	4,144		3,133	1,423
2008	6,240	closed	closed	17,173 [d]	closed	3,562		2,307	3,874
2009	6,463	closed	closed	18,827	closed	3,202		12,475	1,702
2010	4,886	closed	closed	13,745 [e]	closed	2,805		6,537	1,304
2011	3,720	closed	closed	14,803 [e]	closed		22,360	1,219	1,859
2012	2,194	closed	closed	closed	closed		23,406	2,797	2,451
2013	2,757	closed	closed	closed	closed		34,926	7,700	
2014	2,815	closed	closed	closed	closed		19,612	931	3,237
2015	2,033	closed	closed	closed	closed		30,376	0	1,093
Averages									
1981–2012	11,423	2,158	18,310	8,940	2,883	11,944		11,142	4,604
2013–2015	2,535						28,305	2,877	2,165

Source: Harvests were estimated from the Statewide Harvest Survey except Tanner crab harvests 1996–2002, 2008–2010 which are reported harvest on returned shellfish permits. Mills (1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

[a] Calendar year Tanner crab harvest from 1 January to 15 March and 15 July to 31 December until 2008, then season harvest from July to March.

[b] Reduced bag limit from 20 to 5 on 12 July.

[c] Fishery closed 3 August.

[d] Fishery opened 15 July.

[e] Estimate based on personal communication with E. Russ 29 June 2011.

Table 9.–Guided and unguided Chinook salmon harvest in the Lower Cook Inlet Management Area by location and fishery, 1986–2015.

	LCIMA–UCI						LCIMA–LCI								
	Early-run			Late-run			Summer			Winter					
Year	Unguided	Guided	Total	Unguided	Guided	Total	Unguided	Guided	Total	Unguided	Guided	Total	Unguided total	Guided total	Overall total
1986	2,719	168	2,888	1,138	71	1,208	–	–	–	–	–	–	3,857	239	4,096
1987	3,268	345	3,613	1,368	144	1,512	–	–	–	–	–	–	4,636	489	5,125
1988	4,026	217	4,243	1,684	91	1,775	–	–	–	–	–	–	5,710	308	6,018
1989	3,611	252	3,863	1,511	105	1,616	–	–	–	–	–	–	5,122	357	5,479
1990	4,186	508	4,694	1,752	212	1,964	–	–	–	–	–	–	5,938	720	6,658
1991	3,031	1,794	4,824	1,268	750	2,019	–	–	–	–	–	–	4,299	2,544	6,843
1992	3,624	2,372	5,996	1,516	993	2,509	–	–	–	–	–	–	5,140	3,365	8,505
1993	4,548	3,588	8,136	1,903	1,501	3,404	–	–	–	–	–	–	6,451	5,089	11,540
1994	3,809	3,042	6,850	1,276	1,019	2,296	–	–	–	–	–	–	5,085	4,061	9,146
1995	4,225	4,004	8,230	1,373	1,301	2,673	–	–	–	–	–	–	5,598	5,305	10,903
1996	2,464	2,238	4,702	1,099	907	2,006	–	–	–	–	–	–	3,563	3,145	6,708
1997	2,989	2,657	5,646	1,656	1,194	2,850	–	–	–	–	–	–	4,645	3,851	8,496
1998	2,600	3,183	5,783	1,164	516	1,680	–	–	–	–	–	–	3,764	3,699	7,463
1999	2,598	2,309	4,907	624	373	997	–	–	–	–	–	–	3,222	2,682	5,904
2000	2,613	2,160	4,773	457	569	1,026	–	–	–	–	–	–	3,070	2,729	5,799
2001	1,457	2,214	3,671	559	301	860	–	–	–	–	–	–	2,016	2,515	4,531
2002	1,621	1,747	3,368	204	223	427	2,357	1,520	3,877	1,219	204	1,423	5,401	3,694	9,095
2003	1,827	2,215	4,042	89	111	200	2,858	1,732	4,590	1,515	289	1,804	6,289	4,347	10,636
2004	1,631	2,249	3,880	764	775	1,539	2,519	3,515	6,034	1,650	419	2,069	6,564	6,958	13,522
2005	1,746	2,000	3,746	669	371	1,040	4,309	3,861	8,170	2,546	412	2,958	9,270	6,644	15,914
2006	2,212	2,823	5,035	398	500	898	3,717	3,055	6,772	1,346	169	1,515	7,673	6,547	14,220
2007	1,681	2,334	4,015	345	452	797	2,223	1,736	3,959	1,607	404	2,011	5,856	4,926	10,782
2008	680	1,457	2,137	232	285	517	2,072	1,285	3,357	1,356	336	1,692	4,340	3,363	7,703
2009	847	568	1,415	179	77	256	1,636	808	2,444	1,386	310	1,696	4,048	1,763	1,671
2010	1,261	492	1,753	319	239	558	1,789	2,580	4,369	1,770	789	2,559	5,139	4,100	9,239
2011	1,212	989	2,201	534	319	853	1,993	1,718	3,711	1,559	441	2,000	5,298	3,467	8,765
2012	484	471	955	343	110	453	1,556	1,817	3,373	1,749	330	2,079	4,132	2,728	6,860
2013	895	1,132	2,027	204	306	510	2,630	3,180	5,810	1,773	638	2,411	5,502	5,256	10,758
2014	809	745	1,554	570	415	985	2,095	2,964	5,059	2,735	438	3,173	6,209	4,562	10,771
2015	1,306	1,352	2,658	598	930	1,528	4,436	3,594	8,030	4,235	902	5,137	10,575	6,778	17,353
Averages															
1986–2012	2,480	1,792	4,273	905	500	1,405	2,457	2,148	4,605	1,609	373	1,982	5,042	3,320	8,208
2013–2015	1,003	1,076	2,080	457	550	1,008	3,054	3,246	6,300	2,914	659	3,574	7,429	5,532	12,961

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Source: Mills (1987-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Harvest was apportioned 70.5% to the early run and 29.5% to the late run for 1987–1995 based on estimates from onsite creel surveys from 1972 to 1986. Beginning in 1996, the Statewide Harvest Survey has generated separate estimates for the early (prior to and including June 24) and late (after June 24) runs.

Note: An en dash indicates no data are available.

Table 10.–Comparison of LCIMA saltwater guided angler Chinook salmon harvest reported in charter logbooks to that estimated with the Statewide Harvest Survey of charter anglers, 1998–2015.

Year	Charter logbook (reported harvest)	Statewide Harvest Survey (estimated harvest)
1998	4,245	5,478
1999	4,180	4,688
2000	4,304	4,422
2001	3,560	4,410
2002	3,954	3,694
2003	4,710	4,347
2004	5,867	6,958
2005	6,813	6,644
2006	4,711	6,547
2007	2,908	4,926
2008	1,744	3,363
2009	1,184	1,763
2010	2,873	4,100
2011	3,096	3,467
2012	2,288	2,728
2013	4,088	5,256
2014	5,340	4,562
2015	8,771	6,778

Source: Bob Powers, Program Coordinator, ADF&G, Division of Sport Fish Research and Technical Services, Anchorage.

Table 11.–Chinook salmon catch in Lower Cook Inlet Management Area salt waters by area and fishery, 1977–2015.

	LCIMA–UCI [a]			LCIMA–LCI and Kachemak Bay					Remainder (unknown location)	LCIMA saltwater total
Year	Early-run [b]	Late-run [c]	Total	Summer [d]	Winter [e]	Summer + Winter total [f]	NDFL	Total		
1990	–	–	10,750	–	–	4,624	3,584	8,208	136	19,094
1991	–	–	9,477	–	–	2,462	2,181	4,643	449	14,569
1992	–	–	11,543	–	–	6,617	2,441	9,058	366	20,967
1993	–	–	15,755	–	–	8,960	9,258	18,218	574	34,547
1994	–	–	14,838	–	–	11,358	4,527	15,885	455	31,178
1995	–	–	15,951	–	–	6,422	6,396	12,818	396	29,165
1996	3,233	6,419	9,652	–	–	7,256	6,335	13,591	512	23,755
1997	4,949	9,138	14,087	–	–	7,141	5,483	12,624	714	27,425
1998	2,888	8,233	11,121	–	–	6,153	2,881	9,034	396	20,551
1999	1,620	7,656	9,276	–	–	7,213	4,088	11,301	176	20,753
2000	1,385	6,575	7,960	–	–	6,561	4,901	11,462	380	19,802
2001	1,491	5,339	6,831	–	–	5,718	3,877	9,595	287	16,713
2002	573	5,157	5,730	2,048	6,748	8,796	3,925	12,721	28	18,479
2003	450	6,210	6,660	3,275	7,789	11,064	7,188	18,252	297	25,209
2004	2,290	5,301	7,591	2,297	8,248	10,545	5,886	16,431	250	24,272
2005	1,664	5,628	7,292	4,571	12,042	16,613	4,293	20,906	288	28,486
2006	1,596	6,464	8,060	2,624	9,524	12,148	3,133	15,281	161	23,502
2007	1,109	5,117	6,226	3,772	6,116	9,888	2,729	12,617	17	18,860
2008	597	2,536	3,133	2,049	4,078	6,127	1,237	7,364	26	10,523
2009	362	1,785	2,147	2,769	3,654	6,423	1,137	7,560	25	9,732
2010	1,275	3,467	4,742	4,097	6,237	10,334	1,382	11,716	50	16,508
2011	1,320	2,785	4,105	2,744	4,855	7,599	441	8,040	109	12,254
2012	701	1,174	1,875	2,595	3,802	6,397	30	6,427	16	8,318
2013	820	2,744	3,564	3,144	7,207	10,351	405	10,756	288	14,608
2014	1,607	2,132	3,739	4,595	6,438	11,033	1,200	12,233	10	15,982
2015	1,986	4,002	5,988	8,940	10,605	19,545	2,234	21,779	204	27,971
Averages										
1990–2012	1,618	5,234	8,470	2,986	6,645	8,105	3,797	11,902	266	20,637
2013–2015	1,471	2,959	4,430	5,560	8,083	13,643	1,280	14,923	167	19,520

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Source: Mills (1991-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: An en dash indicates no data are available.

[a] Excludes harvest from shore.

[b] Early run is 1 January to 30 June.

[c] Late run is 1 July to 31 December.

[d] Summer is 1 April to 30 September.

[e] Winter is 1 January to 31 March and 1 October to 31 December.

[f] Prior to 2002, SWHS did not estimate the Chinook salmon harvest in Lower Cook Inlet salt waters by fishery.

Table 12.–Chinook salmon genetic samples collected by area and fishery in the LCIMA, 2014–2016.

		Year		
Area	Fishery	2014	2015	2016
Upper Cook Inlet	Early-run	306	516	495
	Late-run	30	27	248
Lower Cook Inlet	Summer	1,443	3,298	1,954
	Winter	326	868	487
Totals		2,105	4,709	3,184

Note: All data are preliminary.

Table 13.–The percentage of the LCIMA saltwater Chinook salmon harvest that was mature by location and fishery, 1996–2016.

	LCIMA–UCI				LCIMA–LCI	
	Early-run					
Year	SHA [a]	Outside [b]	Combined	Late-run	Summer	Winter
1996	–	–	81.5	–	–	–
1997	80.0	33.3	77.8	89.1	–	–
1998	65.7	16.7	60.3	71.6	–	–
1999	82.6	35.6	71.7	–	–	–
2000	76.4	29.0	60.0	–	–	–
2001	70.1	37.1	58.2	–	–	–
2002	52.3	25.7	49.0	–	–	–
2014 [c]	38.0	19.1	34.3	41.7	8.9	–
2015 [c]	24.7	20.4	21.5	42.7	11.1	–
2016 [c]	15.4	10.4	11.7	11.4	10.6	–

Note: An en dash means no data are available.

[a] SHA means Special Harvest Areas. These are within 1 mile from shore bordering the conservation zones around the mouths of the roadside streams.

[b] All remaining waters in LCIMA–UCI greater than 1 mile from shore.

[c] Preliminary.

Table 14.–Sample number and average length from mid eye to tail fork (METF) of Chinook salmon sampled in the LCIMA saltwater harvest by area and fishery, 2014–2016.

		Year					
		2014		2015		2016	
Area	Fishery	Sample number	Average METF length (mm)	Sample number	Average METF length (mm)	Sample number	Average METF length (mm)
Upper Cook Inlet	Early-run	310	705	502	717	469	662
	Late-run	34	725	28	754	235	636
Lower Cook Inlet	Summer	1621	653	3202	644	1814	625
	Winter	293	670	878	676	228	645

Note: All data are preliminary.

Table 15.–Chinook salmon CWT heads collected and tagged by area and fishery from the LCIMA saltwater harvest, 2014–2016.

		Year					
		2014		2015		2016	
Area	Fishery	Collected	Tagged	Collected	Tagged	Collected	Tagged
Upper Cook Inlet	Early-run	28	12	50	20	56	15
	Late-run	5	2	3	2	40	15
Lower Cook Inlet	Summer	282	120	591	215	253	89
	Winter	42	18	190	66	39	14
Total		357	152	834	303	388	133

Note: All data are preliminary.

Table 16.–Number of Chinook salmon by origin containing a CWT in samples of LCIMA saltwater sport harvests, 2014–2016.

Year	Fishery	SE Alaska	British Columbia	Washington	Oregon	Idaho
2014	Early-run	1	8	1	2	
	Late-run		1	1		
	Summer	18	35	38	28	1
	Winter		8	3	7	
2015	Early-run		10	7	3	
	Late-run	1			1	
	Summer	24	57	98	32	4
	Winter	2	26	24	14	
2016	Early-run	1	10	3	1	
	Late-run	1	5	6	3	
	Summer	12	23	39	14	
	Winter	2	7	3	2	

Note: All data are preliminary. No hatchery fish of Cook Inlet origin have been coded-wire-tagged in recent years until 2015.

Table 17.–Salmon smolt releases to terminal fisheries in Kachemak Bay, 1974–2015.

	Nick Dudiak Fishing Lagoon on the Homer Spit				Halibut Cove Lagoon	Seldovia	
Release year	Early-run Chinook	Late-run Chinook	Early-run coho	Late-run coho	Early-run Chinook	Early-run Chinook	Late-run coho
1974					3,872		
1975					3,463		
1976					16,183		
1977					48,907		
1978					126,306		
1979					305,145		
1980					260,295		
1981					76,472		
1982							
1983					200,900		
1984	88,753				84,000		
1985	152,226				98,000		
1986	103,946				101,331		
1987	103,860				94,100	80,420	
1988	219,572			62,550	93,874	111,435	
1989	212,737			153,844	115,682	108,300	
1990	210,087			122,945	112,458	98,525	
1991	190,915			100,029	92,363	91,592	
1992	227,125	126,130		100,570	117,850	112,935	
1993	212,292	100,000		116,129	100,228	106,497	
1994	163,963	156,873		156,213	98,872	107,246	
1995	216,026	123,048		110,701	37,577	116,165	
1996	204,085	108,204		149,685	97,729	118,274	
1997	217,733	100,933		232,146	78,133	103,757	
1998	177,730	112,100		130,219	65,893	69,461	
1999	163,170	59,611		129,602	79,221	74,057	
2000	219,984			122,338	83,277	68,114	
2001	208,062		100,280	124,762	106,719	102,793	
2002	190,026		95,648	120,707	106,279	83,045	
2003	206,292		222,735 [a]	105,000 [b]	106,844	107,521	
2004	168,743		130,243	110,000 [b]	103,771	88,682	
2005	220,822		125,707	91,485 [b,c]	112,521	114,984	
2006	224,053		125,216	324,200 [b,c]	117,549	113,974	113,800 [b,c]
2007	226,972		127,244	100,600 [b]	54,560	54,276	
2008	212,141		125,108	95,000 [b]	59,784	54,464	
2009	164,234		113,696	44,695 [d]	35,065	44,487 [e]	
2010	213,503 [d]		130,206		111,134	114,421	
2011	224,028 [d]		64,595	64,595	107,338	104,095	
2012	221,547		53,625	53,625	110,253	95,800	
2013	216,963		66,014	66,014	60,666	63,311	
2014	178,224		76,535		85,856	74,259	
2015	210,543		122,963		102,718	72,233	

[a] Includes 100,000 coho diverted from Bird Creek because of highway construction.

[b] Purchased from Cook Inlet Aquaculture (CIAA) with non-ADF&G funding source.

[c] Treated for bacterial kidney disease (BKD).

[d] An addition 67,305 were stocked but died from *Chaetoceros* spp. infestion.

[e] One net pen with rearing salmon was sucked down the culvert resulting in unknown but significant mortality.

Table 18.–Shorebased harvest and effort (angler-days) directed toward enhanced Chinook and coho salmon on the Homer Spit, 1987–2015.

Year	Chinook salmon harvest [a]			Pink salmon harvest [b]	Coho salmon harvest	Total (all stocked species)		
	Early-run	Late-run [c]	Total			Harvest	Catch	Angler-days
1987			833			833		
1988			5,275	1,819		7,094		20,282
1989			1,956	3,856	1,439	7,251		15,753
1990			2,027	697	1,272	3,996	5,001	22,751
1991			1,634	647	3,822	6,103	6,150	11,495
1992			1,406	485	1,109	3,000	3,442	8,440
1993			4,997	1,836	5,823	12,656	14,821	28,290
1994			2,607		5,355	7,962	10,495	30,221
1995			4,266		5,367	9,633	12,344	36,451
1996	933	1,423	2,356		9,060	11,416	19,094	24,315
1997	1,512	1,450	2,962		6,091	9,053	14,257	23,197
1998	1,051	805	1,856		6,672	8,528	11,929	15,093
1999	1,753	688	2,441		3,890	6,331	8,730	19,448
2000	1,223	789	2,012		7,067	9,079	14,021	23,075
2001	1,371	1,164	2,535		11,015	13,550	15,698	18,516
2002	2,621		2,621		14,508	17,129	23,460	24,981
2003	4,059		4,059		18,531	22,590	33,087	28,380
2004	4,068		4,068		21,009	25,077	33,101	32,185
2005	2,810		2,810		15,075	17,885	22,237	28,097
2006	2,092		2,092		4,450	6,542	9,368	20,898
2007	1,757		1,757		4,617	6,374	8,092	18,861
2008	833		833		3,767	4,600	6,070	12,649
2009	710		710		509	1,219	1,730	8,988
2010	883		883		1,007	1,890	2,853	10,551
2011	418		418		192	610	916	6,446
2012	14		14		58	72	88	4,086
2013	95		95		233	328	646	8,397
2014	1,060		1,060		9,418	10,478	12,515	20,566
2015	1,766		1,766		2,930	4,696	5,636	16,998
Averages								
1987–2012	1,653	1,053	2,286	1,557	6,321	8,480	12,043	19,738
2013–2015	974		974		4,194	5,167	6,266	15,320

Source: Mills (1988-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

[a] Only early-run fish were stocked prior to 1993 when ocean-age-1 late-run fish first became available for harvest. Early- and late-run harvests have been estimated separately beginning in 1996.

[b] The pink salmon stocking program was discontinued; the last return was in 1993.

[c] The late-run stocking program was discontinued in 2000; the last return occurred in 2004.

Table 19.–Angler participation (angler-days), harvest, and catch of freshwater Chinook salmon in the Lower Cook Inlet Management Area roadside streams, 1977–2015.

	Anchor River			Deep Creek			Ninilchik River			Total		
Year	Angler-days	Harvest	Catch	Angler-days	Harvest	Catch	Angler-days	Harvest	Catch	Angler-days	Harvest	Catch
1977	31,515	1,077		11,399	425		11,350	1,168		54,264	2,670	
1978	42,671	2,109		13,872	804		14,173	1,445		70,716	4,358	
1979	44,220	1,913		12,560	703		18,282	1,493		75,062	4,109	
1980	33,272	605		8,796	182		19,706	723		61,774	1,510	
1981	34,257	1,069		10,127	604		14,184	1,523		58,568	3,196	
1982	24,709	718		12,149	791		11,806	1,240		48,664	2,749	
1983	28,881	1,269		13,505	1,154		9,458	871		51,844	3,294	
1984	26,919	998		15,760	761		10,122	648		52,801	2,407	
1985	31,715	672		19,802	249		10,213	983		61,730	1,904	
1986	34,938	1,098		17,354	944		9,250	420		61,542	2,462	
1987	39,045	761		16,734	604		13,329	1,112		69,108	2,477	
1988	24,356	976		12,115	777		12,533	795		49,004	2,548	
1989	19,145	578		13,414	843		9,977	744		42,536	2,165	
1990	28,829	1,479	4,119	23,567	1,411	3,625	8,323	693	1,598	60,719	3,583	9,342
1991	22,187	1,047	2,540	17,048	1,776	3,947	19,640	3,123	5,260	58,875	5,946	11,747
1992	24,028	1,685	4,506	15,226	1,379	3,045	27,816	5,316	11,425	67,070	8,380	18,976
1993	29,338	2,787	6,022	19,535	2,503	7,058	20,466	4,235	9,491	69,339	9,525	22,571
1994	27,856	2,478	3,890	18,357	2,379	4,174	21,827	3,108	5,482	68,040	7,965	13,546
1995	25,888	1,475	3,545	12,727	1,161	2,470	16,160	2,451	4,313	54,775	5,087	10,328
1996	16,016	1,483	6,594	9,629	886	2,426	11,445	2,401	7,481	37,090	4,770	16,501
1997	17,020	1,563	5,289	9,712	1,249	2,574	11,064	3,263	6,879	37,796	6,075	14,742
1998	14,310	783	2,443	9,206	539	1,456	10,994	1,453	3,395	34,510	2,775	7,294
1999	21,184	1,409	6,903	11,367	741	2,453	15,344	1,945	4,153	47,895	4,095	13,509

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Table 19.–Page 2 of 2.

Year	Anchor River			Deep Creek			Ninilchik River			Total		
	Angler-days	Harvest	Catch	Angler-days	Harvest	Catch	Angler-days	Harvest	Catch	Angler-days	Harvest	Catch
2000	22,971	1,730	5,200	12,174	937	2,903	12,432	1,782	4,648	47,577	4,449	12,751
2001	19,195	889	2,415	7,834	593	1,380	10,602	1,399	3,014	37,631	2,881	6,809
2002	19,245	1,047	4,103	8,925	507	2,551	9,572	830	2,180	37,742	2,384	8,834
2003	17,520	1,011	4,311	8,959	775	2,121	9,843	1,452	4,205	36,322	3,238	10,637
2004	20,452	1,561	5,561	10,575	823	2,727	10,500	1,240	2,961	41,527	3,624	11,249
2005	20,079	1,432	5,028	10,182	642	1,791	9,003	1,342	2,042	39,264	3,416	8,861
2006	17,065	1,394	4,638	7,128	451	1,829	9,620	1,329	3,004	33,813	3,174	9,471
2007	34,390	2,081	9,792	9,382	628	2,493	10,211	1,575	4,774	53,983	4,284	17,059
2008	26,182	1,486	3,245	9,332	602	2,600	8,158	976	2,090	43,672	3,064	7,935
2009	22,057	737	2,296	8,367	124	767	7,687	203	560	38,111	1,064	3,623
2010	16,740	364	889	7,160	249	808	5,296	358	1,371	29,196	971	3,068
2011	9,131	573	1,227	3,537	251	894	2,292	258	678	14,960	1,082	2,799
2012	8,234	38	189	4,037	33	156	2,995	16	75	15,266	87	420
2013	11,173	97	423	2,003	130	439	1,232	103	122	14,408	330	984
2014	10,481	203	926	5,494	101	807	4,306	182	1,432	20,281	486	3,165
2015	13,850	344	1,159	4,498	294	441	2,162	69	563	20,510	707	2,163
Averages												
1977–2012	23,567	1,199	3,948	11,357	797	2,344	11,465	1,457	3,795	46,389	3,453	10,086
2013–2015	11,835	215	836	3,998	175	562	2,567	118	706	18,400	508	2,104

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Catch first reported in SWHS during 1990.

Table 20.–Angler participation (angler-days), harvest, and catch of Chinook, coho, pink, and sockeye salmon; Dolly Varden; and rainbow trout or steelhead, Anchor River, 1977–2015.

	Chinook salmon		Coho salmon		Dolly Varden		Steelhead and rainbow trout		Pink salmon	Sockeye salmon	Angler-
Year	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch[a]	Harvest	Harvest	days
1977	1,077		1,339		9,222		2,099		27		31,515
1978	2,109		1,559		17,357		2,305		139		42,671
1979	1,913		4,006		21,364		1,782		18		44,220
1980	605		2,649		10,948		1,186		339		33,272
1981	1,069		2,949		15,271		928		11		34,257
1982	718		2,379		10,375		698		161		24,709
1983	1,269		1,395		17,277		1,605		252		28,881
1984	998		1,135		5,599		985		249	167	26,919
1985	672		2,239		7,716		475		124	224	31,715
1986	1,098		1,021		3,914		520		136	39	34,938
1987	761		2,010		2,735		643		54	1,263	39,045
1988	976		2,219		2,746		200		109	109	24,356
1989	578		2,635		1,476			2,066	115	136	19,145
1990	1,479	4,119	2,782	4,666	2,821	11,441		1,978	163	136	28,829
1991	1,047	2,540	3,169	3,980	1,409	14,433		2,349	125	152	22,187
1992	1,685	4,506	2,267	4,850	2,532	18,303		2,720	92	66	24,028
1993	2,787	6,022	4,003	6,657	1,031	9,719		4,156	98	45	29,338
1994	2,478	3,890	3,360	5,136	1,574	13,305		4,035	79	82	27,856
1995	1,475	3,545	3,080	5,141	1,537	10,957		2,232	47	94	25,888
1996	1,483	6,594	1,762	4,025	963	17,189		7,570	78	218	16,016
1997	1,563	5,289	1,636	4,017	1,575	17,467		3,103	321	165	17,020
1998	783	2,443	2,386	3,949	2,105	16,195		3,878	7	174	14,310
1999	1,409	6,903	1,780	3,807	1,061	17,076		3,920	54	174	21,184
2000	1,730	5,200	2,604	4,807	1,903	20,469		8,693	123	127	22,971
2001	889	2,415	2,960	6,327	1,652	11,980		3,045	11	61	19,195
2002	1,047	4,103	3,830	7,510	662	11,419		3,501	124	52	19,245
2003	1,011	4,311	3,999	12,133	1,124	18,412		3,409	68	504	17,520
2004	1,561	5,561	4,383	10,194	736	15,052		3,710	146	11	20,452
2005	1,432	5,028	5,314	11,639	675	6,820		2,524	69	156	20,079

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Year	Chinook salmon		Coho salmon		Dolly Varden		Steelhead and rainbow trout		Pink salmon	Sockeye salmon	Angler-days
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch[a]	Harvest	Harvest	
2006	1,394	4,638	3,920	7,634	897	12,920		4,513	112	54	17,065
2007	2,081	9,792	3,962	9,881	1,327	26,842		8,365	298	53	34,390
2008	1,486	3,245	4,790	7,658	822	23,757		8,733	179	652	26,182
2009	737	2,296	3,882	6,332	1,123	20,117		4,119	267	169	22,057
2010	364	889	2,863	4,799	790	8,321		2,018	48	10	16,740
2011	573	1,227	808	1,275	521	6,536		401	43	17	9,131
2012	38	189	1,121	1,548	278	9,410		1,833	66	30	8,234
2013	97	423	912	1,360	2,175	15,086		2,246	96		11,173
2014	203	926	1,528	2,638	894	24,122		3,621	43	13	10,481
2015	344	1,159	2,072	5,070	2,920	26,169		2,892	84		13,850
Averages											
1977–2012	1,168	3,948	2,584	5,749	4,082	14,089	959	3,715	115	166	24,204
2013–2015	215	836	1,504	3,023	1,996	21,792		2,920	74	13	11,835

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Catch first reported in SWHS during 1990.

