Technical Paper No. 444

Copper River Chinook Salmon: The Intersection of Commercial Fisheries and the Subsistence Way of Life in Cordova, Alaska

by
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and
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March 2019

Alaska Department of Fish and Game **Division of Subsistence**

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Measures (fisheries)

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

Mathematics, statistics

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

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The Division of Subsistence Technical Paper Series was established in 1979 and represents the most complete collection of information about customary and traditional uses of fish and wildlife resources in Alaska. The papers cover all regions of the state. Some papers were written in response to specific fish and game management issues. Others provide detailed, basic information on the subsistence uses of particular communities which pertain to a large number of scientific and policy questions.

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ABSTRACT

Retaining commercially harvested salmon, referred to as "home pack," is a key component of Cordovans' procurement of salmon for non-commercial uses. Through key respondent interviews and participant observation in Cordova, this project expanded on household harvest surveys conducted in 2015 to more fully explore the intersection of commercial and subsistence salmon fisheries in which Cordova residents participate. Home pack data, as recorded on commercial fish tickets, were compared to estimates created through household harvest surveys. The amount of salmon home pack estimated from fish tickets and household surveys has differed in the past. While there are not many years of home pack data collection overlap for comparison, the differences between these 2 estimation methods appear to be narrowing. Several themes were identified and explored through the key respondent data. There are many factors that determine whether a commercial fisherman will choose to retain a type of salmon in any given year, ranging from market price to personal and family needs to availability of other options. The weight of each of these factors may change from year to year for a particular commercial fisherman.

Key words: Chinook salmon, Cordova, Prince William Sound, commercial retention, home pack, household surveys

1. INTRODUCTION

This report presents an integration of the results of 2 studies conducted to better understand the intersection of commercial fisheries and the subsistence way of life in Cordova, Alaska (Figure 1-1). Cordova is a community of approximately 2,279 people situated on the shore of Prince William Sound (Alaska Department of Labor and Workforce Development 2018). Study results found that subsistence activities remain a vital component of life in Cordova and that Cordova residents have adapted to the particular regulatory structure surrounding commercial and subsistence fishing activities. Commercial fishing activities supplement, and occasionally supplant, traditional subsistence activities. The Alaska Department of Fish and Game (ADF&G) Division of Subsistence is charged with gathering, quantifying, evaluating, and reporting information about customary and traditional uses of fish and wildlife resources. The results presented within this report provide insight into Cordova fishermen's decision-making processes concerning retention of salmon from commercial catches, as well as discussion of residents' access to salmon for home use through various means.

Project Background

This study is part of the State of Alaska Chinook Salmon Research Initiative (CSRI) program, an effort to help state and federal resource management agencies better understand the factors affecting Chinook salmon abundance in Alaska. The CSRI program was a multi-year initiative to fund a variety of statewide research projects based on the understanding that Chinook salmon declines have caused "social and economic hardships across many communities in rural and urban Alaska" (ADF&G Chinook Salmon Research Team 2013:1). Chinook salmon have been returning to many Alaska rivers in fewer numbers, with widespread shortfalls first becoming apparent in 2007. ADF&G hosted a symposium to identify knowledge gaps and research needs concerning salmon, the result of which was the Chinook Salmon Stock Assessment and Research Plan. In the plan, 12 watersheds, based on existing Chinook indicator stocks, were chosen for recommended research, including the Copper River. This plan was formed in 2013 and recommended, in addition to other regional and statewide concerns, "an analysis of the harvest of Chinook salmon in the subsistence fishery in Copper River District of Prince William Sound, as well as commercial removals of Chinook salmon for personal use, including an LTK [local and traditional knowledge] component" to help address stock-specific information gaps (ADF&G Chinook Salmon Research Team 2013:24–25). This subsistence harvest and local and traditional knowledge (LTK) component would supplement additional information being collected about stock status, migration, and genetics of Copper River Chinook salmon. The requested LTK was identified as a source of "detailed observation about abundance, distribution, run timing, condition, and habitat, often focused on specific locations and informed by considerable time depth" (ADF&G Chinook Salmon Research Team 2013:16). LTK research methods identified in the plan included key respondent interviews, participant observation, literature review, and recording comments during harvest surveys, all of which were employed during the 2 studies conducted in Cordova. This CSRI program study of the Copper River focused on factors relating to commercial removals of Chinook salmon for personal use. To incorporate analysis of the subsistence harvest of Chinook salmon, this Copper River salmon study draws from a contemporaneous ADF&G Division of Subsistence project designed to explore continuing effects of the *Exxon Valdez* oil spill, which included surveys about salmon harvest and use by Cordova residents (Fall and Zimpelman 2016). The Native Village of Eyak partnered with the Division of Subsistence on completing these salmon studies.

Community Background: Cordova

Cordova is nestled in Orca Inlet on the southeastern coast of Prince William Sound. Cordova's environmental setting is representative of the general Prince William Sound area, characterized by "numerous large forested islands and offshore islets, sea stacks, glacier-cut fiords, mist-shrouded valleys, vast glaciers,

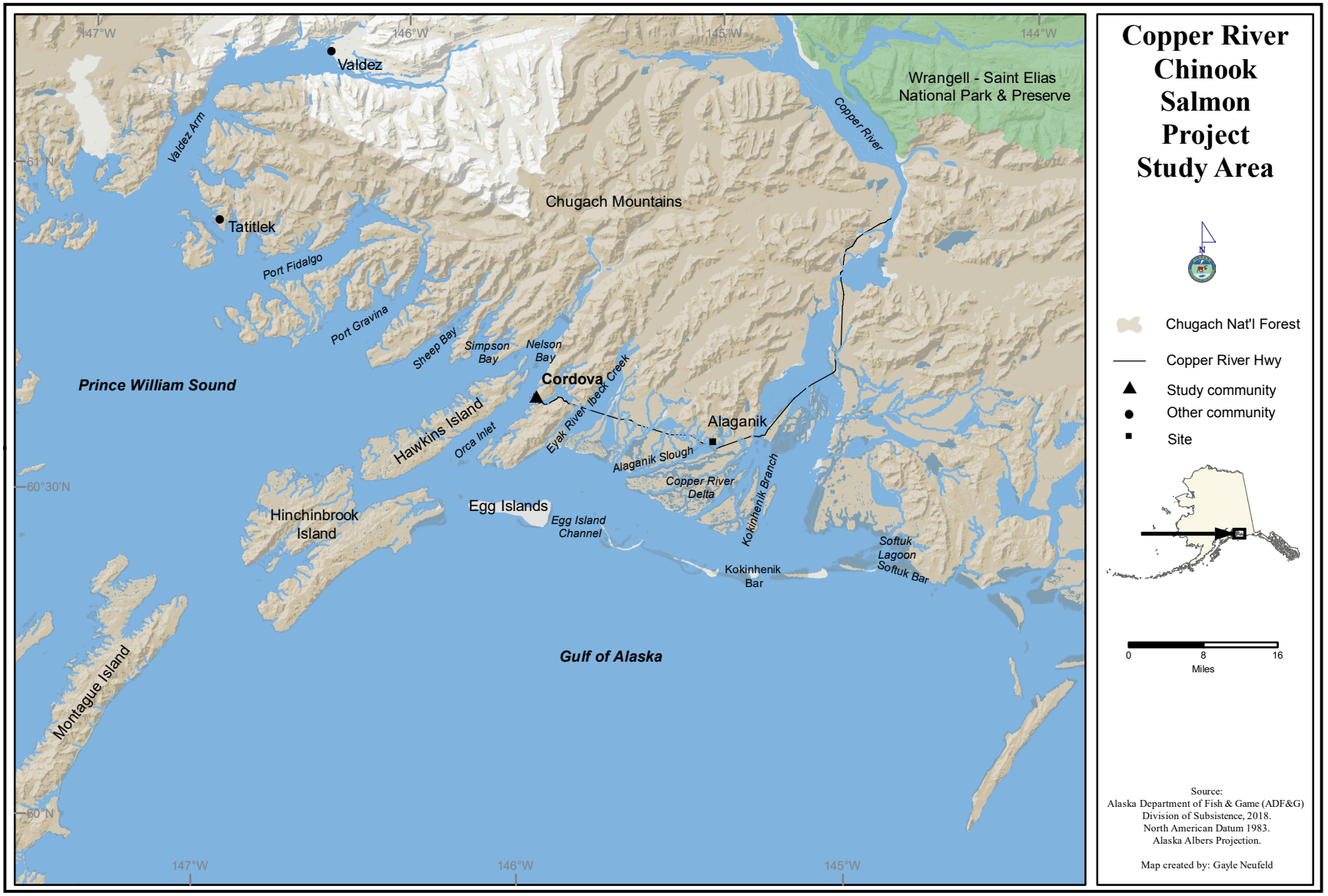

Figure 1-1.–Map of Copper River area and study community, Cordova, 2014.

coastal wetlands, temperate rainforest, and a convoluted 2,700-mile coastline."[1] This transitional ecological zone provides for nutrient-rich waters and lands, giving rise to an array of diverse flora and fauna. Cordova itself is situated between the coast of Orca Inlet to the west and Eyak Lake to the east. The town is close to the delta of the Copper River, which starts approximately 6 miles from town.

Cordova's location is prime habitat for many species, particularly the salmon that journey up the Copper River annually. Because of this reliable resource, the Cordova area has been inhabited by people for centuries. At the time of European contact, the Cordova area was made up of multiple Eyak *dAXunhyuu* communities, including Alaganik, which was located near the Copper River Delta, and Eyak, which was near the mouth of Lake Eyak (Sherman 2012). The area was in proximity to Ahtna and Chugach communities and was in close contact with Tlingit traders. The first consistent Euro-American settlement near Cordova was a trading post, Fort Constantine, built by Russians to control fur trading in 1791 (Sherman 2012). By the late 1880s, there were 2 canneries operating near Eyak Lake. Within 30 years, 50 additional canneries dotted the Copper River Delta and Prince William Sound; this established seasonal commercial fishing, clamming, and cannery work as the dominant economic resource in the area, which continues today. The economy has been punctuated by other economic developments. In 1906, Michael J. Heney began an aggressive "railroad invasion" that would lead to the founding of Cordova as the terminus for the Kennecott mining district, located approximately 196 railroad miles northeast of Cordova. The building of the railroad and the operation of the mining district led to a population boom in Cordova. The Kennecott copper lode would turn out to be the highest grade copper deposit ever found (Sherman 2012).

The last mines in the Kennecott mining district closed in 1938. However, the people of Cordova continued commercial fishing for salmon, marine fish, and marine invertebrates, thus sustaining the town. By the time the mining district had closed, in addition to abundant salmon runs, Cordova was known as the "Razor Clam Capital of the World" (Nielsen 1984). Events such as the 1964 earthquake[2] and the *Exxon Valdez* oil spill (EVOS) in 1989 greatly affected people's ability to participate in these commercial fisheries[3]. While many species have "recovered" or are "recovering" from the spill, the Pacific herring *Clupea pallasii* resource is listed as in "not recovering" status.[4] The loss of commercial fishing opportunities for herring has had a direct effect on the ability of residents to harvest sufficient subsistence resources. Herring, one of the first fish to return after the winter, marked the beginning of the commercial fishing season, which for many fishermen included fishing for herring and then salmon. With herring no longer available for commercial fishing, the fishing season starts 3 months later and it is more difficult to make a living with this truncated season (Gill et al. 2016). However, commercial fishing still makes up the economic lifeblood of the community.

Today, in addition to commercial fishing, Cordova also houses a substantial government sector, including the City of Cordova, ADF&G, the Native Village of Eyak, the Chugach National Forest's Cordova Ranger District office, and various U.S. Coast Guard units, including the U.S.C.G. Cutter *Sycamore*. Additional community services include schools from kindergarten to 12th grade and the Prince William Sound Community College, a medical center and a health clinic, a post office, 3 grocery stores, shops, and a smattering of restaurants, bars, and hotels. Cordova also has a community center (completed in 2015) that houses the Cordova Public Library, the Cordova Historical Museum, City Hall and other municipal

1. National Wildlife Refuge Federation, "Special Ecological Sites in Alaska's Eastern Prince William Sound and Copper River Delta," 2005. http://www.pwsrcac.org/wp-content/uploads/filebase/programs/oil_spill_prevention_planning/special_ecological_sites.pdf (accessed August 15, 2018).
2. Brooks, Kenneth M., "Suitability of Two Sand Bars Near the Native Village of Eyak for the Enhancement of Razor Clams (*Siliqua patula*)," 2004. https://www.adfg.alaska.gov/static/fishing/PDFs/aquaticfarming/eyak_razorclam_report.pdf (accessed August 15, 2018).
3. *Exxon Valdez* Oil Spill Trustee Council, "Commercial Fishing," n.d. http://www.evostc.state.ak.us/index.cfm?FA=status.human_fishing (accessed August 15, 2018).
4. *Exxon Valdez* Oil Spill Trustee Council, "Status of Injured Resources & Services," n.d. http://www.evostc.state.ak.us/index.cfm?FA=status.injured (accessed August 15, 2018).

administrative offices, a full kitchen, performance/theater spaces, and conference/meeting spaces.[5] For recreation, Cordova has the Ilanka Cultural Center, Bidarki Recreation Center, Prince William Sound Science Center, as well as numerous hiking and boating opportunities and the Mt. Eyak ski area.

Cordova has regular air service through Alaska Airlines and Ravn Alaska, as well as year-round ferry service to and from Whittier and Valdez; the former provides access to Anchorage and the Matanuska–Susitna Valley while the latter provides access to the Copper River Valley. Cordova is also linked by ferry service to other communities within Prince William Sound.

Regulatory Context

Cordova is within the Prince William Sound fisheries management area. The Prince William Sound Area supports both wild and enhanced runs of all species of salmon found in Alaska: chum salmon *Oncorhynchus keta*, coho salmon *Oncorhynchus kisutch*, Chinook salmon *Oncorhynchus tshawytscha*, pink salmon *Oncorhynchus gorbuscha*, and sockeye salmon *Oncorhynchus nerka*. State and federal regulations provide subsistence salmon fishing opportunities and state regulations also provide personal use, recreational, and commercial salmon fishing opportunities. The state subsistence fishery most used by Cordova households is the driftnet fishery (see 5 AAC 01.620(b)(3) and 5 AAC 24.330(a)), which occurs in the Copper River and Bering River districts (Figure 1-2).

Under both state and federal regulations, subsistence salmon fishing takes place under the purview of subsistence permits. Federal subsistence fisheries in the Cordova area, which occur in fresh waters only (excluding the Copper River and its tributaries), are open only to federally qualified subsistence users within the Prince Willian Sound Area and are managed by the U.S. Forest Service from the Ranger District office located in Cordova.[6, 7] Harvest limits on the federal subsistence salmon harvest permit in the Prince William Sound Area (see Figure 1-3) mirror the state sport fishing limits, but additional gear types are allowed—including rod and reel, dip net, gaff, and spear—and federally qualified users may accumulate federal subsistence bag limits and also bag limits under state sport fishing regulations, provided the accumulation does not occur during the same day. Depending on where in the Prince William Sound management area the subsistence fishery is being conducted, allowable gear includes purse seine nets, set gillnets (setnet), drift gillnets (driftnet), fish wheels, dip nets, rod and reel, spear, and gaff. Subsistence salmon fishing under state regulations is open to all Alaska residents and is managed by the Division of Commercial Fisheries out of the ADF&G Cordova office. One permit is required per household and the harvest limits for subsistence fishers are 15 fish for a single-person household, 30 fish for a 2-person household, and 10 fish for every additional person in the household. The annual limit for Chinook salmon, no matter the household size, is 5 fish.

The state subsistence driftnet fishery in the Copper River District is open 7 days a week until the commercial fisheries begin, at which point subsistence fishing is open when there are commercial fishery openers, usually lasting from 12–36 hours.[8] Subsistence fishing is allowed until the commercial fishery closes. Commercial fishing openers are announced by Emergency Order (EO) from the ADF&G Cordova

5. The Cordova Center, "Home," n.d. http://www.thecordovacenter.com/ (accessed August 15, 2018).
6. A map depicting where federal agencies administer management programs in the Prince William Sound Area is available in U.S. Fish and Wildlife Service (2013:63).
7. Under federal regulations, there is the permit-required subsistence fishery within the Chugach National Forest and in the Copper River drainage downstream of Haley Creek and the permit-required subsistence fisheries of the Upper Copper River District. The latter fisheries are managed by the National Park Service out of Copper Center and regulations concerning these Upper Copper River fisheries are specified in 50 CFR 100.27(e)(11). Conditions for the Chugach National Forest area are only specified on the subsistence permit. A proposal (FP 19-13) will be considered by the Federal Subsistence Board at its April 2019 meeting to place these conditions in the federal subsistence management regulations at 50 CFR 100.27(e)(11). Federal Subsistence Board meeting materials are available online: https://www.doi.gov/sites/doi.gov/files/uploads/fsb_april_2019_meeting_materials_reduced_1.pdf (accessed February 2019).
8. In 2017, the Alaska Board of Fisheries adopted a regulatory proposal that provided for a Saturday opener in the subsistence fishery that is not tied to the commercial schedule; this regulation took effect in 2018.

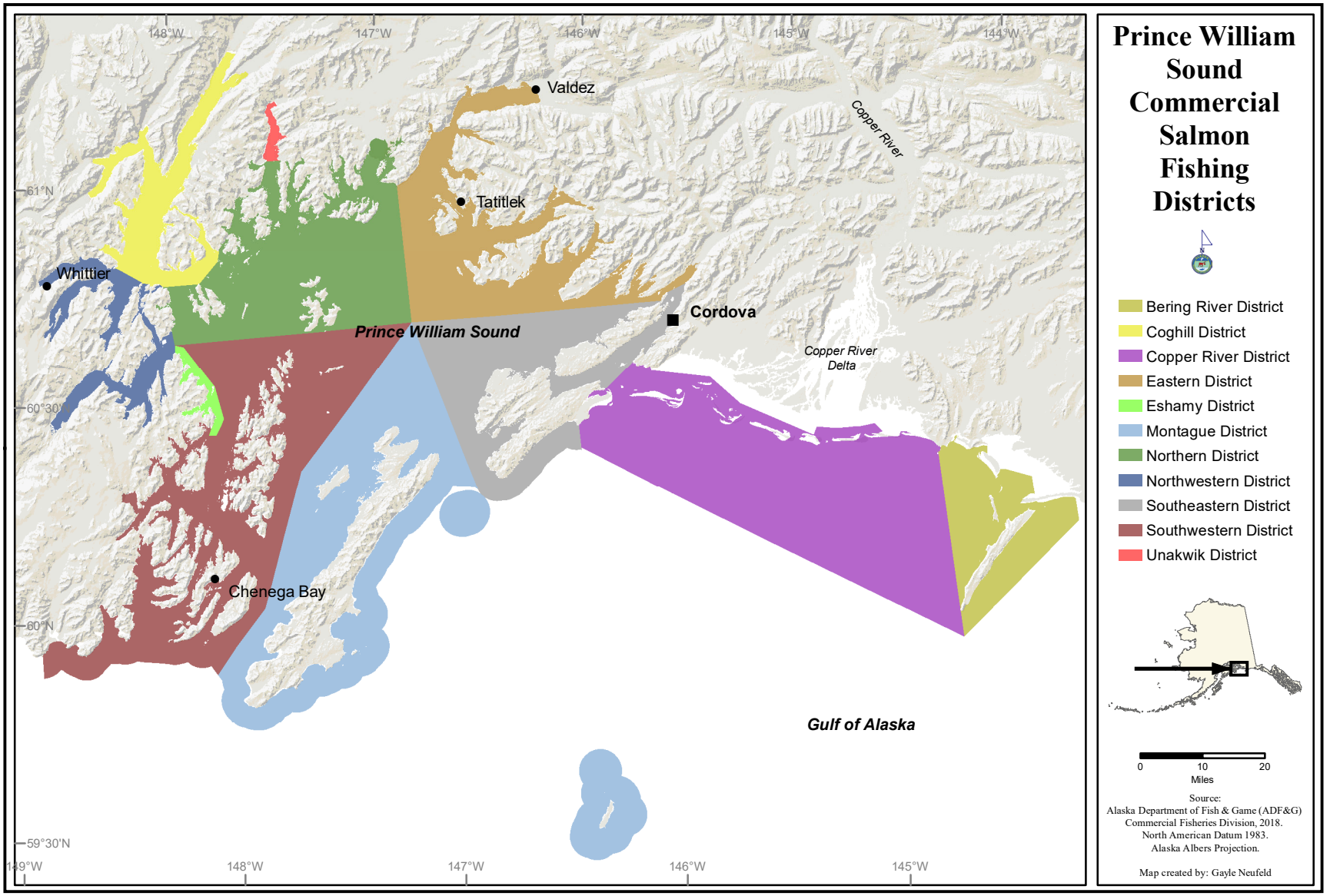

Figure 1-2.–Map of Prince William Sound commercial salmon fishing districts.

OMB Control No. 1018-0075 Expires 02/29/2016

Federal Subsistence Fish Application

Fish - General - FFPW01 - 2016

Permit No.

Federal Land Unit:	Federal Fish Management Area:	
Chugach NF	Copper River / Prince William Sound Area COPPER RIVER DRAINAGE	
Applicant's Name (First, Middle Initial, Last):	Date of Birth (mm/dd/yy):	Telephone Number:
Mailing Address:	Physical Address:	Community of Primary Residence:
Applicant's Signature X _____ I certify that I am a rural resident as defined by 50 CFR 100.4 and 36 CFR 242.4. I have read and understand the conditions on the permit and agree to comply with them and applicable regulations as found in 50 CFR 100 and 36 CFR 242.		Issuing Agent (Print): Date Permit Issued (mm/dd/yy):

Federal Subsistence Permit and Harvest Report

Permit Number:

Report Due: 15-JAN-2017

Fish - General - FFPW01 - 2016
Chugach NF - Copper River / Prince William Sound Area COPPER RIVER DRAINAGE

Season: 01/01/16 thru 12/31/16
Limit: See Permit Conditions

Did you fish? Yes ___ No ___
Did you use a designated fisher? Yes ___ No ___

Permittee's Name:

Print household members authorized to fish with this Permit (must be Federally qualified subsistence users)

Name (s) _____

Gear Legend	***Species Legend***
Rod and Reel = RR / Dip Net = DN / Gaff = GF Spear = SP	Chinook (King) = K / Coho (Silver) = CO / Chum (Dog) = CH / Sockeye (Red) = S Pink (Humpy) = P / Cutthroat Trout = CT / Brook Trout = BT / Arctic Char = AC Whitefishes = W / Grayling = G

Month/ Day	Specific Location	Gear Code	Species Code	Number Harvested	Month/ Day	Specific Location	Gear Code	Species Code	Number Harvested

FWS Form 3-2328 REV 10/13

Figure 1-3.–Sample federal subsistence salmon fishing permit for the Prince William Sound Area within Chugach National Forest in the Copper River drainage downstream of Haley Creek.

Figure 1-3.–Page 2 of 2.

Conditions of the Permit:

FEDERAL SUBSISTENCE PERMIT IS VALID IN FRESHWATER ONLY; REQUIRED FOR HARVEST OF SALMON, CHAR, TROUT, WHITEFISH, & GRAYLING. NO PERMIT REQUIRED FOR EULACHON. SALMON HARVEST NOT ALLOWED IN EYAK LAKE & ITS TRIBUTARIES OR FROM COPPER RIVER & ITS TRIBUTARIES. SUBSISTENCE FISHING IN EYAK RIVER ALLOWED ONLY DOWNSTREAM OF COPPER RIVER HIGHWAY BRIDGE.

REQUIRED: REMOVE BOTH TIPS FROM TAILS OF ALL SUBSISTENCE-CAUGHT SALMON BEFORE LEAVING FISHING SITE. GEAR ALLOWED FOR SALMON: ROD & REEL, DIP NET, SPEAR, & GAFF. GEAR ALLOWED FOR CUTTHROAT TROUT, CHAR, WHITEFISH, & GRAYLING: ROD & REEL, & SPEAR. NO SNAGGING WITH ROD & REEL ALLOWED.