[a] Catch indicates catch-and-release of rainbow trout and steelhead because retention of this species is prohibited. Catch estimates prior to 1989 come from unpublished Statewide Harvest Survey data.

Table 21.–Angler participation (angler-days) and harvest of Chinook, coho, pink, and sockeye salmon; Dolly Varden; and rainbow trout or steelhead, Deep Creek, 1977–2015.

	Chinook salmon		Coho salmon		Dolly Varden		Steelhead and rainbow trout		Pink salmon	Sockeye salmon	Angler-
Year	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch [a]	Harvest	Harvest	days
1977	425		306		1,330		569		109		11,399
1978	804		1,383		3,046		498		294		13,872
1979	703		362		2,027		263		9		12,560
1980	182		478		1,028		236		321		8,796
1981	604		464		1,382		248		11		10,127
1982	791		366		1,247		239		293		12,149
1983	1,154		545		1,112		315		42		13,505
1984	761		1,197		973		311		112	318	15,760
1985	249		2,301		850		179		37	187	19,802
1986	944		588		306		688		52	52	17,354
1987	604		1,050		72		85		18	191	16,734
1988	777		1,528		219		291		72	182	12,115
1989	843		2,254		333			409	28	117	13,414
1990	1,411	3,625	1,111	2,039	708	3,862		1,291	35	165	23,567
1991	1,776	3,947	1,290	1,710	287	2,480		425	50	876	17,048
1992	1,379	3,045	737	1,239	401	2,941		740	46	378	15,226
1993	2,503	7,058	1,722	2,790	145	1,423		1,448	81	145	19,535
1994	2,379	4,174	1,895	2,970	377	3,437		1,156	25	141	18,357
1995	1,161	2,470	1,014	1,636	301	1,325		520	180	87	12,727
1996	886	2,426	2,313	3,818	615	4,346		1,079	21	55	9,629
1997	1,249	2,574	1,115	1,943	276	2,409		384	106	252	9,712
1998	539	1,456	2,035	3,635	1,061	4,477		1,350	47	185	9,206
1999	741	2,453	2,651	3,991	496	2,458		689	165	214	11,367
2000	937	2,903	2,018	3,660	355	2,209		1,805	62	72	12,174
2001	593	1,380	1,828	2,529	240	1,271		627		129	7,834
2002	507	2,551	1,832	3,663	452	2,765		954	223		8,925
2003	775	2,121	1,751	3,179	314	9,703		2,456		406	8,959
2004	823	2,727	2,474	4,624	268	8,673		4,365		45	10,575
2005	642	1,791	2,202	4,631	149	1,800		1,355	54	447	10,182

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Year	Chinook salmon		Coho salmon		Dolly Varden		Steelhead and rainbow trout		Pink salmon	Sockeye salmon	Angler-days
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch [a]	Harvest	Harvest	
2006	451	1,829	1,606	3,302	61	2,108		1,219	0	86	7,128
2007	628	2,493	1,932	3,158	277	3,679		2,668	15	289	9,382
2008	602	2,600	1,631	3,174	164	5,636		3,672	135	144	9,332
2009	124	767	1,323	2,341	230	4,356		1,463	263	85	8,367
2010	249	808	1,484	3,028	209	2,743		1,043	12	52	7,160
2011	251	894	1,358	1,507	21	1,170		122	50		3,537
2012	33	156	1,122	1,536	49	1,041		681	36		4,037
2013	130	439	359	457		421		515			2,003
2014	101	807	1,889	2,385	136	2,167		932		14	5,494
2015	294	441	1,085	2,069	51	8,529		728	141	364	4,498
Averages											
1977–2012	776	2,344	1,349	2,754	563	3,180	280	1,277	86	189	11,664
2013–2015	175	562	1,111	1,637	94	3,706		725	141	189	3,998

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Catch first reported in SWHS during 1990.

[a] Catch indicates catch-and-release of rainbow trout and steelhead because retention of this species is prohibited. Catch estimates prior to 1989 come from unpublished Statewide Harvest Survey data.

Table 22.–Angler participation (angler-days) and harvest of Chinook, coho, and pink salmon; Dolly Varden; and rainbow trout or steelhead, Ninilchik River, 1978–2015.

	Chinook salmon [a]		Coho salmon		Dolly Varden		Steelhead and rainbow trout		Pink salmon	Sockeye salmon	Angler-
Year	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch [b]	Harvest	Harvest	days
1977	1,168		122		424		230		0		11,350
1978	1,445		88		1,003		307		46		14,173
1979	1,493		200		2,390		509		0		18,282
1980	723		321		853		381		260		19,706
1981	1,523		432		875		464		0		14,184
1982	1,240		241		514		179		10		11,806
1983	871		210		199		157		42		9,458
1984	648		549		524		137		150	1,405	10,122
1985	983		697		87		501		0	373	10,213
1986	420		336		505		275		13	465	9,250
1987	1,112		924		507		291		108	2,488	13,329
1988	795		709		655		272		36	1,073	12,533
1989	744		379		39			505	216	526	9,977
1990	693	1,598	368	633	115	1,614		177	12	58	8,323
1991	3,123	5,260	789	899	222	887		512	116	203	19,640
1992	5,316	11,425	785	1,433	131	1,573		1,008	37	1,101	27,816
1993	4,235	9,491	845	1,636	29	410		442	0	406	20,466
1994	3,108	5,482	1,089	1,486	65	167		804	17	943	21,827
1995	2,451	4,313	620	971	133	332		178	38	161	16,160
1996	2,401	7,481	1,071	1,332	560	2,297		522	0	284	11,445
1997	3,263	6,879	402	948	141	1,024		380	32	236	11,064
1998	1,453	3,395	836	963	272	1,016		576	13	101	10,994
1999	1,945	4,153	2,980	5,127	114	818		694	107	964	15,344
2000	1,782	4,648	1,724	3,354	228	1,444		760	20	255	12,432
2001	1,399	3,014	708	1,196	228	1,330		283	0	1,181	10,602
2002	830	2,180	1,655	3,238	44	993		468	85	109	9,572
2003	1,452	4,205	2,526	4,596	20	952		984	0	191	9,843
2004	1,240	2,961	3,425	4,440	136	907		400	49	470	10,500
2005	1,342	2,042	1,339	2,663	74	400		934	0	399	9,003

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Year	Chinook salmon [a] Harvest	Chinook salmon [a] Catch	Coho salmon Harvest	Coho salmon Catch	Dolly Varden Harvest	Dolly Varden Catch	Steelhead and rainbow trout Harvest	Steelhead and rainbow trout Catch [b]	Pink salmon Harvest	Sockeye salmon Harvest	Angler-days
2006	1,329	3,004	2,472	3,069	55	733		559	9	556	9,620
2007	1,575	4,774	1,591	2,225	64	1,351		725	30	225	10,211
2008	976	2,090	692	986	29	736		1,465	151	179	8,158
2009	203	560	895	1,853	54	734		1,181	51	353	7,687
2010	358	1,371	711	854	48	821		360	13	81	5,296
2011	258	678	356	380	9	145		53	50	0	2,292
2012	16	75	1,035	1,113	0	13		169	13	0	2,995
2013	103	122	220	232	104	122		100		43	1,232
2014	182	1,432	820	997	34	187		309			4,306
2015	69	563	300	833		849		336		40	2,162
Averages											
1977–2012	1,419	3,795	898	1,891	299	862	265	566	45	477	11,775
2013–2015	118	706	447	687	69	386		248		42	2,567

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Catch first reported in SWHS during 1990.

[a] Enhanced return beginning in 1991.

[b] Catch indicates catch-and-release of rainbow trout and steelhead because retention of this species is prohibited. Catch estimates prior to 1989 come from unpublished Statewide Harvest Survey data.

Table 23.–Anchor River Chinook salmon escapement, freshwater harvest, total run, and exploitation (harvest per total run), 2003–2016.

Year	Project dates	Escapement		Inriver harvest		Total inriver run [a]	
		Estimate	SE	Estimate	SE	Estimate	Exploitation rate (%)
2003 [b]	30 May–9 Jul	9,238	0	1,011	157	10,249	9.9 [c]
2004	15 May–15 Sep	12,016	283	1,561	198	13,577	11.5
2005	13 May–9 Sep	11,156	229	1,432	233	12,588	11.4
2006	15 May–24 Aug	8,945	289	1,394	197	10,339	13.5
2007	14 May–12 Sep	9,622	238	2,081	326	11,703	17.8
2008	13 May–12 Sep	5,806	169	1,612	241	7,418	21.7
2009	12 May–11 Sep	3,455	0	737	212	4,192	17.6
2010	13 May–29 Sep	4,449	103	364	118	4,813	7.6
2011	13 May–21 Sep	3,545	0	573	163	4,118	13.9
2012	14 May–3 Aug	4,509	100	38	23	4,547	0.8
2013	15 May–3 Aug	4,393		97	55	4,490	2.2
2014	14 May–3 Aug	2,497		203	74	2,700	7.5
2015	10 May–3 Aug	10,048		344		10,392	3.3
2016 [d]	3 May–3 Aug	7,146		Not available			
Averages							
2003–2008		9,464		1,515		10,979	15
2009–2013		4,070		362		4,432	8
2014–2016		6,564		274		6,546	5

Source: Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

[a] Total inriver run equals escapement plus inriver harvest. Total does not account for marine harvest.

[b] In 2003, escapement was not fully assessed due to operational dates. The 2003 estimate was based on a census of all DIDSON files.

[c] Exploitation is biased upward compared to other years because escapement was not fully enumerated.

[d] Preliminary data.

Table 24.–Sport harvest (1976–2012) and unexpanded escapement index counts (1976–2015) of Chinook salmon in Anchor River, Deep Creek, and Ninilchik River.

	Anchor River		Deep Creek		Ninilchik River	
Year	Harvest	Aerial escapement	Harvest	Aerial escapement	Harvest	Aerial escapement
1977	1,077	3,585	425	848	1,168	1,169
1978	2,109	2,209	804	582	1,445	724
1979	1,913	1,335	703	726	1,493	854
1980 [a]	605		182		723	
1981 [a]	1,069	1,066	604	427	1,523	552
1982	718	1,493	791	977	1,240	947
1983	1,269	1,033	1,154	550	871	445
1984	998	1,087	761	380	648	346
1985	672	1,328	249	644	983	582
1986	1,098	2,287	944	976	420	307
1987	761	2,524	604	968	1,112	523
1988	976	1,458	777	409	795	569
1989	578	940	843	561	744	280
1990	1,479	967	1,411	347	693	288
1991	1,047	589	1,776	294	3,123 [c]	594
1992	1,685	99	1,379	63	5,316 [c]	
1993	2,787	1,110	2,503	486	4,235 [c]	688
1994	2,478	837	2,379	364	3,108 [c]	252
1995	1,475	[b]	1,161	229	2,451 [c]	
1996	1,483	277	886	193	2,401 [c]	158
1997	1,563	477	1,249	136	3,263 [c]	393
1998	783	789	539	676	1,453 [c]	316
1999	1,409	685	741	1,190	1,945 [c]	357
2000	1,730	752	937	556	1,782 [c]	578
2001	889	414	593	551	1,399 [c]	268
2002	1,047	748	507	696	830 [c]	[d]
2003	1,011	680	775	1,008	1,452 [c]	[d]
2004	1,561	834	823	1,075	1,240 [c]	[d]
2005	1,432	651	642	1,076	1,342 [c]	[d]
2006	1,394	899	451	507	1,329 [c]	[d]
2007	2,081	678	628	553	1,575 [c]	[d]
2008	1,486	528	602	205	976 [c]	[d]
2009	737	[e]	124	483	203 [c]	[d]
2010	364	[e]	249	387	358 [c]	[d]
2011	573	[e]	251	696	258 [c]	[d]
2012	38	[e]	33	447	16 [c]	[d]
2013	97	[e]	130	475	103 [c]	[d]
2014	203	[e]	101	601	182 [c]	[d]
2015	344	[e]	294	535	69 [c]	[d]
Average						
1976–2012	1,222	1,112	803	593	1,474	528
2013–2015	215		175	537	118	
SEG				350–800		

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/. Escapement estimates are aerial counts.

[a] Escapement counts not conducted or considered minimal due to high turbid water during aerial escapement surveys.

[b] Aerial escapement counts not obtained due to high water.

[c] Enhanced run.

[d] Discontinued. Escapement indexed by weir count during index monitoring period.

[e] Discontinued. Escapement estimated by sonar and weir.

Table 25.–Weir counts and escapement of wild and hatchery-reared Chinook salmon at the Ninilchik River weir during SEG index monitoring period, 1999–2016.

	Wild Chinook salmon				Hatchery Chinook salmon			
		SEG period [a]				SEG period [a]		
Year	Total escapement count	Weir counts [b]	Escapement counts [c]	SEG escapement percentage of total escapement count	Total escapement count	Weir counts [b]	Escapement counts [c]	SEG escapement percentage of total escapement count
1999	1,576	1,351	1,283	81	573	515	447	78
2000	1,553	1,346	1,265	81	685	786	618	90
2001	1,239	1,072	897	72	543	601	471	87
2002	1,340	1,073	897	67	395	403	238	60
2003	1,127	648	517	46	336	293	204	61
2004	1,393	811	679	49	469	409	342	73
2005	2,076	1,424	1,259	61	409	339	286	70
2006	ND	1,114	1,013	ND	ND	260	191	ND
2007	ND	672	543	ND	ND	83	63	ND
2008	ND	721	586	ND	ND	83	62	ND
2009	ND	551	528	ND	ND	97	69	ND
2010[d]	ND	605	605	ND	ND	34	34	ND
2011	ND	757	682	ND	ND	51	24	ND
2012	ND	561	556	ND	ND	65	52	ND
2013	ND	591	571	ND	ND	210	65	ND
2014	ND	983	891	ND	ND	1,116	90	ND
2015	ND	957	874	ND	ND	661	85	ND
2016	1,665	706	572	34	1,132	436	86	8
Averages								
1999–2005	1,472	1,104	971	65	487	478	372	74
2006–2010		733	655			111	84	
2011–2015		770	715			421	63	

Note: ND means no data.

[a] SEG is the sustainable escapement goal of 550–1300 Chinook salmon, established in 2007 based on escapement counts from 3 to 31 July 1999–2007.

[b] Weir counts are the number of Chinook salmon that arrive at the weir during the SEG period.

[c] Escapement counts equal the weir counts minus all removals.

[d] No egg takes were conducted in 2010.

Table 26.–Anchor River coho salmon escapement, freshwater harvest, total run, and exploitation (harvest per total run) estimates, 1987–1989, 1992, and 2004–2011.

Year	Project dates	Escapment estimate [a]	Freshwater harvest		Total run [b]	
			Estimate	SE	Estimate	Exploitation rate (%)[c]
1987	05 Jul–11 Sep	2,409	2,010	ND	4,419 [d]	45
1988	03 Jul–06 Oct	2,805	2,219	ND	5,024 [d]	44
1989	06 Jul–07 Nov	20,187	2,635	ND	22,822 [d]	12
1992	04 Jul–02 Oct	4,596	2,267	ND	6,863 [d]	33
2004	15 May–15 Sep	5,728	4,383	722	10,111	43
2005	13 May–09 Sep	18,977 [e]	5,314	949	24,291	22
2006	15 May–24 Aug	10,181 [e]	3,920	975	14,101	28
2007	14 May–12 Sep	8,226	3,962	679	12,188	33
2008	13 May–12 Sep	5,951	4,790	821	10,741	45
2009	12 May–11 Sep	2,692 [e]	3,882	737	6,574	59
2010	12 May–29 Sep	6,014	2,863	580	8,877	32
2011	13 May–21 Sep	1,866	808	259	2,674	30
Averages						
1987–2009		8,175	3,538	814	11,713	36
2010–2011		3,940	1,836	420	5,776	31

Source: Mills (1988-1994); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

[a] From 1987 to 1989 and in 1992, the escapement weir was located about 1.6 river kilometers (RKM) from the Anchor River mouth and from 2004–2011, it was about 2.8 RKM upstream of the mouth.

[b] Total run equals escapement plus freshwater harvest; this total does not account for the marine harvest.

[c] Percent harvest per total run.

[d] Estimates are biased and may be high because an unknown number of fish in the escapement estimate were harvested after they were counted passing through the weir.

[e] The escapement estimates for 2005 and 2006 are minimums because the weir washed out and counts were high when the weir was removed.

Table 27.–Parameter estimates for coho salmon in Deep Creek from coded wire tag and weir projects, 1996–2004.

Tagging year	Number smolt tagged	Recovery year	Gear type	Weir count	Number examined for CWT	Tagged proportion	Estimated smolt abundance	Inriver harvest	Inriver run	Exploited proportion	Marine survival fraction
1995	9,671	1996	Gillnet		205	0.278	34,351	2,313			
1996	4,868	1997	Weir	2,017	2,017	0.125	38,683	1,115	3,132	0.36	0.081[a]
1997	6,948	1998	Weir	1,537	1,537	0.345	20,097	2,035	3,572	0.57	0.178[a]
1998		1999	Weir	2,267				2,651	4,918	0.54	
1999		2000	Weir	3,425				2,018	5,443	0.37	
2000		2001	Weir	3,747				1,828	5,575	0.33	
2001	2,538	2002	Weir	6,164		0.061	38,473	1,832	7,996	0.23	0.208
2002	7,412	2003	Seine		1,485	0.128	57,672	1,751			
2003	2,667	2004	Seine		1,027	0.059[b]	44,480[b]				

Source: Bendock (1996); King and Breakfield (1998, 1999, 2002); Begich (2002, 2006a); Begich and Evans (2005); Carol Kerkvliet, Fisheries Biologist, ADF&G, Homer, personal communication. Harvest estimates from Howe et al. (1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

[a] Revised harvest and resulting marine survival estimates differ from unrevised harvest and marine survival estimates published in King and Breakfield 1999 and 2002.

[b] Preliminary.

Table 28.–Coho salmon harvest, catch, and angler participation (angler-days) estimates for Silver Salmon Creek, 1983–2015.

Year	Harvest	Catch	Angler-days	Responses
1983	1,872		1,585	23
1984	661		552	12
1985	647		555	8
1986	302		292	6
1987	706		831	19
1988	709		673	11
1989	735		1,285	16
1990	320	1,212	915	12
1991	1,120	1,207	1,112	22
1992	494	842	597	17
1993	1,080	1,280	853	40
1994	329	689	270	18
1995	1,715	2,831	1,851	34
1996	1,979	3,440	1,373	34
1997	408	1,036	932	26
1998	422	1,104	440	18
1999	590	2,157	1,408	22
2000	1,013	2,293	904	28
2001	2,054	3,178	517	15
2002	942	2,598	612	22
2003	2,269	7,377	1,522	25
2004	1,389	10,902	1,203	27
2005	1,568	7,053	1,653	24
2006	997	5,234	1,680	27
2007	1,041	1,998	1,424	24
2008	356	776	687	17
2009	1,133	2,812	873	28
2010	714	2,201	886	20
2011	640	1,238	601	14
2012	419	1,012	737	15
2013	224	311	956	11
2014	409	950	629	14
2015	864	2,081	751	10
Averages				
1983–2012	954	3,001	985	21
2013–2015	499	1,114	779	12

Source: Mills (1984-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Table 29.–Kamishak River coho salmon harvest, catch and participation (angler-days) reported in guide logbooks, 2005–2015.

Year	Harvest	Released	Catch	Angler-days
2006	906	2377	3,283	411
2007	536	724	1,260	346
2008	352	477	829	249
2009	316	820	1,136	332
2010	333	473	806	223
2011	469	743	1,212	357
2012	517	593	1,110	330
2013	647	869	1,516	357
2014	366	203	569	374
2015	911	1,584	2,495	453
Average				
2005–2012	571	1,049	1,639	362
2013–2015	641	885	1,527	395

Source: Sigurdsson and Powers (2009-2014); D. Sigurdsson and B. Powers, ADF&G, unpublished 2015 data.

Table 30.–Angler participation (angler-days) and harvest of Chinook, coho, and pink salmon; Dolly Varden; and rainbow trout and steelhead, Stariski Creek, 1977–2015.

Year	Pink salmon	Sockeye salmon	Coho salmon		Dolly Varden		Steelhead and rainbow trout		Days fished
	Harvest	Harvest	Harvest	Catch	Harvest	Catch	Harvest	Catch	
1977	26		133		461		294		1,442
1978	15		201		1,012		352		3,662
1979			275		2,027		236		1,965
1980			155		327		105		1,499
1981			410		875		118		1,080
1982			119		348		59		1,023
1983			251		283		42		877
1984			0		499		137		519
1985			25				50		1,422
1986			187		183		31		1,162
1987		153	127		199		62		1,612
1988		36	146		182		18		819
1989			396					10 [a]	1,533
1990		29	169	287	167	375		104 [a]	935
1991		13	280	339	65	91		12 [a]	1,143
1992		33	97	138	8	8		70 [a]	523
1993			392	602	67	184		31 [a]	813
1994			446	464	9	36		75 [a]	1,160
1995		105	72	72	55	119		[a]	896
1996			426	482	24	269		47 [a]	694
1997			111	178	64	213		[a]	489
1998			1,168	1,289	25	261		71 [a]	922
1999			153	436		22		305 [a]	327
2000			419	534	24	232		327 [a]	1,217
2001			270	328	11	43		8 [a]	461
2002			367	384		203		14 [a]	640
2003			309	470		161		46 [a]	646
2004			374	915		266		39 [a]	782
2005			379	475		71		106 [a]	875
2006			280	407		39		13 [a]	382
2007			385	502				34	695
2008			283	1,386		1,482		195	1,174
2009			137	261		45		113	335
2010			199	315		0		21	307
2011			538	538		21		19	543
2012			78	78				34	151
2013			114	114	93	121		38	562
2014			175	233		79		9	289
2015			67	87		14		33	167
Averages									
1977–2012	21	62	271	473	314	197	125	77	965
2013–2015			119	145	93	71		27	339

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Stariski Creek is closed to fishing for Chinook salmon.

[a] Rainbow trout and steel head caught and released. Retention of this species is prohibited. Catch estimates for prior to 1989 come from unpublished Statewide Harvest Survey data.

Table 31.–Harvest and catch of steelhead and rainbow trout in LCIMA roadside streams, 1977–2015.

	Anchor River		Stariski Creek		Deep Creek		Ninilchik River		All streams	
Year	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1977	2,099		294		569		230		3,192	
1978	2,305		352		498		307		3,462	
1979	1,782		236		263		509		2,790	
1980	1,186		105		236		381		1,908	
1981	928		118		248		464		1,758	
1982	698		59		239		179		1,175	
1983	1,605		42		315		157		2,119	
1984	985		137		311		137		1,570	
1985	475		50		179		501		1,205	
1986	520		31		688		275		1,514	
1987	643		62		85		291		1,081	
1988	200		18		291		272		781	
1989		2,066		10		409		505		2,990
1990		1,978		104		1,291		177		3,550
1991		2,349		12		425		512		3,298
1992		2,720		70		740		1,008		4,538
1993		4,156		31		1,448		442		6,077
1994		4,035		75		1,156		804		6,070
1995		2,232				520		178		2,930
1996		7,570		47		1,079		522		9,218
1997		3,103				384		380		3,867
1998		3,878		71		1,350		576		5,875
1999		3,920		305		689		694		5,608
2000		8,693		329		1,805		760		11,587
2001		3,045		51		627		283		4,006
2002		3,501		203		954		468		5,126
2003		3,409		46		2,456		952		6,863
2004		3,710		39		4,365		400		8,514
2005		2,524		106		1,355		934		4,919
2006		4,513		13		1,234		563		6,323
2007		8,365		23		2,668		725		11,781
2008		8,733		195		3,672		1,465		14,065
2009		4,119		113		1,463		1,181		6,876
2010		2,018		21		1,043		360		3,442
2011		401		19		122		53		595
2012		1,833		34		681		169		2,717
2013		2,246		38		515		100		2,899
2014		3,621		9		932		309		4,871
2015		2,892		33		728		336		3,989
Average										
1989–2010		4,120		93		1,415		631		6,251
2011–2015		2,199		27		596		193		3,014

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Catch first estimated by the SWHS during 1989. Catch estimates prior to 1989 are from unpublished Statwide Harvest Survey data.

Table 32.–Counts of all species passed upstream at the Anchor River Dolly Varden weir, 1987–1995.

Year	Dates of operation	Dolly Varden	Coho salmon	Pink salmon	Chinook salmon	Sockeye salmon	Chum salmon	Steelhead and rainbow trout
1987	4 July–10 Sep	19,062	2,409	2,084	204	33	19	136
1988	3 Jul–5 Oct	14,935	2,805	777	245	30	24	878
1989	6 Jul–5 Nov	11,384	20,187	4,729	95	212	165	769[a]
1990	4 Jul–15 Aug	10,427	190	355	144	39	17	3
1991	4 Jul–15 Aug	18,002	13	1,757	39	46	9	5
1992	4 Jul–1 Oct	10,051	4,596	992	129	174	39	1,261
1993	3 Jul–16 Aug	8,262	299	1,019	90	71	12	1
1994	3 Jul–16 Aug	17,259	420	723	111	61	2	1
1995	4 Jul–12 Aug	10,994	725	1,094	112	73	4	10

Source: Larson and Balland (1988, 1989); Larson (1990–1995, 1997).

[a] Weir overtopped 18 September–7 November.

Table 33.–Harvest and catch of Dolly Varden from LCIMA road side streams, 1977–2015.

	Anchor River		Stariski Creek		Deep Creek		Ninilchik River		All streams	
Year	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1977	9,222		461		1,330		424		11,437	
1978	17,357		1,012		3,046		1,003		22,418	
1979	21,364		2,027		2,027		2,390		27,808	
1980	10,948		327		1,028		853		13,156	
1981	15,271		875		1,382		875		18,403	
1982	10,375		348		1,247		514		12,484	
1983	17,277		283		1,112		199		18,871	
1984	5,599		499		973		524		7,595	
1985	7,716				850		87		8,653	
1986	3,914		183		306		505		4,908	
1987	2,735		199		72		507		3,513	
1988	2,746		182		219		655		3,802	
1989	1,476				333		39		1,848	
1990	2,821	11,441	167	375	708	3,862	115	1,614	3,811	17,292
1991	1,409	14,433	65	91	287	2,480	222	887	1,983	17,891
1992	2,532	18,303	8	8	401	2,941	131	1,573	3,072	22,825
1993	1,031	9,719	67	184	145	1,423	29	410	1,272	11,736
1994	1,574	13,305	9	36	377	3,437	65	167	2,025	16,945
1995	1,537	10,957	55	119	301	1,325	133	332	2,026	12,733
1996	963	17,189	24	269	615	4,346	560	2,297	2,162	24,101
1997	1,575	17,467	64	213	276	2,409	141	1,024	2,056	21,113
1998	2,105	16,195	25	261	1,061	4,477	272	1,016	3,463	21,949
1999	1,061	17,076		22	496	2,458	114	818	1,671	20,374
2000	1,903	20,469	24	232	355	2,209	228	1,444	2,510	24,354
2001	1,652	11,980	11	43	240	1,271	228	1,330	2,131	14,624
2002	662	11,419		203	452	2,765	44	993	1,158	15,380
2003	1,124	18,412		161	314	9,703	20	952	1,458	29,228
2004	736	15,052		266	268	8,673	136	907	1,140	24,898
2005	675	6,820		71	149	1,800	74	400	898	9,091

-continued-

Table 33.–Page 2 of 2.

	Anchor River		Stariski Creek		Deep Creek		Ninilchik River		All streams	
Year	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
2006	897	12,920		39	61	2,108	55	733	1,013	15,800
2007	1,327	26,842			277	3,679	64	1,351	1,668	31,872
2008	822	23,757		1,482	164	5,636	29	736	1,015	31,611
2009	1,123	20,117		45	230	4,356	54	734	1,407	25,252
2010	790	8,321			209	2,743	48	821	1,047	11,885
2011	521	6,536		21	21	1,170	9	145	551	7,872
2012	278	9,410			49	1,041	0	13	327	10,464
2013	2,175	15,086		161		421	104	122	2,279	15,790
2014	894	24,122		266	136	2,167	34	187	1,064	26,742
2015	2,920	26,169		71	51	8,529		849	2,971	35,618
Averages										
1977–1990	9,202		547		1,045		621		11,336	
1991–2012	1,195	14,850	35	198	307	3,293	121	867	1,639	19,182
2013–2015	1,996	21,792		166	94	3,706	69	386	2,105	26,050

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 2, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Catch first estimated by the SWHS during 1990.

Table 34.–Estimated sport halibut harvest (number of fish) by charter and noncharter users in the Central (CCI) and Lower (LCI) Cook Inlet fisheries, 1986–2015.

	CCI				LCI			
Year	Charter	Noncharter	Total	% Charter	Charter	Noncharter	Total	% Charter
1986	1,615	40,457	42,072	4%	21,698	20,245	41,943	52%
1987	2,019	31,020	33,039	6%	22,009	22,371	44,380	50%
1988	3,956	40,365	44,321	9%	47,147	44,541	91,688	51%
1989	4,722	47,017	51,739	9%	44,199	29,693	73,892	60%
1990	7,866	48,531	56,397	14%	58,030	32,350	90,380	64%
1991	12,457	47,966	60,423	21%	58,413	27,992	86,405	68%
1992	24,613	36,057	60,670	41%	49,000	32,430	81,430	60%
1993	30,040	37,786	67,826	44%	57,429	34,628	92,057	62%
1994	40,122	39,653	79,775	50%	52,284	35,976	88,260	59%
1995	44,585	36,737	81,322	55%	56,113	30,719	86,832	65%
1996	41,573	40,234	81,807	51%	67,997	37,971	105,968	64%
1997	43,442	44,828	88,270	49%	67,923	37,723	105,646	64%
1998	43,780	41,376	85,153	51%	60,823	33,383	94,209	65%
1999	38,654	30,601	69,264	56%	53,321	32,931	86,239	62%
2000	48,569	45,422	93,991	52%	65,189	42,547	107,736	61%
2001	53,990	33,628	87,618	62%	65,130	29,734	94,864	69%
2002	44,718	28,680	73,398	61%	60,883	32,742	93,625	65%
2003	45,559	32,149	77,708	59%	63,881	48,505	112,386	57%
2004	50,915	35,192	86,107	59%	76,164	49,431	125,595	61%
2005	54,057	31,491	85,548	63%	81,004	52,143	133,147	61%
2006	55,915	28,704	84,619	66%	79,560	45,263	124,823	64%
2007	58,933	38,247	97,180	61%	93,933	62,152	156,085	60%
2008	53,197	31,393	84,590	63%	70,670	53,822	124,492	57%
2009	43,704	41,498	85,202	51%	58,543	51,549	110,092	53%
2010	45,781	29,022	74,803	61%	63,629	54,271	117,900	54%
2011	45,535	35,961	81,496	56%	74,485	47,547	122,032	61%
2012	44,171	29,556	73,727	60%	69,734	46,525	116,259	60%
2013	51,317	32,665	84,282	61%	73,075	50,125	123,200	59%
2014	35,856	35,026	70,882	51%	58,441	47,982	106,423	55%
2015	35,552	34,937	70,489	50%	51,912	57,365	109,277	48%
Averages								
2013–2015	40,908	34,209	75,218	54%	61,143	51,824	112,967	54%

Source: Mills (1987-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 3, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Estimates before 1995 do not include the relatively minor West Cook Inlet component.

Table 35.–Assemblage classification used by sport fishery management and maximum ages and lengths of rockfishes *Sebastes* sampled from the Cook Inlet sport fishery, 1991–2015.

Assemblage	Common name	Scientific name	Maximum published age [a]	Cook Inlet sport harvest data [b]			
				Maximum age	Number aged	Maximum length (cm)	Number measured
Pelagic							
	Black	*S. melanops*	50	55	4,843	65	4,906
	Dark	*S. ciliatus*	n.d.	54	1,273	54	1,281
	Dusky	*S. variabilis*	n.d.	62	1,358	57	1,512
	Dusky/Dark[c]		67	58	198	57	198
	Yellowtail	*S. flavidus*	64	24	3	52	3
	Widow	*S. entomelas*	60	13	2	51	2
Nonpelagic							
	Bocaccio	*S. paucispinis*	46	15	1	41	1
	Canary	*S. pinniger*	84	23	28	49	28
	China	*S. nebulosus*	78	70	61	41	59
	Copper	*S. caurinus*	50	42	63	56	63
	Quillback	*S. maliger*	90	71	139	53	139
	Rougheye	*S. aleutianus*	205	30	7	58	7
	Shortraker	*S. borealis*	157	33	9	73	8
	Silvergray	*S. brevispinis*	81	42	5	67	5
	Tiger	*S. nigrocinctus*	116	78	39	52	40
	Yelloweye	*S. ruberrimus*	118	100	2,083	87	2,258

[a] Munk 2001b.

[b] Meyer 1992, 2000; Meyer and Failor *In prep.*

[c] Dusky and dark rockfish were considered alternate forms of a single species (dusky rockfish) before 2004.

Table 36.–Estimated rockfish sport harvest (number of fish) in the Central and Lower Cook Inlet fisheries, 1977–2015.

Year	Central Cook Inlet	Lower Cook Inlet	Total
1977	206	1,654	1,860
1978	561	3,770	4,332
1979	458	2,531	2,989
1980	16	1,979	1,995
1981	9	3,566	3,575
1982	133	2,339	2,473
1983	301	4,060	4,361
1984	736	2,462	3,198
1985	248	2,475	2,723
1986	949	4,976	5,925
1987	906	2,368	3,274
1988	1,933	7,626	9,559
1989	479	3,592	4,071
1990	361	2,333	2,694
1991	291	2,463	2,754
1992	474	4,063	4,537
1993	799	4,169	4,968
1994	961	4,223	5,184
1995	850	3,549	4,399
1996	1,090	4,105	5,195
1997	561	3,930	4,491
1998	225	3,781	4,006
1999	380	5,849	6,229
2000	406	5,718	6,124
2001	1,310	3,316	4,626
2002	503	5,332	5,835
2003	1,024	6,491	7,515
2004	577	9,179	9,756
2005	843	10,764	11,607
2006	275	9,156	9,431
2007	390	12,399	12,789
2008	566	10,692	11,258
2009	677	15,619	16,296
2010	1,274	17,170	18,444
2011	1,376	15,471	16,847
2012	1,803	16,283	18,086
2013	1,942	16,151	18,093
2014	3,044	19,578	22,622
2015	3,326	22,862	26,218

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Table 37.–Estimated sport rockfish harvest (number of fish) by charter and noncharter anglers in the Central (CCI) and Lower (LCI) Cook Inlet fisheries, 1977–2015.

	CCI				LCI			
Year	Charter	Noncharter	Total	% Charter	Charter	Noncharter	Total	% Charter
1986	0	949	949	0%	1,489	3,487	4,976	30%
1987	55	851	906	6%	829	1,539	2,368	35%
1988	509	1,424	1,933	26%	2,000	5,626	7,626	26%
1989	30	449	479	6%	1,330	2,262	3,592	37%
1990	72	289	361	20%	966	1,367	2,333	41%
1991	0	291	291	0%	892	1,571	2,463	36%
1992	285	189	474	60%	1,156	2,907	4,063	28%
1993	304	495	799	38%	2,096	2,073	4,169	50%
1994	648	313	961	67%	2,117	2,106	4,223	50%
1995	430	420	850	51%	1,865	1,684	3,549	53%
1996	500	590	1,090	46%	1,716	2,389	4,105	42%
1997	340	221	561	61%	1,674	2,256	3,930	43%
1998	93	132	225	41%	1,707	2,074	3,781	45%
1999	129	251	380	34%	2,169	3,680	5,849	37%
2000	241	165	406	59%	2,760	2,958	5,718	48%
2001	676	634	1,310	52%	1,691	1,625	3,316	51%
2002	304	199	503	60%	2,115	3,217	5,332	40%
2003	557	467	1,024	54%	3,504	2,987	6,491	54%
2004	369	208	577	64%	6,052	3,127	9,179	66%
2005	586	257	843	70%	4,910	5,854	10,764	46%
2006	175	100	275	64%	5,125	4,031	9,156	56%
2007	161	229	390	41%	6,662	5,737	12,399	54%
2008	310	256	566	55%	6,885	3,807	10,692	64%
2009	265	412	677	39%	8,554	7,065	15,619	55%
2010	669	605	1,274	53%	10,732	6,438	17,170	63%
2011	857	519	1,376	62%	10,475	4,996	15,471	68%
2012	1,052	751	1,803	58%	10,695	5,588	16,283	66%
2013	1,187	755	1,942	61%	11,570	4,581	16,151	72%
2014	2,240	804	3,044	74%	13,641	5,937	19,578	70%
2015	2,969	357	3,326	89%	15,051	7,841	22,892	66%

Source: Mills (1979-1980. 1981a, 1981b, 1982-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Table 38.–Estimated Cook Inlet rockfish sport harvest in numbers of fish and pounds round weight by management group, 1991–2015.

	Pelagic rockfish		Nonpelagic rockfish		Harvest	Harvest biomass
Year	Number	Pounds	Number	Pounds	(no. fish)	(lb)
1991	1,106	4,611	1,648	14,585	2,754	19,195
1992	2,954	9,116	1,583	11,877	4,537	20,993
1993	2,670	10,819	2,298	22,083	4,968	32,902
1994	3,087	11,789	2,097	16,858	5,184	28,648
1995	2,756	11,642	1,643	16,280	4,399	27,922
1996	3,325	11,999	1,870	23,667	5,195	35,666
1997	2,045	8,419	2,446	25,181	4,491	33,600
1998	2,883	13,136	1,123	10,487	4,006	23,623
1999	4,751	17,637	1,478	14,897	6,229	32,534
2000	2,952	10,477	3,172	34,365	6,124	44,843
2001	2,861	10,307	1,765	20,799	4,626	31,106
2002	4,390	18,574	1,445	15,641	5,835	34,215
2003	5,410	25,907	2,105	24,539	7,515	50,446
2004	6,963	31,788	2,793	31,006	9,756	62,794
2005	8,269	37,931	3,338	35,441	11,607	73,372
2006	6,459	26,224	2,972	33,060	9,431	59,284
2007	10,869	57,034	1,920	21,539	12,789	78,573
2008	8,924	42,571	2,334	26,648	11,258	69,220
2009	13,824	53,690	2,472	25,338	16,296	79,027
2010	16,849	66,463	1,595	15,392	18,444	81,855
2011	14,015	61,927	2,832	28,652	16,847	90,579
2012	15,647	66,437	2,439	22,253	18,086	88,690
2013	15,147	68,505	2,946	24,939	18,093	93,444
2014	20,194	79,260	2,428	18,308	22,622	97,568
2015	22,981	93,929	3,237	27,059	26,218	120,989

Source: Mills (1992-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Pounds round weight are preliminary estimates based on assemblage composition of harvest samples from Homer applied to the total Cook Inlet harvest.

Table 39.–Central and Lower Cook Inlet rockfish harvest reported in angler interviews by target species category, 2013–2015.

Fishery	Target category	Number of interviews [a]	Pelagic rockfish		Nonpelagic rockfish	
			Number	Percent	Number	Percent
Central Cook Inlet						
	Groundfish	15	280	62%	48	62%
	Groundfish + salmon	308	136	30%	19	24%
	Halibut	1,702	15	3%	1	1%
	Lingcod	2	19	4%	10	13%
	Salmon	2	0	0%	0	0%
	Total	2,029	450	100%	78	100%
Lower Cook Inlet						
	Groundfish	53	705	42%	56	33%
	Groundfish + salmon	206	685	41%	94	55%
	Halibut	851	244	15%	21	12%
	Rockfish	1	2	0%	0	0%
	Salmon	31	27	2%	0	0%
	Total	1,142	1,663	100%	171	100%

Source: Meyer and Failor (*In prep*).

[a] Number of interviews represent vessel-trips.

Table 40.–Estimated average weight and harvest in pounds of round weight in the Cook Inlet lingcod sport fishery, 1992–2015.

Year	Average weight (lb) [a]	Harvest biomass (lb) [b]
1992	15.6	49,400
1993	22.9	38,500
1994	27.3	33,900
1995	24.9	28,600
1996	26.9	59,300
1997	26.7	59,600
1998	29.5	43,000
1999	28.7	37,200
2000	29.5	53,600
2001	32.4	64,400
2002	33.3	53,300
2003	31.1	65,900
2004	29.3	97,100
2005	30.9	93,700
2006	31.6	102,800
2007	28.7	201,000
2008	28.4	174,400
2009	28.0	162,200
2010	26.2	136,900
2011	28.0	209,400
2012	26.9	149,100
2013	25.6	144,000
2014	25.1	108,600
2015	22.7	66,000

[a] Based on harvest samples from Homer applied to the total Cook Inlet harvest.

[b] Preliminary estimates to the nearest 100 lb.

Table 41.–SWHS estimates of lingcod sport harvest (number of fish) in Cook Inlet by area, 1990–2015.

Year	West Cook Inlet	Central Cook Inlet		Lower Cook Inlet		Total
		Number	% of total	Number	% of total	
1990	[a]	839	32%	1,805	68%	2,644
1991	35	989	36%	1,751	63%	2,775
1992	0	942	29%	2,257	71%	3,199
1993	45	0	0%	1,636	97%	1,681
1994	56	0	0%	1,184	95%	1,240
1995	28	149	13%	970	85%	1,147
1996	[b]	888	40%	1,317	60%	2,205
1997	[b]	470	21%	1,765	79%	2,235
1998	[b]	461	32%	995	68%	1,456
1999	[b]	253	19%	1,045	81%	1,298
2000	[b]	226	12%	1,588	88%	1,814
2001	[b]	473	24%	1,514	76%	1,987
2002	[b]	236	15%	1,364	85%	1,600
2003	[b]	365	17%	1,754	83%	2,119
2004	[b]	448	14%	2,863	86%	3,311
2005	[b]	282	9%	2,754	91%	3,036
2006	[b]	310	9%	2,997	91%	3,307
2007	[b]	186	3%	6,826	97%	7,012
2008	[b]	196	3%	5,937	97%	6,133
2009	[b]	345	6%	5,449	94%	5,794
2010	[b]	406	8%	4,819	92%	5,225
2011	[b]	692	9%	6,785	91%	7,477
2012	[b]	470	8%	5,073	92%	5,543
2013	[b]	254	5%	5,376	95%	5,630
2014	[b]	162	4%	4,158	96%	4,320
2015	[b]	148	5%	2,760	95%	2,908

Source: Mills (1991-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

[a] Lingcod information was not requested in the SWHS questionnaire before 1991.

[b] After 1995, the West Cook Inlet estimates were apportioned and merged with the Central and Lower Cook Inlet estimates.

Table 42.–Statewide Harvest Survey estimated lingcod sport harvest (number of fish) by charter and noncharter anglers in the Central (CCI) and Lower Cook Inlet (LCI) fisheries, 1990–2015.

	CCI				LCI				Cook
Year	Charter	Noncharter	Total	% Charter	Charter	Noncharter	Total	% Charter	Inlet total
1990	71	768	839	8%	1,046	759	1,805	58%	2,644
1991	63	926	989	6%	806	945	1,751	46%	2,740
1992	327	615	942	35%	802	1,455	2,257	36%	3,199
1993	0	0	0	–	993	643	1,636	61%	1,636
1994	0	0	0	–	766	418	1,184	65%	1,184
1995	140	9	149	94%	703	267	970	72%	1,119
1996	494	394	888	56%	702	615	1,317	53%	2,205
1997	318	152	470	68%	1,178	587	1,765	67%	2,235
1998	312	149	461	68%	599	396	995	60%	1,456
1999	169	84	253	67%	784	261	1,045	75%	1,298
2000	177	49	226	78%	1,294	294	1,588	81%	1,814
2001	382	91	473	81%	1,145	369	1,514	76%	1,987
2002	180	56	236	76%	852	512	1,364	62%	1,600
2003	259	106	365	71%	1,343	411	1,754	77%	2,119
2004	297	151	448	66%	2,010	853	2,863	70%	3,311
2005	218	64	282	77%	1,639	1,115	2,754	60%	3,036
2006	301	9	310	97%	2,399	598	2,997	80%	3,307
2007	139	47	186	75%	5,218	1,608	6,826	76%	7,012
2008	164	32	196	84%	4,839	1,098	5,937	82%	6,133
2009	233	112	345	68%	3,789	1,660	5,449	70%	5,794
2010	351	55	406	86%	3,692	1,127	4,819	77%	5,225
2011	346	346	692	50%	4,951	1,834	6,785	73%	7,477
2012	107	363	470	23%	3,743	1,330	5,073	74%	5,543
2013	125	129	254	49%	4,019	1,357	5,376	75%	5,630
2014	51	111	162	31%	3,284	874	4,158	79%	4,320
2015	81	67	148	55%	1,941	819	2,760	70%	2,908

Source: Mills (1991-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

Note: Estimates for 1996 and later include the West Cook Inlet portion, apportioned between Central and Lower Cook Inlet.

Table 43.–Harvest quotas in the Ninilchik and Kasilof-area educational fisheries, 1993–2016.

		Chinook salmon quotas				Coho salmon quotas					
		Ninilchik				Ninilchik					
Year	Participant	Salt water	Ninilchik River	Kasilof River	Total	Salt water	Ninilchik River	Kasilof River	Total	Total salmon quota	Eulachon and herring quota
1993	NTC[a]	100	20		100	250	30		250	2000	
1994	NTC	100	20		100	250	30		250	2000	
1995	NTC	100	20		100	250	30		250	2000	
1996	NTC	150	20		150	250	30		250	2000	
1997	NTC	150	20		150	250	30		250	2000	
1998	NTC	75	10		75	125	15		125	1,000	
	NND[b]	75	10		75	125	15		125	1,000	
	Total	150	20		150	250	30		250	2,000	
1999	NTC	75	10		75	125	15		125	1,000	
	NND	75	10		75	125	15		125	1,000	
	Total	150	20		150	250	30		250	2,000	
2000	NTC	75	10		75	125	15		125	1,000	
	NND	75	10		75	125	15		125	1,000	
	Total	150	20		150	250	30		250	2,000	
2001	NND	100	10		100	125	15		125	1,000	
	NTC	100	10		100	125	15		125	1,000	
	Total	200	20		200	250	30		250	2,000	
2002	NTC	100	10		100	125	15		125	1,000	
	NND	100	10		100	125	15		125	1,000	
	Total	200	20		200	250	30		250	2,000	
2003	NTC	100	10		100	100	15		100	850	
	NND	100	10		100	100	15		100	850	1,000
	NES[c]	25			25	50			50	250	
	Total	225	20		225	250	30		250	1950	1,000

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Year	Participant	Chinook salmon quotas: Ninilchik Salt water	Chinook salmon quotas: Ninilchik Ninilchik River	Chinook salmon quotas: Kasilof River	Chinook salmon quotas: Total	Coho salmon quotas: Ninilchik Salt water	Coho salmon quotas: Ninilchik Ninilchik River	Coho salmon quotas: Kasilof River	Coho salmon quotas: Total	Total salmon quota	Eulachon and herring quota
2004	NTC	100	10		100	100	15		100	850	
	NND	100	10		100	100	15		100	850	1,000
	NES	25			25	50			50	250	
	Total	225	20		225	250	30		250	1950	1,000
2005	NTC	100	10		100	100	15		100	850	
	NND	100	10		100	100	15		100	850	1,000
	NES	25			25	50			50	250	
	Total	225	20		225	250	30		250	1950	1,000
2006	NTC	100	10		100	100	15		100	850	
	NND	100	10		100	100	15		100	850	no limit[d]
	NES	25			25	50			50	250	
	Total	225	20		225	250	30		250	1950	1,000
2007	NTC	300	10	50	300	300	15	200	500	2,800	
	NND	200	10		200	200	15		200	2,800	no limit[d]
	NES	25			25	50			50	250	
	Total	525	20	50	525	550	30	200	750	5850	1,000
2008	NTC	200	10	100	300	300	15	200	500	2,800	
	NND	100	10		100	150	15		150	2,800	no limit[d]
	Total	300	20	100	400	450	30	200	650	5,600	1,000
2009	NTC	100	10	100	200	200	15	300	500	2,800	
	NND	50	10		50	150	15		150	2,800	no limit[d]
	Total	150	20	100	250	350	30	300	650	5,600	

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		Chinook salmon quotas				Coho salmon quotas					
		Ninilchik				Ninilchik				Total	Eulachon and
Year	Participant	Salt water	Ninilchik River	Kasilof River	Total	Salt water	Ninilchik River	Kasilof River	Total	salmon quota	herring quota
2010	NTC	100	10	100	200	200	15	300	500	2,800	
2011	NND	50	10		50	150	15		150	2,800	no limit[d]
	NTC	100	10	100	200	200	15	300	500	2,800	
	Total	150	20	100	250	350	30	300	650	5,600	
2012[e]	NTC	100	10	100	200	200	15	300	500	2,800	
	NND	50	10		50	150	15		150	2,800	no limit[d]
	NES	25			25	50			50	250	
	Total	175	20	100	275	400	30	300	700	5,850	
2013[e]	NTC	100	10	100	200	200	15	300	500	2,800	
	NND	50	10		50	150	15		150	2,800	no limit[d]
	NES	25			25	50			50	250	
	Total	175	20	100	275	400	30	300	700	5,850	
2014	NTC	100	10	100	200	200	15	300	500	2,800	
	NND	50	10		50	150	15		150	2,800	no limit[d]
	NES	25			25	50			50	250	
	Total	175	20	100	275	400	30	300	700	5,850	
2015	NTC	100	10	100	200	200	15	300	500	2,800	
	NND	50	10		50	150	15		150	2,800	no limit[d]
	NES	25			25	50			50	250	
	Total	175	20	100	275	400	30	300	700	5,850	
2016	NTC	100	10	100	200	200	15	300	500	2,800	
	NND	50	10		50	150	15		150	2,800	no limit[d]
	NES	25			25	50			50	250	
	Total	175	20	100	275	400	30	300	700	5,850	

[a] Ninilchik Traditional Council.

[b] Ninilchik Native Descendents.

[c] Ninilchik Emergency Services.

[d] Unlimited eulachon harvest permitted. Herring harvest not permitted because opportunity is available via personal use regulation (1 April for herring); salmon permit begins 1 May.

[e] Educational fishery modifications for Ninilchik area harvest quotas: effective 1 July, no retention of Chinook salmon, last two freshwater educational fisheries closed.

Table 44.–Harvest numbers in the Ninilchik and Kasilof-area educational fisheries, 1993–2016.

		Ninilchik area							Kasilof area						
			Harvest							Harvest					
Year	Participant	Saltwater fishing period	Chinook	Sockeye	Coho	Pink	Chum	Total	Fishing period	Chinook	Sockeye	Coho	Pink	Chum	Total
1993	NTC[a]	15 May–31 Oct						215							
1994	NTC	15 May–31 Oct	7	162	119	16		304							
1995	NTC	15 May–31 Oct	77	229	85	23		414							
1996	NTC	15 May–31 Oct	101	910	56	8		1,075							
1997	NTC	15 May–31 Oct	94	474	99	55		722							
1998	NTC	15 May–31 Oct	67	506	95	57		725							
	NND[b]	15 May–31 Oct	52	139	110	20		321							
	Total		119	645	205	77		1,046							
1999	NTC	15 May–31 Oct	117	434	84	5		640							
	NND	15 May–31 Oct	56	302	76	18		452							
	Total		173	736	160	23		1,092							
2000	NTC	15 May–31 Oct	50	439	59	57		605							
	NND	15 May–31 Oct	51	199	96	15		361							
	Total		101	638	155	72		966							
2001	NND	15 May–31 Oct	73	310	123	0		506							
	NTC	15 May–31 Oct	75	760	125	42		1002							
	Total		148	1,070	248	42		1,508							
2002	NTC	15 May–31 Oct	44	138	95	31		308							
	NND	15 May–31 Oct	65	339	106	52		562							
	Total		109	477	201	83		870							
2003	NTC	15 May–31 Oct	86	426	100	15		627							
	NND	15 May–31 Oct	65	98	80	12		255							
	NES[c]	01 Jul–15 Aug	0	4	0	0		4							
	Total		151	528	180	27		886							
2004	NTC	1 May–31 Oct	73	395	83	0		551							
	NND	1 Apr–31 Oct	78	199	79	14		370							
	NES	1 Jul–15 Aug	1	77	0	9		87							
	Total		152	671	162	23		1008							

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		Ninilchik area							Kasilof area						
			Harvest							Harvest					
Year	Participant	Saltwater fishing period	Chinook	Sockeye	Coho	Pink	Chum	Total	Fishing period	Chinook	Sockeye	Coho	Pink	Chum	Total
2005	NTC	1 May–31 Oct	70	264	83	0		417							
	NND	1 Apr–31 Oct	88	84	78	15		265							
	NES	1 Jul–15 Aug	0	5	0	0		5							
	Total		158	353	161	15		687							
2006	NTC	1 May–31 Oct	75	550	100	0		725							
	NND	1 Apr–31 Oct	64	55	99	10		228							
	NES	1 Jul–15 Aug	Did not fish												
	Total		139	605	199	10		953							
2007	NTC	1 May–31 Oct	300	1,363	483	2		2,148		Did not fish					
	NND	1 Apr–31 Oct	65	227	102	14		408							
	NES	1 Jul–15 Aug	Did not fish												
	Total		365	1590	585	16		2556							
2008	NTC	1 May–15 Sep	199	857	200	248		1,504	8 Aug–15 Sep	0	0	3	0	0	3
	NND	1 Apr–15 Sep	69	192	150	69		480	8 Aug–15 Sep						
	Total		268	1,049	350	317		1,984		0	0	3	0	0	3
2009	NTC	1–20 May; 15 Jun–15 Sep	32	788	200	123		1,143	8 Aug–15 Sep	0	56	254	0	0	310
	NND	1 Apr–20 May; 15 Jun–15 Sep	20	276	56	34		386							
	Total		52	1,064	256	157		1,529		0	56	254	0	0	310
2010	NTC	1–20 May; 15 Jun–15 Sep	78	605	200	108		991	8 Aug–15 Sep	5	38	300	155	0	498
2011	NND	1 Apr–20 May; 15 Jun–15 Sep	29	185	84	37		335							
	NTC	1–20 May; 15 Jun–15 Sep	64	500	181	131		876	8 Aug–15 Sep	0	94	166	0	0	260
	Total		93	685	265	168		1,211		0	94	166	0	0	260

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Table 44.–Page 3 of 3.