NO CUTTHROAT TROUT HARVEST APRIL 15 THROUGH JUNE 14. GILL NET HARVEST OF THESE FISH ALLOWED JANUARY 1 THROUGH APRIL 1.

ANNUAL LIMITS: CUTTHROAT TROUT, INDIVIDUAL LIMIT: 5 -- ONLY 2 OVER 20 INCHES. CUTTHROAT TROUT, HOUSEHOLD LIMIT: 30. INCIDENTAL GILL NET HARVEST OF TROUT: 10. SALMON OTHER THAN PINK SALMON: 15 SALMON FOR HOUSEHOLD OF 1, 30 FOR HOUSEHOLD OF 2; 10 SALMON FOR EACH ADDITIONAL PERSON. YOU MAY NOT ADD FEDERAL PERMIT HARVEST LIMIT WITH STATE SUBSISTENCE HARVEST.

In accordance with the Privacy Act (5 U.S.C. 552a) and the Paperwork Reduction Act (44 U.S.C. 3501), please note the following information. This information collection is authorized by the Alaska National Interest Lands Conservation Act and associated regulations. The Federal Subsistence Board will use this information to manage fish and wildlife resources for subsistence uses. It is our policy not to use your name for any other purpose. We will maintain this information in accordance with the Privacy Act. Your response is voluntary, but is required to obtain or retain a benefit. We may not conduct or sponsor and you are not required to respond to an information collection unless it displays a currently valid OMB control number. OMB has approved this information collection and assigned OMB Control No. 1018-0075. We estimate it will take you about 15 minutes to complete the application and record your harvest. This burden estimate includes time for reviewing instructions, gathering data, and completing and reviewing the form. You may direct comments regarding the burden estimate or any other aspect of the form to the Service Information Collection Clearance Officer, Fish and Wildlife Service, Mail Stop 222, Arlington Square, Department of the Interior, 1849 C Street, NW., Washington D.C. 20240.

U.S. Fish and Wildlife Service
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PO Box 280
Cordova, AK 99574-9986

Conditions of the Permit:

FEDERAL SUBSISTENCE PERMIT IS VALID IN FRESHWATER ONLY; REQUIRED FOR HARVEST OF SALMON, CHAR, TROUT, WHITEFISH, & GRAYLING. NO PERMIT REQUIRED FOR EULACHON. SALMON HARVEST NOT ALLOWED IN EYAK LAKE & ITS TRIBUTARIES OR FROM COPPER RIVER & ITS TRIBUTARIES. SUBSISTENCE FISHING IN EYAK RIVER ALLOWED ONLY DOWNSTREAM OF COPPER RIVER HIGHWAY BRIDGE.

REQUIRED: REMOVE BOTH TIPS FROM TAILS OF ALL SUBSISTENCE-CAUGHT SALMON BEFORE LEAVING FISHING SITE. GEAR ALLOWED FOR SALMON: ROD & REEL, DIP NET, SPEAR, & GAFF. GEAR ALLOWED FOR CUTTHROAT TROUT, CHAR, WHITEFISH, & GRAYLING: ROD & REEL, & SPEAR. NO SNAGGING WITH ROD & REEL ALLOWED.

NO CUTTHROAT TROUT HARVEST APRIL 15 THROUGH JUNE 14. GILL NET HARVEST OF THESE FISH ALLOWED JANUARY 1 THROUGH APRIL 1.

ANNUAL LIMITS: CUTTHROAT TROUT, INDIVIDUAL LIMIT: 5 -- ONLY 2 OVER 20 INCHES. CUTTHROAT TROUT, HOUSEHOLD LIMIT: 30. INCIDENTAL GILL NET HARVEST OF TROUT: 10. SALMON OTHER THAN PINK SALMON: 15 SALMON FOR HOUSEHOLD OF 1, 30 FOR HOUSEHOLD OF 2; 10 SALMON FOR EACH ADDITIONAL PERSON. YOU MAY NOT ADD FEDERAL PERMIT HARVEST LIMIT WITH STATE SUBSISTENCE HARVEST.

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office. Because commercial and subsistence salmon fishery openers occur simultaneously, participation in subsistence salmon fishing, particularly of Chinook[9] and sockeye salmon, using a gillnet can be challenging for households. To participate, commercial fishermen need to change out their commercial-length nets for legal subsistence nets that measure no more than 50 fathoms, which requires a minimum of boating 2 or more hours round-trip from a commercial fishing location back to the harbor and out again before being able to participate in subsistence fishing. Because of this, a substantial percentage of Cordova households obtain salmon for home use through other methods, such as sport fishing, federal subsistence fishing, or retention of salmon from their commercial catches (Fall and Utermohle 1995; Stratton 1989, 1992).

Retaining fish from a commercial catch for a person's own use is allowed under 5 AAC 39.010(a). Fishermen must report their "home pack" on their commercial fish tickets. Sport fishing with a rod and reel is another common method for obtaining salmon. Harvests through sport fishing are estimated through a voluntary annual Statewide Harvest Survey that is mailed out to a random selection of people who obtain sport fishing licenses. State regulations provide daily and possession limits as well as specific closed waters.

Study Objectives

Working with the residents of the study community of Cordova, researchers addressed 2 overarching research questions: 1) what is the relationship between subsistence harvests and uses of wild resources and involvement in commercial fisheries; and 2) how and why are commercially caught Chinook salmon selected for home use and noncommercial exchange, instead of commercial sale, in the study community?

The project had the following objectives:

- Analyze the harvest of Chinook salmon in the subsistence fishery in the Copper River District of the Prince William Sound Area, as well as commercial removals of Chinook salmon for home/personal use.
- Identify factors that influence harvest and use of Chinook salmon in commercial and subsistence fisheries.
- Refine estimates of Chinook salmon "home pack."

Final Report Organization

This report summarizes the results of in-depth, semi-structured key respondent interviews and participant observation conducted by staff from ADF&G. The report also includes some of, and draws on all of, the results of systematic household surveys conducted in Cordova by ADF&G staff and local research assistants for the 2014 study year. Full results of that comprehensive harvest study have been published in Fall and Zimpelman (2016).

The report continues with a chapter on the methods used for conducting the key respondent interviews and participant observation, as well as those methods used in administering and analyzing the comprehensive household harvest survey, which are also detailed in Fall and Zimpelman (2016). Chapter 3 focuses on the quantitative results—addressing objectives 1 and 3—such as participation in commercial fisheries, harvest and use quantities and characteristics, and home pack estimates. Chapter 4 approaches the objectives from a qualitative perspective, identifying and discussing themes that arose through the key respondent interviews, participant observation, and survey comments. The final chapter concludes with a discussion of possible management recommendations to refine estimates of home pack.

ADF&G provided a draft report to study participants from the ADF&G Cordova office, Chugach National Forest Service's Cordova Ranger District office, and the Native Village of Eyak for review and comment. After receipt of comments, the report was finalized. ADF&G mailed copies of a short (4-page) summary of the study findings to the same offices to be distributed to Cordova residents (Appendix E).

9. It is important to note that Chinook salmon do not run up the road-accessible freshwater streams near Cordova, and local residents without access to the state-managed subsistence fisheries in marine waters do not effectively have access to Chinook salmon harvesting opportunities.

2. RESEARCH METHODS AND ANALYSIS

Research Methods

Ethical Principles for the Conduct of Research

The project was guided by the research principles outlined in the *Alaska Federation of Natives Guidelines for Research*[1], by the National Science Foundation, Office of Polar Programs in its *Principles for the Conduct of Research in the Arctic*[2], and by the *Ethical Principles for the Conduct of Research in the North* (Association of Canadian Universities for Northern Studies 2003), as well as the Alaska confidentiality statute (AS 16.05.815). These principles stress community approval of research designs, informed consent, anonymity or confidentiality of study participants, community review of draft study findings, and the provision of study findings to each study community upon completion of the research.

Project Planning and Approvals

The CSRI program study was funded largely under the Dingell-Johnson Act (D-J), the Alaska Sustainable Salmon Fund (AKSSF), and the Pacific Salmon Commission's (PSC) Chinook Technical Committee's Letter of Agreement (ADF&G Chinook Salmon Research Team 2013). For the Copper River, research coordination under ADF&G's CSRI program included multiple divisions, including the Division of Commercial Fisheries, the Division of Sport Fish, and the Division of Subsistence. The 3 main components to studying this watershed were: 1) escapement or inriver assessment (using mark-recapture methods), 2) smolt assessment (using coded-wire-tagging recaptures), and 3) LTK assessment (including analysis of the harvests of Chinook salmon from the subsistence and commercial fisheries for personal use). Research activities for the third study component were assigned to the Division of Subsistence.

In the winter of 2013, ADF&G staff Robbin La Vine and Emilie Springer traveled to Cordova to conduct a community review of the investigation plan for the LTK assessment portion of the study for the CSRI program that the Division of Subsistence was assigned, which included plans for both quantitative surveys and qualitative interviews, and also participant observation. The scoping meeting was conducted through the Prince William Sound (PWS) Science Center's invited speaker series. La Vine and Springer also met with representatives of several community organizations, including Cordova District Fishermen United (CDFU), the Copper River Watershed Project, and the Native Village of Eyak. The project was well-received in all of these venues.

Due to La Vine's departing the ADF&G organization, the project temporarily had no principal investigator. During this interim period, ADF&G received funding to conduct quantitative household surveys in communities affected by the *Exxon Valdez* oil spill of 1989, including the community of Cordova. These comprehensive harvest and use household surveys, which asked specifically about salmon, as well as many other resources, were substituted for the original quantitative salmon-specific surveys planned for as part of the CSRI program study. For implementing the household harvest surveys for the *Exxon Valdez* oil spill (EVOS) study, ADF&G staff member Davin Holen contacted the Native Village of Eyak (NVE) in November 2014. Holen worked with NVE and presented at the PWS Science Center lecture series in December 2014 to obtain approval for the project and develop the survey. In early February 2015, ADF&G staff member Rosalie Grant was assigned by Holen as the community lead researcher for Cordova. Grant then coordinated with ADF&G field staff as well as local research assistants (LRAs) from NVE and the ADF&G Cordova office to complete household harvest surveys in Cordova. Additionally, 2 key respondent interviews (KRIs) were completed in Cordova for the EVOS study.

1. Alaska Federation of Natives. "Alaska Federation of Natives Guidelines for Research," 2013. Alaska Native Knowledge Network. http://www.ankn.uaf.edu/IKS/afnguide.html (accessed May 2018).
2. National Science Foundation Interagency Social Science Task Force. "Principles for the Conduct of Research in the Arctic," 2012. http://www.nsf.gov/od/opp/arctic/conduct.jsp (accessed May 2018).

Table 2-1.–Estimated households and sample achievement, Cordova, 2014.

Sample information	Community Cordova
Number of dwelling units	1,489
Interview goal	150
Households interviewed	184
Households failed to be contacted	257
Households declined to be interviewed	46
Households moved or occupied by nonresident	539
Total households attempted to be interviewed	487
Refusal rate	20.0%
Final estimate of permanent households	950
Percentage of total households interviewed	19.4%
Interview weighting factor	5.16
Sampled population	504
Estimated population	2,602.2

Source Fall and Zimpelman (2016).

The CSRI program study resumed under leadership by ADF&G staff Joshua Ream, Malla Kukkonen, and Hannah Johnson, and the investigation plan for the CSRI study was updated. In April 2016, KRIs were completed by Ream and Johnson that focused on addressing the study objectives for identifying characteristics relating to commercial removals of Chinook salmon for personal use.

Systematic Household Surveys

The primary method for collecting subsistence harvest and use information in the EVOS study was a systematic household survey. Following receipt of comments at the scoping meetings, ADF&G finalized the survey instrument in early 2015. A key goal was to structure the survey instrument to collect demographic, resource harvest and use, and other economic data that are comparable with information collected in other household surveys in the study communities and with data in the Community Subsistence Information System (CSIS[3]). Additionally, the survey form included questions to evaluate the status of subsistence uses in light of the *Exxon Valdez* Oil Spill Trustee Council's recovery objective. Appendix A is the survey instrument used in the EVOS study. Also, during household surveys, the researchers asked respondents to indicate the locations of their fishing, hunting, and gathering activities during the study year; the methods for collecting and analyzing mapping responses are published in Fall and Zimpelman (2016). A sample of 184 randomly selected households in Cordova was achieved (19% of the community total households) (Table 2-1). The refusal rate was 20% in Cordova. Surveys lasted 53 minutes on average, with a minimum survey time of 10 minutes and a maximum of 4 hours (Fall and Zimpelman 2016:11).

The initial investigation plan for the CSRI study anticipated conducting household surveys with a stratified sample. Many seasonal Cordova residents are present for commercial fishing and have local addresses for their permits while living the majority of the year in other locations (both in and outside Alaska). As such, the sampling strategy was to distinguish those households from year-round local residents to record valuable perspectives and insights from both salmon user groups while identifying potential differences in patterns of salmon use and harvest. In addition, surveying these seasonal households would allow researchers to develop an estimate of home pack that could be compared to commercial fish ticket data. To accomplish stratification of the sample in the CSRI study, researchers were to survey a sample of 25% of commercial gillnet permit holders citing Cordova residency as well as a sample of 20% of year-round resident households.

3. ADF&G Community Subsistence Information System: http://www.adfg.alaska.gov/sb/CSIS/ (hereinafter cited as CSIS).

However, the CSRI study's household survey included many redundant survey questions executed for the EVOS study and therefore was not administered. As mentioned previously, comprehensive survey results from the EVOS study were identified in an updated investigation plan for the CSRI study to be used in lieu of administering the original salmon surveys to a stratified sample. The CSRI study refocused upon using KRIs to gather data, particularly data on practices concerning the retention of commercially caught salmon, the methods for which are described below.

Key Respondent Interviews

Key respondents for both studies were identified in consultation with a mix of input from NVE, local ADF&G Division of Commercial Fisheries staff, U.S. Forest Service staff, and community representatives.

One purpose of the KRIs for the EVOS study was to provide current and historical context for the analysis of the household surveys administered for that study. There were 2 KRIs completed in Cordova that were semi-structured and directed by a KRI protocol that has proven successful on other baseline study projects gathering similar quantitative and qualitative data. These interview materials were closely tied to specific EVOS study project goals; they were assessed through the perspective of CSRI study goals, but it was determined that the material was not relevant to this report.

Key respondents selected for interviews for the CSRI study were long-term community residents, active participants in the local commercial and subsistence fisheries, and/or commercial permit holders who had reported home pack on their fish tickets. Due to the changed investigation plan, one purpose of the KRIs was to gather information specifically identifying factors relating to what influence commercial fishing has on the harvest and use of salmon for home use. Interviews for the CSRI study were in-depth, open-ended, semi-structured, and directed by a KRI protocol designed by ADF&G researchers La Vine and Springer, and modified by researchers Ream and Johnson to account for changes in the scope of the project (see the revised KRI protocol in Appendix B). Over the course of the CSRI study, ADF&G researchers recorded KRIs with 11 Cordovans. The respondents ranged in age from 37 to 77 and 91% were male. Their length of residency in the community spanned from 10 to 71 years. Respondents' experiences in Copper River fisheries included being fisheries managers, administrators, biologists, subsistence fishers, sport anglers, and commercial fishermen (driftnetters and seiners).

Along with gathering qualitative data through the KRI protocol for the CSRI study, ADF&G staff took notes during household surveys administered for the EVOS study, which provided additional information and context for Chapter 4 of this report.

Participant Observation

In addition to in-depth interviews, researchers used several opportunities to engage in participant observation of activities related to the commercial and subsistence salmon fisheries in the Cordova area. In May 2014, ADF&G researcher Springer accompanied an Alaska State Trooper on an enforcement flight during the first commercial salmon opener of the season. In June 2014, Springer also spent 3 days aboard a tender vessel during a commercial salmon fishery opener. In May 2016, researchers Ream and Johnson participated in a subsistence salmon opener with a driftnetter. These opportunities provided context for other research activities and enhanced analysis of research findings.

Household Survey Implementation

Household survey implementation in Cordova for the EVOS study included a partnership between the Division of Subsistence and NVE. Initial preparation occurred with help from the City of Cordova, and ongoing support was provided by the ADF&G Cordova office. To launch the survey effort, researchers arrived in Cordova the first week of February 2015. Prior to conducting surveys, project staff developed an initial household list based on parcel data provided by the City of Cordova. These data were depicted on community area maps and served as a starting point for the necessary ground-truthing to locate the randomly selected households for the survey. The research team quickly learned that comprehensive ground-truthing of the community maps and parcel data was required to successfully maintain an accurate and random household list for the survey sample goal. To accomplish this task, the household list was

organized using Microsoft Access.[4] To administer surveys, 8 LRAs who were tribal members were hired in coordination with the NVE. One additional LRA was hired by the division. LRAs underwent a full day of survey implementation training on February 4, 2015. This training included a detailed review of the comprehensive survey form, explanation about the goals of the survey and the voluntary nature of survey participation, as well as practical tips on how to efficiently conduct a survey when interviewing a respondent. During training, LRAs were given the opportunity to ask questions about their role and pair with an ADF&G researcher to form a surveyor team. Survey implementation began the next day and continued until mid-March. The continual ground-truthing, coupled with community festivities such as the Ice Worm Festival, extended the duration of fieldwork. The length of time required to complete the fieldwork necessitated the help of many Division of Subsistence researchers (10 total) and the size of the community required the help of many LRAs (9 total).

Data Analysis and Review

Survey Data Entry and Analysis

Surveys were coded for data entry by Division of Subsistence staff in Anchorage. Surveys were reviewed and coded only by ADF&G research staff for consistency. Responses were coded following standardized conventions used by the Division of Subsistence to facilitate data entry. Information Management staff within the Division of Subsistence set up database structures within Microsoft SQL Server at ADF&G in Anchorage to hold the survey data. The database structures included rules, constraints, and referential integrity to ensure that data were entered completely and accurately. Data entry screens were available on a secured internet network. Daily incremental backups of the database occurred, and transaction logs were backed up hourly. Full backups of the database occurred twice weekly. This ensured that no more than 1 hour of data entry would be lost in the unlikely event of a catastrophic failure. All survey data were entered twice and each set compared in order to minimize data entry errors.

Once data were entered and confirmed, information was processed with the use of Statistical Package for the Social Sciences (SPSS) software, version 20. Initial processing included the performance of standardized logic checks of the data. Logic checks are often needed in complex data sets where rules, constraints, and referential integrity do not capture all of the possible inconsistencies that may appear. Harvest data collected as numbers of animals, or in gallons or buckets, were converted to pounds usable weight using standard factors (see Appendix C for salmon conversion factors that came from Fall and Zimpelman (2016:389), which is where conversion factors of the full species list for the EVOS study are available).

ADF&G staff also used SPSS for analyzing the survey information. Analyses included review of raw data frequencies, cross tabulations, table generation, estimation of population parameters, and calculation of confidence intervals for the estimates. Missing information was dealt with on a case-by-case basis according to standardized practices, such as minimal value substitution or using an averaged response for similarly-characterized households. Typically, missing data are an uncommon, randomly-occurring phenomenon in household surveys conducted by the division. In unusual cases where a substantial amount of survey information was missing, the household survey was treated as a "non-response" and not included in community estimates. ADF&G researchers documented all adjustments.

Harvest estimates and responses to all questions were calculated based upon the application of weighted means (Cochran 1977). These calculations are standard methods for extrapolating sampled data. As an example, the formula for harvest expansion is:

$$H_i = \bar{h}_i S_i \tag{1}$$

$$\bar{h}_i = \frac{h_i}{n_i} \tag{2}$$

4. Product names are given because they are established standards for the State of Alaska or for scientific completeness; they do not constitute product endorsement.

where:

H_i = the total estimated harvest (numbers of resource or pounds) for the community *i*,

$\bar{h}_i$ = the mean harvest of returned surveys,

h_i = the total harvest reported in returned surveys,

n_i = the number of returned surveys, and

S_i = the number of households in a community.

As an interim step, the standard deviation (SD) (or variance [V], which is the SD squared) was also calculated with the raw, unexpanded data. The standard error (SE), or SD of the mean, was also calculated. This was used to estimate the relative precision of the mean, or the likelihood that an unknown value would fall within a certain distance from the mean. In this study, the relative precision of the mean is shown in the tables as a confidence limit (CL), expressed as a percentage. Once SE was calculated, the CL was determined by multiplying the SE by a constant that reflected the level of significance desired, based on a normal distribution. The value of the constant is derived from the student's *t* distribution, and varies slightly depending upon the size of the community. Though there are numerous ways to express the formula below, it contains the components of a SD, V, and SE:

$$CL\%(\pm) = \frac{t_{\alpha/2} \times \frac{s}{\sqrt{n}} \times \sqrt{\frac{N-n}{N-1}}}{\bar{x}} \quad (3)$$

where:

s = sample standard deviation,

n = sample size,

N = population size,

$t_{\alpha/2}$ = student's *t* statistic for alpha level (α=0.95) with n–1 degrees of freedom, and

$\bar{x}$ = sample mean.

Small CL percentages indicate that an estimate is likely to be very close to the actual mean of the sample. Larger percentages mean that estimates could be further from the mean of the sample.

The corrected final data from the household survey was added to the Division of Subsistence CSIS. This publicly-accessible database includes community-level study findings.

Key Respondent Interview Analysis

Researchers analyzed key respondent interviews using NVivo software and inductive coding (compiling arising themes and patterns). Key respondents were informed that, to maintain anonymity, their names would not be included in this report.

Participant Observation Analysis

Field notes from the participant observation trips in 2014 and 2016 were analyzed for themes and sub-themes pertaining to the qualitative information categories developed during key respondent interview analysis.

Community Review Meetings

ADF&G staff presented preliminary EVOS study survey findings and associated harvest maps at 2 meetings in Cordova (Fall and Zimpelman 2016:16).

The first community review meeting in Cordova was held on September 21, 2015, at the U.S. Forest Service meeting room in the old courthouse building. Prior to the meeting, an invitation was sent to the NVE. Additional advertisement for the meeting was done through informative fliers made available at the ADF&G

Cordova office and other prominent locations in the community, as well as through announcements on one of the local radio stations. ADF&G staff Kukkonen and Johnson presented the draft data to 2 community members who attended the meeting.

Due to minimal public attendance in September, a second community meeting was held in Cordova on April 5, 2016, at the U.S. Forest Service meeting room in the old courthouse building. The presentation was integrated with the Community Lecture Series of the Prince William Sound Science Center and was widely advertised through that organization. A total of 20 community members attended the talk and many offered valuable feedback on the data presented. The meeting was staffed by ADF&G representatives Johnson and Ream.

After the CSRI study ethnographic fieldwork was completed, no community review meeting occurred with the general Cordova community or those who contributed to the collection of local traditional knowledge regarding the relationship between subsistence and commercial fishing participation and harvest reporting. ADF&G researchers Ream, Kukkonen, and Johnson all departed the Division of Subsistence following the completion of the ethnographic fieldwork and left study notes and interview recordings to facilitate publication of ethnographic findings. ADF&G staff Gabriela Halas and Lauren Sill assumed responsibility for qualitative data analysis and report writing.

3. QUANTITATIVE RESULTS

The CSRI study draws from several sources to estimate salmon harvests for home use by households in the community of Cordova. This chapter reprints various data from tables and figures previously published in ADF&G Technical Paper No. 412 that show estimated salmon use and harvest levels of Cordova residents for study year 2014 based on analysis of surveys administered to a random sample of households as part of the *Exxon Valdez* oil spill study. A total of 184 households were surveyed in Cordova; the sample achievement was 19% of the community's estimated 950 households. This survey also provided results for community demographics and income characteristics along with the salmon use and harvest estimates. As a brief summary, in 2014, there were an estimated 2,602 residents; 16% were Alaska Native, and 48% were female and 52% were male. Also, more than 50% of the population was over the age of 35. The average household size was 3 people. Commercial fishing, and related industry jobs (such as working on tenders or at the cannery), contributed an estimated 41% of the total community income and was the largest generator of income in the community. This industry accounted for an estimated one-third of jobs, and 54% of households had at least 1 member employed in the agriculture, forestry, and fishing employment sector. Full study results, and also a map depicting search and harvest locations for all salmon species combined, are available in Fall and Zimpelman (2016).

Additionally, the CSRI study effort involved compiling records from subsistence salmon permits distributed through the Division of Commercial Fisheries, past household harvest surveys available in the CSIS, as well as commercial fish ticket data from Cordova detailing the amount of salmon retained for home use from commercial harvests.

Participation in Subsistence and Commercial Fisheries Based on Issued and Returned Permits

In 2014, Cordova households were issued 246 state subsistence salmon fishing permits, out of which 234 were returned (Fall et al. 2017:237). The number of subsistence permits issued to Cordova residents varies from year to year, but from 2003 through 2013 averaged 321 permits issued (range 211 to 422). In comparison, according to the Alaska Commercial Fisheries Entry Commission, there were 300 permit holders with Cordova addresses holding 351 commercial salmon fishing permits in 2014[1], which has remained relatively stable since 2002[2] when a total of 363 commercial salmon fishing permits were held by 293 permit holders with Cordova addresses. At the same time, the number of active commercial salmon fishermen increased from 262 in 2002 to 283 in 2014. The number of commercial salmon fishing permits actively fished also increased from 296 permits in 2002 to 312 permits in 2014.[3] Currently, during commercial fishing openers, it is legal to retain commercial harvest for the personal use of the fisherman (5 AAC 39.010). The species and amount retained are to be recorded on commercial fish tickets. Information on the number of fishermen retaining salmon, and the amount retained, is available from 1994 and on. In general, about one-half of all fished salmon permits retain salmon for personal use, but this amount varies from year to year (Figure 3-1). The number of permits recording home pack appears to have stabilized at about 200 permits since 2009.

1. Alaska Commercial Fisheries Entry Commission, "Permit & Fishing activity by Year, State, Census area, or City: State or Census Area: Valdez-Cordova CA, City: Cordova: Fishery Group Salmon 2014," https://www.cfec.state.ak.us/gpbycen/2014/261507.htm (accessed Oct. 31, 2018).
2. Alaska Commercial Fisheries Entry Commission, "Permit & Fishing activity by Year, State, Census area, or City: State or Census Area: Valdez-Cordova CA, City: Cordova: Fishery Group Salmon 2002," https://www.cfec.state.ak.us/gpbycen/2002/261507.htm (accessed Oct. 31, 2018).
3. Since 2002, a commercial fisherman may hold more than 1 permit in the same salmon fishery group.

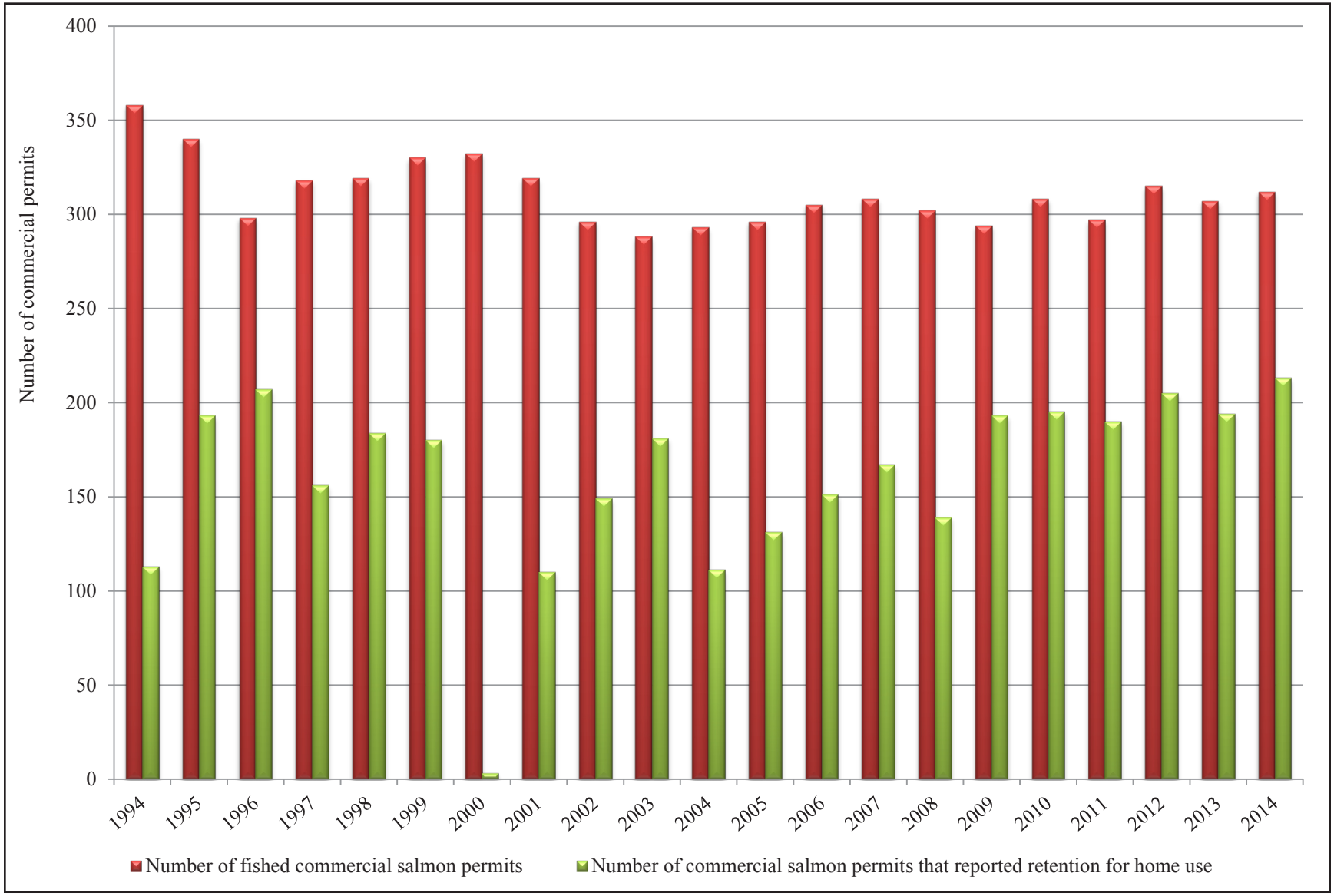


Figure 3-1.–Number of total commercial salmon permits fished issued to a Cordova resident in comparison with the number of commercial permits that reported salmon retention for personal use, 1994–2014.

Harvest Quantities and Composition

Table 3-1 reports estimated salmon harvests and uses by Cordova residents in 2014. All edible resources are reported in pounds usable weight (see Appendix C for salmon conversion factors). The harvest category includes salmon harvested by any member of the surveyed household during the study year. The use category includes all salmon taken, given away, or used by a household, and resources acquired from other harvesters, either as gifts, by barter or trade, through fishing partnerships, or as meat given by fishing guides and non-local fishers. Purchased foods are not included. Differences between harvest and use percentages reflect sharing among households, which results in a wider distribution of wild foods.

Use and Harvest Characteristics of Salmon

A majority of Cordovans harvest and process salmon. In 2014, 60% of individuals fished (this included attempted harvests of any salmon and nonsalmon fish species); nearly the same proportion of individuals (59%) participated in processing fish harvests (Figure 3-2). Of individuals who participated in fishing or processing fish, males were slightly more likely to participate in fishing (52% of males as compared to 48% of females), but substantially more likely to participate in processing fish (70% of males) (Figure 3-3). The overall population of Cordova is slightly skewed toward males who compose 52% of the total population. Comparing levels of individual participation based on age shows similar and substantial levels of participation across most ages. The smallest percentages of participating individuals come from the 0–9 and 80–99 age ranges. The youngest members of the community were more likely to participate in fishing than processing harvests, whereas the eldest participated in both activities equally. Among the remaining age ranges, individuals between 10 and 39 were more or equally involved in fishing than processing fish, whereas individuals age 40 and older were more likely to process fish than to harvest it. Participation differences were most pronounced in the 10–19 age range (9% greater participation in fishing than processing) and in the 50–59 and 70–79 age ranges, with 12% greater participation in processing than fishing (Figure 3-4). This effort resulted in a harvest of approximately 114,031 lb of salmon, equal to 120 lb of salmon per household, or 44 lb per capita (Table 3-1). The total salmon harvest in 2014 was lower than all previous study results estimated by the Division of Subsistence; the household and per capita harvests in study year 2014 were the lowest estimates documented (Table 3-1; Table 3-2). The largest portion (43%) of the salmon harvest in 2014 was sockeye salmon with a total harvest of 49,364 lb, or 19 lb per capita (Figure 3-5; Table 3-1). Coho salmon composed much of the remaining harvest (36% of usable pounds totaling 40,947 lb total, or 16 lb per capita); Chinook salmon contributed the next most amount to the total harvest with 21,236 lb of salmon (19%, or 8 lb per capita). The harvests of chum and pink salmon made up approximately 2% of the total salmon harvest with less than 1 lb of each species harvested per capita.

In 2014, as in previous study years, salmon was used by nearly all (92%) households in Cordova and was harvested by nearly three-quarters of households (69%) (Table 3-1). Consistent with the harvest amounts of the different salmon species, more households participated in the harvest of coho, Chinook, and sockeye salmon, while just 4% of households harvested chum or pink salmon. A similar pattern exists in the use and sharing of these salmon species. Among the 3 most harvested species, the most households used sockeye salmon (73% as compared to 71% using coho salmon), but more households harvested coho salmon (54%) than sockeye salmon (41%). Chinook salmon was used and harvested by the fewest households (63% and 34% of households, respectively). The discrepancy between the percentage of households using a resource and the percentage harvesting indicated the importance of sharing in the community. For any species of salmon, 52% of households gifted the resource to another household, either within or beyond Cordova, while 63% of households received salmon from another household. At the species level, more households shared (38%) and received (43%) sockeye salmon than any other. In comparison, more households gave away coho salmon (32% of households) than Chinook salmon (21% of households), yet more households (41% of households) received Chinook salmon than coho salmon (28% of households).

Table 3-1.–Estimated uses and harvests of salmon, Cordova, 2014.

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	limit (±) harvest
Salmon	**92.4**	**71.7**	**69.0**	**62.5**	**51.6**	**114,031.4**	**120.0**	**43.8**	**114,031.4**	**lb**	**120.0**	**21.0**
Chum salmon	7.6	4.3	4.3	3.3	3.8	1,201.0	1.3	0.5	213.0	ind	0.2	87.8
Coho salmon	71.2	57.6	54.3	28.3	31.5	40,947.3	43.1	15.7	6,757.0	ind	7.1	24.6
Chinook salmon	63.0	39.7	34.2	40.8	21.2	21,235.7	22.4	8.2	1,667.3	ind	1.8	45.7
Pink salmon	7.6	4.3	4.3	3.3	2.7	1,283.0	1.4	0.5	521.5	ind	0.5	110.1
Sockeye salmon	73.4	44.0	40.8	42.9	37.5	49,364.3	52.0	19.0	11,249.3	ind	11.8	26.7
Landlocked salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown salmon	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source Fall and Zimpelman (2016).

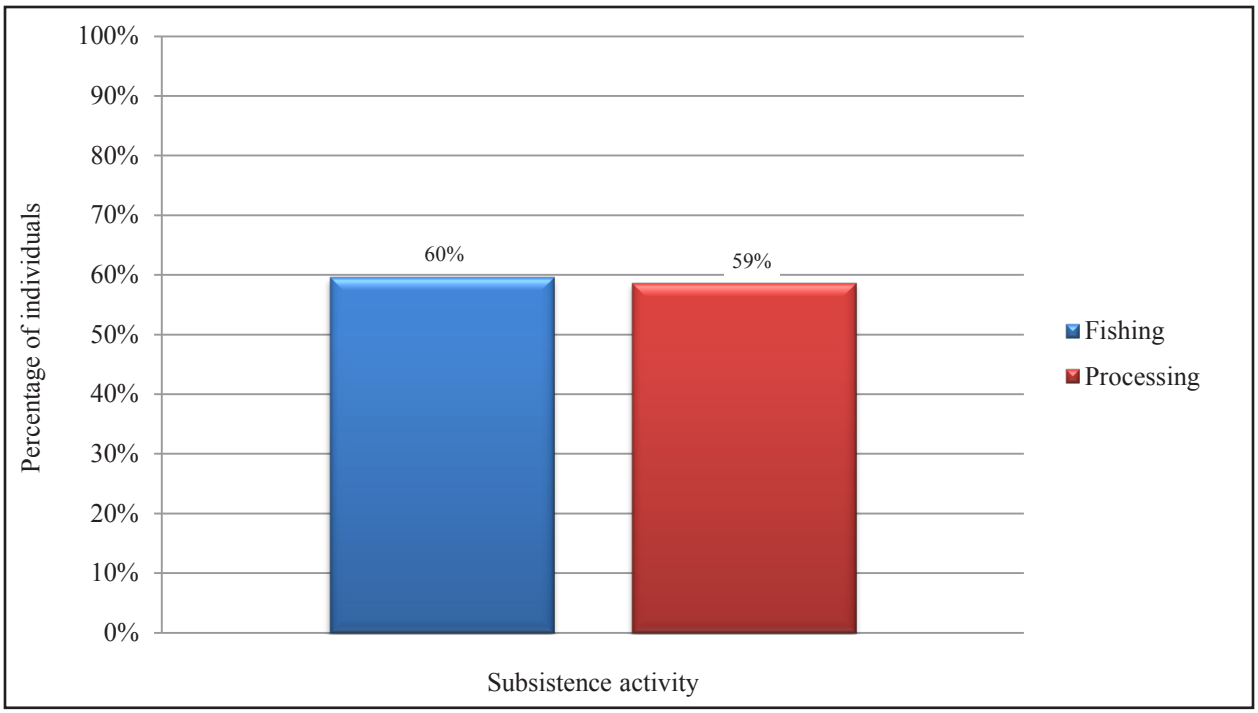


Figure 3-2.–Individual participation in subsistence fishing and processing activities, any fish species, Cordova, 2014

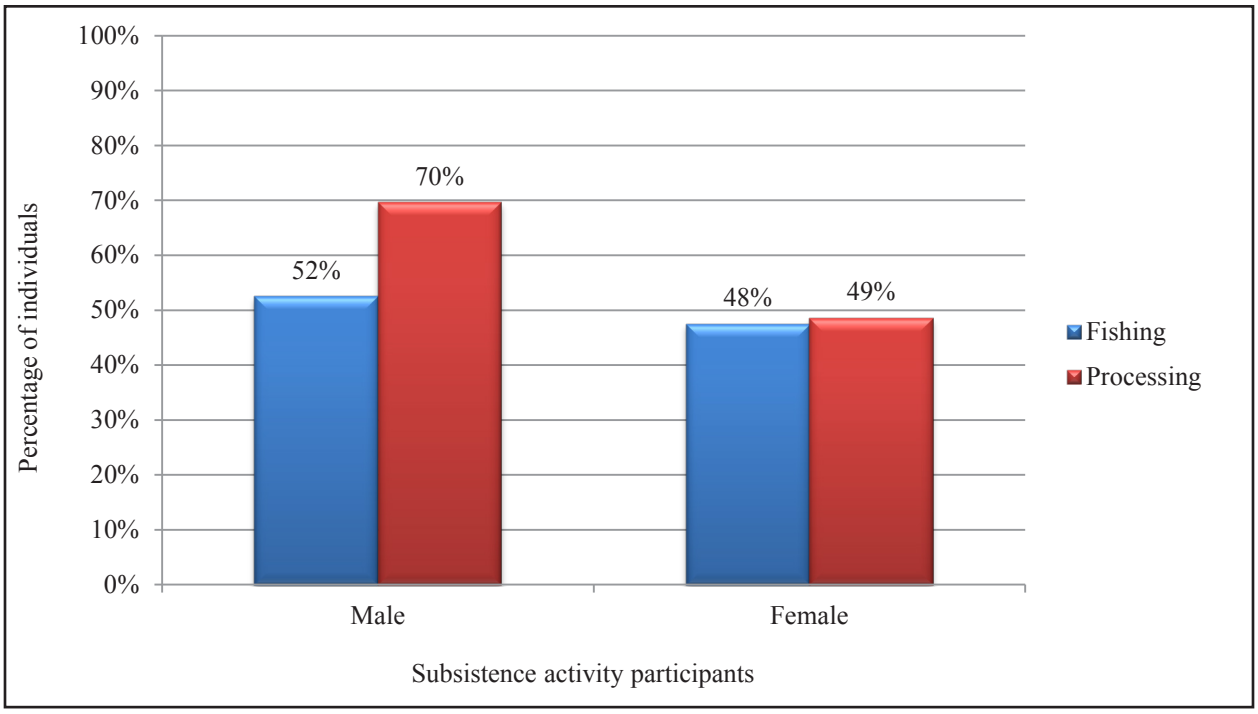


Figure 3-3.–Individual participation in subsistence fishing and processing activities by gender, any fish species, Cordova, 2014

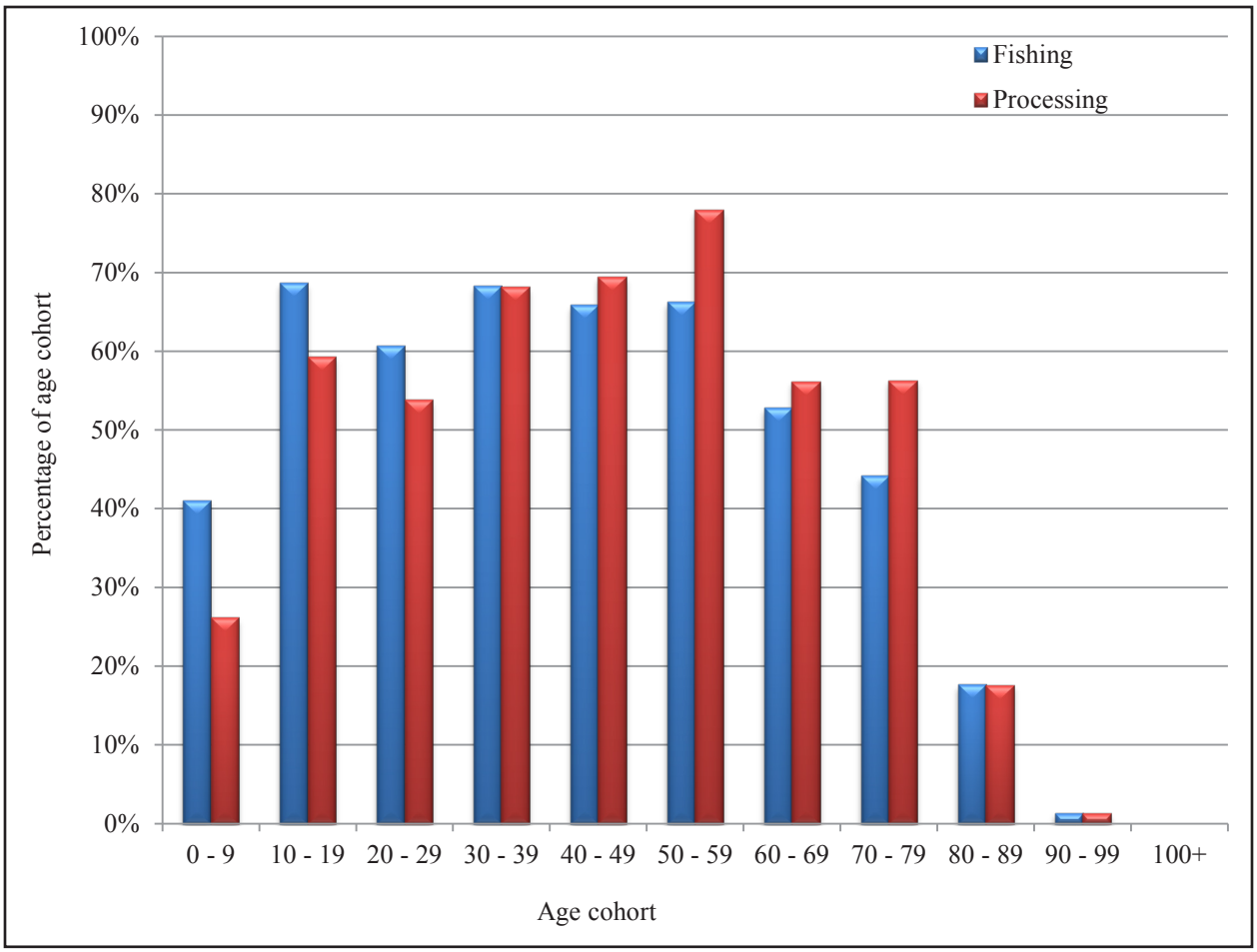


Figure 3-4.–Individual participation in subsistence fishing and processing activities by age cohort, any fish species, Cordova, 2014

Table 3-2.–Historical salmon harvest, pounds usable weight, Cordova, 1985, 1988, 1991–1993, 1997, 2003, and 2014.

	Estimated harvest		
Study year	Total pounds	Mean pounds per household	Mean pounds per capita
1985	141,094	165	62
1988	142,767	164	59
1991	197,465	252	86
1992	190,809	243	71
1993	172,797	183	58
1997	156,875	189	63
2003	186,910	205	77
2014	114,031	120	44

Sources ADF&G Division of Subsistence, Community Subsistence Information System (CSIS) (http://www.adfg.alaska.gov/sb/CSIS/) for 1985–2003 data; Fall and Zimpelman (2016) for 2014 data.

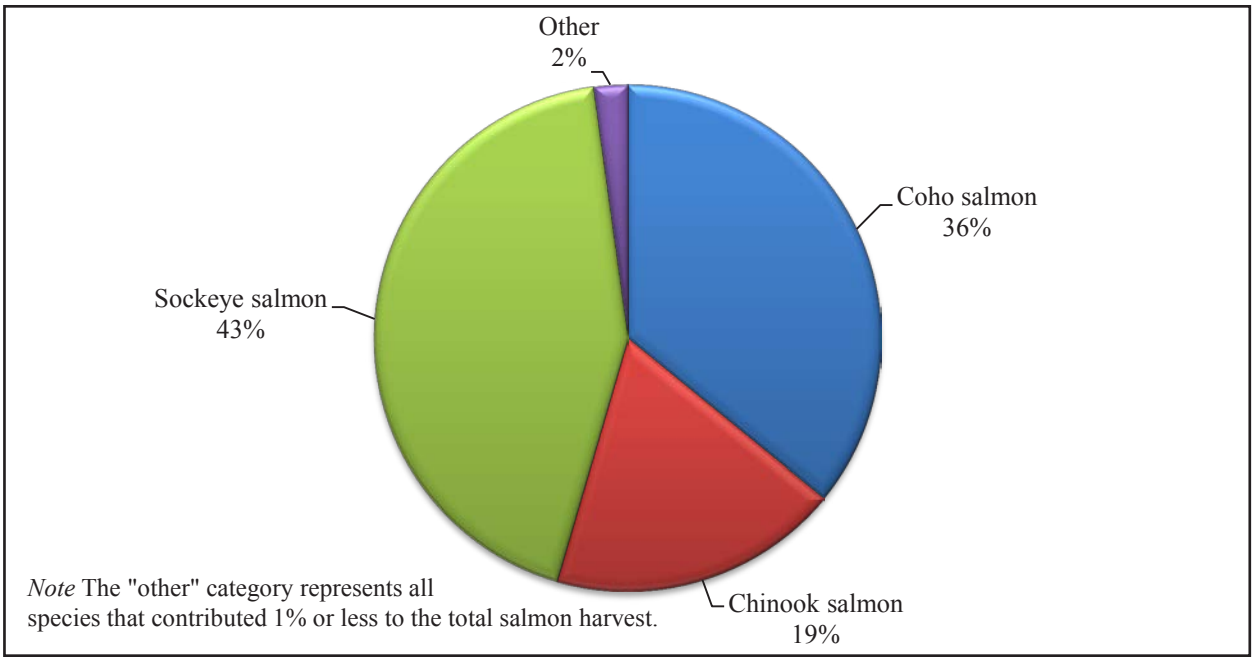


Figure 3-5.–Composition of salmon harvest for home use in pounds usable weight, Cordova, 2014.