		Ninilchik area							Kasilof area						
			Harvest							Harvest					
Year	Participant	Saltwater fishing period	Chinook	Sockeye	Coho	Pink	Chum	Total	Fishing period	Chinook	Sockeye	Coho	Pink	Chum	Total
2012[e]	NTC	1–20 May; 15 Jun–15 Sep	67	240	215	54		576	8 Aug–15 Sep	1	7	191	199	0	398
	NND	1 Apr–20 May; 15 Jun–15 Sep	17	65	145	25		252							
	NES	1–20 May; 15 Jun–15 Sep	1	37	0	2		40							
	Total		85	342	360	81		868		1	7	191	199	0	398
2013[e]	NTC	1–20 May; 15 Jun–15 Sep	60	594	210	52		916	8 Aug–15 Sep	2	29	224	4	0	259
	NND	1 Apr–20 May; 15 Jun–15 Sep	16	195	128	26		365							
	NES	1–20 May; 15 Jun–15 Sep	13	141	50	23		227							
	Total		89	930	388	101		1,508		2	29	224	4	0	259
2014	NTC	1–20 May; 15 Jun–15 Sep	62	744	37	166	2	1,011	8 Aug–15 Sep	0	56	118	55	0	229
	NND	1 Apr–20 May; 15 Jun–15 Sep	21	108	79	10	0	218							
	NES	1–20 May; 15 Jun–15 Sep	22	163	50	6	9	250							
	Total		105	1,015	166	182	11	1,479		0	56	118	55	0	229
2015	NTC	1–20 May; 13 Jun–15 Sep	104	294	153	41	0	592	8 Aug–15 Sep	3	75	159	10	0	247
	NND	1 Apr–20 May; 13 Jun–15 Sep	36	37	45	0	0	118							
	NES	1–20 May; 13 Jun–15 Sep	34	58	46	8	1	147							
	Total		174	389	244	49	1	857		3	75	159	10	0	247
2016	NTC	1–20 May; 15 Jun–15 Sep	93	250	182	136	1	662	8 Aug–15 Sep	2	69	212	97	0	380
	NND	1 Apr–20 May; 15 Jun–15 Sep	50	57	34	11	1	153							
	NES	1–20 May; 15 Jun–15 Sep	18	41	38	7	0	104							
	Total		161	348	254	154	2	919		2	69	212	97	0	380

[a] Ninilchik Traditional Council.

[b] Ninilchik Native Descendents.

[c] Ninilchik Emergency Services.

[d] Unlimited eulachon harvest permitted. Herring harvest not permitted because opportunity is available via personal use regulation (1 April for herring); salmon permit begins 1 May.

[e] Educational fishery modifications for Ninilchik area harvest quotas: effective 1 July, no retention of Chinook salmon, last two freshwater educational fisheries closed.

Table 45.–Harvest and harvest quotas in the Seldovia area for the Seldovia Village Tribe (SVT) educational fisheries, 2004–2016.

Year	Educational fishery participant	Seldovia saltwater fishing period	Seldovia Village Tribe area harvest							Fish quotas						
			Chinook	Sockeye	Coho	Chum	Pink	Dolly Varden	Total	Chinook	Sockeye	Coho	Chum	Pink	Dolly Varden	Total
2004	SVT	15–21 Jul				9	1		10	0	20	0	20	50	15	70
2005	SVT	10–15 Jul							0	0	20	0	20	50	15	70
2006	SVT	10–15 Jul			DID NOT FISH					0	20	0	20	50	15	70
2007	SVT	30 Jun, 6–15 Jul		2					2	0	20	0	20	50	15	70
2008	SVT	18–22 Aug			DID NOT FISH					0	20	0	20	50	15	70
2009	SVT	13–20 Jul			DID NOT FISH					0	20	0	20	50	15	70
2010	SVT	15–17 Jul			DID NOT FISH					0	20	0	20	50	15	70
2011	SVT	21–22 Jul	0	0	0	0	0	0	0	0	20	0	20	50	15	70
2012	SVT	no permit								0	20	0	20	50	15	70
2013	SVT	no permit								0	20	0	20	50	15	70
2014	SVT	21–22 Jul			DID NOT FISH					0	20	0	20	50	15	70
2015	SVT	no permit								0	20	0	20	50	15	70
2016	SVT	no permit								0	20	0	20	50	15	70

Table 46.–Harvest and harvest quotas between the Anchor River and Whiskey Gulch for the Veterans of Foreign Wars Men's Auxiliary Post 10221 (Men's VFW) educational fishery, 2011–2016.

			Anchor Point area harvest						Salmon quotas		
Year	Educational fishery participant	Anchor Point saltwater fishing period	Chinook salmon	Sockeye salmon	Coho salmon	Pink salmon	Chum salmon	Total harvest	Chinook salmon	Coho salmon	Total
2007	APVFW	15 Jul–31 Aug	0	77	76	0	0	153		80	160
2008	APVFW	15 Jul–31 Aug	1	89	38	11	0	139		80	240
2009	APVFW	15 Jul–31 Aug	0	103	75	6	0	184	0	80	240
2010	APVFW	15 Jul–31 Aug	0	37	47	21	1	106	0	50	200
2011	APVFW	15 Jul–31 Aug	0	47	41	21	0	109	0	50	200
2012	APVFW	15 Jul–31 Aug	0	66	25	15	0	106	0	50	200
2013	APVFW	15 Jul–31 Aug	0	50	21	40	1	112	0	50	200
2014	APVFW	15 Jul–31 Aug	0	44	48	40	0	132	0	50	200
2015	APVFW	15 Jul–31 Aug	0	50	32	26	9	117	0	50	200
2016	APVFW	15 Jul–31 Aug	0	30	39	34	0	103	0	50	200

Table 47.–Harvest and harvest quotas in the Silver Salmon Creek area for the Southcentral Foundation educational fisheries, 2010–2016.

Year	Educational fishery participant	Silver Salmon Creek saltwater fishing period	Sockeye salmon harvest	Coho salmon harvest	Chum salmon harvest	Pink salmon harvest	Total harvest	Salmon quotas		
								Chinook salmon	Coho salmon	Total
2010	SCF	1 Jul–15 Sep[a]		27			27	0	50	300
2011	SCF	1 Jul–15 Sep[a]	34	5			39	0	50	300
2012	SCF	1 Jul–15 Sep[a]	76	36	0	0	112	0	50	300
2013	SCF	15 Jul–15 Sep[b]	0	30	0	0	30	0	50	300
2014	SCF	1 Jul–20 Sep[b]	44	35	3	2	84	0	50	300
2015	SCF	6 Jul–20 Sep[b]	13	16	21	0	50	0	50	300
2016	SCF	1 Jul–20 Sep[b]	53	14	0	0	67	0	50	300

[a] Opening days on Tuesdays, Wednesdays, and Friday through Sunday only.

[b] Opening days on Tuesdays, Wednesdays, and Fridays only.

Table 48.–Harvest and harvest quotas between the Anchor River and Whiskey Gulch for the Sons of the American Legion Post 16 (Legion Post 16) educational fishery, 2011–2016.

Year	Educational fishery participant	Anchor Point saltwater fishing period	Anchor Point Area Harvest						Salmon quotas		
			Chinook salmon	Sockeye salmon	Coho salmon	Pink salmon	Chum salmon	Total harvest	Chinook salmon	Coho salmon	Total
2011	Post 16	1–31 Aug	0	39	35	0	0	74	0	50	200
2012	Post 16	15 Jul–31 Aug	0	65	39	0	0	104	0	50	200
2013	Post 16	15 Jul–31 Aug	0	67	24	0	0	91	0	50	200
2014	Post 16	15 Jul–31 Aug	0	45	31	0	0	76	0	50	200
2015	Post 16	15 Jul–31 Aug	0	45	3	2	0	50	0	50	200
2016	Post 16	15 Jul–31 Aug	0	11	23	0	0	34	0	50	200

Table 49.–Razor clam abundance estimates by size for Ninilchik beaches for survey years between 1989 and 2016.

	Juvenile				Adult				Total			
	South		North		South		North		South		North	
Year	Clams	SE	Clams	SE	Clams	SE	Clams	SE	Clams	SE	Clams	SE
1989			1,499,166		-	-	421,675	105,073			1,920,841	505,457
1990	475,649		1,084,464		125,937	30,046	573,810	200,351	601,586	119,576	1,658,274	367,945
1991	44,174		102,676		251,601	49,842	1,821,120	349,334	295,775	50,880	1,923,796	357,753
1992	57,234		41,608		237,755	51,703	3,336,073	998,267	294,989	55,993	3,377,681	993,826
1998	114,628		390,003		308,129	75,611	597,993	183,638	422,757	87,878	987,996	79,596
2001	359,037		220,256		275,475	51,176	540,652	97,323	634,512	56,924	760,908	123,905
2003	402,163		2,303,824		241,475	74,825	1,249,055	323,374	643,638	182,971	3,552,879	603,422
2005	517,109		506,444		440,851	63,504	857,322	339,138	957,960	117,110	1,363,766	460,504
2011	156,410		60,887		1,621,765	322,109	1,212,311	280,355	1,778,175	327,654	1,273,198	288,796
2012	40,776				624,992	63,989			665,768	67,435		
2013	108,540				65,688	12,101			174,228	23,919		
2014	135,650				90,344	19,830			225,994	43,968		
2015	33,208		43,161		69,934	14,763	33,535	15,629	103,142	17,909	76,696	28,414
2016 [a]	840,245				45,674	10,367			885,919	144,686		

Note: Blanks indicate the beach was not surveyed.

[a] Preliminary estimate.

Table 50.–Razor clam abundance estimates by size for Clam Gulch beaches for survey years between 1988 and 2016.

	Juvenile				Adult				Total			
	South		North		South		North		South		North	
Year	Clams	SE	Clams	SE	Clams	SE	Clams	SE	Clams	SE	Clams	SE
1988	1,511,345				1,339,042	319,330			2,850,387	330,652		
1989	1,513,810		1,474,779		2,616,217	231,660	1,645,048	202,821	4,130,027	386,911	3,119,827	361,986
1990	3,416,956		2,272,240		1,074,908	184,983	1,798,280	99,991	4,491,864	535,982	4,070,520	268,950
1999	1,215,406		852,083		6,139,901	511,760	4,036,610	365,445	7,355,307	595,215	4,888,693	411,575
2008	765,571		1,170,770		600,037	135,000	651,872	100,675	1,365,608	214,866	1,822,642	194,944
2014	115,250		332,407		174,188	37,945	327,815	49,151	289,438	50,077	660,222	95,057
2015	321,564		332,750		106,005	22,907	164,851	25,006	427,569	58,649	497,601	70,693
2016[a]			2,511,608				187,929	21,242			2,699,537	225,175

Note: Blanks indicate the beach was not surveyed.

[a] Preliminary estimate.

Table 51.–Razor clam harvest in the Ninilchik Beach Management Area, adjusted for relative success, 1970–2015.

Year	Harvest	SE	Digger-days	SE	Razor clams per digger	Percent of total harvest
1970	53,653		1,104	441	48.6	19.0
1971	34,457	2,293	742	361	46.4	18.4
1972	100,137	7,014	2,074	428	48.3	22.9
1973	195,372	12,451	4,298	594	45.5	28.6
1974	57,310	9,989	1,060	536	54.1	6.6
1975	105,788	7,259	1,702	388	62.2	11.8
1976	113,506	18,875	2,083	384	54.5	12.1
1977	140,512	18,215	2,454	412	57.3	16.1
1978	85,353	8,328	1,572	436	54.3	9.5
1979	132,005	9,358	2,469	498	53.5	13.7
1980	177,685	11,499	2,246	446	79.1	23.0
1981	143,827	10,148	3,442	543	41.8	17.3
1982	181,998	13,196	3,627	553	50.2	18.9
1983	222,879	18,548	4,436	556	50.2	22.8
1984	281,517	23,010	5,682	675	49.5	27.0
1985	439,417	30,993	9,246	880	47.5	41.1
1986	615,506	39,149	13,989	1,309	44.0	54.7
1987	537,182	49,134	10,817	1,196	49.7	54.9
1988	753,175	80,698	15,322	1,484	49.2	64.3
1989	401,078	27,088	9,398		42.7	48.2
1990	438,900	36,242	12,926		34.0	46.2
1991	547,383	35,524	15,166		36.1	46.9
1992	715,767	32,377	26,078		27.4	61.9
1993	584,210	27,104	23,636		24.7	61.7
1994	820,375	33,278	29,956		27.4	64.6
1995	758,040	36,835	26,806		28.3	65.5
1996	465,052	21,877	16,412		28.3	57.2
1997	465,325	21,204	15,483		30.1	56.1
1998	326,296	17,751	13,120		24.9	50.7
1999	400,447	23,349	18,763		21.3	53.4
2000	414,438	22,301	17,348		23.9	49.2
2001	242,739	15,535	12,153		20.0	38.6
2002	352,983	22,108	14,903		23.7	46.5
2003	226,120	15,402	9,434		24.0	39.9
2004	217,003	13,524	11,738		18.5	42.7
2005	226,960	15,028	15,900		14.3	53.2
2006	275,553	22,097	13,839		19.9	62.8
2007	238,493	17,482	14,426		16.5	68.3
2008	362,552	28,676	16,313		22.2	67.8
2009	372,909	30,894	15,527		24.0	75.8
2010	197,570	17,088	7,550		26.2	60.7
2011	301,481	24,596	13,257		22.7	74.7
2012	189,309	16,294	12,433		15.2	72.9
2013 [a]	61,598	6,209	10,083		6.1	35.3
2014 [b]	0	0	255		0.0	0.0
2015 [c]						
Average						
1970–2008	329,513		10,825		38.3	40.1
2009–2012	265,317		12,192		22.0	71.0
2013–2015	30,799		5,169		3.1	17.7

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Note: Harvest success 1970–2008 adjusted to 0.5 for the Whiskey Gulch (WGMA), Deep Creek (DCMA) and Coho (CMA)Management Areas and to 1.0 for the Ninilchik (NMA), Oil Pad (OPMA), and Clam Gulch (CGMA) Management Areas. Harvest success 2009–2012 adjusted to 0.2, 0.4, 0.6, 1.0, 0.6, 0.3, 0.4, 0.7 WGMA, DCMA, NMA-South, NMA-North, OPMA, CGMA-South, CGMA-North, and CMA respectively. Harvest success 2013 adjusted to 0.1, 0.4, 0.3, 0.2, 0.5, 0.2, 0.3, 1.0 for the WGMA, DCMA, NMA-South, NMA-North, OPMA, CGMA-South, CGMA-North, and CMA, respectively.

[a] Bag and possession limits were reduced by emergency order.

[b,c] Ninilchik South and North beaches were closed to harvest and bag and possession limits were reduced to 25 razor clams for the remaining management areas.

[c] All eastside management areas closed by emergency order.

Table 52.–Percentage of razor clam harvest by management area, adjusted for relative success, 1970–2015.

Year	Whiskey Gulch	Deep Creek	Ninilchik	Oil Pad Access	Clam Gulch	Cohoe
1970		11.3	19.0	8.1	55.4	6.2
1971	5.4	16.5	18.4	13.4	45.0	1.4
1972	6.8	20.1	22.9	7.2	38.0	5.0
1973	5.0	11.5	28.6	13.1	34.0	7.8
1974	3.1	10.9	6.6	23.6	49.8	6.0
1975	0.9	9.5	11.8	19.9	49.7	8.2
1976	2.2	7.9	12.1	16.3	53.8	7.7
1977	2.2	5.6	16.1	17.0	55.7	3.3
1978	2.6	6.2	9.5	17.4	61.4	2.9
1979	1.8	7.7	13.7	13.0	60.1	3.7
1980	3.0	9.5	23.0	13.1	49.5	1.9
1981	4.7	17.0	17.3	17.0	40.8	3.2
1982	7.4	25.0	18.9	14.8	32.1	1.8
1983	9.3	19.2	22.8	14.3	32.0	2.6
1984	5.3	14.5	27.0	21.7	30.2	1.3
1985	2.7	13.3	41.1	21.1	20.9	0.9
1986	1.3	13.7	54.7	14.1	15.9	0.2
1987	4.3	11.2	54.9	16.0	13.4	0.3
1988	4.6	11.5	64.3	5.6	13.4	0.6
1989	2.0	6.5	48.2	12.4	21.4	9.5
1990	2.0	5.9	46.2	14.9	30.8	0.3
1991	1.3	5.8	46.9	13.0	32.5	0.5
1992	0.8	5.0	61.9	10.4	21.5	0.3
1993	0.7	4.3	61.7	11.8	21.3	0.3
1994	1.0	3.8	64.6	10.1	20.3	0.3
1995	0.7	3.2	65.5	10.5	19.9	0.1
1996	1.1	3.8	57.2	13.8	23.5	0.5
1997	1.1	2.2	56.1	13.6	26.5	0.6
1998	1.1	2.4	50.7	16.6	28.2	1.0
1999	0.8	3.7	53.4	13.6	27.3	1.2
2000	1.4	4.6	49.2	12.6	30.3	1.9
2001	1.3	3.5	38.6	17.2	37.5	1.9
2002	1.9	3.2	46.5	17.6	29.0	1.9
2003	1.8	4.3	39.9	18.5	34.3	1.3
2004	2.2	4.8	42.7	19.6	29.5	1.1
2005	3.2	6.2	53.2	9.9	26.6	0.9
2006	4.4	6.5	62.8	7.7	18.2	0.4
2007	5.7	9.6	68.3	3.1	12.9	0.5
2008	4.0	10.6	67.8	4.1	13.1	0.3
2009	2.6	10.4	75.8	4.3	6.1	0.8
2010	6.5	12.1	60.7	7.7	11.6	1.4
2011	1.6	9.1	74.7	4.2	9.0	1.4
2012	1.4	8.5	72.9	4.9	10.1	2.2
2013[b]	2.2	23.3	35.3	11.9	17.1	10.1
2014[c]	3.1	32.5	0.0	10.3	29.6	24.5
2015[d]						
Averages						
1970–2008	2.9	8.7	40.7	13.9	31.6	2.2
2009–2012	3.0	10.0	71.0	5.3	9.2	1.4
2013–2015	2.7	27.9	17.7	11.1	23.3	17.3

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Note: Harvest success 1970–2008 adjusted to 0.5 for the Whiskey Gulch (WGMA), Deep Creek (DCMA) and Coho (CMA)Management Areas and to 1.0 for the Ninilchik (NMA), Oil Pad (OPMA), and Clam Gulch (CGMA) Management Areas. Harvest success 2009–2012 adjusted to 0.2, 0.4, 0.6, 1.0, 0.6, 0.3, 0.4, 0.7 WGMA, DCMA, NMA-South, NMA-North, OPMA, CGMA-South, CGMA-North, and CMA respectively. Harvest success 2013 adjusted to 0.1, 0.4, 0.3, 0.2, 0.5, 0.2, 0.3, 1.0 for the WGMA, DCMA, NMA-South, NMA-North, OPMA, CGMA-South, CGMA-North, and CMA, respectively.

[a] Bag and possession limits were reduced by emergency order.

[b,c] Ninilchik South and North beaches were closed to harvest and bag and possession limits were reduced to 25 razor clams for the remaining management areas.

[c] All eastside management areas closed by emergency order.

Table 53.–Abundance of male Tanner crab in Kachemak Bay estimated from trawl surveys, 1990–2013.

Year	No. tows	Legal		Mature		Total	
		No.	SE	No.	SE	No.	SE
1990	19	390,100	201,278	884,520	331,569	2,729,478	575,486
1991	20	501,214	111,542	1,354,916	218,674	2,744,262	439,151
1992	18	1,058,920	376,958	1,978,570	553,697	2,768,042	576,964
1993	20	609,073	185,361	981,914	271,528	1,838,002	339,498
1994	20	199,397	57,451	359,485	84,930	1,006,790	227,218
1995	20	275,449	150,081	781,263	394,798	2,093,943	655,520
1996	19	98,926	33,414	696,266	277,803	1,450,297	591,041
1997	23	139,547	39,828	453,778	100,562	1,014,358	151,543
1998	23	206,424	94,644	402,345	172,953	790,113	186,469
1999	20	104,563	46,153	307,436	120,994	3,095,614	1,389,427
2000	23	82,709	36,416	468,032	128,896	1,855,622	387,537
2001	22	97,150	30,555	490,769	153,492	3,097,601	1,002,304
2002	21	88,170	34,536	299,724	115,010	4,115,229	1,039,513
2003	23	48,961	26,451	339,915	95,665	3,477,758	862,680
2004	23	84,794	25,200	654,763	166,152	2,988,688	704,379
2005	22	45,882	20,801	395,230	220,020	1,816,758	538,287
2006	23	238,859	151,714	479,571	308,974	1,982,536	962,011
2007	23	165,387	120,957	545,419	437,825	1,157,570	635,933
2008[a]							
2009	16	144,282	72,309	700,356	257,415	3,209,885	1,190,113
2010	0						
2011	38	41,595	20,322	135,265	60,116	5,059,467	1,123,156
2012	37	20,501	10,254	77,588	26,316	4,850,135	920,820
2013	37	38,053	17,354	179,987	53,237	3,238,095	503,935

[a] Survey results were deemed unusable.

Table 54.–Abundance of male Tanner crab by size in Kachemak Bay estimated from trawl surveys, 1990–2013.

Year	No. tows	Pre-4 (<70 mm)	Pre-3 (70– 91 mm)	Pre-2 (92–114 mm)		Pre-1 (115–139 mm)		Recruit (140–165 mm)		Postrecruit (>165 mm)	
				New	Old	New	Old	New	Old	New	Old
1990	19	500,377	726,045	608,033	10,503	453,381	41,040	145,890	173,780	12,268	58,162
(SE)		162,723	231,659	169,309	4,040	136,379	12,346	44,864	128,938	5,485	49,220
1991	20	294,871	281,582	779,874	33,018	743,583	110,120	262,865	172,972	43,218	22,159
(SE)		150,200	100,930	168,661	12,869	142,441	40,407	81,820	73,395	12,081	10,843
1992	18	211,948	123,479	418,542	35,503	696,802	222,848	829,341	148,111	54,037	27,431
(SE)		81,188	33,205	117,210	16,194	191,260	131,226	320,606	98,181	18,771	20,195
1993	20	614,626	101,806	125,215	14,441	246,694	126,147	345,927	191,983	52,474	18,689
(SE)		174,022	28,822	31,651	5,346	54,851	53,917	126,149	97,666	20,592	9,503
1994	20	307,358	207,891	122,248	9,808	94,447	65,642	67,109	102,556	6,641	23,090
(SE)		119,335	58,505	26,925	4,407	23,689	23,624	21,137	45,864	4,143	10,860
1995	20	356,705	390,375	547,530	18,071	465,902	39,911	187,967	68,885	7,645	10,952
(SE)		125,729	135,621	249,655	7,149	250,522	16,361	114,088	41,996	5,297	8,500
1996	19	187,040	44,714	370,451	151,826	416,787	180,553	51,355	47,571		
(SE)		73,505	20,698	253,509	68,948	227,832	65,852	17,842	19,319		
1997	23	163,873	118,850	270,676	7,182	276,004	38,227	128,040	10,812	695	
(SE)		44,892	27,044	54,977	3,492	67,837	11,112	38,731	3,887	735	
1998	23	344,212	19,461	12,974	11,120	127,268	68,654	129,198	71,048	6,178	
(SE)		127,621	7,436	5,442	4,056	58,558	42,369	52,550	59,810	4,067	
1999	20	927,252	1,162,413	611,856	86,657	121,786	81,087	60,159	42,011	849	1,545
(SE)		540,683	657,248	242,830	23,784	54,126	53,019	30,832	31,990	907	1,649
2000	23	525,829	459,415	385,124	17,221	372,427	12,897	72,592	8,572		1,545
(SE)		244,492	192,561	127,598	4,685	97,272	5,382	31,089	4,144		1,634
2001	22	1,628,434	658,453	296,160	23,785	291,990	101,629	71,125	24,481		1,545
(SE)		717,398	326,465	116,429	9,883	122,454	60,782	29,265	14,744		1,639
2002	21	2,036,757	1,277,179	472,621	28,949	194,256	17,299	86,404	1,765		
(SE)		758,742	448,071	159,453	13,042	82,488	7,275	34,562	1,276		
2003	23	1,233,647	1,191,205	674,070	38,922	271,570	19,384	37,532	11,429		
(SE)		393,002	381,061	173,422	12,347	73,228	6,250	19,018	7,859		

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Table 54.–Page 2 of 2.

Year	No. tows	Pre-4 (<70 mm)	Pre-3 (70– 91 mm)	Pre-2 (92–114 mm)		Pre-1 (115–139 mm)		Recruit (140–165 mm)		Postrecruit (>165 mm)	
				New	Old	New	Old	New	Old	New	Old
2004	23	636,770	865,236	763,375	68,544	473,161	96,808	62,784	22,009		
(SE)		193,785	310,455	204,634	32,846	142,022	56,856	22,111	18,344		
2005	22	1,046,973	186,659	97,778	90,117	174,221	175,127	27,678	18,205		
(SE)		438,977	92,290	36,201	49,985	65,947	144,149	6,799	16,715		
2006	23	1,094,364	164,259	198,161	46,181	195,535	45,177	212,988	25,871		
(SE)		735,560	120,572	125,658	18,312	144,750	32,951	138,963	18,722		
2007	23	338,506	94,200	150,827	28,618	283,780	96,252	46,781	117,822	785	
(SE)		113,422	59,825	136,585	23,560	243,739	77,085	35,491	96,799	830	
2008											
(SE)											
2009	16	1,002,804	645,080	800,662	60,982	423,611	132,463	107,217	37,065		
(SE)		390,536	328,174	342,154	22,478	192,603	76,832	72,244	25,389		
2010	0										
(SE)											
2011	38	4,726,502	158,495	15,748	23,457	10,115	83,555	12,235	29,360		
(SE)		1,104,941	48,959	8,137	7,566	6,190	40,534	10,757	17,790		
2012	37	2,036,538	2,545,879	171,843	18,287	4,583	52,504	0	20,501		
(SE)		379,127	637,406	38,744	7,352	2,571	18,339	0	10,254		
2013	37	983,075	680,417	1,304,422	90,194	74,774	67,160	1,885	33,549		2,619
(SE)		230,855	132,780	272,259	34,912	19,497	32,112	1,363	16,118		2,123

Note: "New" and "old" indicate shell condition.

Table 55.–Sport and personal use crab harvests in Cook Inlet reported on permits 1996 through 2002 and 2008-2009, 2009-2010, 2010-2011 and 2011-2012 seasons (estimates of harvest not expanded for nonreporting).