In 2014, removal from commercial catches accounted for the largest number of salmon harvested; 9,241 salmon (48,778 lb) were removed from commercial harvests, and 7,192 salmon (43,690 lb) were harvested using rod and reel gear, which would include harvests under state sport fishing regulations as well as federal subsistence regulations (Table 3-3). Subsistence gear was the gear type used to harvest the least amount of salmon in 2014: 3,976 salmon (21,564 lb) were harvested with subsistence gear. Figure 3-6 is a visual representation of the salmon harvest weight caught by gear type. An estimated 43% of the salmon harvest weight was from commercial removals (Table 3-4). For 3 species, commercial removal was the most commonly used harvest method: 64% of chum salmon, 47% of Chinook salmon, and 63% of sockeye salmon harvests. Rod and reel harvests accounted for 38% of the salmon harvest, most of which came from harvests of coho salmon. Approximately 82% of all the coho salmon harvest weight was taken with rod and reel gear; 77% of the rod and reel harvest total was coho salmon. As in previous study years 1991, 1992, and 1993, coho salmon was the only species that was harvested more with rod and reel than removed from commercial catches for home use (Fall and Utermohle 1995:II-67, II-80). About one-quarter of pink, chum, and Chinook salmon harvests were taken with rod and reel gear. Pink salmon was the only species harvested mainly with subsistence gear (42% of the pink salmon harvest); however, nearly one-third of the Chinook salmon harvest was caught by subsistence methods—mainly driftnets.

Subsistence methods in 2014 accounted for more of the salmon harvest than average for the 8 study years (Table 3-5). For the overall salmon harvest, rod and reel accounted for less of the harvest than average, but for the harvest of individual species, rod and reel was used for more harvest of Chinook, chum, and coho salmon than average. During the *Exxon Valdez* oil spill study, respondents noted their concerns for the increasing popularity of the fall coho salmon fishery occurring at Ibeck Creek—a rod and reel fishery that is road accessible. The overall contribution of coho salmon to Cordovans' total salmon harvest has fallen since 1993. Despite the decrease in retention of sockeye salmon from commercial harvests, the overall contribution of sockeye salmon to the total salmon harvest has increased (Figure 3-7), indicating that rod and reel harvests and subsistence harvests are compensating to an extent. Overall harvests were still lower in 2014, and the Chinook harvest composed a smaller proportion of the harvest (see Appendix D for additional depiction of historical salmon harvest composition).

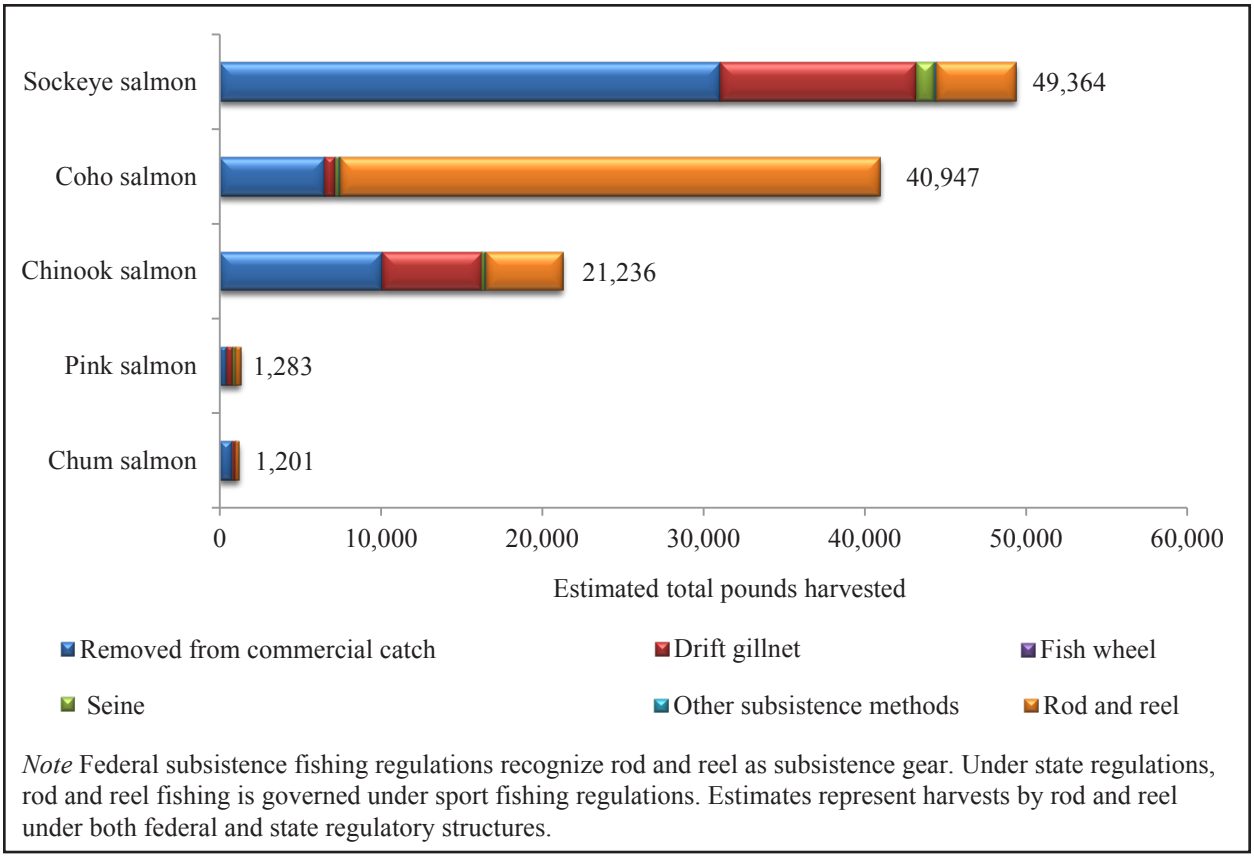
Table 3-3.–Estimated harvest of salmon by gear type and resource, Cordova, 2014.

			Subsistence methods													
	Removed from commercial catch		Setnet		Seine		Driftnet		Other method		Subsistence gear, any method		Rod and reel[a]		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**9,241.0**	**48,777.5**	**0.0**	**0.0**	**371.7**	**1,701.5**	**3,552.2**	**19,567.3**	**51.6**	**295.6**	**3,975.5**	**21,564.4**	**7,191.6**	**43,689.5**	**20,408.1**	**114,031.4**
Chum salmon	135.5	764.3	0.0	0.0	0.0	0.0	36.1	203.8	0.0	0.0	36.1	203.8	41.3	232.9	213.0	1,201.0
Coho salmon	1,073.0	6,502.3	0.0	0.0	36.1	219.0	108.4	657.0	15.5	93.9	160.1	969.9	5,523.9	33,475.1	6,757.0	40,947.3
Chinook salmon	789.6	10,056.4	0.0	0.0	15.5	197.3	485.3	6,181.5	5.2	65.8	506.0	6,444.5	371.7	4,734.8	1,667.3	21,235.7
Pink salmon	170.4	419.3	0.0	0.0	62.0	152.4	154.9	381.0	0.0	0.0	216.8	533.5	134.2	330.2	521.5	1,283.0
Sockeye salmon	7,072.4	31,035.3	0.0	0.0	258.2	1,132.8	2,767.4	12,143.9	31.0	135.9	3,056.5	13,412.6	1,120.4	4,916.5	11,249.3	49,364.3
Landlocked salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source Fall and Zimpelman (2016).

Note The harvested number of salmon is represented as individual fish harvested.

a. Federal subsistence fishing regulations recognize rod and reel as subsistence gear. Under state regulations, rod and reel fishing is governed under sport fishing regulations. Estimates represent harvests by rod and reel under both federal and state regulatory structures.



Note Federal subsistence fishing regulations recognize rod and reel as subsistence gear. Under state regulations, rod and reel fishing is governed under sport fishing regulations. Estimates represent harvests by rod and reel under both federal and state regulatory structures.

Figure 3-6.–Estimated harvest of salmon in pounds usable weight by gear type and resource, Cordova, 2014.

Table 3-4.–Estimated percentages of salmon harvest in pounds usable weight by gear type, resource, and total salmon harvest, Cordova, 2014.

Resource	Percentage base	Removed from commercial catch	Subsistence methods						
			Setnet	Seine	Driftnet	Other	Subsistence gear, any method	Rod and reel[a]	Any method
Salmon	**Gear type**	**100.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**42.8%**	**0.0%**	**1.5%**	**17.2%**	**0.3%**	**18.9%**	**38.3%**	**100.0%**
	Total	**42.8%**	**0.0%**	**1.5%**	**17.2%**	**0.3%**	**18.9%**	**38.3%**	**100.0%**
Chum salmon	Gear type	1.6%	0.0%	0.0%	1.0%	0.0%	0.9%	0.5%	1.1%
	Resource	63.6%	0.0%	0.0%	17.0%	0.0%	17.0%	19.4%	100.0%
	Total	0.7%	0.0%	0.0%	0.2%	0.0%	0.2%	0.2%	1.1%
Coho salmon	Gear type	13.3%	0.0%	12.9%	3.4%	31.8%	4.5%	76.6%	35.9%
	Resource	15.9%	0.0%	0.5%	1.6%	0.2%	2.4%	81.8%	100.0%
	Total	5.7%	0.0%	0.2%	0.6%	0.1%	0.9%	29.4%	35.9%
Chinook salmon	Gear type	20.6%	0.0%	11.6%	31.6%	22.2%	29.9%	10.8%	18.6%
	Resource	47.4%	0.0%	0.9%	29.1%	0.3%	30.3%	22.3%	100.0%
	Total	8.8%	0.0%	0.2%	5.4%	0.1%	5.7%	4.2%	18.6%
Pink salmon	Gear type	0.9%	0.0%	9.0%	1.9%	0.0%	2.5%	0.8%	1.1%
	Resource	32.7%	0.0%	11.9%	29.7%	0.0%	41.6%	25.7%	100.0%
	Total	0.4%	0.0%	0.1%	0.3%	0.0%	0.5%	0.3%	1.1%
Sockeye salmon	Gear type	63.6%	0.0%	66.6%	62.1%	46.0%	62.2%	11.3%	43.3%
	Resource	62.9%	0.0%	2.3%	24.6%	0.3%	27.2%	10.0%	100.0%
	Total	27.2%	0.0%	1.0%	10.6%	0.1%	11.8%	4.3%	43.3%
Landlocked salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unknown salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2015.

a. Federal subsistence fishing regulations recognize rod and reel as subsistence gear. Under state regulations, rod and reel fishing is governed under sport fishing regulations. Estimates represent harvests by rod and reel under both federal and state regulatory structures.

Table 3-5.–Estimated salmon harvests for home use by gear type, in numbers of fish and percentage of total salmon harvest, Cordova households, 1985, 1988, 1991–1993, 1998, 2003, and 2014.

	1985		1988		1991		1992		1993		1998		2003		2014		8-year average	
Resource	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	1,695	8	1,596	8	3,004	10	2,601	9	2,948	10	3,450	15	3,066	11	1,667	8	2,503	10
Subsistence methods	29	2	82	5	85	3	115	4	155	5	263	8	1,755	57	506	30	374	15
Rod and reel	273	16	143	9	528	18	191	7	1,410	48	636	18	193	6	372	22	468	19
Commercial removal	1,393	82	1,371	86	2,391	80	2,295	88	1,383	47	2,551	74	1,119	37	790	47	1,662	66
Chum salmon	604	3	1,202	6	616	2	0	0	318	1	1,098	5	614	2	213	1	583	2
Subsistence methods	0	0	0	0	0	0	0	0	0	0	10	1	292	48	36	17	42	7
Rod and reel	124	21	55	5	101	16	0	0	27	9	170	16	221	36	41	19	92	16
Commercial removal	480	80	1,147	95	515	84	0	0	291	92	918	84	100	16	136	64	448	77
Coho salmon	8,528	42	10,583	53	15,090	52	14,398	51	11,570	40	7,481	32	11,881	41	6,757	33	10,786	43
Subsistence methods	4	0	97	1	881	6	0	0	0	0	863	12	1,542	13	160	2	443	4
Rod and reel	4,905	58	9,018	85	10,126	67	10,899	76	9,278	80	4,631	62	8,695	73	5,524	82	7,884	73
Commercial removal	3,619	42	1,468	14	4,083	27	3,499	24	2,292	20	1,987	27	1,644	14	1,073	16	2,458	23
Pink salmon	1,673	8	1,524	8	1,595	5	1,261	4	773	3	1,693	7	1,252	4	522	3	1,287	5
Subsistence methods	83	5	0	0	8	1	382	30	0	0	65	4	188	15	217	42	118	9
Rod and reel	961	57	827	54	477	30	191	15	637	82	797	47	726	58	134	26	594	46
Commercial removal	629	38	697	46	1,110	70	688	55	136	18	831	49	339	27	170	33	575	45
Sockeye salmon	7,704	38	5,123	26	8,670	30	9,877	35	12,789	45	9,339	40	12,295	42	11,249	55	9,631	39
Subsistence methods	468	6	311	6	916	11	1,769	18	1,183	9	1,256	13	5,194	42	3,057	27	1,769	18
Rod and reel	899	12	499	10	1,094	13	1,033	11	1,828	14	1,512	16	1,154	9	1,120	10	1,142	12
Commercial removal	6,337	82	4,313	84	6,660	77	7,075	72	9,778	77	6,571	70	5,947	48	7,072	63	6,719	70
Unknown salmon	0	0	0	0	232	1	0	0	218	1	0	0	0	0	0	0	56	0
Subsistence methods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rod and reel	0	0	0	0	163	70	0	0	182	84	0	0	0	0	0	0	43	77
Commercial removal	0	0	0	0	69	30	0	0	36	17	0	0	0	0	0	0	13	23
All salmon	**20,204**	**100**	**20,028**	**100**	**29,207**	**100**	**28,137**	**100**	**28,616**	**100**	**23,061**	**100**	**29,108**	**100**	**20,408**	**100**	**24,846**	**100**
Subsistence methods	584	3	490	2	1,890	7	2,266	8	1,338	5	2,457	11	8,971	31	3,976	19	2,746	11
Rod and reel	7,162	35	10,542	53	12,489	43	12,314	44	13,362	47	7,746	34	10,989	38	7,192	35	10,224	41
Commercial removal	12,458	62	8,996	45	14,828	51	13,557	48	13,916	49	12,858	56	9,148	31	9,241	45	11,875	48

Source Fall and Zimpelman (2016) for 2014, and Community Subsistence Information System (CSIS) online at http://www.adfg.alaska.gov/sb/CSIS/ (accessed November 2018) for the remaining years.

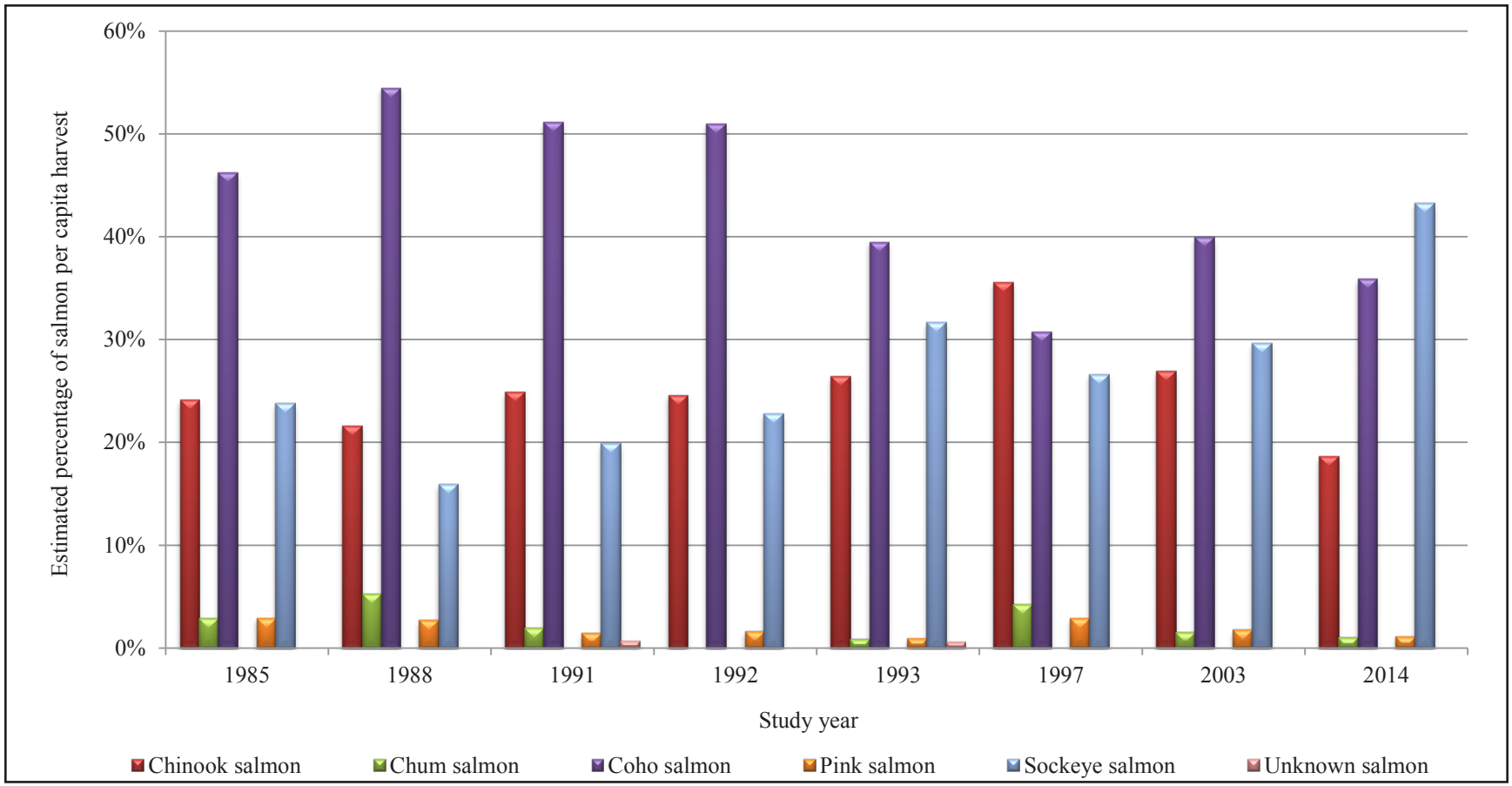


Figure 3-7.–Composition of estimated per capita salmon harvest weight, by resource and study year, Cordova, 1985, 1988, 1991–1993, 1997, 2003, and 2014.

Table 3-6.–Household participation in commercial salmon fisheries, Cordova, 2014.

Households that commercial fished (2014)	Households that usually commercial fish	Percent of households retaining salmon for personal use					
		Any salmon	Chinook	Sockeye	Coho	Chum	Pink
34.8%	35.3%	29.3%	17.9%	25.0%	13.0%	2.7%	1.6%

Source ADFG Division of Subsistence household surveys, 2015.

Home pack

As discussed in the previous section regarding harvest characteristics, removal from commercial harvests is a main source of salmon, especially sockeye salmon, for Cordova residents. This "home pack" has played such a vital role in Cordovans' supply of salmon for a variety of reasons, which will be discussed further in Chapter 4. Briefly, subsistence fishing opportunities are limited because many community residents are engaged in commercial fisheries for their livelihoods and have to focus on commercial fishing efforts during fishing openers. With concurrent openers in the subsistence and commercial fisheries, commercial fishermen must choose between commercial fishing and subsistence fishing for salmon; if they choose to commercial fish, then they do not have much of an opportunity to subsistence fish for salmon.[4] For the majority of Cordova households that do not participate in the commercial fisheries, their sources of salmon are the state sport fishery, the federal and state subsistence fisheries, and the sharing of home packed salmon. In addition, survey respondents noted that many community households cannot go subsistence salmon fishing because of a lack of appropriate motorized transportation, the need to work at the time of fishery openings (which during the 2014 study year occurred almost exclusively on weekdays[5]), or because of the increasing costs of gas and boat maintenance. Furthermore, survey respondents pointed out that when planning their marine water subsistence salmon fishing, they also need to take into consideration the weather and tides; if these are not conducive for fishing at a time when all the other factors are positively lined up, they may not be able to go subsistence salmon fishing.

As estimated through household surveys, in 2014, approximately 35% of households participated in commercial fishing (Table 3-6). This includes participation as a permit holder or crew, and there could be more than one individual in a household participating. An estimated 29% of households retained salmon from their commercial harvest; more households retained sockeye salmon (25%) than any other species, but Chinook salmon were also retained by 18% of households and coho salmon by 13%. The fewest households retained chum and pink salmon. In 2014, home pack accounted for 43% by weight of all salmon harvested for home use, as estimated through household surveys (Table 3-4). Sockeye salmon composed the largest percentage of home pack (64% of all commercial removals), followed by Chinook salmon at 21% of removals. Approximately 13% of the home pack was coho salmon with pink and chum salmon harvests contributing 1% and 2%, respectively.

4. In 2017, the Alaska Board of Fisheries adopted a regulatory proposal that provided for a Saturday opener in the subsistence fishery. This regulation took effect in 2018.
5. Alaska Department of Fish and Game. "Regulation Announcements, News Releases, and Updates: Commercial, Subsistence, and Personal Use Fishing," select results for 2014 (effective year), commercial fishing (activity), salmon (species group), Prince William Sound (management area), gillnet (gear class). http://www.adfg.alaska.gov/index.cfm?adfg=cfnews.main (accessed June 2016).

In addition to household harvest survey data, information about home pack is reported on commercial fish tickets. To improve the comparability between harvest estimates based on Cordova community household surveys and reported harvests on fish tickets, the fish ticket data in the following figures draw from only those fished commercial permits that cite a Cordova address and reported salmon retained for personal use. Comparing household survey data to fish ticket data in 2014, it is evident that the number of retained sockeye salmon (the most frequently retained species) estimated through both data collection methods is approximately the same at around 7,000 sockeye salmon (Figure 3-8). Harvest differences based on the 2 methods for collecting home pack values are larger for the other species, however they may not be significantly different. More fish overall were reported as home pack on the household surveys than on fish tickets in 2014, with chum and pink salmon reported in miniscule amounts on fish tickets. The number of households estimated to be retaining commercially caught fish is not significantly different than the number of permits with reported retained salmon (Figure 3-9). There are only a few data points over a longer time period where both household surveys were conducted and fish ticket home pack information are available (Figure 3-10), but those years show a similar pattern in that there was a higher estimated home pack from household surveys than what was reported on fish ticket data. The differences between the 2 measurements appear more pronounced earlier in the record. For example, in 1997 no sockeye salmon was reported as retained for personal use on fish tickets, but more than 6,000 fish were estimated as removed from the commercial fishery by the household survey method (Figure 3-11).[6] Chum and pink salmon were often not recorded on fish ticket data prior to 2007, but survey estimates have shown substantial amounts of commercial removals of these species (Figure 3-12; Figure 3-13). Retained coho salmon were not recorded on fish tickets consistently until 2005; since then, the number of coho salmon retained has grown in most years (Figure 3-14). Household harvest survey estimates showed significant amounts of coho salmon retained, with the smallest estimate in 2014. Nevertheless, the retained coho salmon reported on fish tickets in 2014 was 32% lower than the estimated commercial retention from household harvest surveys. In contrast to coho salmon, commercial fishermen have reported retention of Chinook salmon from commercial harvests every year since 1994 (Figure 3-15). Similar to other salmon species, reported fish ticket retentions were less than the household harvest survey estimates; in 2014, 300 fewer Chinook salmon were reported than the survey estimates. See Appendix D for a table that complements the figures depicting home pack harvests.

Differences in home pack estimates may arise due to sampling challenges, namely that some fishermen who have Cordova addresses for their commercial permits do not reside in Cordova year-round so would not be accounted for in the household data but would show up in the fish ticket data. There may be reporting bias, especially with pink and chum salmon, where fishermen are not as concerned with making sure those species are recorded on their fish ticket data. Fish that are consumed on board during a fishery opening may also not end up being recorded on fish ticket data, though this is more likely to occur with the seine fleet that stays out of port for longer periods of time. Estimates from household surveys and reported fish ticket data appear to be drawing closer together. Beginning in 1994, Chinook salmon harvested in the Bering River and Copper River districts and retained for personal use had to be recorded on fish tickets. In 2008, a new regulation requiring reporting of all salmon retained from commercial harvests statewide went into effect. The regulation specific to the Prince William Sound Area, which was replaced by the statewide requirement, was not repealed until the following year, which is when a more recent pattern started of generally increasing numbers of salmon being reported as retained for home use (Figure 3-10).[7] The predominance of

6. Note that the range for the secondary y axis (pertaining to the number of commercial permits reporting any salmon retention for home use) in figures 3-10 and 3-11 differs in scale in comparison to the secondary y axis range depicted in figures 3-12 through 3-16.

7. Per 5 AAC 01.021, (see Register 126, effective May 15, 1993) and 5 AAC 39.010 (see Register 169, effective March 13, 2004) it is legal for a commercial fisher to retain fish from a lawfully taken commercial catch for that person's own use, but requirements for specifically reporting fish retained from a commercial catch that are not sold are cited elsewhere in the Alaska Administrative Code. See 5 AAC 24.356 (see Register 130, effective May 22, 1994), which stated, "A commercial fisherman shall report on an ADF&G fish ticket, at the time of landing the fisherman's commercial catch, the number of Chinook salmon taken in the Copper River and Bering River

reporting Chinook salmon commercial retention in the earlier reporting years reflects the species-specific requirement that was in place at the time. The increased numbers of salmon reported over time since 2009, to some extent, may be attributed to greater compliance with regulatory requirements. As with any new regulation, knowledge of and compliance with reporting requirements takes time to spread throughout the affected community.

Looking over a longer time period, in comparing the 2014 household harvest survey data to the average harvest by gear types over 8 study years, home pack composed a smaller percentage of the overall harvest as well as of individual salmon species harvests in 2014 (Table 3-5). Some of the variability in the percentage of the community's harvest coming from commercial retention stems from changes in commercial fishing permit ownership. The number of actively fished commercial permits held by fishermen with a Cordova address has decreased from a high of 358[8] in 1994 to 312 in 2014 (Figure 3-1); however, it has not been a steady decline. For example, fewer permits were fished in 2003 than in 2014 (Figure 3-1). However, the number of permits retaining commercially caught fish has not changed substantially, but the amount of reported retention has generally increased steadily since 2009 (when all retained salmon from any fishing district was required to be reported) (Figure 3-16). Fish ticket data include permit holders with Cordova addresses who are not year-round residents of Cordova and are therefore not included in the household survey data. Changing harvest patterns between these 2 groups may account for some of the observed changes, but investigating that is beyond the scope of this study.

Districts but not sold"; this requirement was repealed April 24, 2009 (Register 190). Prior to that, 5 AAC 39.130 (Register 187, effective August 15, 2008) was amended to incorporate an addition to the specifications for what information commercial fish tickets must include. Specifically, 5 AAC 39.130(c)(10) stated, "The first purchaser of raw fish, a catcher-seller, and an individual or company that catches and processes or exports that individual's or company's own catch or has that catch processed or received by another individual or company, shall record each delivery on an ADF&G fish ticket. … At the time of delivery, or as otherwise directed by the department, fish tickets must include the following: … (10) the number of fish of any species retained by a commercial fisherman for personal use as specified in 5 AAC 39.010."

8. Alaska Commercial Fisheries Entry Commission, "Permit & Fishing activity by Year, State, Census area, or City: State or Census Area: Valdez-Cordova CA, City: Cordova: Fishery Group Salmon 1994," https://www.cfec.state.ak.us/gpbycen/1994/261507.htm (accessed Nov. 7, 2018).

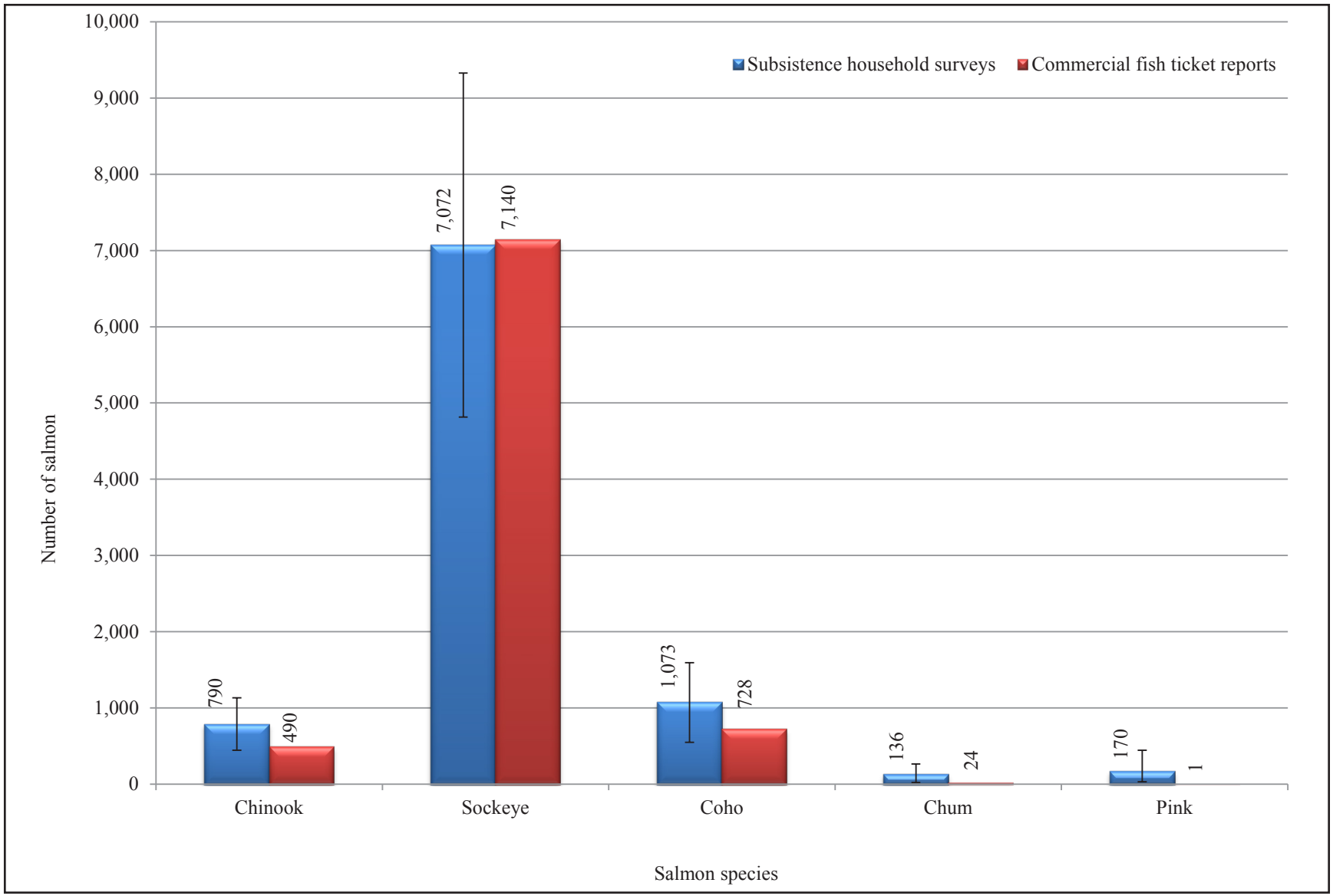
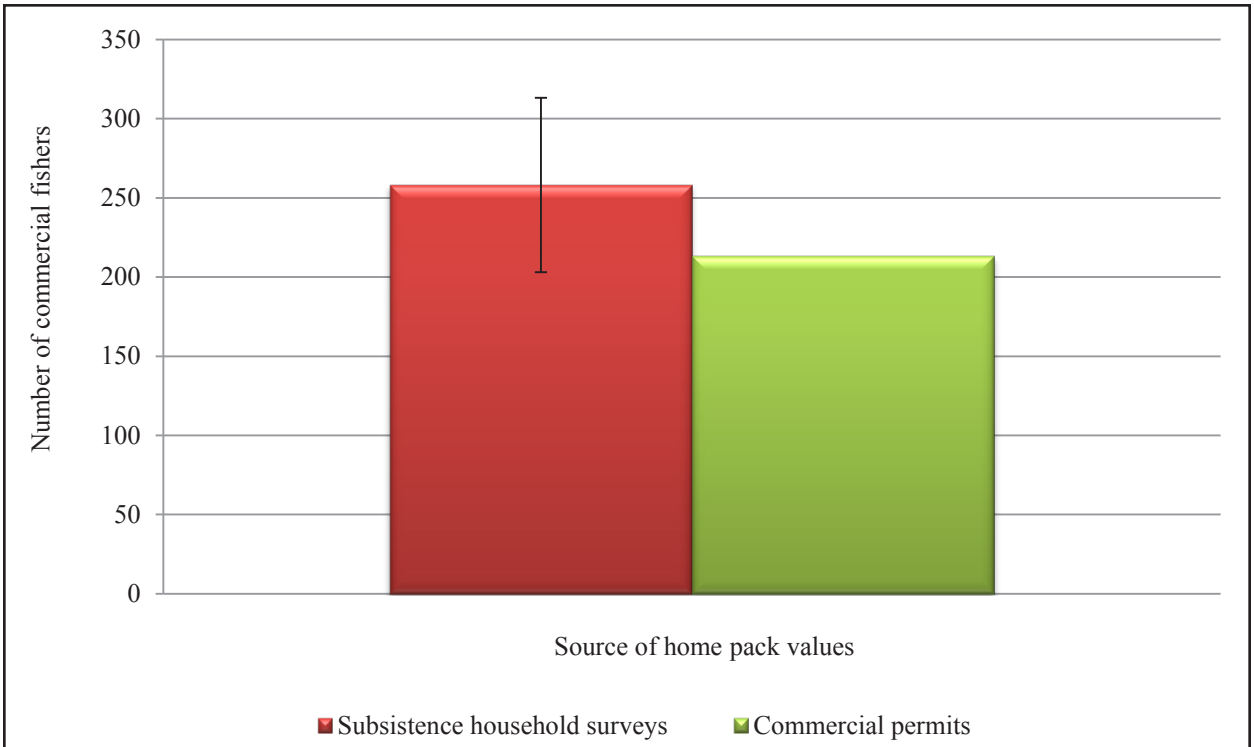
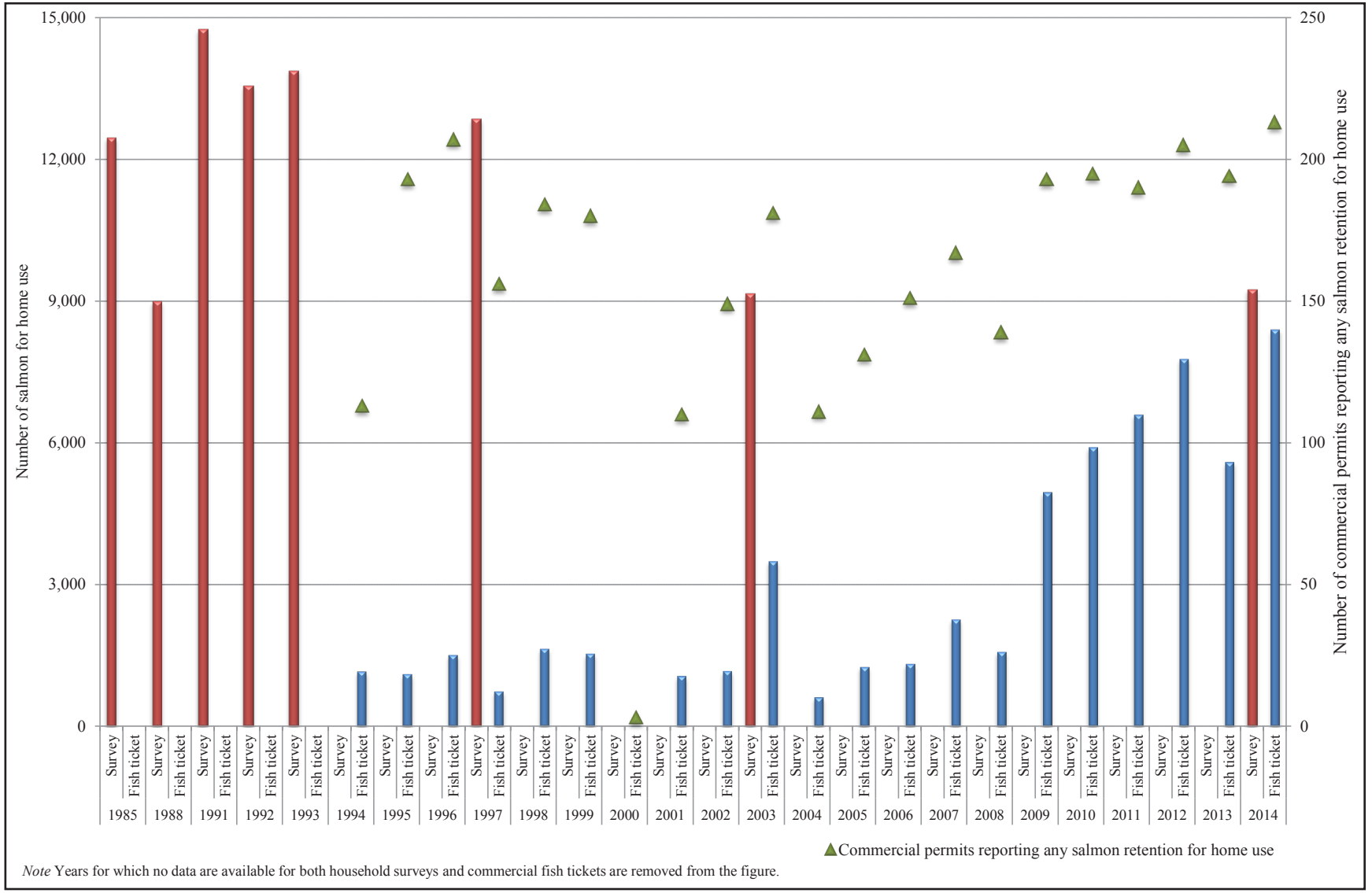


Figure 3-8.–Comparison of number of salmon retained as home pack as reported on commercial fish tickets and estimated through household surveys, by salmon species, Cordova, 2014.



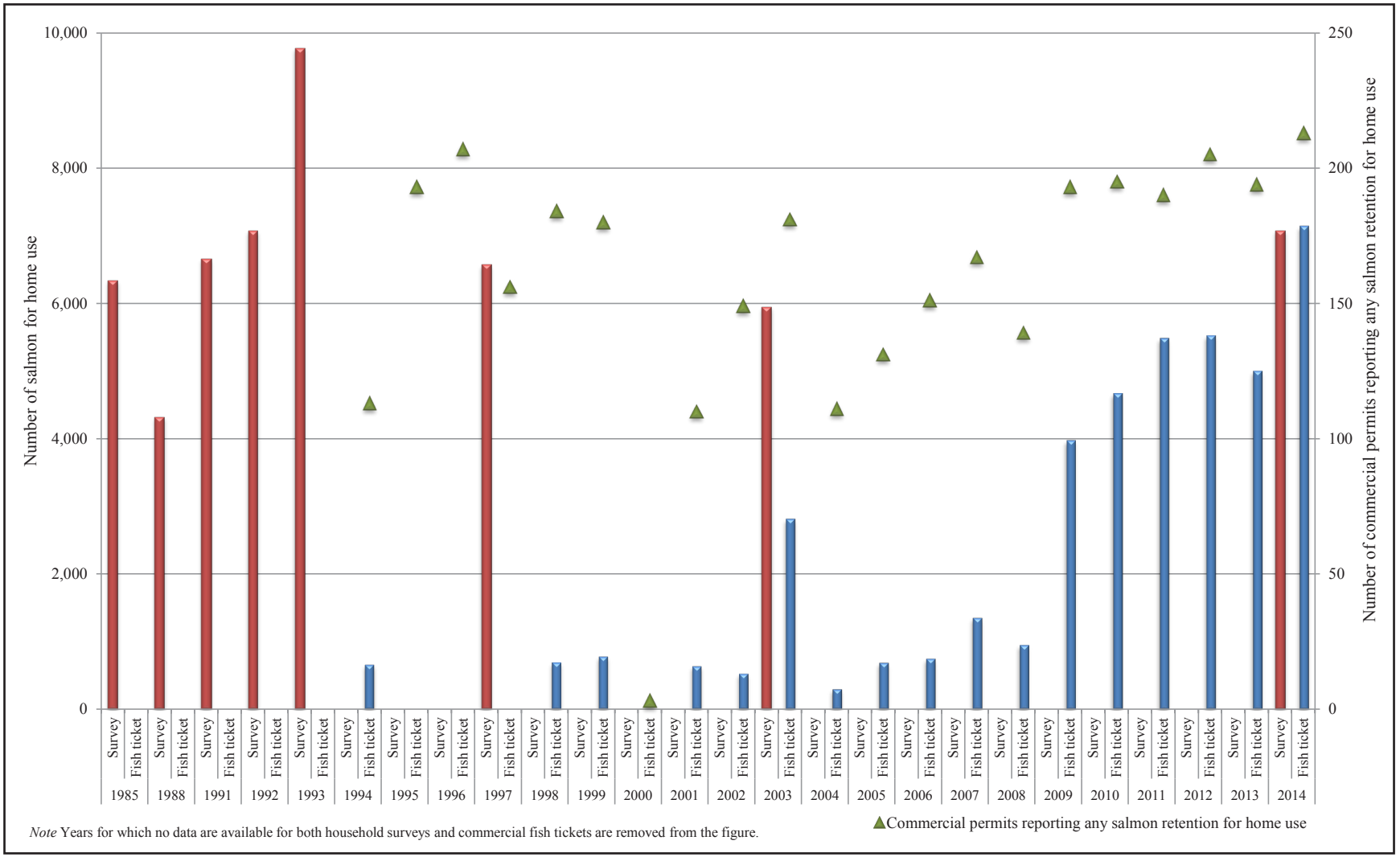
Note The number of permits are reported from the Division of Commercial fisheries OceanAK database. Subsistence household survey data are estimated based on household respondents. Both numbers indicate the number of commercial fishers retaining commercially harvested fish.

Figure 3-9.–Comparison of permits reporting salmon retention reported through commercial fish tickets and as estimated through household surveys, Cordova, 2014.



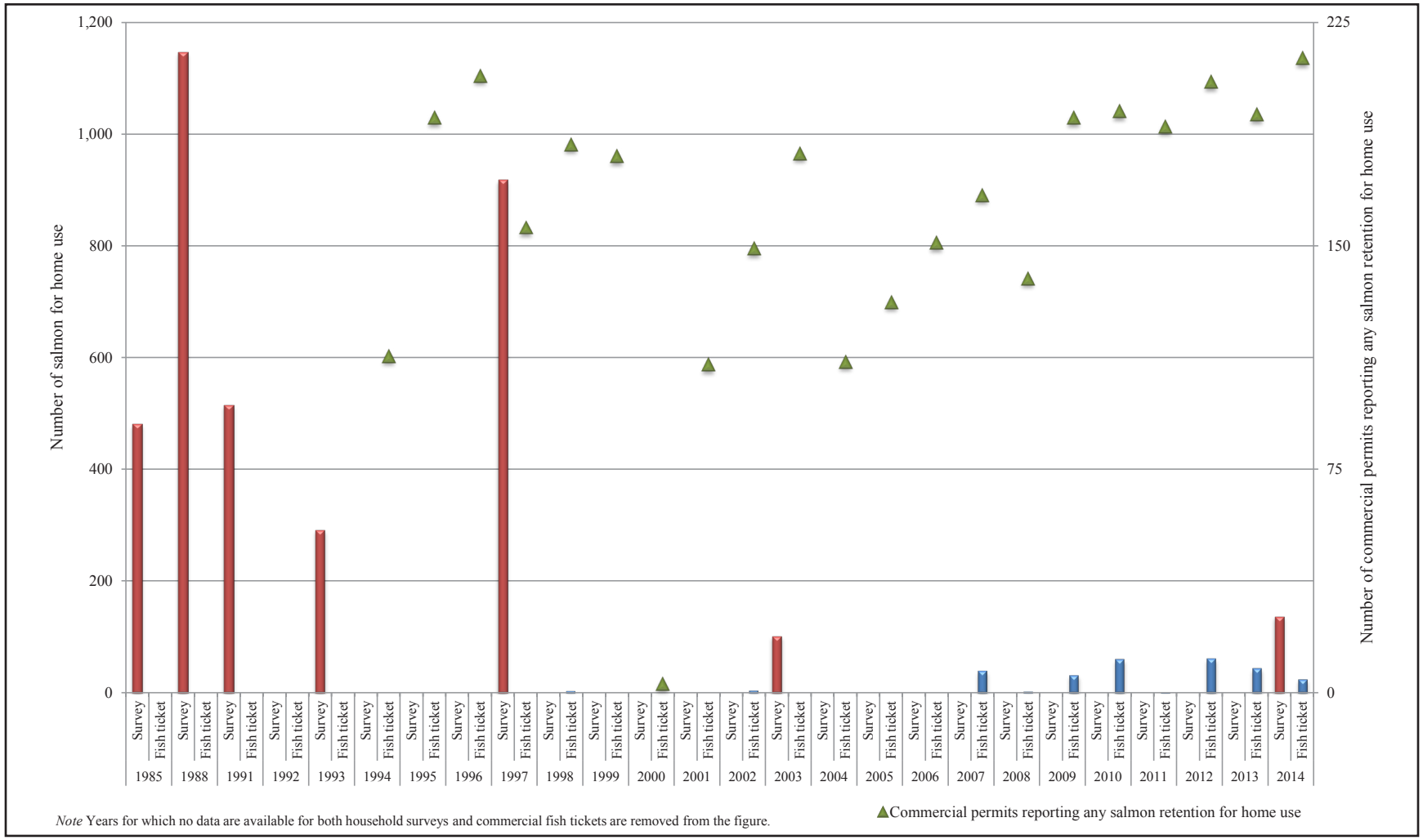
Note Years for which no data are available for both household surveys and commercial fish tickets are removed from the figure.

Figure 3-10.–Historical estimated number of total salmon harvested by commercial retention based on subsistence household survey estimates and commercial fish tickets, and number of commercial permits reporting commercial retention of any salmon for home use, Cordova, 1985, 1988, 1991–2014.