		Effort		Harvest (numbers)	
Year	Location	Trips	Crabber-days	Dungeness crab	Tanner crab
1996	Cook Inlet north of Anchor Point	33		12	300
	Cook Inlet remainder	6		0	0
	North Gulf Coast	19		15	6
	Kachemak Bay east of Homer Spit	2,132		7,337	2,495
	Kachemak Bay west of Homer Spit	651		341	9,112
	Unknown	55		167	146
	Total	2,896		7,872	12,059
1997	Cook Inlet north of Anchor Point	29	58	146	5
	Cook Inlet remainder	30	65	42	791
	North Gulf Coast	21	46	6	19
	Kachemak Bay east of Homer Spit	1,674	3,057	6,977	2,856
	Kachemak Bay west of Homer Spit	560	956	475	7,559
	Unknown	34	68	128	146
	Total	2,348	4,250	7,774	11,376
1998	Cook Inlet north of Anchor Point	13	17	40	0
	Cook Inlet remainder	10	15	1	46
	North Gulf Coast	3	4	0	0
	Kachemak Bay east of Homer Spit	232	420	17	2,285
	Kachemak Bay west of Homer Spit	850	1,144	58	13,386
	Unknown	75	162	0	1,046
	Total	1,183	1,762	116	16,763
1999	Cook Inlet north of Anchor Point	5	5	0	0
	Cook Inlet remainder	39	64	77	792
	North Gulf Coast	10	10	0	0
	Kachemak Bay east of Homer Spit	315	575	303	2,562
	Kachemak Bay west of Homer Spit	783	1,066	1,176	13,102
	Unknown	50	62	33	589
	Total	1,202	1,782	1,589	17,045
2000	Cook Inlet north of Anchor Point	2	3	0	0
	Cook Inlet remainder	12	23	50	204
	North Gulf Coast	9	27	0	0
	Kachemak Bay east of Homer Spit	258	419	453	2,216
	Kachemak Bay west of Homer Spit	1,161	1,603	2,150	16,341
	Unknown	76	107	149	911
	Total	1,518	2,182	2,802	19,672

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Table 55.–Page 2 of 2.

Year	Location	Effort		Dungeness crab number released	Tanner crab number harvested
		Trips	Crabber-days		
2001	Cook Inlet north of Anchor Point	2	2	0	0
	Cook Inlet remainder	6	8	1	76
	North Gulf Coast	2	4	0	0
	Kachemak Bay east of Homer Spit	205	359	265	932
	Kachemak Bay west of Homer Spit	719	1,114	1,180	5,374
	Unknown	46	38	3	117
	Total	980	1,525	1,449	6,499
2002	Cook Inlet north of Anchor Point	0	0	0	0
	Cook Inlet remainder	2	2	10	10
	North Gulf Coast	0	0	0	0
	Kachemak Bay east of Homer Spit	94	179	214	530
	Kachemak Bay west of Homer Spit	430	756	924	2,929
	Unknown	15	10	0	105
	Total	541	947	1,148	3,574
2008-2009					
	Cook Inlet north of Anchor Point	2	3	0	0
	Cook Inlet remainder	148	249	823	3,861
	North Gulf Coast	12	19	9	48
	Kachemak Bay east of Homer Spit	699	1,203	3,443	13,995
	Kachemak Bay west of Homer Spit	2,079	3,580	12,742	58,157
	Unknown	38	54	156	452
	Total	2,978	5,108	17,173	76,513
2009-2010 [a]					
	Cook Inlet north of Anchor Point	5	5	20	131
	Cook Inlet remainder	138	357	1,320	4,123
	North Gulf Coast	70	128	241	1,901
	Kachemak Bay east of Homer Spit	581	1,149	3,358	13,093
	Kachemak Bay west of Homer Spit	2,203	3,625	13,783	61,058
	Unknown	21	23	105	302
	Total	3,018	5,287	18,827	80,608
2010-2011 [a]					
	Cook Inlet north of Anchor Point	8	14	34	114
	Cook Inlet remainder	92	197	610	1,543
	North Gulf Coast	24	31	41	179
	Kachemak Bay east of Homer Spit	437	759	1,708	4,871
	Kachemak Bay west of Homer Spit	2,251	3,537	10,968	38,360
	Unknown	67	185	384	1,335
	Total	2,879	4,723	13,745	46,402
2011-2012 [a, b]					
	Cook Inlet north of Anchor Point	6	9	21	48
	Cook Inlet remainder	57	104	372	1,002
	North Gulf Coast	15	19	48	170
	Kachemak Bay east of Homer Spit	312	518	1,509	3,266
	Kachemak Bay west of Homer Spit	1,167	2,145	6,762	23,324
	Unknown	37	68	267	628
	Total	1,594	2,863	8,979	28,438

[a] Harvest numbers for 2009-2010, 2010-2011, and 2011-2012 fishery seasons were expanded for nonrespondents.

[b] Closed by EO on 6 September 2011.

Table 56.– Dungeness crab catch in numbers for Southern District Dungeness crab pot surveys, 1990–2000, 2009.

Year	Dates	Location	Pots pulled	Females	Sublegal males	Legal males	Total males	Soft-shell males (%)
1990	15–17 May	East of Spit	90	53	47	17	64	8 (13)
	19–21 Jun		90	54	65	23	88	9 (10)
1991	04–06 Jun	East of Spit	89	6	116	110	226	21 (9)
	09–11 Jul		90	21	388	263	651	36 (6)
	06–08 Aug		90	85	625	475	1,100	47 (4)
	12–14 Sep		90	30	615	492	1,107	5 (<1)
	02–06 Jul	West of Spit	82	9	6	5	11	2 (18)
	14–16 Aug		95	9	7	11	18	0 (0)
1992[a]	31 May–04 Jun	East of Spit	89	27	276	180	456	2 (1)
	30 Jun–02 Jul		89	76	583	578	1,161	31 (3)
	27–29 Jul		90	65	621	531	1,152	50 (4)
	11–13 Aug		90	47	849	792	1,641	14 (1)
	25–27 Aug		88	47	853	737	1,590	24 (2)
	10–12 Sep		89	47	621	749	1,370	4 (<1)
	07–09 Oct		90	19	516	349	865	2 (<1)
	05–07 Jul	West of Spit	96	30	7	14	21	1 (5)
	05–07 Aug		78	59	49	59	108	0
1993[a]	17–19 May	East of Spit	90	18	105	120	225	2 (1)
	15–17 Jun		90	60	226	203	429	5 (1)
	20–22 Jul		90	95	297	448	745	25 (3)
	16–23 Aug		90	84	352	555	907	35 (4)
	22–24 Sep		86	78	148	280	428	5 (1)
	13–15 Jul	West of Spit	70	11	6	3	9	0
	09–11 Aug		80	25	9	34	43	0
1994[a]	23–25 May	East of Spit	90	18	9	7	16	1 (6)
	21–23 Jun		90	119	28	48	76	0
	19–21 Jul		90	113	39	93	132	0
	22–24 Aug		88	37	58	119	177	3 (2)
	12–14 Jul	West of Spit	70	17	0	3	3	0
	16–18 Aug		77	13	3	8	11	0

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Table 56.–Page 2 of 2.

Year	Dates	Location	Pots pulled	Females	Sublegal males	Legal males	Total males	Soft-shell males (%)
1995[a]	23–25 May	East of Spit	90	0	5	3	8	0
	27–29 Jun		90	14	22	8	30	0
	25–27 Jul		90	88	20	9	29	0
	29–31 Aug		90	49	18	13	31	2
	18–20 Jul	West of Spit	77	31	3	10	13	0
	16–18 Aug		74	41	8	51	59	0
1996[a]	12–14 Jun	East of Spit	89	5	16	6	22	3
	13–15 Jul		90	20	39	20	59	4
	11–13 Aug		90	64	55	19	74	0
1997[a]	21–23 Jun	East of Spit	90	2	15	8	23	1 (4)
	21–23 Jul		89	11	19	8	27	1(<1)
	20–22 Aug		90	21	58	5	63	0
1998[a]	16–18 Aug	East of Spit	90	0	11	3	14	0
2000[a]	14–16 Aug	East of Spit	87	1	8	1	9	1(11)
2009[a]	10–12 Aug	East of Spit	90	3	32	0	32	0

[a] 33% of escape rings were closed 1992–2009.

FIGURES

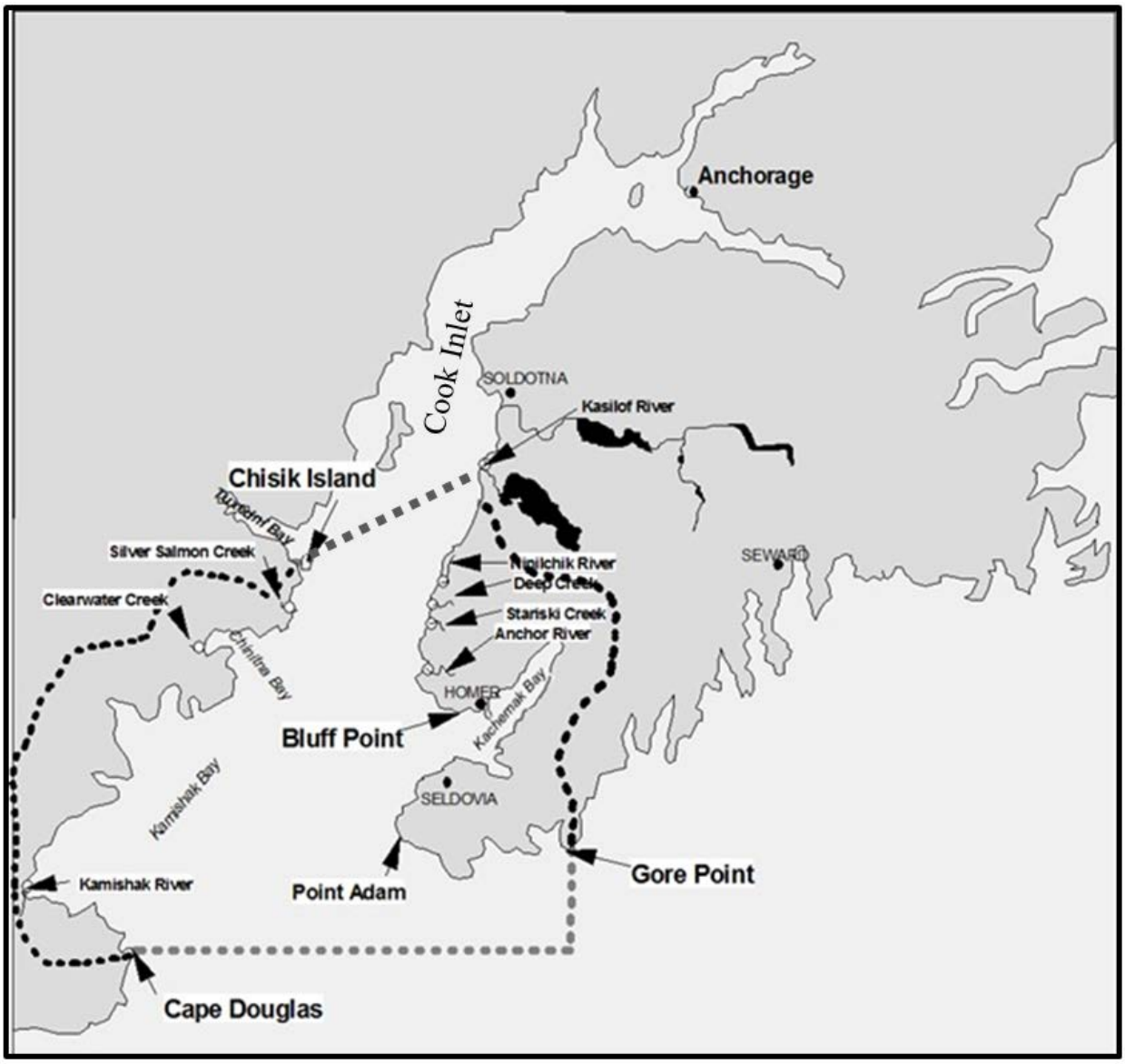

Figure 1.–Lower Cook Inlet Management Area.

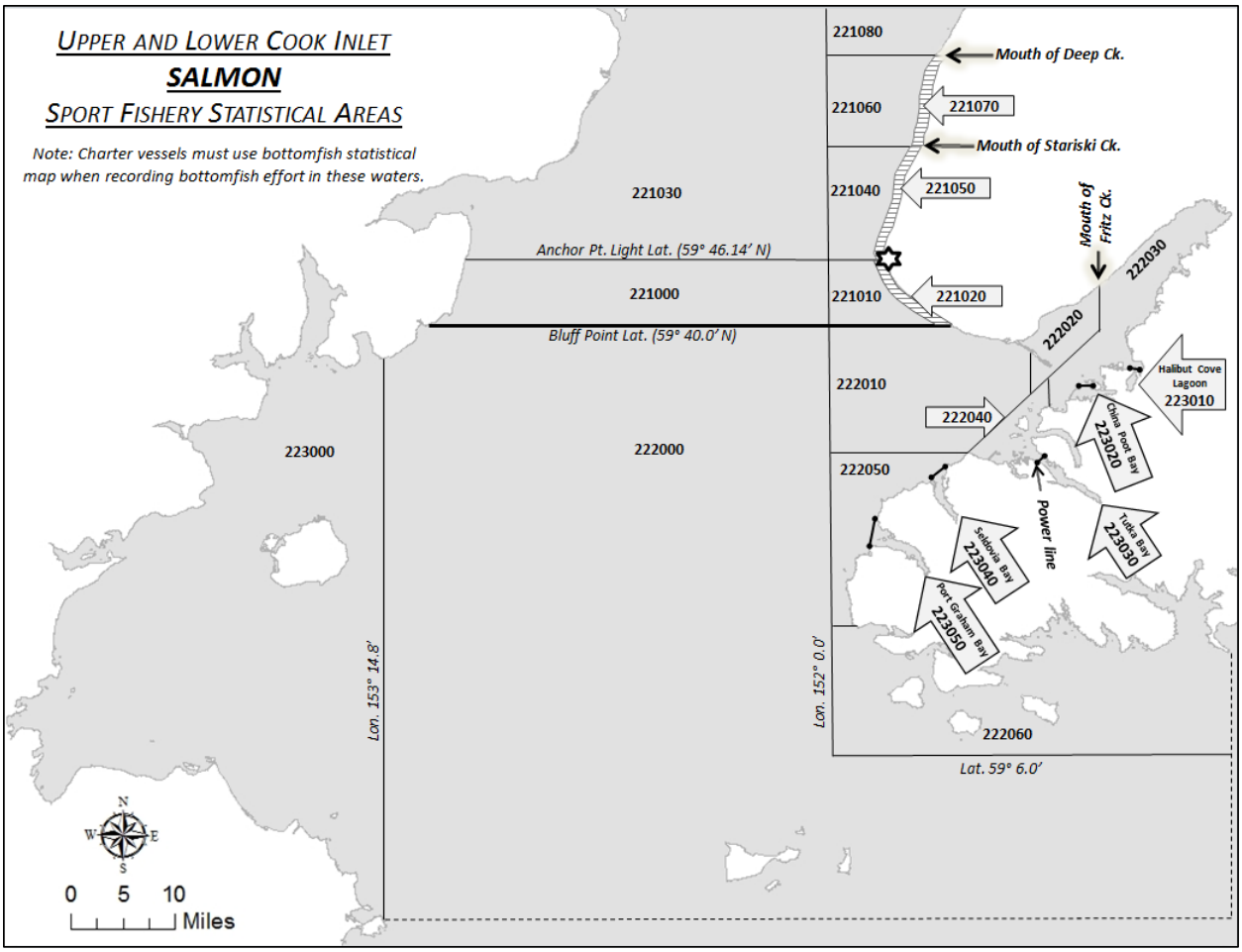

Figure 2.–Central and Lower Cook Inlet Salmon Sport Fishery Statistical Areas.

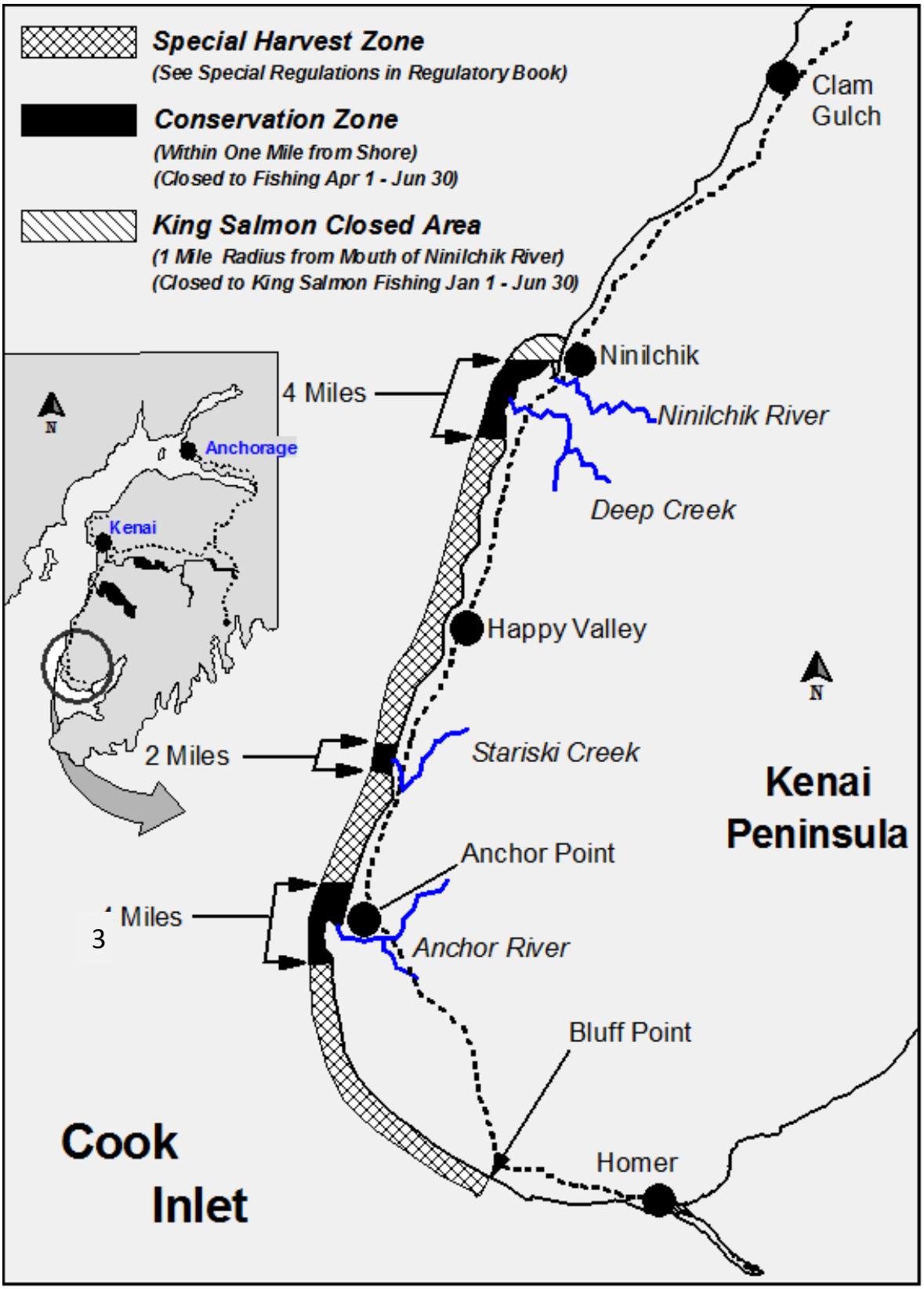

Figure 3.–Central Cook Inlet regulatory zones.

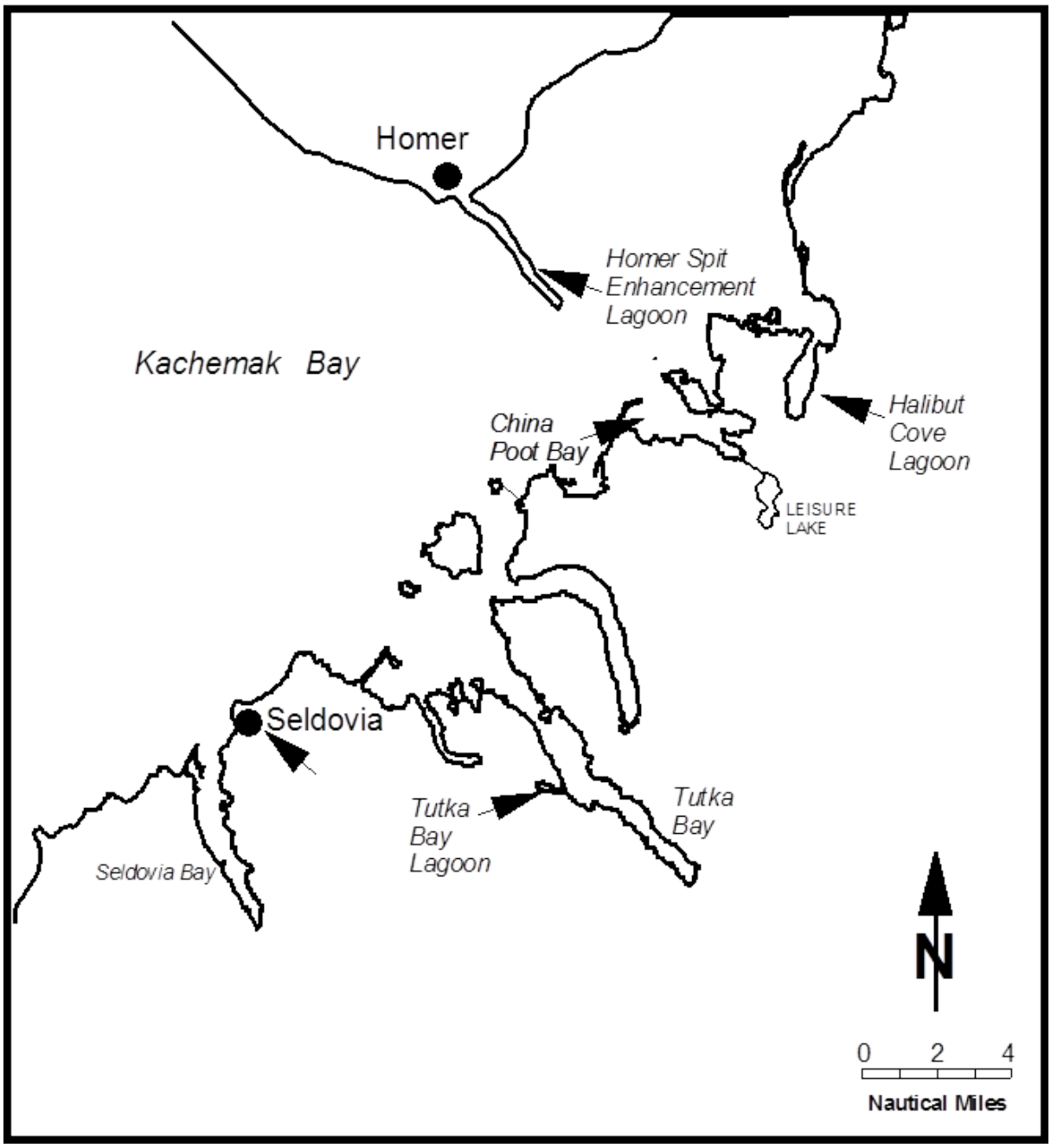

Figure 4.–Saltwater stocking locations in Kachemak Bay and Lower Cook Inlet.

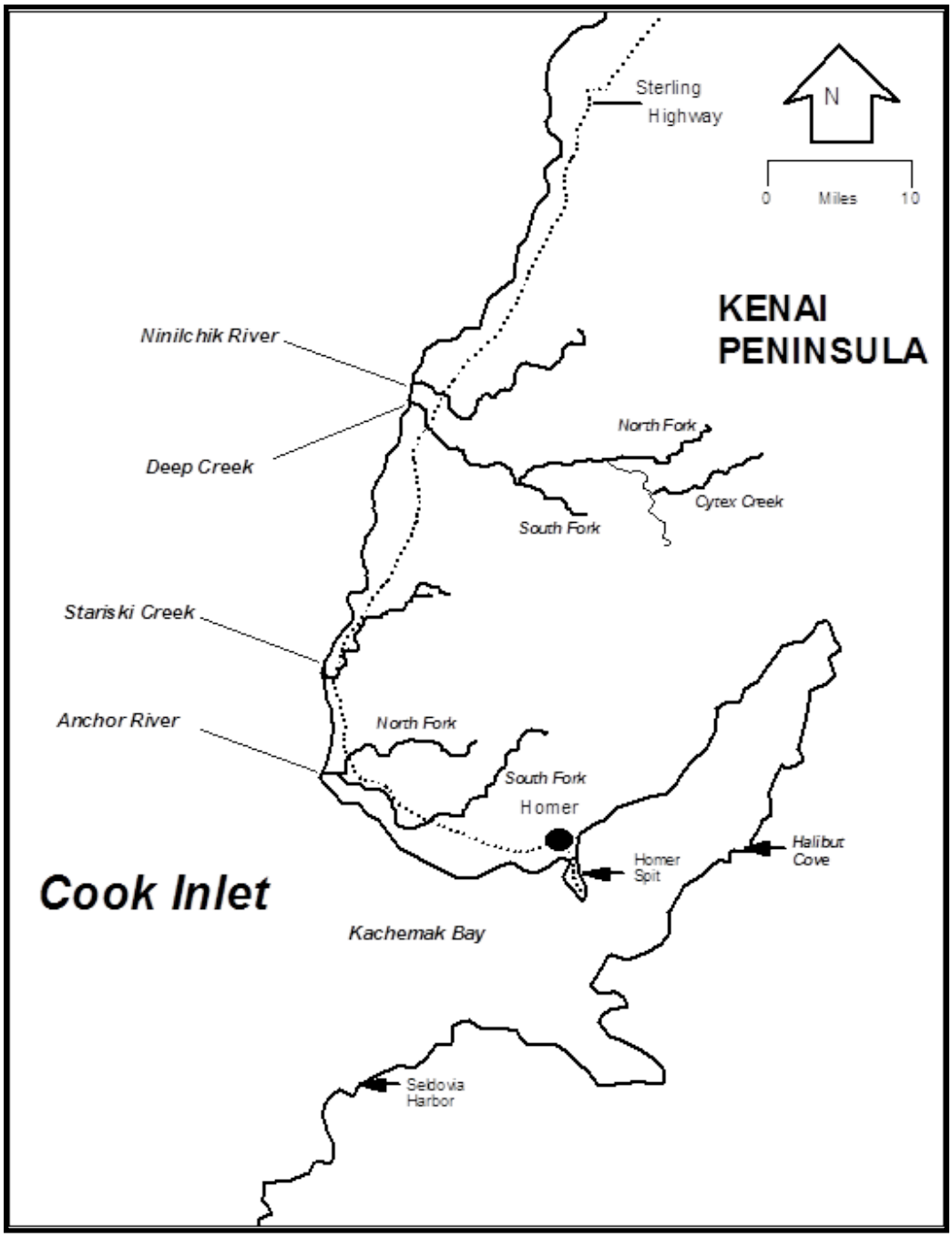

Figure 5.–Lower Kenai Peninsula road system streams.

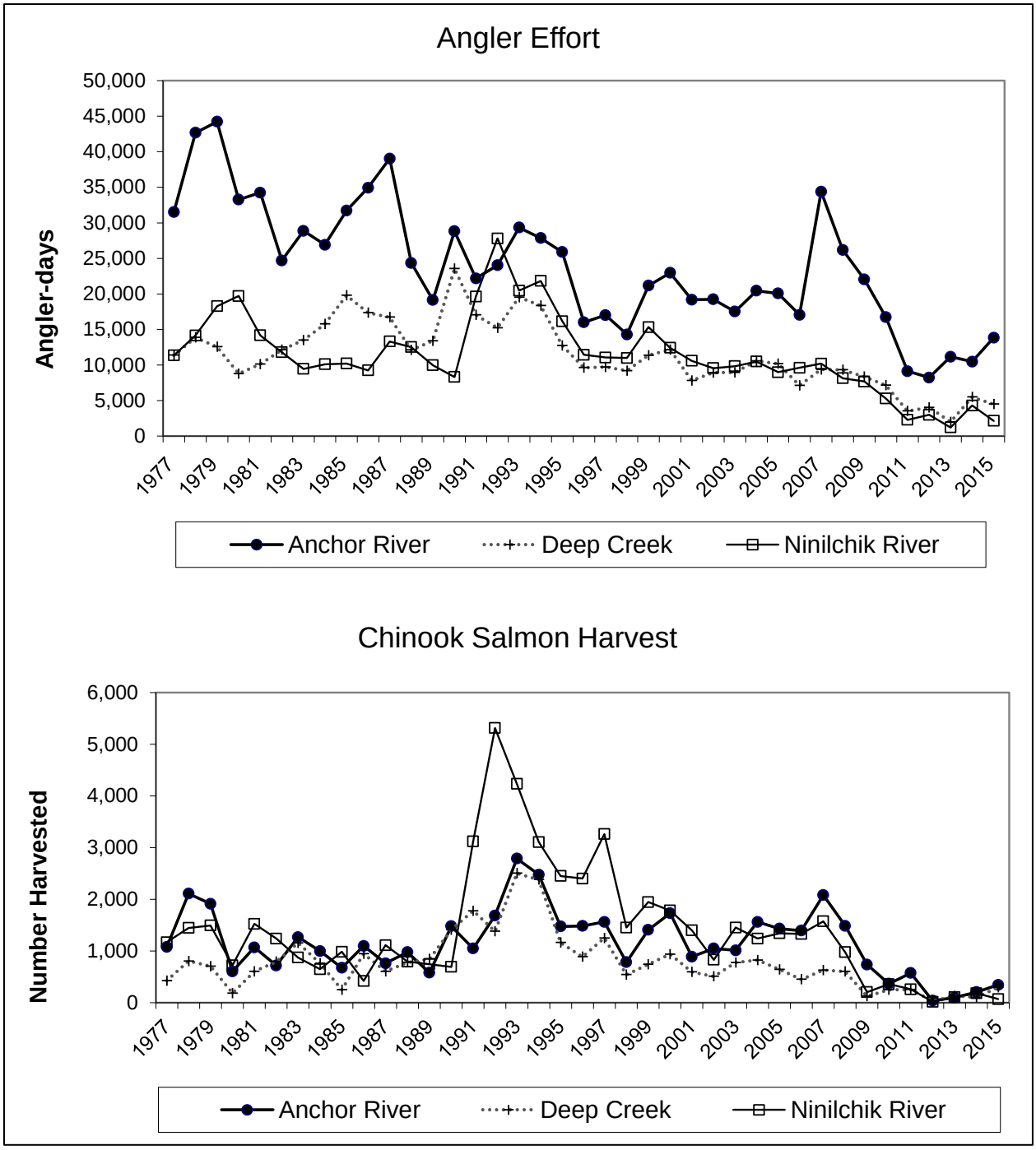

Figure 6.–Sport fishing effort and Chinook salmon harvest in Anchor River, Deep Creek, and Ninilchik River 1977–2015.

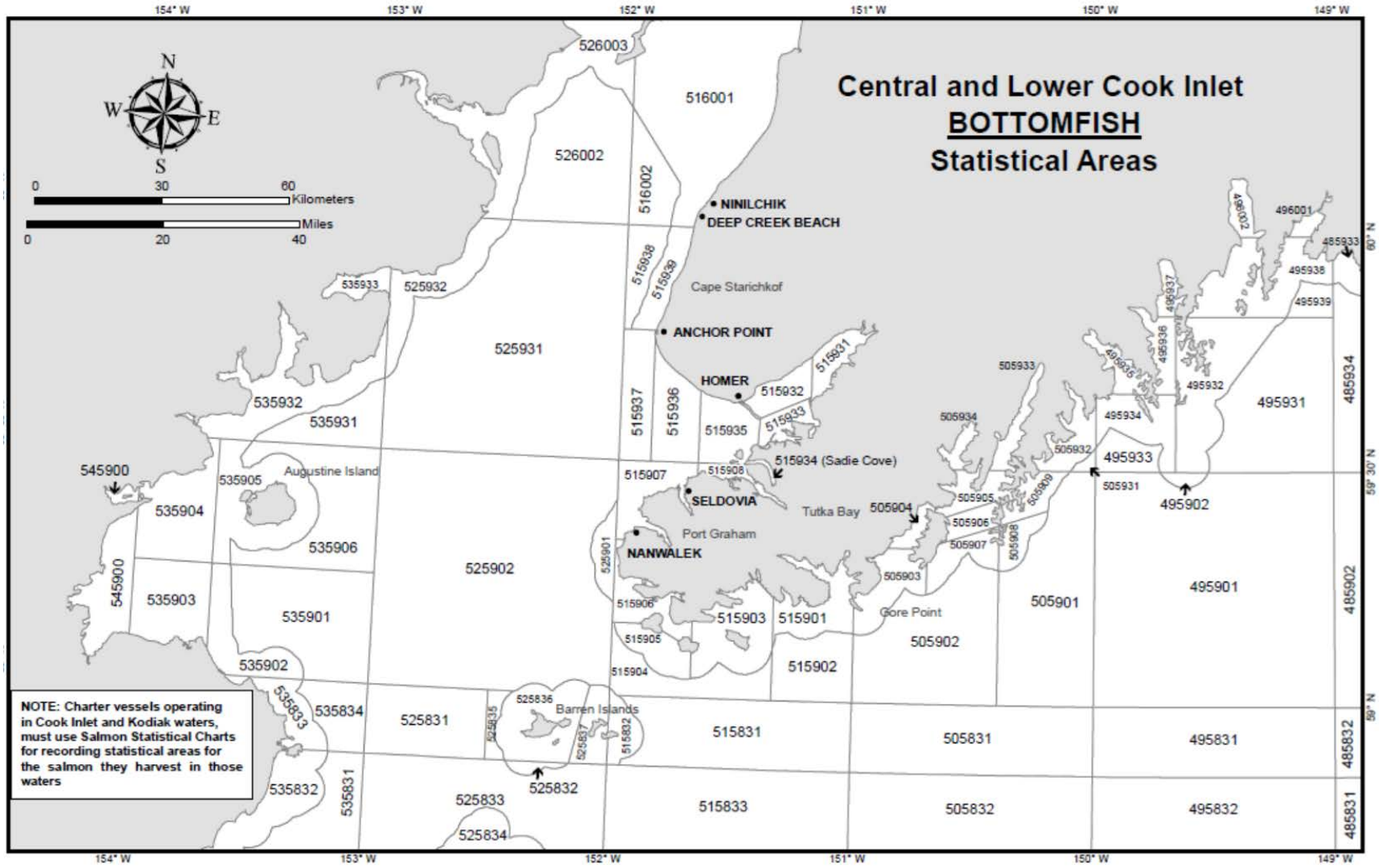

Figure 7.–Groundfish statistical areas for recording charter logbook data.

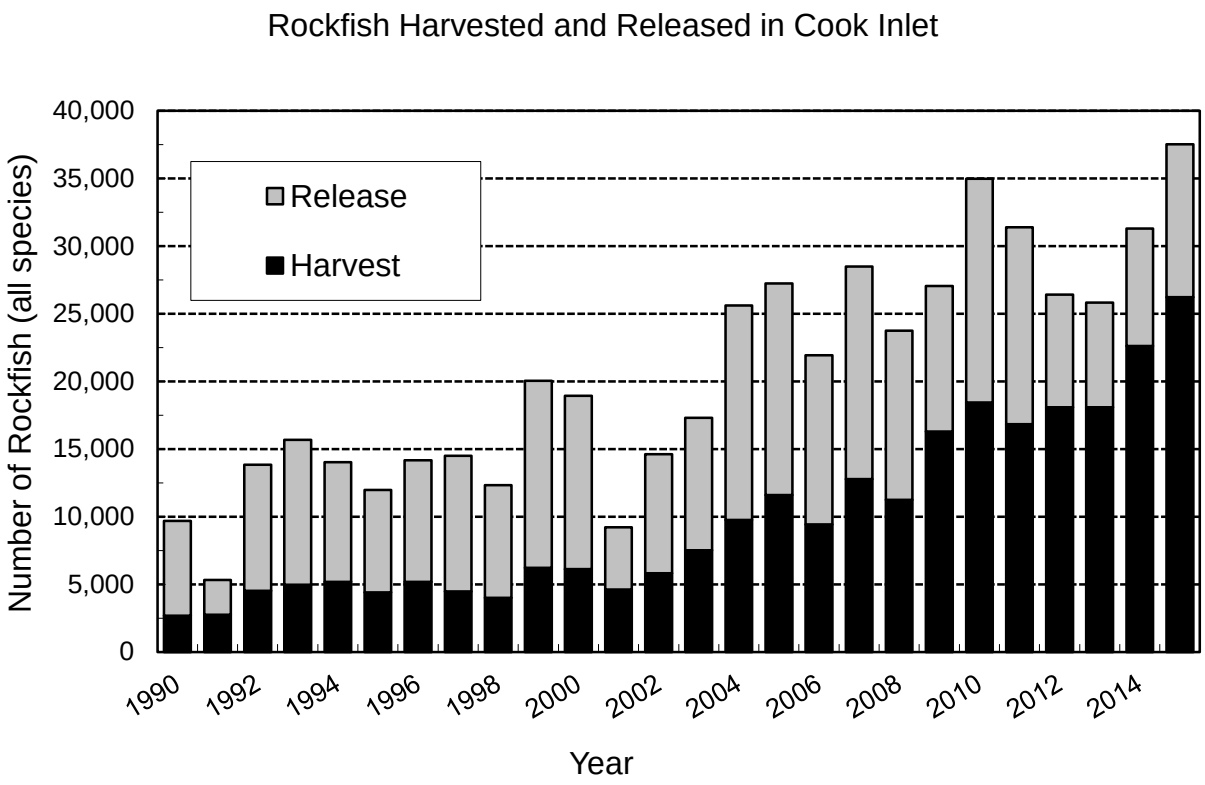

Figure 8.–Estimated numbers of rockfish harvested and released in Cook Inlet, 1990–2015.

Source: Mills (1991-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

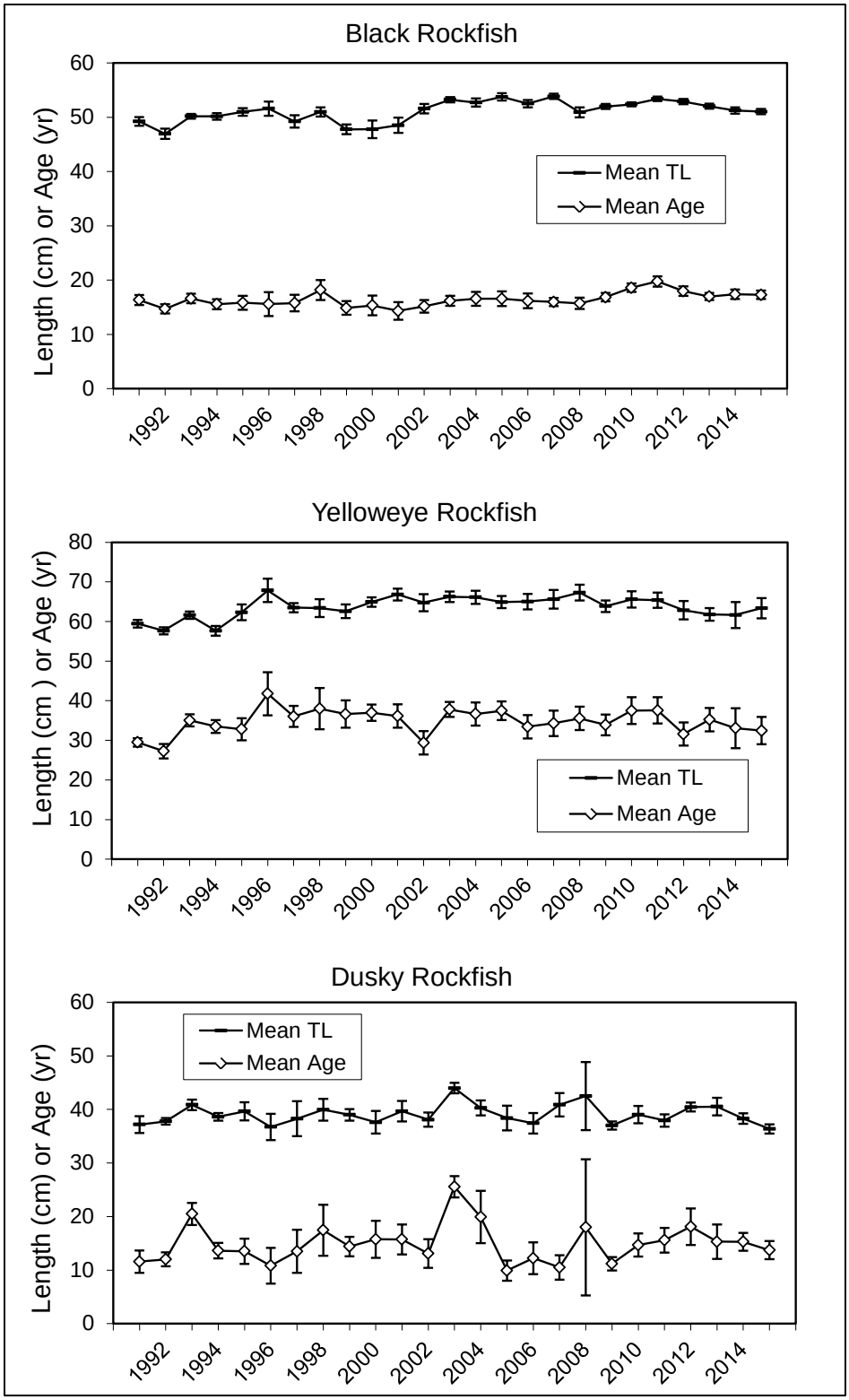

Figure 9.–Trends in mean total length (TL) and age of selected rockfish species (black, yelloweye, and dusky) in the Lower Cook Inlet sport harvest, 1991–2015.

Note: Error bars show 95% confidence intervals.

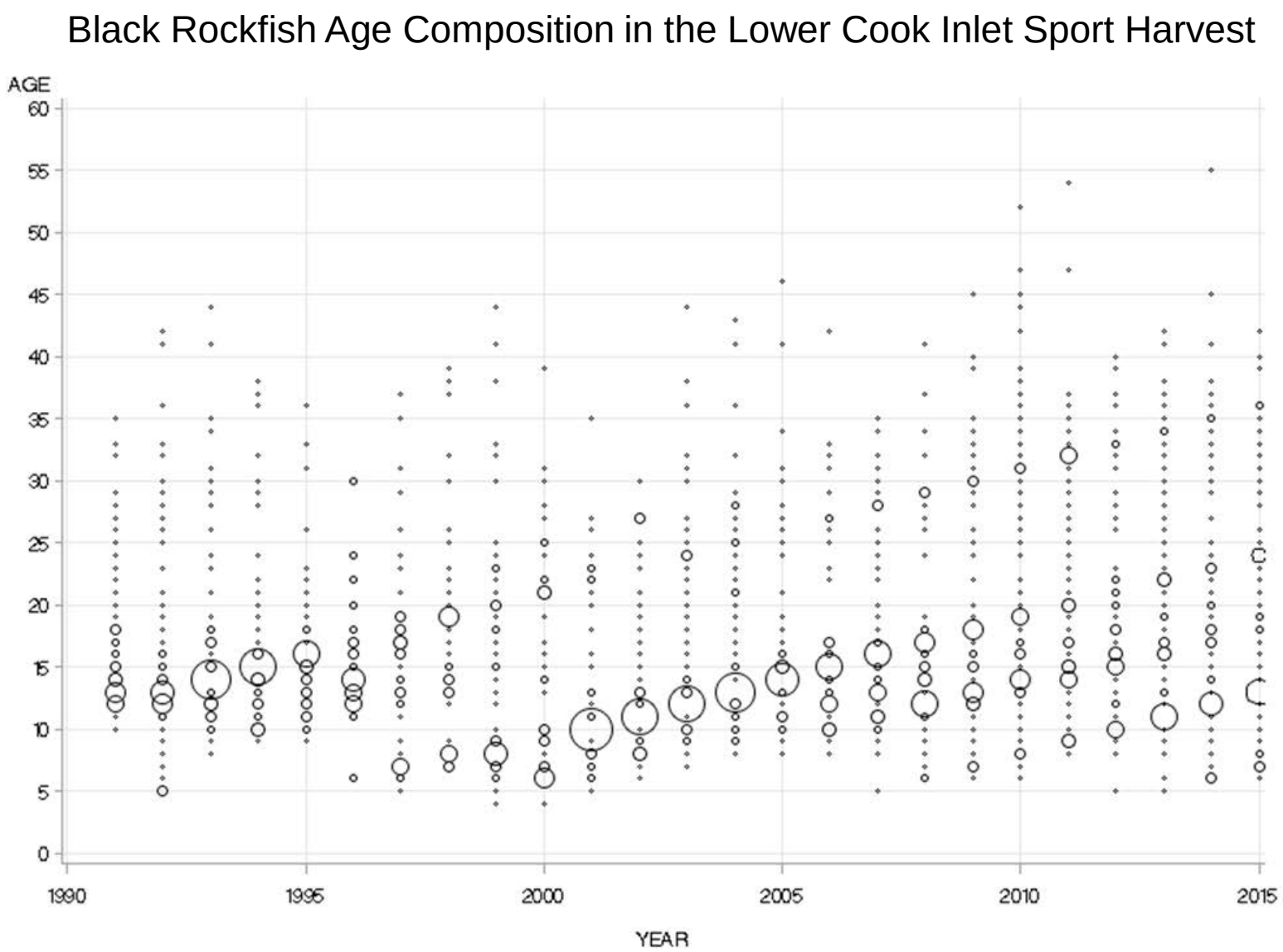

Figure 10.–Age composition of the black rockfish sport harvests landed at Homer, 1991–2015.

Note: Bubble diameter is proportional to the percentage of harvest in each age group.

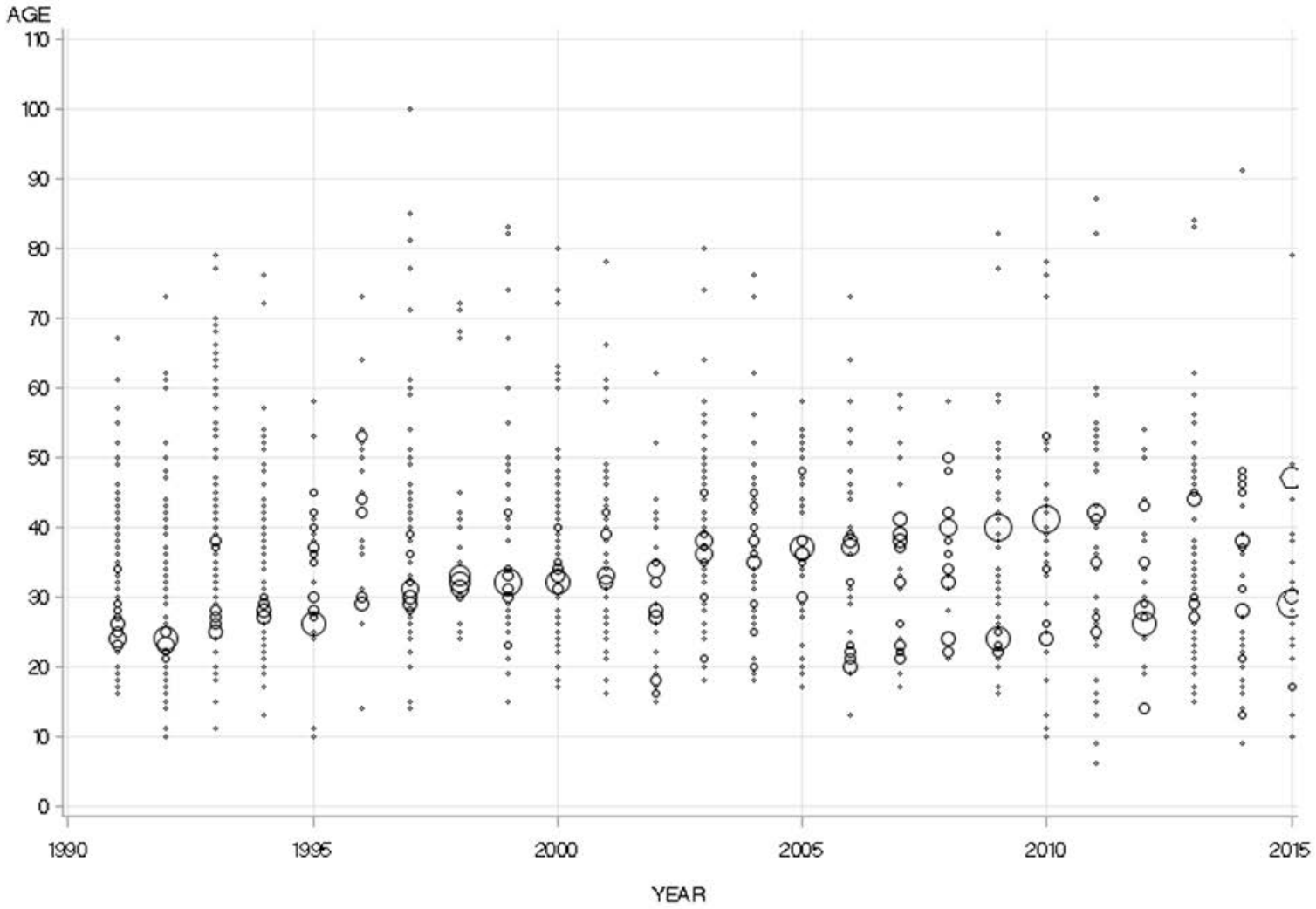

Figure 11.–Age composition of the yelloweye rockfish sport harvests landed at Homer, 1991–2015.

Note: Bubble diameter is proportional to the percentage of harvest in each age group.

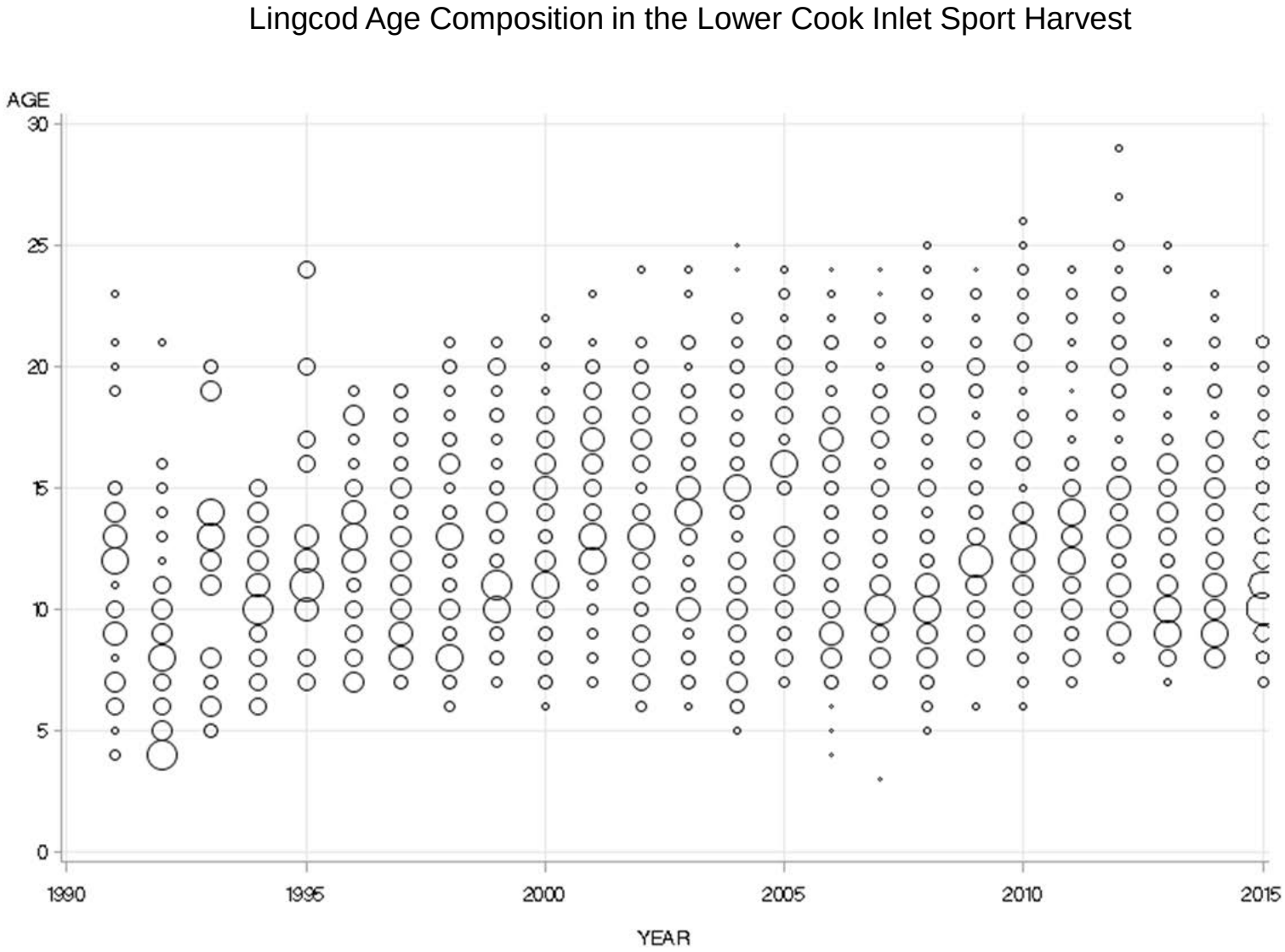

Figure 12.–Age composition of the lingcod sport harvest landed at Homer, 1991–2015.

Note: Bubble diameter is proportional to the percentage of harvest in each age group.