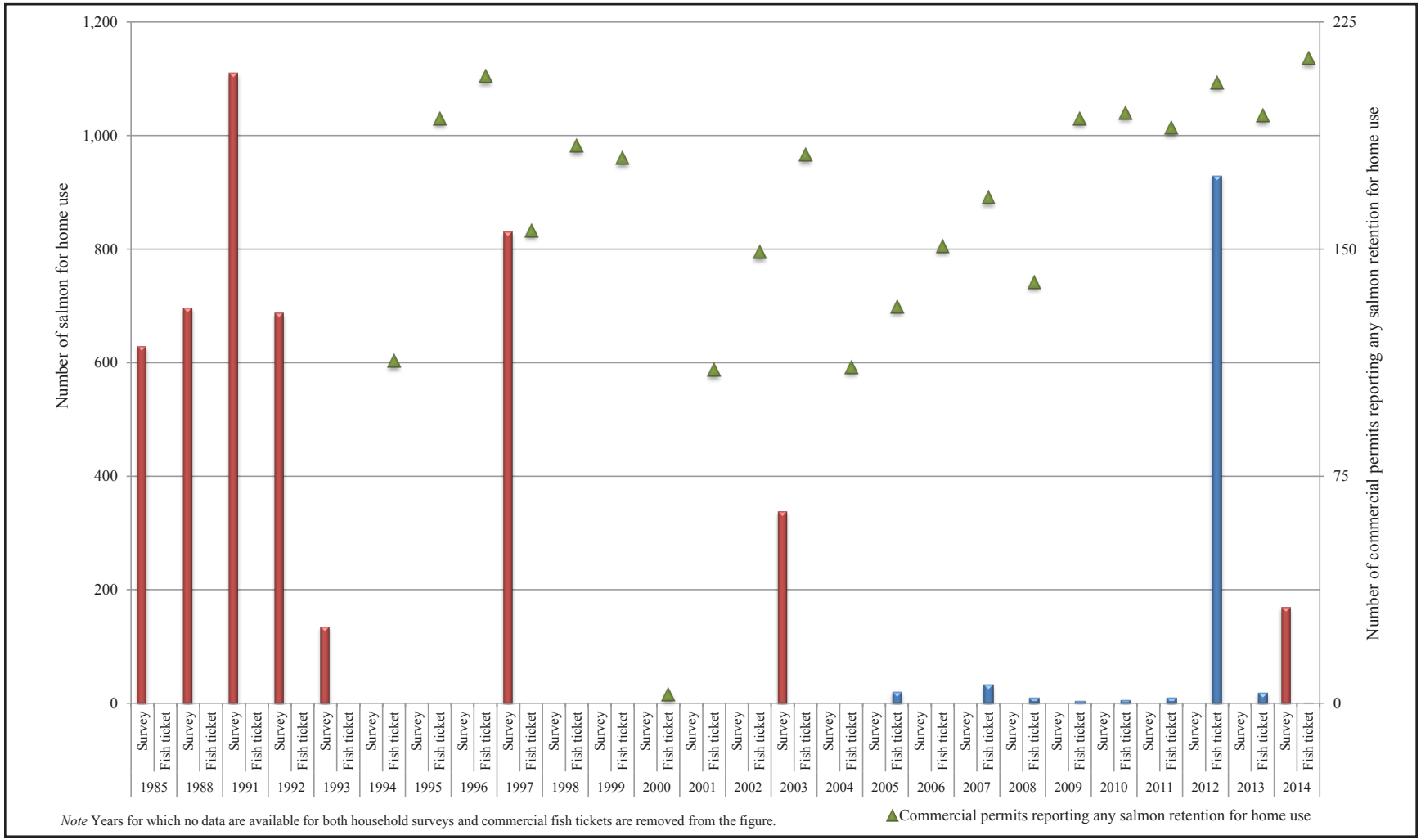
Note Years for which no data are available for both household surveys and commercial fish tickets are removed from the figure.

Figure 3-11.–Historical estimated number of sockeye salmon harvested by commercial retention based on subsistence household survey estimates and commercial fish tickets, and number of commercial permits reporting commercial retention of any salmon for home use, Cordova, 1985, 1988, 1991–2014.



Note Years for which no data are available for both household surveys and commercial fish tickets are removed from the figure.

Figure 3-12.–Historical estimated number of chum salmon harvested by commercial retention based on subsistence household survey estimates and commercial fish tickets, and number of commercial permits reporting commercial retention of any salmon for home use, Cordova, 1985, 1988, 1991–2014.



Note Years for which no data are available for both household surveys and commercial fish tickets are removed from the figure.

Figure 3-13.–Historical estimated number of pink salmon harvested by commercial retention based on subsistence household survey estimates and commercial fish tickets, and number of commercial permits reporting commercial retention of any salmon for home use, Cordova, 1985, 1988, 1991–2014.

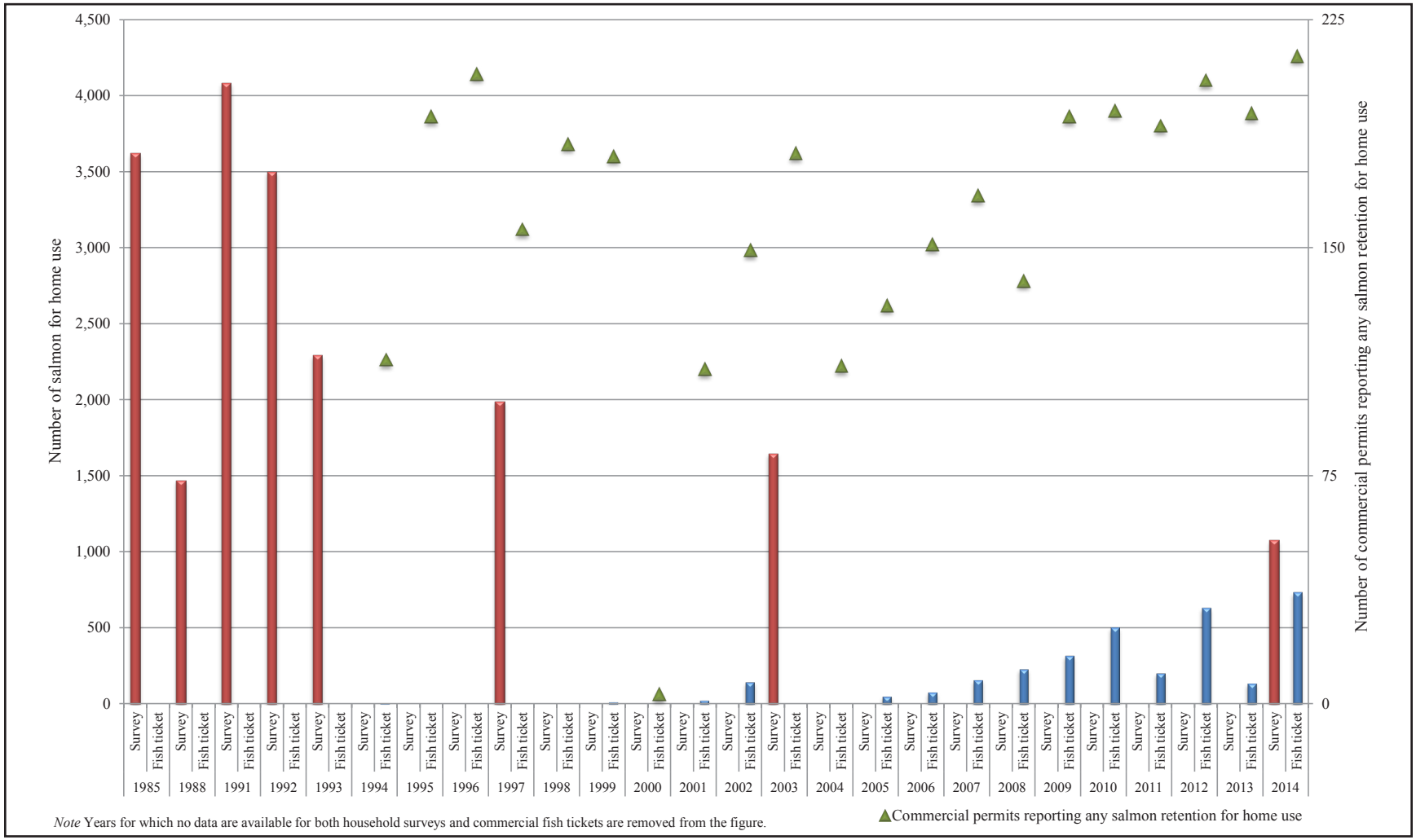
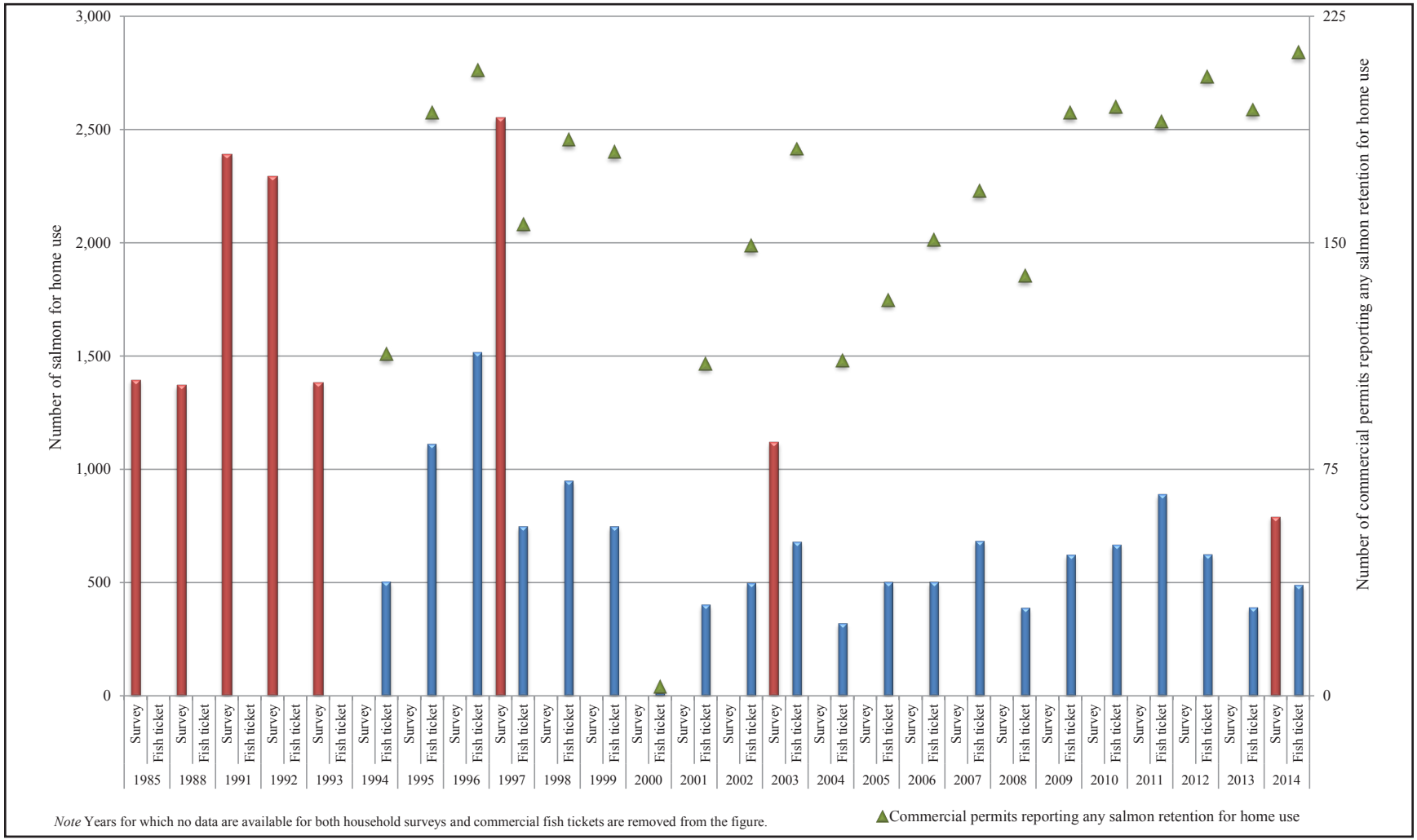


Figure 3-14.–Historical estimated number of coho salmon harvested by commercial retention based on subsistence household survey estimates and commercial fish tickets, and number of commercial permits reporting commercial retention of any salmon for home use, Cordova, 1985, 1988, 1991–2014.



Note Years for which no data are available for both household surveys and commercial fish tickets are removed from the figure.

Figure 3-15.–Historical estimated number of Chinook salmon harvested by commercial retention based on subsistence household survey estimates and commercial fish tickets, and number of commercial permits reporting commercial retention of any salmon for home use, Cordova, 1985, 1988, 1991–2014.

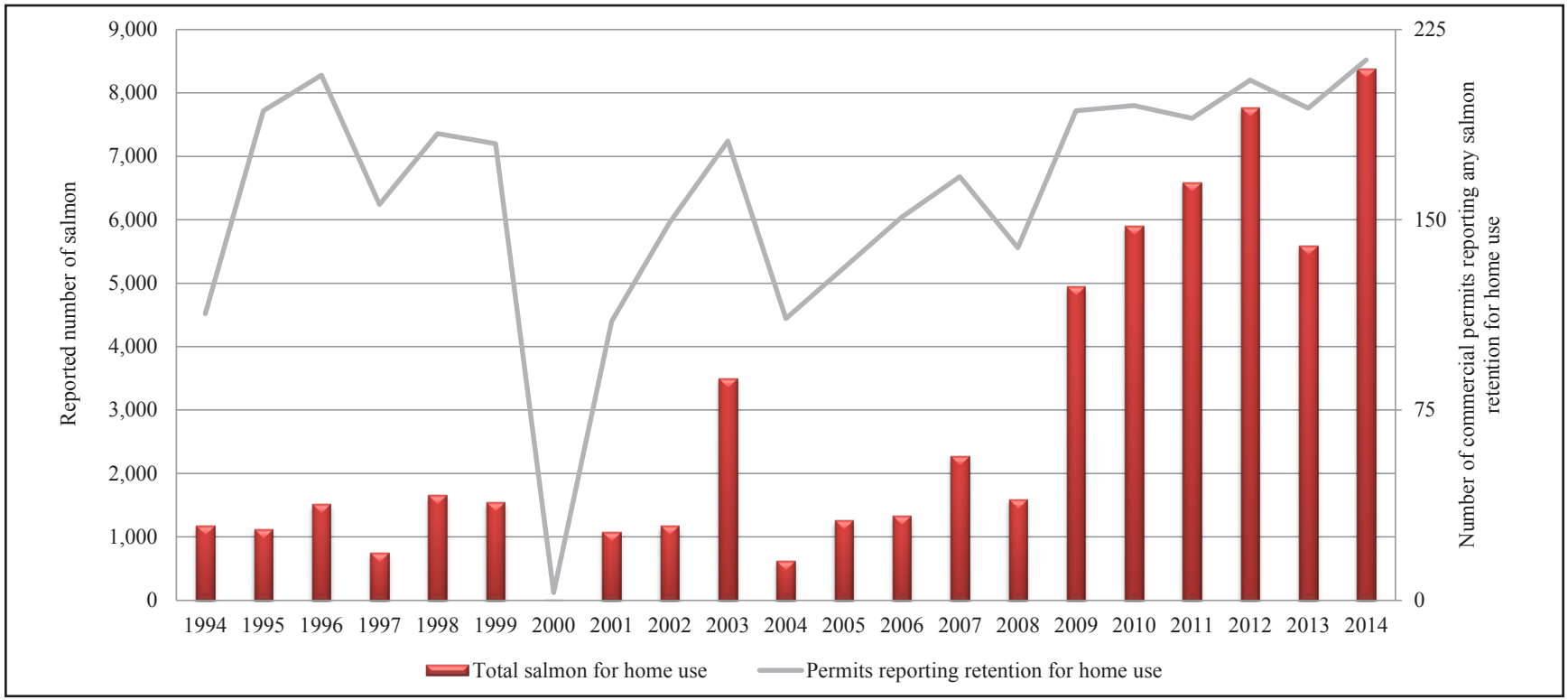


Figure 3-16.–Number of salmon retained for home use from commercial harvests based on commercial fish ticket reporting and number of commercial permits reporting any salmon retention, Cordova, 1994–2014.

4. QUALITATIVE RESULTS

Themes from Interviews

Qualitative data from this study were designed to investigate the following objectives:

- Analyze the harvest of Chinook salmon in the subsistence fishery in the Copper River District of the Prince William Sound Area, as well as commercial removals of Chinook salmon for home/personal use.
- Identify factors that influence harvest and use of Chinook salmon in commercial and subsistence fisheries.

Qualitative data were organized using NVivo software to identify topical themes discussed by key respondents. The themes were summarized and those relevant to this project were:

1. Factors Influencing Decisions to Retain Home Pack Chinook Salmon,
2. Reporting of Commercially Caught Chinook or Other Salmon,
3. Access to and Participation in Fisheries,
4. Dual Fisheries Openers,
5. Needs and Limits, and
6. Chinook Salmon Resource Concerns: Size, Run Timing, and Health.

In total, 11 interviews were conducted with a variety of Cordova residents as part of the CSRI study. Participants in the local commercial salmon fisheries made up the bulk of interview respondents, and they ranged in age and gender. The remainder of those interviewed were state and federal agency personnel, the Cordova mayor (at the time of the interview), and one tribal member, all of whom participated in the subsistence salmon fishery. Two interview respondents were also used as contacts for 2016 participant observation by previous research lead Joshua Ream, who was assisted by ADF&G research intern Hannah Johnson. Both individuals in Cordova who took Ream and Johnson to observe the subsistence salmon fishery were public employees (one state, one federal) and subsistence fishers. Also, ADF&G research intern Emilie Springer conducted participant observation activities in 2014; Springer accompanied an Alaska State Trooper on a commercial season fishery enforcement flight and boarded a tender vessel for 3 days.

Field notes from participant observation activities, CSRI study project staff notes throughout fieldwork and community visits to Cordova, comments from household survey respondents from the *Exxon Valdez* oil spill (EVOS) study, and the responses from the 11 CSRI study KRIs were analyzed thematically. The sections below will provide a summary to introduce each main theme and then explore themes in depth using interview data. After each summary follow bullet points organized around a theme that is drawn from KRIs or from the *Exxon Valdez* survey comments. Comments come from surveys administered to 184 randomly selected households (19% of the community total households) that were collected for study year 2014. Reporting the survey comments along with the KRI responses better illustrates a comprehensive community awareness about salmon and common concerns outside of the ethnographic work done for the CSRI study. The bullet points contain an amalgamation of direct and summarized quotes per key respondent or survey respondent. All respondents are kept anonymous, but each bullet consists of one individual's response. To conclude the narrative for each theme are staff field notes or notes summaries.

Factors Influencing Decisions to Retain Home Pack Chinook Salmon

Although there were no recorded comments from household surveys in 2014 that addressed commercial home pack issues or concerns, the 2014 EVOS study confirmed that a notable percentage of Cordova

households rely on home pack salmon. Up until regulatory changes in 2017, the state subsistence driftnet fishery for the Copper River and Bering River districts was generally open only during commercial fishing openers. These openers were announced by Emergency Order (EO) from the ADF&G Cordova office. Due to the nature of the commercial and subsistence salmon fishery openers being usually identical for most of the fishing season (open on Mondays and Thursdays), respondents said participation in subsistence salmon fishing (particularly for Chinook[1] and sockeye salmon) using a gillnet was challenging for households. To participate, commercial fishermen need to change out their commercial-length nets for legal subsistence nets that measure no more than 50 fathoms, which usually requires a minimum of boating 2 or more hours round-trip from a commercial fishing location back to the harbor and out again before being able to participate in subsistence fishing. This was viewed as a financial and temporal burden on a fisher particularly when this had to be accomplished when the subsistence fishery was open only during a commercial fishery opener. Because of this, a substantial percentage of Cordova households obtain salmon for home use from their commercial catches (Fall and Utermohle 1995; Stratton 1989, 1992). For example, in 2014, an estimated 43% of the total salmon harvest weight was removed from commercial catches, and a higher proportion (64%) of the Chinook salmon harvest weight was home pack (Fall and Zimpelman 2016:221).

Decision-making regarding why an individual or family would choose to retain Chinook or other salmon was addressed by some interview respondents and during participant observation. Respondents generally felt that taking Chinook salmon home was very important for their sociocultural, economic, and nutritional needs. Several interviewees expressed that losing income from not selling Chinook salmon in the commercial fishery was not a major inhibitor to keeping Chinook salmon for home use. The commercial fleet members expressed that being able to retain Chinook salmon for home use was the best way to get Chinook for their households.

- I will make sure I keep some [Chinook] from my commercial catch. Ten to 14 Chinook salmon taken for personal use/subsistence each year as home pack from my commercial catch [is needed]. It depends on timing and how long the opener is, and it determines when/if I will start keeping kings. Weather plays a role—if it is bad weather, windy and choppy, I do need [to] retain kings. Price does not determine my decision to keep Chinook for home pack. I will always keep what I need for home pack regardless of the market price at the time. And I keep the kings which are in good shape and not beat up too bad, the biggest Chinook for home pack also means more meat. Commercial fishing enhances my ability to get home pack Chinook salmon. Without this option [I] would only be able to get 5 Chinook [Note: under subsistence fishing regulations, no more than 5 Chinook salmon may be taken per permit annually (5 AAC 01.645)] and I wouldn't know how else I could get the other Chinook salmon I would need.
- Not anymore, too expensive. I sell them [Chinook that formerly would have been kept for home use]!
- I think with the commercial guys, those kings are so valuable price-wise that I know a lot of them [commercial fishermen] are kind of bummed out that the subsistence openers fall at the same times as commercial openers, because then they [have] got to make a choice. And they don't want to miss a commercial opener to get their home pack so they'll either wait 'til later or bring home a fish here or a fish there, maybe over time. But you know when you got … those kings, those early kings probably average 200 bucks a fish or something, it's probably hard to take that as a home pack.

1. It is important to note that Chinook salmon do not run up the road-accessible freshwater streams near Cordova, and local residents without access to the state-managed subsistence fisheries in marine waters do not effectively have access to Chinook salmon harvesting opportunities.

- It's really important for folks to have king salmon in the freezer or fresh king salmon. So they [commercial fishermen], regardless of run size, they will take home a few fish, typically.
- When I fished, didn't retain kings or reds because [it was] money out of your pocket.
- Home pack is essentially buying fish from yourself, [it is] not true subsistence.
- Subsistence salmon is not available if the household fishes commercially. [They] have to buy the fish for the household.
- [It is] a hassle to get home pack [from the] commercial [fishery]. [It is] not done often anymore. I have retained Chinook in the past but now everything goes to the cannery.

La Vine field notes summary:

- A local resident said that while he would send sockeye salmon to the cannery, he would keep every Chinook salmon that he caught until he had enough for his own family. He said that last year (2013) he did not sell one Chinook salmon: those fish were far more valuable to him for home use than being sent to the commercial market. Even for a disappointing opener, there were plenty of fish bound for home use to help meet household needs rather than being sold to the market. Some fishermen did not earn enough from the commercial market to cover the costs of the trip/gas, indicating an average harvest was 300 lb. A local fisherman decided not to sell 60 fish caught during a commercial fishing outing; there was more value in keeping the salmon. A local resident thought that subsistence opportunity [the ability to subsistence fish when commercial fishing is not occurring] was not met. Comments reflected that many people chose home use over profit—at least some did.

Ream and Johnson field notes summary:

- Researchers ran into different sentiments regarding commercial retention: some local residents said that Chinook salmon would not be sold until the commercial fishermen had enough in their home; others said that their wives (2 fishermen reported something like this) would "clobber" them if they DID bring home Chinook salmon since it was worth too much on the market—especially during the opener.

Reporting of Commercially Caught Chinook or Other Salmon

Most of the respondents reported that they believe home pack reporting is accurate. Commercial fishery participants who were interviewed indicated that they (and those whom they "fish with") report home pack and that there is "no reason" to not report Chinook salmon that one is taking home. One interviewee quantified home pack reporting participation at 90%, and another valued it at 75%–80% (although he acknowledged he does not always report his home pack), with some underreporting being assessed as the case due to either tender boats or fishermen "forgetting" to report. One respondent reported that he believes underreporting occurs in the subsistence fishery. ADF&G research intern Springer conducted participant observation on a tender boat and described the nature of rapid fish transfer, weighing, and catch reporting, and described that this may prove challenging to accurate fish harvest reporting.

- On the commercial ticket there is a section where you have to declare your home pack, so I would say it's [reporting is] really high. The only time I don't do it is if it's the tender man's fault where I told them to write it down and I left, and I look and it's not on the ticket. But they are pretty much on top of it.
- We report when we fill our fish ticket. They [tender] tell you had 500 lb of hatchery, 15 lb of home pack. So they [salmon] should all get reported. [Enforcement does not check] red salmon … but if they [enforcement] see you with a king salmon cleaning them down there

[at the dock], they'll [enforcement will] come down and ask you and will want to see your card, [commercial] fish ticket with that king salmon reported on it.