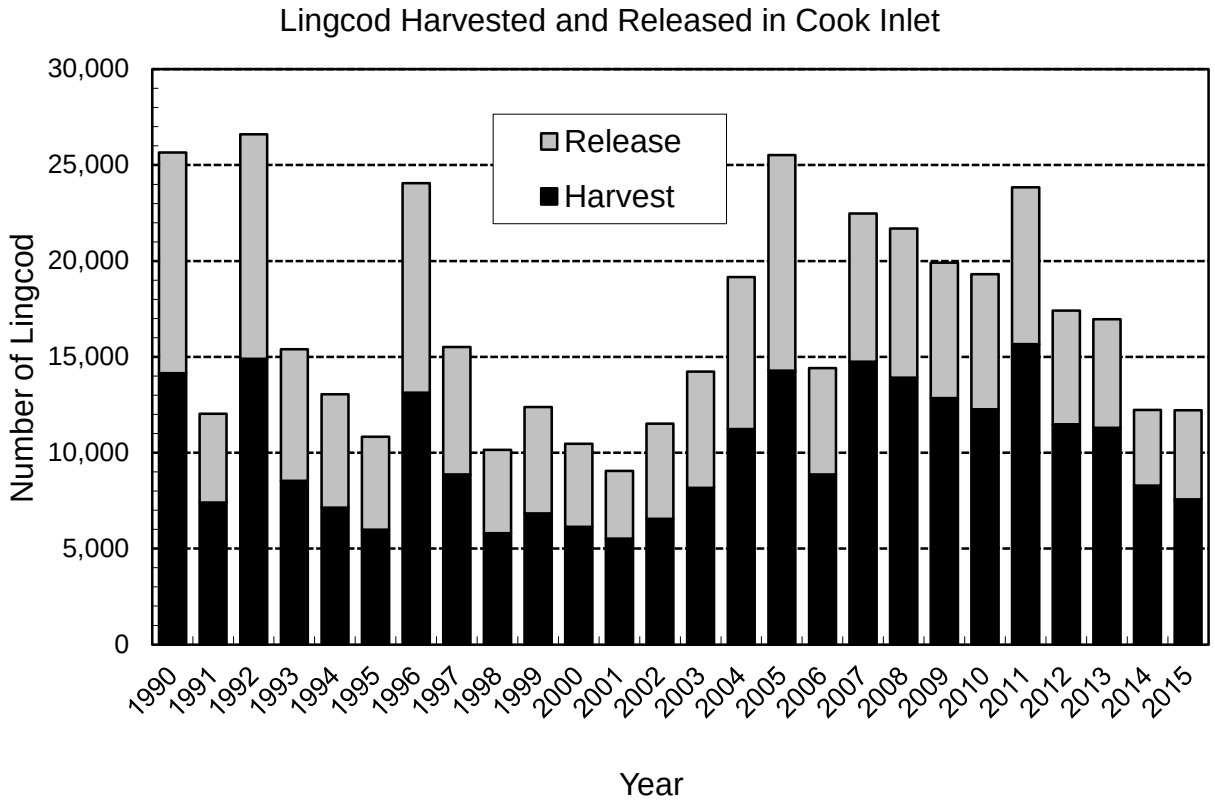

Figure 13.–Estimated numbers of lingcod harvested and released in Cook Inlet, 1990–2015.

Source: Mills (1991-1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 22, 2016). Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/.

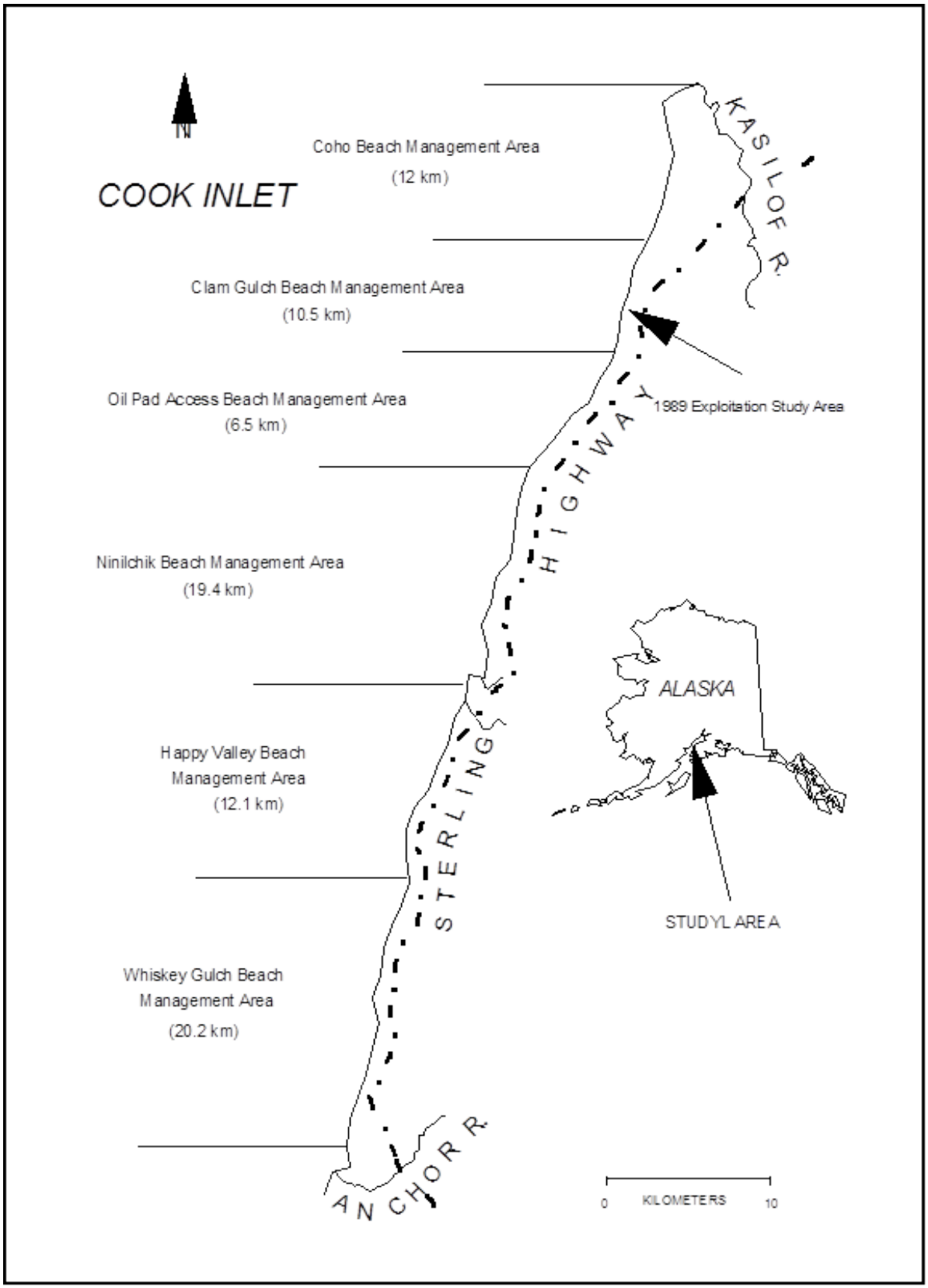

Figure 14.–Eastside Cook Inlet razor clam beaches.

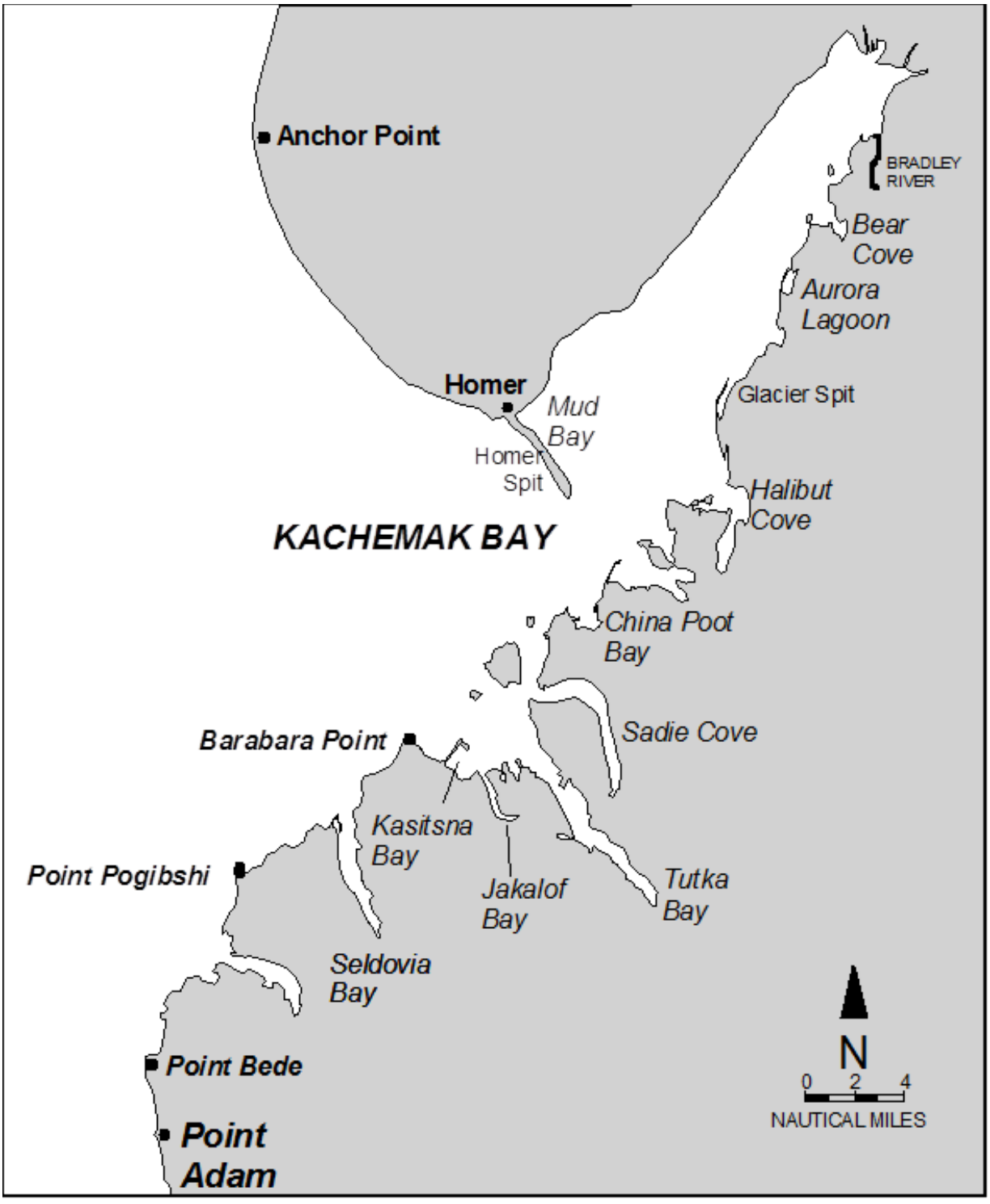

Figure 15.–Kachemak Bay.

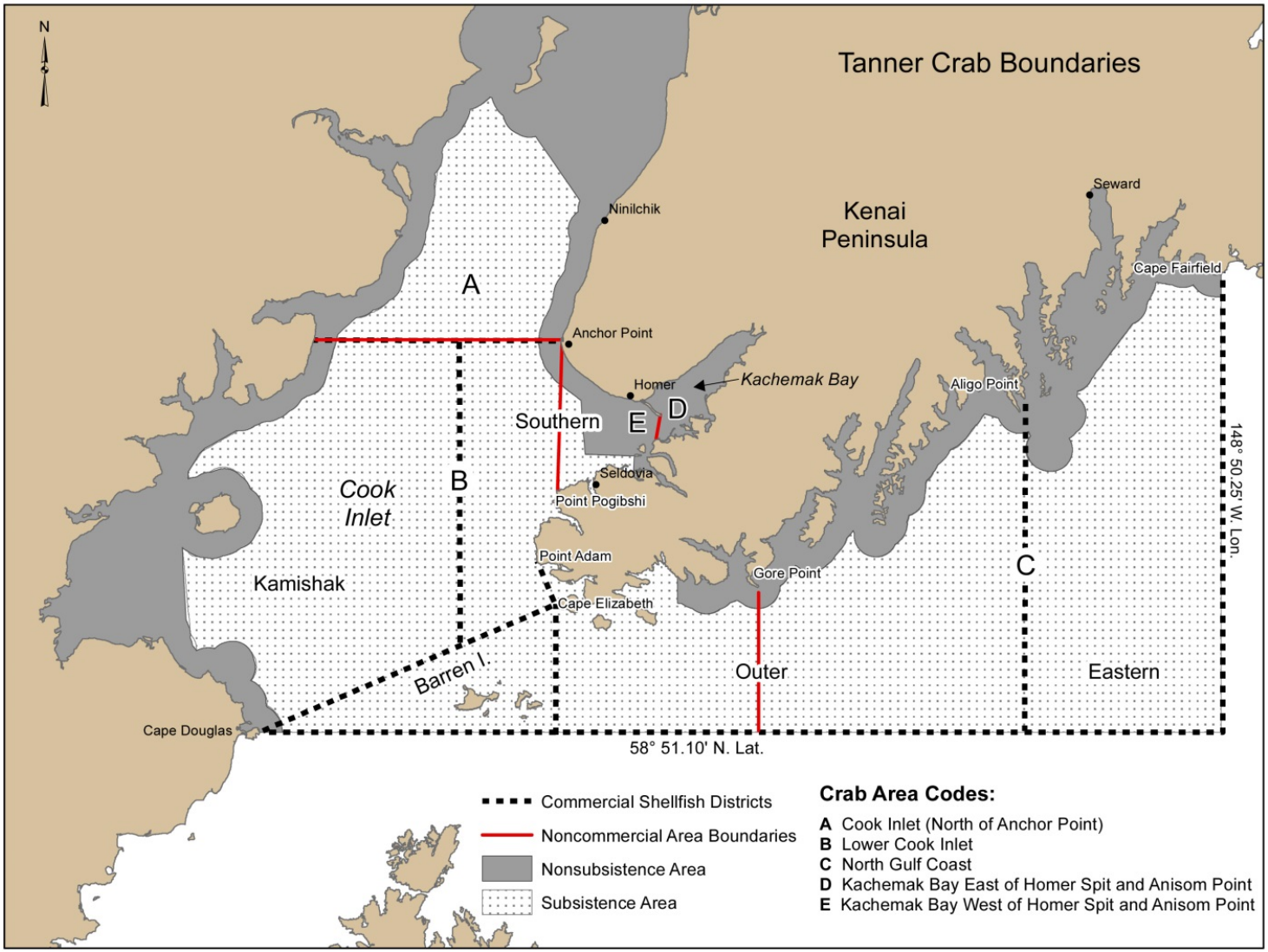

Figure 16.–Shellfish subsistence and nonsubsistence areas.

APPENDIX A: EMERGENCY ORDERS

Emergency Orders issued in 1996:

1) EO 2-SHR-1-08-96 closed the sport shrimp fishery in Kachemak Bay east of a line from Anchor Point to Point Pogibshi. Effective 15 April through 31 December 1996.
2) EO 2-KS-1-20-96 extended the Chinook (king) salmon fishery on the Ninilchik River on a continual basis between Saturday, 15 June through Monday, 24 June. Effective 15 June, 12:01 AM through Monday 24 June 1996.
3) EO 2-SS-1-41-96 opened the NDFL to snagging for Chinook salmon and coho salmon. Effective 8 September through 31 December 1996.

Emergency Orders issued in 1997:

1) EO 2-SHR-7-01-97 closed sport fishing for shrimp in all of Kachemak Bay east of a line from Anchor Point to Point Pogibshi. Effective 1 January through 31 December 1997.
2) EO 2-PU-H-02-96 closed the personal use fishery for shrimp in waters of Kachemak Bay east of a line from Anchor Point to Point Pogibshi. Effective 1 January through 31 December 1997.
3) EO 2-KS-7-21-97 opened snagging at the Homer Lagoon. Effective 12:00 PM, 2 July through 7 July 1997.
4) EO 2-PS-7-32-97 increased the bag limit for pink salmon to 12 per day in the marine waters of Tutka Bay. Effective 9 August through 21 September 1997.
5) EO 2-SS-7-35-97 closed the Fox Creek personal use dip net fishery.
6) EO 2-SS-7-36-97 increased the daily bag and possession limit for salmon other than Chinook salmon, including coho (silver) salmon 16 inches or more in length from 1 to 3 in Ninilchik River, Deep Creek, Stariski Creek, and the Anchor River. Effective 29 August through 15 October 1997.
7) EO 2-SS-7-41-97 opened the Homer Lagoon to snagging. Effective 7 August through 31 December 1997.

Emergency Orders issued in 1998:

1) EO 2-DC-7-05-98 closed the Dungeness crab sport fishery in Lower Cook Inlet east of a line extending from Anchor Point to Point Bede. Effective 29 May until further notice.
2) EO 2-DC-7-06-98 closed the personal use fishery for Dungeness crab in Lower Cook Inlet east from a line extending from Anchor Point to Point Bede. Effective 29 May until further notice.
3) EO 2-KS-7-13-98 opened the Homer Spit and enhancement lagoon to snagging. Effective 1 July through 7 July 1998.
4) EO 2-RS-7-24-98 closed the Ninilchik Traditional Council Educational Fishery. Effective 28 July through 10 August 1998.

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Emergency Orders issued in 1998 (continued):

5) EO 2-RS-1-27-98 rescinded EO 2-RS-7-24-98 and restored the Ninilchik Traditional Council educational fishery to the regular fishing times. Effective 3 August through 1 October 1998.

6) EO 2-PU-7-29-98 closed the personal use dip net fishery in Fox Creek. Effective 22 August through 31 December 1998.

7) EO 2-SS-7-32-98 opened snagging on the Homer Spit. Effective 12:00 PM, 18 September through 31 December 1998.

Emergency Orders issued in 1999:

1) EO 2-KS-7-08-99 opened the Homer Spit NDFL to snagging. Effective 12:00 PM, 30 June through 4 July 1999.

2) EO 2-RS-7-19-99 opened China Poot Creek to sockeye salmon dipnetting. Effective 12:00 PM, 11 August through 12:00 PM, 20 August 1999.

3) EO 2-SS-7-24-99 opened the Homer Spit and enhancement lagoon to snagging. Effective 12:00 PM, 24 September through 31 December 1999.

Emergency Orders issued in 2000:

1) EO 2-KS-7-08-00 opened snagging on the Homer Spit and enhancement lagoon. Effective 24 June through 2 July 2000.

2) EO 2-SS-7-22-00 opened the Homer Spit and lagoon to snagging. Effective 12:00 PM, 22 September through 31 December 2000.

Emergency Orders issued in 2001:

1) EO 2-RS-7-02-01 closed all waters of the English Bay River drainage and Port Graham Subdistrict to sockeye salmon sport fishing from 12:01 AM, 1 June 2001 until 31 August.

2) EO 2-KS-7-05-01 opened Deep Creek downstream of the regulatory marker for an additional 3-day weekend, 12:01 AM, 16 June 2001 to 11:59 PM, 18 June 2001.

3) EO 2-KS-7-05-02 opened the Ninilchik River downstream of the regulatory marker for an additional 3-day weekend, 12:01 AM, 16 June 2001 to 11:59 PM, 18 June 2001.

4) EO 2-KS-7-10-01 opened the Homer Spit Enhancement Lagoon area to snagging from noon, Friday, 29 June 2001 until 11:59 PM, Sunday, 8 July 2001.

5) EO 2-KS-7-11-01 prohibited the use of weighted hooks or weights following hooks in the Homer Spit Enhancement Lagoon area from Monday, 9 July 2001 until superceded by EO.

6) EO 2-TC-7-19-01 reduced the personal use daily bag and possession limit from 20 male crab to 5 and the pot limit from 5 to 1 per person and 2 per boat.

7) EO 2-TC-7-18-01 reduced the sport fishery daily bag and possession limit from 20 male crab to 5 and the pot limit from 5 to 1 per person and 2 per boat.

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Emergency Orders issued in 2001 (continued):

8) EO 2-SS-7-22-01 opened the Homer Spit Enhancement Lagoon area to snagging from noon, Sunday, 16 September 2001 through 11:59 PM, Monday, 31 December 2001.

Emergency Orders issued in 2002:

1) EO 2-KS-7-08-02 opened the Ninilchik River from its mouth to the downstream edge of the Sterling Highway Bridge, from 12:01 AM, Saturday, 15 June to 11:59 PM, Monday, 17 June 2002, to sport fishing for hatchery Chinook salmon only. The daily bag and possession limit was 1 fish 20 inches or greater in length or 10 fish under 20 inches. Only unbaited artificial lures were permitted.

2) EO 2-KS-7-16-02 opened the Homer Spit Enhancement Lagoon area to snagging for Chinook salmon from noon, Friday, 28 June 2002 until 11:59 PM, Sunday, 7 July 2002.

3) EO 2-TC-7-19-02 reduced sport Tanner crab bag and possession limits from 20 per person to 5 per person, effective 19 July 2002. The number of pots used to harvest Tanner crab was reduced to 2 per person and a maximum of 2 per vessel.

4) EO 2-TC-7-20-02 reduced personal Tanner crab bag and possession limits from 20 per person to 5 per person effective 19 July 2002. The number of pots used to harvest Tanner crab was reduced to 2 per person and a maximum of 2 per vessel.

5) EO 2-SS-7-16-02 opened the Homer Spit Enhancement Lagoon area to snagging for silver salmon from noon, Friday, 13 September 2002 through 11:59 PM, Tuesday, 31 December 2002.

Emergency Orders issued in 2003:

1) EO 2-KS-7-03-03 opened the Ninilchik River from its mouth to the downstream edge of the Sterling Highway Bridge from 12:01 AM, Saturday, 14 June 2003 to 11:59 PM, Monday, 31 June 2003 to sport fishing for hatchery Chinook salmon only. The daily bag and possession limit was 1 fish 20 inches or greater in length and 10 fish under 20 inches. Use of only 1 single hook was allowed.

2) EO 2-KS-7-09-03 opened the Homer Spit Enhancement Lagoon area to snagging from noon, Wednesday, 25 June 2003 until 11:59 PM, Sunday, 6 July 2003.

3) EO 2-SS-7-24-03 opened the Homer Spit Enhancement Lagoon area to noon, Wednesday, 17 September 2003 until 11:59 PM, Wednesday, 31 December 2003.

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Emergency Orders issued in 2004:

1) EO 2-KS-7-03-04 opened the Ninilchik River from its mouth upstream to the regulatory marker located approximately 2 miles upstream, to fishing for hatchery Chinook salmon 7 days per week. Bait was allowed. Only 1, single hook could be used. A person could not possess a Chinook salmon that had been filleted, headed, mutilated, or otherwise disfigured in a manner that prevented identification of hatchery or wild origin until permanently transported away from the fishing site if the fish was taken from the riverbank. "Fishing site" meant the riverbank where the fish was hooked and removed from the water. The EO was effective 12:01 AM, Saturday, 29 May 2004 until 11:59 PM 31 December 2004.
2) EO 2-KS-7-07-04 opened the Anchor River to fishing on 12:00 AM, Saturday, 26 June 2004 through 11:59 PM, 28 June 2004 from its mouth upstream approximately 2 miles to the ADF&G marker located approximately 600 feet downstream of the confluence of the north and south forks of the Anchor River.
3) EO 2-KS-7-12-04 opened the Homer Spit to snagging Chinook salmon, 12:01 PM, Thursday, 1 July 2004 through 11:59 PM, Monday, 5 July 2004.
4) EO 2-KS-7-15-04 rescinded EO 2-KS-7-03-04, which opened the Ninilchik River to fishing for hatchery Chinook salmon 7 days per week.
5) EO 2-SS-7-24-04 opened the Homer Spit to snagging silver salmon noon, Friday, 10 September through 11:59 PM, Friday, 31 December 2004

Emergency Orders issued in 2005:

1) EO 2-RS-7-4-05 closed the waters of the English Bay drainage and Port Graham Subdistrict to sport fishing for sockeye salmon from 11:59 PM, Wednesday, 1 June until further notice.
2) EO 2-KS-7-11-05 opened the Homer Spit to snagging Chinook salmon, noon, Wednesday, 29 June through 11:59 PM, Monday, 4 July 2005.
3) EO 2-RS-7-19-05 rescinds EO 2-RS-7-4-05, effective 12:01 AM, Saturday, 2 July 2005.
4) EO 2-SS-7-29-05 opened the Homer Spit to snagging silver salmon noon, Wednesday, 14 September through 11:59 PM, Saturday, 31 December 2005.

Emergency Orders issued in 2006:

1) EO 2-KS-7-12-06 opened the Ninilchik River from the mouth to the regulatory markers approximately 2 miles upstream to harvest of hatchery Chinook salmon 12:01 AM, Wednesday, 4 June until 11:59 PM, Friday, 14 July 2006. Bait was allowed but only 1 single hook could be used.
2) EO 2-RS-7-9-06 closed the waters of the English Bay drainage and Port Graham Subdistrict to sport fishing for sockeye salmon from 11:59 PM, Wednesday, 31 May through 11:59 PM, Monday, 31 July 2006.
3) EO 2-KS-7-22-06 opened the Homer Spit to snagging Chinook salmon 12:01 PM, Thursday, 6 July through 11:59 PM, Sunday, 9 July 2006.

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Emergency Orders issued in 2006 (continued):

4) EO 2-RS-7-23-06 rescinded EO 2-RS-7-9-06, effective 12:01 AM, Thursday, 6 July 6 2006.

Emergency Orders issued in 2007:

1) EO 2-KS-7-06-07 opened the Ninilchik River from the mouth to the regulatory markers approximately 2 miles upstream to harvest of hatchery Chinook salmon. Effective 12:01 AM, Saturday, 26 May through 12:59 PM, Sunday, 15 July 2007. Bait was allowed but only 1 single hook could be used.
2) EO 2-RS-7-11-07 closed the waters of the English Bay drainage and Port Graham Subdistrict to sport fishing for sockeye salmon from 12:01 AM, Thursday, 31 May 2007 through 11:59 PM, Tuesday, 31 July 2007.
3) EO 2-KS-7-23-07 opened NDFL to snagging from 12:00 noon, Thursday, 5 July 2007 through 11:59 PM, Sunday, 8 July 2007.
4) EO 2-RS-7-18-07 rescinded the English Bay and Port Graham closure effective 6:00 AM, Tuesday, 26 June 2007.

Emergency Orders issued in 2008:

1) EO 2-RS-7-06-08 closed the waters of the English Bay drainage and Port Graham Subdistrict to sport fishing for sockeye salmon from 11:59 PM, Saturday, 31 May 2008 through 11:59 PM, Thursday, 31 July 2008.
2) EO 2-RS-7-15-08 rescinded the English Bay and Port Graham closure effective 6:00 AM, Tuesday, 1 July 2008.
3) EO 2-SS-7-27-08 opened NDFL to snagging from 12:00 noon, Friday, 12 September 2008 through 11:59 PM, Wednesday, 31 December 2008.

Emergency Orders issued in 2009:

1) EO 2-KS-7-08-09 closed waters of the Anchor River drainage from its mouth upstream to the junction of the north and south forks to fishing and increased the closed area in the salt waters of Cook Inlet at the mouth of the Anchor River from 2 miles to 4 miles beginning 12:01 AM, Saturday, 6 June 2009 through 11:59 PM, Tuesday, 30 June 2009.

Emergency Orders issued in 2010:

1) EO 2-KS-7-10-10 prohibited the use of bait in the Anchor River, Deep Creek, and Ninilchik River drainages, and increased the closed area in the salt waters of Cook Inlet at the mouth of the Anchor River from 1 to 2 miles north and south of the Anchor River mouth and 1 mile off shore beginning 12:01 AM, Saturday, 5 June 2010 through 11:59 PM, Wednesday, 30 June 2010.
2) EO 2-KS-7-15-10 prohibited the retention of Chinook salmon in the Anchor River drainage from its mouth upstream to the junction of the north and south forks beginning 12:01 AM, Saturday, 12 June 2010 through 11:59 PM, Wednesday, 30 June 2010. Chinook salmon could not be possessed or retained; Chinook salmon caught could not be removed from the water and had to be released immediately. EO 2-KS-7-10-10, which prohibited the use of bait in the Anchor River, Deep Creek, and Ninilchik River drainages, remained in effect.

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Emergency Orders issued in 2010 (continued):

3) EO 2-KS-7-28-10 closed the salt waters of Cook Inlet at the mouth of the Anchor River to all sport fishing from 2 miles north and south of the Anchor River mouth and 1 mile offshore beginning 12:01 AM, Thursday, 1 July 2010 through 11:59 PM, Saturday, 31 July 2010.
4) EO 2-TC-7-27-10 reduced the daily bag and possession limits for male Tanner crab in Cook Inlet from 5 per person to 4 per person beginning 12:01 AM, Thursday, 15 July 2010 through 11:59 PM, Tuesday, 15 March 2011 during open fishing periods.
5) EO 2-KS-7-36-10 rescinded EO 2-KS-7-28-10 issued 29 June 2010. Effective 12:01 AM, Tuesday, 13 July 2010, the salt waters of Cook Inlet at the mouth of the Anchor River from 2 miles north and south of the Anchor River mouth and 1 mile offshore were open to all sport fishing.

Emergency Orders issued in 2011:

1) EO 2-HC-7-04-11 reduced the combined sport fishery bag and possession limits of littleneck and butter clams in the Cook Inlet–Resurrection Bay Saltwater Area, including Kachemak Bay, to 80 clams per person beginning 12:01 AM, Saturday, 14 May 2011 through 11:59 PM, Saturday, 31 December 2011.
2) EO 2-HC-7-05-11 reduced the combined personal use bag and possession limits of littleneck and butter clams in the Cook Inlet–Resurrection Bay Saltwater Area, including Kachemak Bay, to 80 clams per person beginning 12:01 AM, Saturday, 14 May 2011 through 11:59 PM, Saturday, 31 December 2011.
3) EO 2-KS-7-06-11 prohibited the use of bait in the Anchor River, Deep Creek, and Ninilchik River drainages beginning 11 June 2011 through 11:50 PM, Wednesday, 22 June 2011.
4) EO 2-KS-7-07-11 closed the waters of the Anchor River drainage from its mouth upstream to the junction of the north and south forks to sport fishing beginning 12:01 AM, Wednesday, 15 June 2011 through 11:59 PM, Thursday, 30 June 2011.
5) EO 2-KS-7-16-11 required the use of only 1 unbaited, single-hook, artificial lure in the flowing waters of the Anchor River drainage, and closed the salt waters of Cook Inlet at the mouth of the Anchor River to all sport fishing from 2 miles north and south of the Anchor River mouth and 1 mile offshore beginning 12:01 AM, Friday, 1 July 2011 through 11:59 PM, Sunday, 31 July 2011.
6) EO 2-TC-7-28-11 closed the Tanner crab fishery in waters of Kachemak Bay located east of a line from Anchor Point to Point Pogibshi beginning 12:01 AM, Tuesday, 6 September 2011 through 11:59 PM, Thursday, 15 March 2012.

Emergency Orders issued in 2012:

1) EO 2-HC-7-04-12 reduced the combined sport fishery bag and possession limits of littleneck and butter clams in the Cook Inlet–Resurrection Bay Saltwater Area, including Kachemak Bay, to 80 clams per person beginning 12:01 AM, Wednesday, 4 April 2012 through 11:59 PM, Monday, 31 December 2012.

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Emergency Orders issued in 2012 (continued):

2) EO 2-HC-7-05-12 reduced the combined personal use fishery bag and possession limits of littleneck and butter clams in the Cook Inlet–Resurrection Bay Saltwater Area, including Kachemak Bay, to 80 clams per person beginning 12:01 AM, Wednesday, 4 April 2012 through 11:59 PM, Monday, 31 December 2012.
3) EO 2-KS-7-08-12 closed waters of the Anchor River drainage from its mouth upstream to the junction of the north and south forks to sport fishing each Wednesday during the Chinook salmon season beginning 12:01 AM, Saturday, 19 May 2012. In addition, this EO also decreases the waters of the Anchor River drainage open to sport fishing by relocating the ADF&G regulatory marker downstream approximately 1,000 feet below the junction of the north and south forks beginning 12:01 AM, Saturday, 19 May 2012 through 11:59 PM, Tuesday, 31 July 2012.
4) EO 2-KS-7-09-12 limited sport fishing gear to only 1 unbaited, single-hook, artificial lure when fishing in the Anchor River, Deep Creek, and Ninilchik River drainages beginning 12:01 AM, Saturday, 2 June 2012 through 11:59 PM, Wednesday, 20 June 2012.
5) EO 2-KS-7-10-12 closed waters of the Anchor River drainage from its mouth upstream to the junction of the north and south forks to sport fishing beginning 12:01 AM, Saturday, 9 June 2012 through 11:59 PM, Saturday, 30 June 2012.
6) EO 2-KS-7-13-12 prohibited sport fishing within 1 mile of shore in the salt waters of Cook Inlet south of the latitude of the mouth of the Ninilchik River to the latitude of Bluff Point beginning 12:01 AM, Friday, 15 June 2012 through 11:59 PM, Saturday, 30 June 2012.
7) EO 2-KS-7-21-12 closed waters of the Anchor River and Ninilchik River from the mouth upstream approximately 2 miles to the ADF&G markers to sport fishing for any species of fish, beginning 12:01 AM, Sunday, 1 July 2012 through 11:59 PM, Sunday, 15 July 2012.
8) EO 2-KS-7-22-12 limited sport fishing gear to only 1 unbaited, single-hook, artificial lure when fishing in the Ninilchik River, Deep Creek, Stariski Creek, and Anchor River drainages beginning 12:01 AM, Sunday, 1 July 2012 through 11:59 PM, Tuesday, 31 July 2012.
9) EO 2-KS-7-23-12 prohibited the retention of Chinook salmon while sport fishing within 1 mile of shore in the salt waters of Cook Inlet south of the latitude of the mouth of the Ninilchik River to the latitude of Bluff Point beginning 12:01 AM, Sunday, 1 July 2012, through 11:59 PM, Sunday, 15 July 2012. Catch-and-release fishing for Chinook salmon was allowed, but Chinook salmon could not be retained or possessed. Chinook salmon that were caught could not be removed from the water and had to be released immediately.
10) EO 2-TC-7-27-12 closed the Tanner crab season in Cook Inlet and North Gulf Coast waters effective 12:01 AM, Sunday, 15 July 2012 through 11:59 PM, Saturday, 15 March 2013.
11) EO 2-RS-7-32-12 closed all waters of the English Bay River drainage and Port Graham Subdistrict to sport fishing for sockeye salmon from 12:01 AM, Wednesday, 4 July 2012 through 11:59 PM, Tuesday, July 31 2012.

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Emergency Orders issued in 2012 (continued):

12) EO 2-KS-7-39-12 prohibited sport fishing for Chinook salmon in the Ninilchik River beginning 12:01 AM, Monday, 16 July 2012 through 11:59 PM, Wednesday, 31 October 2012. This closure prohibited all sport fishing for Chinook salmon, including catch-and-release fishing. Chinook salmon could not be retained or possessed; Chinook salmon caught while fishing for other species could not be removed from the water and had to be released immediately.
13) EO 2-KS-7-41-12 prohibited the retention of Chinook salmon while sport fishing within 1 mile of shore in the salt waters of Cook Inlet south of the latitude of the mouth of the Ninilchik River to the latitude of Bluff Point beginning 12:01 AM, Monday, 16 July 2012 through 11:59 PM, Tuesday, 31 July 2012. Catch-and-release fishing for Chinook salmon is allowed, but Chinook salmon could not be retained or possessed. Chinook salmon that are caught could not be removed from the water and had to be released immediately.
14) EO 2-KS-7-44-12 superseded EO 2-KS-7-41-12, issued Friday, 13 July 2012. This EO prohibits sport fishing for Chinook salmon in the salt waters of Cook Inlet north of the latitude of Bluff Point beginning 12:01 AM, Thursday, 19 July 2012, through 11:59 PM, Tuesday, 31 July 2012. Chinook salmon could not be retained or possessed. Chinook salmon caught while fishing for other species could not be removed from the water and had to be released immediately.

Emergency Orders issued in 2013:

1) EO 2-KS-7-03-13 closed waters of the Anchor River drainage from its mouth upstream to the junction of the north and south forks to sport fishing each Wednesday during the Chinook salmon season and decreased the waters of the Anchor River drainage open to sport fishing by relocating the ADF&G regulatory marker downstream approximately 1,000 feet below the junction of the north and south forks. This EO was effective from 12:01 AM, Wednesday, 1 May 2013 through 11:59 PM, Sunday, 30 June 2013.
2) EO 2-KS-7-04-13 established a combined annual limit of 2 Chinook salmon 20 inches or greater in length for fish harvested in the Anchor River, Deep Creek, Ninilchik River, and all marine waters south of the latitude of the mouth of the Ninilchik River (lat 60°03.99′N) to the latitude of Bluff Point (lat 59°40.00′N). In addition, a person who took and retained a Chinook salmon 20 inches or greater in length from either Deep Creek, Anchor River, or Ninilchik River could not sport fish in any of those drainages for the rest of that day. This EO was effective from 12:01 AM, Wednesday, 1 May 2013 through 11:59 PM, Sunday, 30 June 2013. Any Chinook salmon caught in these waters and recorded before Wednesday, 1 May 2013 on the harvest portion of an Alaska sport fishing license or harvest record card did not count against the annual limit of 2 Chinook salmon after 12:01 AM, Wednesday, 1 May 2013, but did count against the Cook Inlet annual limit of 5 Chinook salmon.

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Emergency Orders issued in 2013 (continued):

3) EO 2-KS-7-05-13 limited sport fishing gear to only 1 unbaited, single hook, artificial lure when fishing in the Anchor River, Deep Creek, or Ninilchik River drainages beginning 12:01 AM, Wednesday, 1 May 2013 through 11:59 PM, Sunday, 30 June 2013.
4) EO 2-KS-7-06-13 reduced the bag and possession limit for Chinook salmon in the Ninilchik River drainage to 1 Chinook salmon 20 inches or greater in length. During the 3-day weekend fishing periods that begin on Memorial Day weekend, anglers could retain either a hatchery Chinook salmon or a naturally-produced (wild) Chinook salmon. Beginning in July, anglers could only retain hatchery Chinook salmon. This EO was effective beginning 12:01 AM, Wednesday, 1 May 2013 through 11:59 PM, Thursday, 31 October 2013
5) EO 2-RC-7-12-13 reduced the sport bag and possession limit for razor clams to the first 25 razor clams harvested from the eastside Cook Inlet beaches extending from the mouth of the Kenai River to the southernmost tip of the Homer Spit. This EO was effective beginning 12:01 AM, Thursday, 23 May 2013 through 11:59 PM, Tuesday, 31 December 2013.
6) EO 2-RC-7-13-13 reduced the personal use bag and possession limit for razor clams to the first 25 razor clams harvested from the eastside Cook Inlet beaches extending from the mouth of the Kenai River to the southernmost tip of the Homer Spit. This EO was effective beginning 12:01 AM, Thursday, 23 May 2013 through 11:59 PM, Tuesday, 31 December 2013.
7) EO 2-KS-7-17-13 superseded EOs 2-KS-7-03-13 and 2-KS-7-06-13 issued 18 April 2013. This EO closed waters of the Anchor River, Deep Creek, Ninilchik River, and Stariski Creek from the mouth upstream approximately 2 miles to ADF&G markers or to clearly recognizable physical features to sport fishing for any species of fish, beginning 12:01 AM, Saturday, 15 June 2013 through 11:59 PM, Monday, 15 July 2013.
8) EO 2-KS-7-18-13 superseded EO 2-KS-7-04-13, issued 18 April 2013. This emergency order prohibited Chinook salmon fishing (including catch-and-release) while sport fishing within 1 mile of shore in the salt waters of Cook Inlet south of the latitude of the mouth of the Ninilchik River (lat 60°03.99′N) to the latitude of Bluff Point (lat 59°40.00′N). Chinook salmon incidentally caught while fishing for other fish could not be removed from the water and had to be released immediately. This emergency order was effective from 12:01 AM, Saturday, 15 June 2013 through 11:59 PM, Monday, 15 July 2013.
9) EO 2-TC-7-32-13 closed the Tanner crab season in Cook Inlet and North Gulf Coast waters effective 12:01 AM, Monday, 15 July 2013 through 11:59 PM, Saturday, 15 March 2014.
10) EO 2-KS-7-35-13 prohibited sport fishing for Chinook salmon in the Ninilchik River drainage effective beginning 12:01 AM, Tuesday, 16 July 2013 through 11:59 PM, Thursday, 31 October 2013.

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Emergency Orders issued in 2014:

1) EO 2-KS-7-01-14 closed the Anchor River drainage to sport fishing each Wednesday during the Chinook salmon season and reduced the waters of the Anchor River open to sport fishing during the Chinook salmon season. Under this EO, waters open to sport fishing extended from the mouth to the downstream side of the Old Sterling Highway Bridge approximately 550 feet below the junction of the north and south forks. This EO was effective from 12:01 AM, Thursday, 1 May 2014, through 11:59 PM, Monday, 30 June 2014.
2) EO 2-KS-7-02-14 established a combined annual limit of 2 Chinook salmon 20 inches or greater in length in the Anchor River, Deep Creek, Ninilchik River, and all marine waters south of the latitude of the mouth of the Ninilchik River (lat 60°03.99′N) to the latitude of Bluff Point (lat 59°40.00′N). This emergency order was effective from12:01 AM, Thursday, 1 May 2014, through 11:59 PM, Monday, 30 June 2014. Chinook salmon harvested in these waters and recorded before Thursday, 1 May and after Monday, 30 June 2014 do not count against the 2–Chinook salmon annual limit after 12:01 AM, Thursday, 1 May 2014, but do count against the Cook Inlet annual limit of 5 Chinook salmon.
3) EO 2-KS-7-03-14 restricted sport fishing gear in the Anchor River, Deep Creek, and Ninilchik river drainages to only 1 unbaited, single-hook, artificial lure beginning 12:01 AM, Thursday, 1 May 2014, through 11:59 PM, Monday, 30 June 2014.
4) EO 2-RCL-7-09-14 closed Ninilchik Beach areas to the taking of clams from the north bank of Deep Creek north to a marker located approximately 3.2 miles north of the Ninilchik River at lat 60°05.66′N, and it reduces the bag and possession limit for razor clams to the first 25 razor clams harvested for the remaining eastside Cook Inlet beaches extending from the mouth of the Kenai River to the southernmost tip of the Homer Spit. This EO was effective beginning 12:01 AM, Wednesday, 12 March 2014, through 11:59 PM, Wednesday, 31 December 2014.
5) EO 2-RCL-7-10-14 closed Ninilchik Beach areas to the taking of clams from the north bank of Deep Creek north to a marker located approximately 3.2 miles north of the Ninilchik River at lat 60°05.66′N, and it reduced the bag and possession limit for razor clams to the first 25 razor clams harvested for the remaining eastside Cook Inlet beaches extending from the mouth of the Kenai River to the southernmost tip of the Homer Spit. This emergency order was effective beginning 12:01 AM, Wednesday, 12 March 2014, through 11:59 PM, Wednesday, 31 December 2014.
6) EO 2-KS-7-16-14 superseded EO 1-KS-7-01-14 issued 27 February 2014. This EO closed waters of the Anchor River drainage from its mouth upstream to the junction of the north and south forks to sport fishing; and prohibited Chinook salmon fishing (including catch-and-release) while sport fishing within 1 mile of shore in the salt waters of Cook Inlet south of the latitude of the mouth of the Ninilchik River (lat 60°03.99′N) to the latitude of Bluff Point (lat 59°40.00′N). Chinook salmon incidentally caught while fishing for other fish may not be removed from the water and must be released immediately. This EO was effective from 12:01 AM, Friday, 13 June 2014, through 11:59 PM, Monday, 30 June 2014.

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Emergency Orders issued in 2014 (continued):

7) EO 2-TC-7-37-14 closed the Tanner crab season in Cook Inlet and North Gulf Coast waters effective 12:01 AM, Tuesday, 15 July 2014, through 11:59 PM, Sunday, 15 March 2015.
8) EO 2-KS-7-43-14 prohibited sport fishing for Chinook salmon in the salt waters of Cook Inlet north of the latitude of Bluff Point beginning 12:02 AM, Saturday, 26 July 2014, through 11:59 PM, Thursday, 31 July 2014. Chinook salmon could not be retained or possessed. Chinook salmon caught while fishing for other species could not be removed from the water and had to be released immediately.
9) EO 2-SS-7-49-14 allowed snagging in the waters of the Nick Dudiak Fishing Lagoon and adjacent waters along the Homer Spit. The waters opened to snagging extend from the Homer City Dock near the entrance of the Homer Boat Harbor, northwest along the east side of the Homer Spit to the ADF&G marker placed approximately 200 yards northwest of the entrance to the Nick Dudiak Fishing Lagoon, to a distance of 300 feet from shore. Snagging will be permitted from 12:01 AM, Friday, 15 August 2014 through 11:59 PM Wednesday, 31 December 2014.

Emergency Orders issued in 2015:

1) EO 2-KS-7-01-15 closed the first and fifth opening weekend and the 5 Wednesday openings in May and June for the Anchor River drainage and decreased the waters of the Anchor River drainage open to sport fishing to the downstreams side of the Old Sterling Highway Bridge approximately 550 feet below the junction of the north and south forks. This EO was effective from 12:01 AM, Wednesday, 1 April 2015 through 11:59 PM, Tuesday, 30 June 2015.
2) EO 2-KS-7-02-15 limited sport fishing gear to only 1 unbaited, single-hook, artificial lure when fishing in the Anchor River, Deep Creek, or Ninilchik River drainages. This EO was effective from 12:01 AM, Wednesday, 1 April 2015 through 11:59 PM, Tuesday, 30 June 2015.
3) EO 2-KS-7-03-15 established a combined annual limit of 2 Chinook salmon 20 inches or greater in length for fish harvested in Anchor River, Deep Creek, Ninilchik River, and all marine water south of the latitude of the mouth of the Ninilchik River (lat 59°40.00′N). This EO was effective from 12:01 AM, Wednesday, 1 April 2015 through 11:59 PM, Tuesday, 30 June 2015.
4) EO 2-KS-7-16-14 superseded EO 1-KS-7-01-14 issued 27 February 2014. This EO closed waters of the Anchor River drainage from its mouth upstream to the junction of the north and south forks to sport fishing; and prohibited Chinook salmon fishing (including catch-and-release) while sport fishing within 1 mile of shore in the salt waters of Cook Inlet south of the latitude of the mouth of the Ninilchik River (lat 60°03.99′N) to the latitude of Bluff Point (lat 59°40.00′N). Chinook salmon incidentally caught while fishing for other fish could not be removed from the water and had to be released immediately. This EO was effective from 12:01 AM, Friday, 13 June 2014, through 11:59 PM, Monday, 30 June 2014.

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Emergency Orders issued in 2015 (continued):

5) EO 2-KS-7-04-15 extended the date by 2 weeks of the closed saltwater area surrounding the Anchor River mouth and the special harvest areas north to lat 59°92.98′N, located approximately 1 mile south of Stariski Creek and south to Bluff Point (lat 59°40.00′N). This EO was effective from 12:01 AM, Wednesday, 1 July 2015 through 11:59 PM, Wednesday, 15 July 2015.
6) EO 2-RCL-7-11-15 closed east Cook Inlet beach areas from the mouth of the Kenai River to the southernmost tip of the Homer Spit to the taking of all clam species for personal use. This EO was effective from 12:01 AM, Sunday, 1 March through 11:59 PM, Thursday, 31 December 2015.
7) EO 2-RCL-7-12-15 closed east Cook Inlet beach areas from the mouth of the Kenai River to the southernmost tip of the Homer Spit to the taking of all clam species in the sport fishery. This EO was effective from 12:01 AM, Sunday, 1 March through 11:59 PM, Thursday, 31 December 2015.
8) EO 2-KS-7-20-15 superseded EO 2-KS-7-01-15 and allowed sport fishing during the first opening weekend from 13 to 15 June, and the fifth Wednesday, 17 June for the Anchor River drainage. The preseason actions that restricted gear, and established a combined annual limit of 2 Chinook salmon 20 inches or greater in length for fish harvested in the Anchor River, Deep Creek, and Ninilchik River and all marine waters south of the latitude of the mouth of the Ninilchik River to the latitude of Bluff Point remained in effect. This EO was effective from 12:01 AM, Saturday, 13 June through 11:59 PM, Tuesday, 30 June 2015.
9) EO 2-KS-7-21-15 rescinded EO 2-KS-7-04-15, which extended the closed saltwater area surrounding the Anchor River mouth and the special harvest areas through 15 July. The affected waters surround the Anchor River mouth and the special harvest areas north to lat 59°52.98′N located approximately 1 mile south of Stariski Creek and south to Bluff Point (lat 59°40.00′N). The preseason actions that restricted gear and established a combined annual limit of 2 Chinook salmon 20 inches or greater in length for fish harvested in the Anchor River, Deep Creek, and Ninilchik River and all marine waters south of the latitude of the mouth of the Ninilchik River to the latitude of Bluff Point still remained in effect. This EO was effective from 12:01 AM, Wednesday 1 July 2015 through 11:59 PM, Wednesday, 15 July 2015.
10) EO 2-KS-7-27-15 rescinded EO 2-KS-7-03-15 and restored the Cook Inlet annual limit of 5 Chinook salmon 20 inches or greater in length for fish harvested in the Ninilchik River and all marine waters south of the latitude of the mouth of the Ninilchik River (lat 60°03.99′N) to the latitude of Bluff Point (lat 59°40.00′N). This EO was effective from 12:01 AM, Saturday, 20 June 2015. Any Chinook salmon recorded before Saturday, 20 June of the harvest portion of an Alaska sport fishing license or harvest record card counted toward the Cook Inlet annual limit.

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Emergency Orders issued in 2015 (continued):

11) EO 2-KS-7-32-15 allowed snagging along the east side of the Homer Spit, from the Homer City Dock (excluding the Homer Boat Harbor) to the ADF&G markers about 200 yards northwest of the entrance to the Nick Dudiak Fishing Lagoon (including the Nick Dudiak Fishing Lagoon) to a distance of 300 feet from shore. This EO was effective from 12:00 noon, Friday, 26 June through 11:59 PM, Sunday, 28 June 2015.
12) EO 2-TC-7-43-15 closed the Tanner crab season in Cook Inlet and North Gulf Coast waters effective 12:01 AM, Wednesday, 15 July 2015 through 11:59 PM, Tuesday, 15 March 2016.
13) EO 2-SS-7-56-15 allowed snagging along the east side of the Homer Spit, from the Homer City Dock (excluding the Homer Boat Harbor) to the ADF&G markers about 200 yards northwest of the entrance to the Ninilchik Dudiak Fishing Lagoon (including the Nick Dudiak Fishing Lagoon) to a distance of 300 feet from shore. This EO was effective from 12:00 noon, Friday, 28 August through 11:59 PM, Thursday, 31 December 2015.

Emergency Orders issued in 2016:

1) EO 2-RCL-7-01-16 closed east Cook Inlet beach areas from the mouth of the Kenai River to the southernmost tip of the Homer Spit to the taking of all clam species. This EO was effective from 12:01 AM, Friday, 1 January through 11:59 PM, Saturday, 31 December 2016.
2) EO 2-RCL-7-02-16 closed east Cook Inlet beach areas from the mouth of the Kenai River to the southernmost tip of the Homer Spit to the taking of all clam species for personal use. This EO was effective from 12:01 AM, Friday, 1 January through 11:59 PM, Saturday, 31 December 2016.
3) EO 2-KS-7-21-16 opened the Ninilchik River to fishing for hatchery Chinook salmon from its mouth to an ADF&G regulatory marker located approximately 2 miles upstream. In addition, only 1 unbaited single-hook, artificial lure was allowed while sport fining in the Ninilchik River. This EO was effective from 12:01 AM, Saturday, 16 June 2016 through 11:59 PM, Friday, 15 July 2016.
4) EO 2-KS-7-25-16 allowed snagging along the east side of the Homer Spit, from the Homer City Dock (excluding the Homer Boat Harbor) to the ADF&G markers about 200 yards northwest of the entrance to the Nick Dudiak Fishing Lagoon (including the Nick Dudiak Fishing Lagoon) to a distance of 300 feet from shore. This EO was effective from 12:00 noon, Friday, 1 July 2016 through 11:59 PM, Monday, 4 July 2016.
5) EO 2-TC-7-26-16 closed the Tanner crab season in Cook Inlet and North Gulf Coast waters effective 12:01 AM, Friday, 15 July 2016 through 11:59 PM, Monday, 15 March 2017.

Appendix A2.–Dates when snagging was opened by emergency order (EO) at the Homer Spit Nick Dudiak Fishing Lagoon (NDFL).

	Broodstock		
Year	Early-run Chinook salmon	Coho salmon	Pink salmon
1989	Sat, 24 Jun	Sat, 02 Sep	Sat, 01 Jul
1990	Sun, 24 Jun	Mon, 17 Sep	
1991	Mon, 24 Jun	Wed, 18 Sep	
1992	Wed, 24 Jun	Fri, 18 Sep	Tue, 28 Jul
1993	Thu, 24 Jun	Wed, 22 Sep	Wed, 04 Aug
1994	Fri, 24 Jun	Wed, 14 Sep	
1995	Wed, 28 Jun	Thu, 14 Sep	
1996		Sun, 08 Sep	
1997	Wed, 02 Jul to Mon, 07 Jul	Sat, 20 Sep	
1998	Wed, 01 Jul to Sun, 05 Jul	Fri, 18 Sep	
1999	Wed, 30 Jun to Sun, 04 Jul	Fri, 24 Sep	
2000	Sat, 24 Jun to Sun, 02 Jul	Fri, 22 Sep	
2001	Fri, 29 Jun to Sun, 08 Jul	Sun, 16 Sep	
2002	Fri, 28 Jun to Sun, 07 Jul	Fri, 13 Sep	
2003	Wed, 25 Jun to Sun, 06 Jul	Wed, 17 Sep	
2004	Thu, 01 Jul to Mon, 05 Jul	Fri, 10 Sep	
2005	Wed, 29 Jun to Fri, 01 Jul	Wed, 14 Sep	
2006	Thu, 06 Jul to Sun, 09 Jul		
2007	Thu, 05 Jul to Mon, 09 Jul		
2008		Fri, 12 Sep	
2009–2013			
2014		Fri, 14 Aug	
2015	Fri, 26 Jun to Sun, 28 Jun	Fri, 28 Aug	
2016	Fri, 01 Jul to Mon, 04 Jul		