- What percentage of commercial fishery is [reported] home packed? From what I know, all of it … they are pretty religious about reporting it.
- I know quite a few people that subsistence fish and I don't believe anybody's not reporting or anything, but I guess I've never thought about it too much.
- It sounds like based on the numbers that you guys [Division of Subsistence] were getting, based on your [household harvest] surveys, there was substantially more fish than what it looked like we [staff at ADF&G Division of Commercial Fisheries] were getting on our fish tickets. I started to look into it a little, and think there's definitely some potential for underreporting. I mean it's incumbent upon the commercial fishermen to physically put that [number of fish on their fish ticket] … he's keeping the fish on board his boat, so he has to remember to go over and fill that out on his fish ticket, or have somebody fill out on the ticket, so I imagine that folks just set some fish aside and then don't bother to put it on a ticket, at times. But yeah, I mean, education in regards to the importance of reporting home pack accurately … when it comes to king salmon that actually can represent a fairly large proportion of the total run really, in some years … .
- I don't know. I don't report all mine [home pack]. I would say [I report] probably about 75%–80% [of home pack]. I tell them [the tender] to [report king home pack]. They might see I have a king or two in my hold iced down and they'll want to know if I want it recorded—or they will record if they see it, almost every tender. If they see it, they'll put it. There's lots of little enterprising things going on. People trying to make a buck. Canning and selling their subsistence fish. Some guys will catch way over their limit, and this is subsistence, and they'll get on the radio and say, "Hey, I need some red salmon, I've got some extra king." And they'll swap them around. And some of those aren't recorded. But I'd say once again 75%–80% of them [salmon] are.
- I don't know how that system works with commercial fishermen reporting home pack. I'd like to—I hope it's high, that it mostly gets reported. I've never heard anyone bragging about not reporting.
- When you sell your fish they [cannery] see that you have some home pack and they write it down. They always ask. For [a] fisherman there is no reason not to report it.
- I'm just one of those people that reports it. And people that I fish with report it. The people that I fish with get it. That it's part of the accounting. It's a pretty enlightened community management-wise. And at least the people who are here year-round and understand how it all works. I can't say that for maybe other people, but you know we have a pretty integrated non-resident portion of this fleet.

Springer and La Vine field notes summary:

- In general, observations showed that if fishermen wanted/intended to sell their Chinook salmon then they stored it in a bag separate from the sockeye salmon and specifically told a tender what was located in the separate bag—fishermen get a higher price for Chinook salmon, so clearly they would want the fact noted. It was not possible to watch every single delivery, but effort was made to try to pay attention to at least 75% of deliveries or so, and during the observation experience researchers heard at least 3 people tell the tender that they

were keeping X# of Chinook salmon and/or X# of sockeye salmon for home pack. There were at least 2 (and possibly more, but not regular) occasions where the tender specifically asked if there were species other than sockeye salmon in the bags.

Springer field notes:

- I am just witnessing "home pack" without actually asking, and I have seen all deliveries; it is clear that the delivery happens as quickly as possible. These boats just want the load off and they are off to fish more. They will probably deliver 2 more times in the opener. More people save reds than kings. Cordova may actually be less likely to randomly hold king without reporting it because they are not necessarily going to eat a king for dinner. On a seiner, if a king or red is caught, the vessel is more likely to keep it for dinner that evening. It actually may be that personal use/home pack is more likely to be underreported with the seine fishery or with drift boats that stay on the flats between openers. They are technically required to report [home pack] but the delivery process is so rapid (often with a boat on each side of the tender) that I noticed very few (maybe 3 or 4) people specifically say that they were holding fish for home; however, when [the tender] did ask others—he often received an, "Oh, yeah. I do. X# reds."

Access to and Participation in Fisheries

The general sentiment among 5–6 interview respondents, and most of the EVOS study household survey respondents who commented on the topic, was that access to the subsistence fishery in Cordova is limited, poor, or totally absent. This is mainly due to cost (fuel, equipment), lack of access to equipment needed (boats, nets), conflicts in time (the need to work during subsistence fishing openers), location (dangerous waters to navigate, especially with smaller boats), unpredictable weather (general safety concerns), and demographics (elders are unable to go out into certain conditions). The remainder of the respondents seemed to indicate that access is moderate or communicated a yes- or no-type response; access was described as being dependent on a variety of factors. Proxy fishing was indicated as a way to bypass some of the limiting factors of access, with a few respondents also reporting that most subsistence fishers will fish with multiple households, or with "stacked" permits (taking more than one household's permit out and then distributing the harvest accordingly).[2] Sharing was also a factor indicated in obtaining enough fish. Competition between the subsistence and commercial fisheries was generally not expressed as a concern, but the difficulty for a commercial fisherman to also participate in the subsistence fishery was highlighted. An issue of access was also indicated by working people who were seen to be heavily constrained by a Monday and Thursday open subsistence schedule (note that during the 2014 study year subsistence fishery openers occurred almost exclusively on weekdays[3]). The subsistence fishery openers are dictated through the dual opener management system discussed below, and participation in the subsistence fishery is limited further by the nature of fishing in Prince William Sound (e.g., weather, geography, tides); if conditions are not conducive for fishing at a time when all the other factors are positively lined up, residents are not able to go subsistence salmon fishing. Two respondents made the point that they "make time" for getting their fish but recognized this is not the case for most working residents.

- Subsistence should be for low-income people or Alaska Natives only.
- Subsistence should trump everything else. It is the only opportunity for non-commercial fishermen to harvest.

2. State regulations allow for proxy fishing under limited conditions (e.g., the beneficiary must be 65 years of age or older; or legally blind; or at least 70% physically disabled; or developmentally disabled) (AS 16.05.405).
3. Alaska Department of Fish and Game, "Regulation Announcements, News Releases, and Updates: Commercial, Subsistence, and Personal Use Fishing," select results for 2014 (effective year), commercial fishing (activity), salmon (species group), Prince William Sound (management area), gillnet (gear class). http://www.adfg.alaska.gov/index.cfm?adfg=cfnews.main (accessed June 2016).

- Subsistence needs to be protected [because] Alaskans benefit.
- It's a moderately accessible fishery, if you look at the extended concept of other people getting taken out. I think it is fairly well managed and fairly well reported. It's very uncomfortable to be a subsistence fisherman, competing with people who are fishing for a living and I've had some direct conflicts as a result. A guy sits there fishing for 6 or 7 hours, doesn't catch anything and some little subsistence fisherman comes and throws a net in front of him, right? Cause that fish is probably headed for his [commercial] net, and [the subsistence fisher] catches his 40-lb king. And I get that. It's a $200–$300 bill and they've got a living to make. So that's uncomfortable, those conflicts. Having it only between Monday and Friday puts a burden on people who have day jobs. I don't see a lot of people subsistence fishing, but that's partly because of the way it's structured. Very often, I would say more often than not, there's at least 2 permits on board each small boat. They're kind of splitting fuel and splitting fish.
- I'd say it's relatively accessible. I know people with boats that think anything south of town as being too dangerous, too difficult, and too hard to get to. So you got to have a boat, got to have a net, got to have some money for fuel, got to have some time. I know I'll take time off to do it if I can.
- I [serve on] the local AC [advisory committee] and we have received many complaints over the years about accessibility and we have worked many scenarios trying to increase access for locals who work 9–5 and can't get out except on weekend[s]. We brought various proposals [to the Board of Fisheries] to increase their access. None of the efforts have been successful, or very limited. In general they have refused to increase access because there is so much access due to access from [the] commercial fishery. I only subsistence fish when commercial fishing is closed [inseason, making home pack not an option]. It [home pack] enhances my personal access a lot! Ninety percent of my subsistence comes from home pack, so, a lot. Just gotta bite the bullet on the financial hit because it's a push between taking it out of your catch and losing the revenue and funding the fuel to go subsistence fishing.
- Accessibility to subsistence fishing for average Cordova residents is very poor, perhaps 5%–10% of the population has good access. This is because of [what] people's work schedules are and the schedule of subsistence fishing openers. Elderly people who do not have jobs usually cannot get out anyways, or they don't have a boat. They are dependent on others for their subsistence fish. If his fishing is for commercial, he does not have much opportunity to get fish specifically for subsistence/personal use purposes. I did take other residents out in my boat to help them get salmon for home use. Lots of Cordova families cannot really access salmon (or crab) for subsistence. People who own boats need to be able to take other residents out to fish for subsistence, otherwise there is no opportunity. When there is the occasional "subsistence opener" the time slot often does not fall right with local residents' time availability so usually a lot of people do not get to participate in these openers.
- The average resident of Cordova does not have access [to] king salmon, period.
- For a lot of people, it's inconvenient, for the elderly. And the price of fuel. A lot of people will get a proxy on their permit. If you were eligible, you could give me your proxy and I could catch your limit.

- It's [subsistence] not [accessible for locals]. I feel bad for those working in the grocery stores or canneries that don't have boats that could do that. Either they have to eat silvers, which aren't the worst thing in the world, but they don't have access to kings and sockeye. The exception to it is when the commercial folks have—when there's a closure in the commercial fishery and an opening of the subsistence fishery, those guys with the commercial boats have to take their nets off and they put on a subsistence net and they'll go fish way out on the delta. They know where to go, they're commercial, they know where fish are. I'm an advocate for trying to have more days to fish. Some of it gets down to lifestyle and tradition and stuff. There are some people that value those kings so highly that they're going to bring them home—there's no price that could buy them. They value having them in their household so much.
- I haven't heard any subsistence folks complain about lack of success because they were right next to commercial. When the fish are there the fish are there. I mean depending on what your priorities are and when you can get the time off as a subsistence person. If you're total fixated on these early early kings, or on sockeye, the first sockeye that come through, then yeah you're going to have some competition. But it's not—I've never heard of lack of success because of fishing side by side. If you're going to go later in the season when the runs are tapering off and whatnot, or if you go out for silvers, but mostly by then, it's so iffy for silvers for subsistence.
- [There are] more subsistence boats around but not from Cordova. [It is] spendy [to] run 25 miles out for subsistence and then come back.
- If subsistence is priority, why can we only fish during commercial fishing?
- [There is] no "real" subsistence fishery in Cordova. I always get enough subsistence foods, you just have to keep going until you have enough, [there is] no other choice.
- [There is] no real subsistence opportunity unless you have a sea-worthy skiff, which costs a lot.
- [There are] great subsistence opportunities here.
- [It is] too expensive to go out and fish.
- Concerned about subsistence [and it] needs to be taught more hands-on.
- I wish it was easier to access fish.

La Vine field notes summary:

- Underscoring the importance of the commercial fishery as part of the subsistence way of life is that people must home pack salmon for their subsistence opportunity. Essentially one must have a commercial boat to get to the flats; it is dangerous to go in a small vessel. Also, since the subsistence salmon harvest is limited to 15 salmon (no more than 5 of which can be Chinook salmon) for a household of 1, a subsistence fisher must spend time and money to get out for only 15 fish; often local residents decide that it is not worth it to fish in the subsistence fishery. Participation was high for the first opener in 2014 because the weather was so good, but the ADF&G manager pointed out that despite the good weather, the smaller vessels were forced to fish the northernmost inside channels and those were rarely productive for salmon.

- All the partners that a local resident usually subsistence fishes with pulled out to participate in the commercial opener. Without the stacked permits for subsistence fishing, the effort to go fishing simply was not worth it. His interest is not in increasing the harvest limits but in providing greater opportunity that either does not conflict with, or is augmented by, commercial activities.

Dual Fisheries Openers

The issue of access to the subsistence fishery overlapped thematically with the concept of dual fisheries openers in which the subsistence and commercial fisheries are open at the same time and in the same area. Decoupling the 2 fisheries would allow both fisheries to operate on differing days and provide additional opportunity via both means and methods. Most respondents were in support of subsistence fishing periods being offered independent of the commercial fishery schedule. Similarly, to the over-arching theme of "access," a couple respondents reported competition between subsistence and commercial users; one respondent indicated that he would have preferred not being out at the same time as a commercial opener due to a negative encounter. On the other hand, other respondents did not think competition was the issue, but rather that different openers gave commercial fishermen a chance to go and obtain subsistence salmon (if they changed nets and wanted to take the time and additional fuel). A few respondents indicated that they did not think salmon (specifically, Chinook salmon) harvests overall would increase if subsistence and commercial fisheries were open at different times, but that it would simply provide more opportunity for non-commercial fishing residents. Some respondents mentioned that one of the benefits of a dual system is that enforcement by Alaska Wildlife Troopers is likely made easier by all users being in one area at one time, but that safety may be an issue since different-sized boats are out fishing at the same time. One commercial fisherman mentioned that if he was unable to get his home pack salmon, given the opportunity with a different subsistence opener, he would use that (subsistence) opener to get his salmon for the year. Another commercial fishery participant did not believe commercial boats would travel back to shore and change out gear for subsistence (including consuming more fuel), and that competition (or lack of success) between subsistence and commercial fishing as a result, was not a concern.

- I'd be hard pressed to come up with a single benefit of having dual openers. I think globally about it, I would say it benefits ADF&G enforcement right? Got all the boats in one place at one time.
- If I was a commercial fisherman, it'd be nice to have a time, I can understand that, when it's not open to commercial fishing but it is open to subsistence, when they could put on a smaller net and run around in there. And I think there is always the question of burning a lot of fuel and stuff.
- What I was told was the initial impetus was, for having them [commercial and subsistence openers] tied together, was to prevent subsistence fish from moving into the commercial market and so that's the benefit [of keeping it status quo] there. And then also, when we've had subsistence-only openers during extended commercial closures, we've had this rule that we have to have 48 hours before and after, after a commercial opener and before the next one, to have a subsistence opener, to ensure that we don't have fish moving into the—especially king salmon, they're so valuable—moving into the commercial side. So that's the reason it was structured that way. But it definitely tends to limit opportunity for some folks, I guess you have the commercial folks [feeling limited]. I mean, because they have the access to home pack; that's why we, in part, have the two-tier ANS [amount necessary for subsistence], so a lot of folks meet their subsistence needs that way. But for folks that don't necessarily [meet their needs] there's definite drawbacks to not having some sort of regular subsistence opener. You can kind of count on a Monday/Thursday deal, but that's during the workweek. But I'm not sure we would see a real change in the participation by

the commercial fleet [if there were dual openers] but you definitely see more opportunity for folks that aren't, that don't have that direct tie-in [with the commercial fishery]. My thought on the matter is that the [subsistence] permits is kind of self-regulating; just the total allowable harvest per household, it's not that high. I could see that happening more, with permit holders taking other folks out potentially and splitting up the catch amongst permits.

- There is no benefit in any "dual" subsistence/commercial openers. It creates conflict between the subsistence user that is trying to go out and get it [subsistence salmon] and the commercial fleet because they are all kind of stuck between Steamboat Island and town or Egg Island and town. They [subsistence fishers] are competing right along with the gillnet commercial fleet and even though they [subsistence fishers] don't have as much net it's a competition between the two. Dual openers create tension.
- I don't think we should have to sacrifice commercial opener just to have better access to the subsistence fishery.
- The only benefit [to a dual opener] I would say is for safety. There are more people to help you if you get in trouble.
- I would just so love it if there was the opportunity to fish outside of commercial openers for subsistence. I think that's a real restriction on our ability to get out. Working around my work schedule, and weather, and everything, it puts a real limitation. I've heard the argument that for law enforcement it's more convenient because everybody's out at the same time. But there's adequate means of discriminating subsistence-caught fish from commercial-caught fish by clipping tails and stuff. In this day and age, I just don't think it's necessary; enforcement could be done at the docks. I understand that it's [home pack] money out of their pocket, to take it out of their catch and not sell it. It's the most convenient thing for them to do. Or sometimes they take a boatload of friends with several permits on one boat and make it efficient that way. I think it would be huge if we had some wider latitude to choose which days we could go out.
- Subsistence fishing should be opened more. They have to fish during the commercial openers only. [It] takes a lot of gas [and one] has to pick [good] weather. Subsistence salmon is very important to us!
- Need subsistence fishing opener separate from commercial. It interferes with commercial fisherman's abilities [for] subsistence.
- Need to have a better opener for subsistence fishing. Commercial fishermen as well as other Cordova residents are having a very hard time harvesting their salmon under current opening schedules. Current situation is not good for anyone in the community.
- Concerned about the lack of subsistence fishing opening for the community. In 2014 they [ADF&G fisheries managers] had none during the weekend which puts people who work during Monday–Friday into any impossible position. They [Cordovans] can't harvest subsistence fish.
- [Cordova] needs an opening for subsistence.
- The subsistence opening needs to be re-scheduled.

Needs and Limits

The majority of respondents reported that their needs, in regard to the 5 Chinook salmon annual harvest limit under subsistence regulations, are being met. During subsistence fishing, it can be difficult to harvest

the limit of 5 Chinook salmon before harvesting the limit of sockeye salmon, at which point the subsistence fisher is required to stop fishing. There is no limit to the amount of salmon a commercial fisherman may remove for home use. Most of the interviewees indicated that Chinook salmon were used for a specific purpose (fresh eating, canning, smoking), and that the greater sockeye availability helped to fulfill the needs of residents. Some of the respondents, who also participate in commercial fisheries, were clear that the high price of Chinook salmon did not matter; they would home pack them regardless, believing their value was greater at home than on the market. One or two commercial fishermen disagreed and reported that they used to take Chinook salmon home when they were more plentiful in the past (and worth less money), but now that they are increasingly valued on the market, they cannot afford (or do not want) to bring any home. Most of the interviewees were satisfied with 1–5 Chinook salmon to bring home.

- So for us, 2 30-lb king salmon would be acceptable. [If] I caught more than that it would get canned as a hold over for the following year. In case we didn't get any or something.
- With me, my family has it dialed in over the years, exactly how many fish we use. We usually try to get our limit of 5. I don't think we'd use more than 5. Like I say it's a lot of work, the smoking and the canning and stuff. If we get 5, that's a load.
- It's probably adequate at the current, with the current fishery the way it's structured because it's just not easy to get 5 [kings] anyway before you would max out on your sockeye—of your total allowable [harvest]. A gillnet is not selective.
- I would say yes [5 Chinook meet subsistence needs]. I haven't looked at the ANS lately. Unfortunately, we should probably match upriver but we don't. I started taking home pack kings back then, in 1973. It just diminished because they got so valuable.
- I need about 7 fish [Chinook] per year for my household.
- Yeah [able to meet needs with home pack]. About 15, 20 … but now less as it's just the wife and I. I would say yes [the current limit of 5 Chinook is adequate to meet people's needs]. At the same time, you have access to the reds, too.
- That depends on the household members, how many you've got. Like for me, the 5 kings and 25 reds or whatever is real good. My kids are grown up and we still share with them, though not like we used to. It's a good number right there.
- I think it does [limit of 5 Chinook meets household needs]. I've learned to live with it. And I think it's reasonable given king conservation concerns. Our household—it's just my wife and I—we're allowed 30 salmon with that subsistence fishery and the household limit for kings is just 5. You always hope we can do that. We put a lot of energy into trying to get those each year. It's a little bit of the roll of the dice when we can get out on the openers and then run timing and stuff. All I can say is some years we eat kings, some years we eat red. Last year I just got one king. I went out by myself and did really well with reds.
- It [commercial fishing] enhances my use of it [Chinook salmon for home use]. I don't know how else I would get Copper River king … unless I went and accessed upriver, personal use fisheries.
- I think it's way plenty [5 Chinook limit to meet household needs]. I'm [commercial fishing] sockeye and coho, and there's only 2 in our household. I'll bring home 1 or 2 [Chinook]. I'm not catching that many kings in the commercial catch. And because we're no longer fishing the inside barrier waters until later in the early run, there was about 6 years there where we just didn't really have them. It just wasn't even available. But in the last 3 years, there's been enough where I could. And I guess my thought process usually is: it's not about the money

it's about, "Do I really want this? Is it a good size? Can I get what I need with this sockeye?" And king is a wonderful thing, but it's more of what's been available that dictates whether or not I am going to get it.

Chinook Salmon Resource Concerns: Size, Abundance, Run Timing, and Health

Interview participants were asked questions regarding any changes they noticed over time in terms of Chinook salmon size, run abundance and timing, and general fish health. Respondents were then asked about general historical timelines of when these changes were noted. Not all key respondents noticed changes to Chinook salmon, or they indicated a healthy Chinook salmon population. Other respondents were very specific about decadal downward shifts in the Chinook salmon population, the size of Chinook salmon having diminished, and potential diseases or parasites.

- It seems to me we have had less smaller ones [Chinook] in bygone years. If we get a lot of small ones, then [the] cannery doesn't want to buy [Chinook] so they come home. Usually smaller ones earlier in the season, then they get bigger and bigger.
- I think the guys up the river [Copper River personal use fisheries] probably think that we are catching them all but we are not. They just aren't there. Just like the salmon last year they thought that we were catching all the big ones and letting the little ones go but that's not the case. They were all small. But it seems like there is usually somebody that wants to blame somebody for everything that goes wrong.
- I have not really noticed [changes to run timing]. I think it's because my time is different every year. Sometimes I miss the main run and go later.
- They [Chinook populations] fluctuate certainly. I noticed a major difference when we quit fishing the inside [of the barrier islands], specifically the area that I fished. It's been closed for 10 years or so. Major impact to me as I don't fish on the inside anymore. I watched my king catch drop sharply 10 years ago. It [run timing] kind of depends on breakup and timing. If it's an early breakup, fish are going up the river. If it's not, you have a build up because of ice blockage. It's more climate driven, or breakup driven. The timing has not gotten earlier from what I can tell.
- They seemed to be smaller last year. It seemed to me that some of the fish we were catching were the hatchery fish from down in the Seattle area, Vancouver Island. Our kings have been down for a few years and I'm hoping they'll come back. I don't normally target them when I'm gillnetting. Some of the guys do and it makes a difference on how our fishing is regulated. If there are no kings we can't fish in certain areas. It puts everyone out in the ocean.
- We have seen a decrease in size and age. And a change in age class structure, too. It's changed over the past 10 [years], but really it's been even more long term than that. There was a switch in the '70s, '80s, I think we had more dominant 6-year-old age class of Chinook salmon. I think that's a smaller component now. We have a much stronger 5-year-old component now, which means smaller fish because they are younger. Since 2009 we have been in a lower king salmon abundance for the Copper River. So, they have been harder to come by. We have a size selective fishery, so no we don't [see more jack Chinook]. Last year [2015], there was a lot of smaller kings. The average weight was down, lower than you'd usually see for the Copper [River]. It's usually around 18- 20-lb average. I think we went down to 16 lb for the commercial fishery, and maybe even 14 lb for specific periods.

- Yes [I] noticed a change in the king size, more recently. We used to have a contest in the commercial fishery for the largest fish … it's uncommon now to catch a king over 50 lb. We always consider the kings done by June 10 but now we have later kings about 35 lb. Probably in the last 10 years [was there a decline in the size of Chinook]. It seems like there is more predation than there used to be, this is very frustrating. Now it's ridiculous the amount of seals. Yes, they impact kings but also silvers in July, August, September. I'd say you are losing 6 out of 10 silvers that hit your net. A huge predation there. We used to go fishing on the 10th of May, so that would have been in the 1960s. Then [fisheries managers] changed it to the 15th of May, but talking to some of the old-timers it used to be as early as the 1st of May. They said that when they first went fishing, early on, it was mostly kings, very few reds. And we noticed that when we would go fishing on the 10th, the reds were really slow in the beginning. But this was when we still had an inside fishery. Inside the barrier islands.
- We don't catch as big a kings as we used to. I mean, I caught a 96-pounder [a] long time ago. I know there were ones over 100 [lb] before that, too. I don't know, it [size decrease] was just a gradual thing. The biggest king I've caught in some years was 77 lb. That was 5 years ago. One of the biggest changes that I've seen is if you weren't out there in early May when I was first started fishing and my dad was fishing, you didn't get the king salmon because the king salmon were in late April to about the 15th of May. But now we're catching them into July.
- I haven't noticed a trend [in size change]. Not in my small sample, I don't think. I do think that the winter kings ran a little smaller this year. I didn't get any real nice fish and I was hearing a lot of people catching 5- 7-lb fish. [The] window that I fish on the Copper River is just so narrow. And the kings are always in the early part of the run. I think by mid-June, even for the commercial fishery, the king component has slowed way down. So, we just target them early and that's when they seem to be there. The winter king fishery seems to run anywhere from September through now [Note: April was when this interview took place]. I haven't seen any change in size of fish. Size can be really variable. They can be from 2 lb to 25. It's kind of a crapshoot. They can be all over that board.
- [Chinook are] definitely smaller … and I think that's reflected in the data. I think we used to average 26, 24 lb and we're down to around 20 to 18 [lb] now. I can only turn to the researchers and to the availability of the stock answers—the availability of food, the migration patterns, the temperature shifts in those patterns. I guess that I understand Chinook, like coho, but probably more so coho, but that last critical year, 10 months, is a time when 20%–30% of the body weight is put on. It's a big ocean out there, and there's a lot happening. So that food availability is I think really geared toward temperature shifts and temperature ranges. That's my understanding of it. But you can tell between the female and the male timings [Note: though respondent indicated no change to overall timing of the migration or spawning]. That pattern still holds true of June—males, females too, but it just seems like that early June king input is more uniform body size, they're bigger, they're rounder. And that has always been my preferred take-home time. Plus, the price is a little bit less. But the price has not been adjusted much on these kings at all. I think it's interesting [that there have not been any changes to Chinook health, parasites, or lesions]. And I think this is an outreach thing that the department could do maybe a little bit better, and others of us that are in the education, but that whole parasite question is often a lot less dramatic than people clue in to, but when you do see something different, you do. But no, particularly on

the kings, no parasitic changes. Sea lice is still evident on the exterior, but once you open them up, even the white corpuscle ones are pretty much the same if you're going to get them. But no, I haven't seen any changes either way.

Conclusion

The interaction between the subsistence and commercial fisheries in Cordova is complex and varied, as many of the interviews with residents attest. The objectives of this project included an analysis of the harvest of Chinook salmon in the subsistence fishery and commercial removals of Chinook salmon for home/personal use, and to identify factors that influence the harvest and use of Chinook salmon in commercial and subsistence fisheries. An extensive and detailed analysis of the qualitative interview data and participant observation notes identified key themes—including use of home pack, access to the fishery, and subsistence salmon needs of Cordova residents—that provided findings for this dynamic and vital fishery in Prince William Sound.

The role of salmon retained from the commercial salmon fishery for personal home use represents an important resource where commercial fishermen can choose which fish to bring home based on preferred species of salmon and the intended use of that species, such as canning or freezing. Chinook salmon, even when highly valued in the commercial industry, still tended to be brought home as an important nutritional and culturally significant resource. Depending on the commercial fisherman, however, some opted to sell all their Chinook salmon because prices for selling this species dictated the economic importance to a household's income. Although an individual commercial fisherman can choose the number of Chinook salmon used for home pack, interview participants, when asked about the 5-fish subsistence Chinook salmon harvest limit, overall expressed that 5 Chinook salmon were enough for a household.

The factors that influence the harvest and use of Chinook salmon seem to be dependent on both the needs of an individual or household, as well as the price of Chinook salmon in the commercial fishery each year. While some commercial fishermen discussed that they used to home pack more Chinook salmon but reduced their take over time to sell more to canneries, others reported that the value of the fish for home use was greater than a strict financial gain. This varied approach appears to ensure that home pack will continue to be a viable means to bring Chinook salmon into a household, balanced with the ongoing sale of fish and necessary economic viability of commercial fishermen in the region.

At the time key respondent interviews occurred, subsistence fishing was strictly tied to the commercial fishing openers. Many of the comments in this chapter regarding opening the subsistence fishery to weekends to allow for more flexible and manageable subsistence opportunities were due to the 2 fisheries being linked in days and times of open seasons. This project used interview data to address the research objectives, and is further supported by Technical Paper No. 412, *Update on the Status of Subsistence Uses in Exxon Valdez Oil Spill (EVOS) Area Communities, 2014* (Fall and Zimpelman 2016). The EVOS report also confirmed that subsistence opportunities were felt to be limited by local residents, who indicated that the current regulations (in 2014) prohibited adequate access to subsistence salmon fishing (Fall and Zimpelman 2016:220). In December 2017, the Board of Fisheries adopted new regulations for the Cordova subsistence fishery (see Chapter 5: Discussion). It remains to be seen if the same concerns expressed in this chapter are retained, or if the interaction between subsistence and commercial salmon fishing will change with time. With increased opportunity for subsistence fishing the role of home pack may change as commercial fishermen may conclude that they have increased opportunity to obtain salmon for home use. Future research will be needed to evaluate if subsistence fishers continue to feel that their opportunities are affected by the commercial fishing industry or the regulatory framework.

5. CONCLUSION

Management Recommendations

This CSRI program study of the Copper River was undertaken to investigate participation in commercial fisheries by residents of Cordova and explore the ways this occupational activity integrates with local subsistence practices. Sound management depends on an understanding of subsistence activities and the way contextual changes, whether environmental, economic or social, have affected those activities over time. Summarized below are management recommendations or implications based on the findings of this study.

Subsistence Regulations

Through key respondent interviews, public testimony[1] through various avenues such as the Alaska Board of Fisheries, and household survey comments, numerous Cordova residents expressed the need for additional subsistence salmon fishing opportunity. Under the regulatory framework in place at the time of the study, openers in the commercial fisheries occurred at the same times as openers in the subsistence fisheries. Because of reasons described in earlier chapters, the overall sentiment in the community was that current fishing regulations were not able to provide ample and safe subsistence opportunities and that managing the fisheries independent of one another is key for improving subsistence fishing opportunity. Specifically, for youth, elders, and those who are limited economically, the "coupled" nature of the 2 distinct fisheries was seen as problematic. As one respondent noted in the previous chapter, "I feel bad for those working in the grocery stores or canneries that don't have boats that could do that. Either they have to eat silvers, which aren't the worst thing in the world, but they don't have access to kings and sockeye." Looking at the harvest data by gear type from household surveys (see Table 3-4) reinforces this insight. For those residents able to participate in the commercial fishery the major species removed from commercial catches is sockeye salmon while coho salmon is the main harvested species for those who participate in rod and reel fisheries. Few coho salmon are retained from commercial fisheries, compared to those harvested by rod and reel, and few sockeye salmon are harvested by rod and reel. Chinook salmon are harvested in moderate amounts in the subsistence net and rod and reel fisheries, as well as retained from commercial harvests, though the latter method accounts for the most Chinook salmon by weight and rod and reel accounts for the least. For residents who need to obtain their fish through federal subsistence regulations or state sport fishing regulations, Chinook and sockeye salmon are not as available to them as coho salmon is.

The quantitative data discussed in this report were collected in 2015 as part of an *Exxon Valdez* oil spill study. Qualitative data in this report were from research conducted in 2014, 2015, and 2016. In December 2017, the Alaska Board of Fisheries convened in Valdez, Alaska, to evaluate proposals to change finfish regulations in the Prince William Sound Area. The board considered Proposal 19[2], which would have allowed salmon to be taken for subsistence purposes at any time between May 1 and November 30 in the Copper River District. Written comments, oral testimony, and board members' statements expressed support for providing more opportunity to subsistence fishers, but concerns were also expressed regarding enforcement, especially regarding preventing fishers from potentially selling subsistence-caught fish. Compromise language was developed and passed unanimously by the board, which allowed for a Saturday opener in the subsistence fishery and a prohibition on subsistence fishing 24 hours prior to the opening of a commercial period. The new regulation was implemented for the subsistence salmon season of 2018. While the new schedule was generally popular in the community, the 2018 commercial season was unusual

1. For further information on the Alaska state Board of Fisheries process, including the role of public testimony, please refer to the ADF&G website section titled, "Alaska's Fisheries and Game Board Process," http://www.adfg.alaska.gov/index.cfm?adfg=process.main (accessed November 2018).
2. ADF&G, Board of Fisheries, "2017–2018 Proposal Book: Proposal 19—5 AAC 01.610. Fishing seasons," http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2017-2018/proposals/PWS.pdf (accessed November 2018).

because of a weak sockeye salmon run and an extended closure of the commercial salmon fishery. A full evaluation of the Saturday openers will need to wait until a time when a more typical commercial fishing season occurs.

Another regulatory discussion may be necessary regarding fishing multiple subsistence permits simultaneously from one boat without all permit holders aboard. The focal harvest area of the marine subsistence fishery in Cordova is on the Copper River Flats, which respondents indicated can be dangerous for smaller boats to access due to variable ocean conditions and not all potential fishers have access to suitable vessels. That, coupled with the high cost of fuel (and the timing of subsistence fishing opportunities, which, until recently, generally happened during the week), increases the importance for residents to have the ability to make each subsistence fishing trip as efficient as possible. One way some fishers increase their efficiency is to fish for multiple permit holders at one time, which local residents refer to as fishing "stacked permits." The fish that are harvested are shared back to the multiple permit holders, regardless of whether they were on the boat, as well as more broadly in the community. This practice is currently not in compliance with regulations for the Prince William Sound Area. State regulations allow for proxy fishing under limited conditions (e.g., the beneficiary must be 65 years of age or older; or legally blind; or at least 70% physically disabled; or developmentally disabled) (AS 16.05.405). Because of these limitations, proxy fishing is not an option for the portion of the population that needs help to procure subsistence fish due to the different reasons stated by research respondents that do not fall under allowable proxy fishing conditions. Changes to the permit system could be considered to better meet the customary and traditional practices of Cordova residents.

Home Pack Estimates

There was consensus among the interviewees that home pack is generally reported. The 2 available data sources for home pack are commercial fish tickets and household surveys. Unfortunately, the time spans for which data are available from these 2 sources do not overlap particularly well. Several years of survey data are available from the late 1980s and early 1990s, but this is before fish ticket data are available. It was not until 1994 that Chinook salmon retained for personal use in the Bering and Copper River districts had to be recorded on commercial fish tickets, and 2008 is when all species of salmon retained for personal use statewide had to be recorded. The survey estimates from 1985–1993 indicate a high number of salmon retained from the commercial fishery for personal use. Fish ticket information is available from 1994 onward. The first 2 years for which fish ticket data are available record lower numbers of Chinook salmon retained for personal use in comparison to the estimated numbers based on household surveys for all the preceding years (1985–1993) (Figure 3-15). For 1997, 2003, and 2014, data are available from both fish tickets and household surveys. In 1997, the estimated Chinook salmon harvested for personal use from commercial catches based on household surveys was nearly 3 times more than the number reported on fish tickets (Figure 3-15). In 2003, the estimated Chinook and sockeye salmon retained from commercial harvests based on household surveys was approximately double what was recorded on fish tickets (Figure 3-15; Figure 3-11). By 2014, survey estimates and fish ticket reports are much more closely aligned, perhaps reflecting the generally accurate fish ticket reporting the study's interviewees claimed. Based on the variable trends in permits fished and home pack harvests provided through Commercial Fisheries Entry Commission and fish ticket data as compared to household surveys, further investigation into home pack retention and reporting is warranted for the different groups fishing out of Cordova. For instance, the commercial gear type of the vessel (seiners or gillnetters) may be correlated with the accuracy of home pack reporting. Additionally, comparing home pack characteristics based on the fisher's actual residency, meaning residency based on the permit holder's physical address, not the address associated with the permit, may illustrate differences between the local and non-local sectors of the fleet. An example of these differences is shown in Appendix D tables D2 through D4. Compared to commercial permits with a Cordova address, there are more permits reporting home pack and the amount of salmon retained is increased when all Prince William Sound Area permit holders are factored in. However, there is not a direct correlation between the increase in permit holders and the increase in salmon retained. In years such as 1996, there was 68% more total permits than the number of permits reporting a Cordova address, but there was only a 45% increase in the amount of

retained fish reported on fish tickets. Furthermore, additional comparison of fish ticket data to household harvest survey data is necessary to determine if the decreased harvest discrepancy between the 2 estimation methods in 2014 represents an anomaly, or an actual increase in accurate reporting of home pack.

Commercial retention of salmon has been, and remains, a vital component of Cordova households' access to salmon, especially Chinook, coho, and sockeye salmon. There are many reasons a household chooses either to retain Chinook salmon from their commercial catch or to sell those Chinook salmon in the commercial market. These reasons may vary from household to household and from year to year. One of the common reasons provided by respondents was that dual commercial/subsistence openers did not provide enough opportunity for commercial fishermen to obtain subsistence-caught fish. Since the 2018 fishing season marked a regulatory change with additional subsistence opportunity provided on Saturdays, when the commercial fishery is closed, there may be less need to retain fish from a fisherman's commercial catch. However, home pack is likely to remain an important source of salmon because retaining commercially caught salmon will continue to be an efficient means of procuring salmon for use in the home. In addition, for some fishers, the added effort of changing out commercial gear for subsistence gear in order to participate in both fisheries will not be worthwhile. Many respondents felt that the 5 Chinook salmon limit was sufficient for their families, with several noting that their children were no longer living at home. Further, if 5 Chinook salmon meet a family's needs, harvesting those 5 Chinook salmon before limiting out on a household's sockeye salmon limit can be challenging.

With the regulatory changes that have occurred, a follow-up study on how Cordova families are meeting their needs and how commercial retention patterns may or may not have changed is necessary. Further regulatory changes may need to be considered if the community continues to express an increased need for subsistence salmon fishing opportunity.

Salmon Resource Concerns

Cordova residents are concerned about Chinook salmon because of this species' value for home use, both nutritionally and culturally, due to their long-held use in households and their overall role as a valuable subsistence food. Concerns about the resource were expressed by respondents, and overall stock health was a focus when discussing the needs of the Cordova subsistence fishery. In general, research participants identified 4 main areas of Chinook salmon concerns related to changes in: 1) fish size, 2) abundance, 3) run timing, and 4) health. To an extent, these concerns may affect home pack practices. Several respondents indicated a shift toward smaller Chinook salmon over time. These smaller fish may be less valuable in the commercial fishery and perhaps more likely to be retained. The changes in abundance, which some respondents indicated fluctuated on decadal patterns, did not seem to affect commercial fishermens' decisions about retaining fish. Ocean conditions influencing the abundance and quality of Chinook salmon food sources, ocean temperatures, and changes in weather and climate, were all expressed as overarching large ecological concerns regarding the resource. Some respondents indicated a shift in migration patterns, seeing Chinook salmon arriving later in the season.

Because of the interconnected nature of commercial and subsistence salmon fishing, changes in the salmon commercial fishery should be noted and analyzed since these changes may also affect the local subsistence fishers. For instance, following the study period, historically low numbers of Copper River sockeye salmon in the 2018 fishing season initiated closures of the commercial, personal use, and subsistence fisheries in various parts of the Prince William Sound Area in both the Copper River Delta and upper Copper River portions of the management area.[3,4,5] For example, the commercial fishery was open for 3 12-hour openers

3. Alaska Department of Fish and Game Division of Commercial Fisheries, "2018 Prince William Sound Salmon Season Summary," news release, October 17, 2018, http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/998411889.pdf (accessed November 2018).
4. Alaska Department of Fish and Game Division of Sport Fish, "Copper River Personal Use Dip Net Salmon Fishing Closed Until Further Notice," news release, July 12, 2018, http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/943498288.pdf (accessed November 2018).
5. Alaska Department of Fish and Game Division of Sport Fish, "Copper River Glennallen Subdistrict Fishery Restricted to Weekly 48-Hour Periods," news release, June 20, 2018, http://www.adfg.alaska.gov/static/

in May before closing for 6 consecutive weeks, with very limited openers occurring after that time. The personal use dip net fishery was closed in the Chitina Subdistrict in June 2018, with sporadic openers and closures based on fish passage past the Miles Lake sonar. Lastly, the Glennallen Subdistrict subsistence fishery was heavily restricted at the end of June 2018 due to low sockeye salmon escapement numbers. Subsistence fishers were restricted to fishing from noon on Fridays until noon on Sundays on June 25 before returning to a 7-days a week schedule on July 8.[6] These examples show the linked nature of the concerns of Cordova residents to general salmon health.

Research Recommendations

The concerns expressed by research participants appear to be shared by a broad group of Southcentral Alaska residents. During the fall 2018 meeting of the federal Southcentral Alaska Subsistence Regional Advisory Council (RAC), members identified several priority research needs for the 2019–2020 years. ADF&G, the federal Office of Subsistence Management (OSM), and the United States Forest Service (USFS) could pursue management and research actions that align with local research requests. A select group of research priorities are listed below:

1. Obtain reliable estimates of Chinook, coho, and sockeye salmon escapement into the Copper River drainage and Copper River Delta systems (for example, projects utilizing weir, sonar, and mark-recapture methods).
2. Develop, test, and implement methods for monitoring salmon spawning escapement in the Copper River drainage (e.g., reliable monitoring and assessment of the quality of escapement based on factors such as age, sex, and size composition of spawners; estimate numbers of spawners reaching, or salmon entering, key/index spawning locations or tributaries of the Copper River; drainage-wide assessment of Chinook salmon spawning locations, run timing, and run strength; and assessment of stock harvest and run timing based on collection of genetic materials from Chitina Subdistrict fisheries).
3. Identify traditional practices for managing and caring for the Copper River fisheries.
4. Explore how regulatory, social, and ecological changes affect Copper River communities.

Exploring research options regarding Chinook and other salmon and management implications as a result of changing regulations offers further insight into the interaction between the subsistence and commercial fisheries of the Cordova area. There is a recognized need to increasingly understand salmon systems, especially in the face of uncertainty. The community of Cordova, as well as the broader region, depends on and benefits from the harvest and sharing of strong salmon fisheries.

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6. Alaska Department of Fish and Game Division of Sport Fish, "Copper River Glennallen Subdistrict Subsistence Fishing Restored to 7-Days A Week," news release, July 3, 2018, http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/932593140.pdf (accessed December 2018).

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APPENDIX A–SURVEY INSTRUMENT (CORDOVA, 2014)

COMPREHENSIVE SUBSISTENCE SURVEY

EVOS

CORDOVA, ALASKA

From January 1, 2014 to December 31, 2014

printed: 2015-01-23

This survey is used to estimate wild food harvests and to describe rural community economies. We will publish a short summary report, that will be available to community members. We share this information with the Alaska Department of Fish and Game. We work with the Federal Regional Advisory Councils and with local Fish and Game Advisory Committees to better manage wild food resources.

We will NOT identify your household. We will NOT use this information for enforcement. Participation in this survey is voluntary. Even if you agree to be surveyed, you may stop at any time.

HOUSEHOLD ID:		
COMMUNITY ID:	104	104
NVE MEMBER:		
INTERVIEWER #1:		
INTERVIEWER #2:		
INTERVIEW DATE:		
START TIME:		
STOP TIME:		
DATA CODED BY:		
DATA ENTERED BY:		
SUPERVISOR:		

Photo by Davin Holen

COOPERATING ORGANIZATIONS

ALASKA DEPARTMENT OF FISH AND GAME
333 RASPBERRY ROAD
ANCHORAGE, AK 99518
907-267-2353

NATIVE VILLAGE OF EYAK
110 NICHOLOFF WAY
CORDOVA, AK 99574
907-424-7738

DIVISION OF PUBLIC HEALTH AND SOCIAL SERVICES
3601 C STREET, SUITE 540
ANCHORAGE, AK 99503
907-269-8000

HOUSEHOLD MEMBERS

HOUSEHOLD ID

First, I would like to ask about the people in your household, permanent members of your household who live in your house. This includes students who return home every summer. I am NOT interested in people who lived with you temporarily, even if they stayed several months.

Last year, that is, between January 1, 2014 and December 31, 2014 WHO were the head or heads of your household?

Is this person answering questions on this survey?		How is this person related to HEAD 1?	Is this person MALE or FEMALE?	Is this person an ALASKA NATIVE?	How OLD is this person?	Where were parents living when this person was born?	How many years has this person lived in Cordova?
ID #	*(circle)*	*(relation)*	*(circle)*	*(circle)*	*(years)*	*(AK city or state)*	*(number)*
HEAD 1	Y N		M F	Y N			
1							
NEXT enter spouse or partner. If a household has a SINGLE HEAD, leave HEAD 2 row BLANK and move to PERSON 3.							
HEAD 2	Y N		M F	Y N			
2							
BELOW, enter children (oldest to youngest), grandchildren, grandparents, or anyone else living full-time in this household.							
PERSON 03	Y N		M F	Y N			
3							
PERSON 04	Y N		M F	Y N			
4							
PERSON 05	Y N		M F	Y N			
5							
PERSON 06	Y N		M F	Y N			
6							
PERSON 07	Y N		M F	Y N			
7							
PERSON 08	Y N		M F	Y N			
8							
PERSON 09	Y N		M F	Y N			
9							
PERSON 10	Y N		M F	Y N			
10							
PERSON 11	Y N		M F	Y N			
11							
PERSON 12	Y N		M F	Y N			
12							
PERSON 13	Y N		M F	Y N			
13							

PERMANENT HH MEMBERS: 01 **CORDOVA: 104**

HOUSEHOLD PARTICIPATION

HOUSEHOLD ID

To continue our questions about people in your household, I would like to ask a few questions about participation in subsistence activities…

Between January 1, 2014 and December 31, 2014

Did this person ….

PERSON ID#	FISH		LARGE LAND MAMMALS		SMALL LAND MAMMALS		MARINE MAMMALS		BIRDS AND EGGS		PLANTS / BERRIES / WOOD	
FROM PAGE 2	FISH FOR	PROCESS	HUNT	PROCESS	HUNT / TRAP	PROCESS	HUNT	PROCESS	HUNT / GATHER	PROCESS	GATHER	PROCESS
ID #	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*
HEAD 1	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
1												
HEAD 2	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
2												
PERSON 03	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
3												
PERSON 04	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4												
PERSON 05	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5												
PERSON 06	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
6												
PERSON 07	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
7												
PERSON 08	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
8												
PERSON 09	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
9												
PERSON 10	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
10												
PERSON 11	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
11												
PERSON 12	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
12												
PERSON 13	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
13												

PERMANENT HH MEMBERS: 01 **CORDOVA: 104**

RETAINED COMMERCIAL HARVESTS: SALMON

HOUSEHOLD ID

1. Do you or members of your household USUALLY participate in commercial SALMON fishing? ..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household PARTICIPATE in a commercial SALMON fishery? ..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

During the last year,[1] did you or members of your household...

A … FISH commercially for _____?

B … KEEP any ____ from your commercial catch for your own use[2] or to share?

C Was the ____ that you kept INCIDENTAL[4] catch?

if keep is "yes"

Please estimate how many fish ALL MEMBERS OF YOUR HOUSEHOLD removed from commercial harvests for personal use during the last year.

Include COMMERCIALLY HARVESTED fish that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If helping others, report ONLY THIS HOUSEHOLD'S share.

Read names below in blanks above	A COMM FISH?	B KEEP?	C INCI?	How many were removed for your OWN USE?[5]	How many were removed for your CREW?[5]	How many were removed to give to OTHERS?	Units[3]	
				number	*number*	*number*	*specify*	*comments*
CHINOOK (KING) SALMON	Y N	Y N	Y N				IND.	
113000001								
CHUM (DOG) SALMON	Y N	Y N	Y N				IND.	
111000001								
SOCKEYE (RED) SALMON	Y N	Y N	Y N				IND.	
115000001								
PINK SALMON (HUMPIES)	Y N	Y N	Y N				IND.	
114000001								
COHO SALMON (SILVERS)	Y N	Y N	Y N				IND.	
112000001								
UNKNOWN SALMON	Y N	Y N	Y N				IND.	
119000001								
	Y N	Y N	Y N					
	Y N	Y N	Y N					
	Y N	Y N	Y N					

1 *"LAST YEAR" means between January 1, 2014 and December 31, 2014.*

2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*

3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

4 *"INCIDENTAL CATCH" means the fish kept was not being commercially fished. For example, a king salmon kept from a chum commerical fishery.*

5 *Double counting (captains' removals for crew members and crew members' removal for own uses) is fixed in analysis. Collect both.*

COMMERCIAL FISHING: 03 **CORDOVA: 104**

RETAINED COMMERCIAL HARVESTS: OTHER FISH

HOUSEHOLD ID

1. Do you or members of your household USUALLY participate in a commercial fishery for OTHER FISH?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household PARTICIPATE in a commercial fishery for OTHER FISH?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

During the last year,[1] did you or members of your household...

A … FISH commercially for _____?

B … KEEP any ____ from your commercial catch for your own use[2] or to share?

C Was the ____ that you kept INCIDENTAL[4] catch?

if keep is "yes"

Please estimate how many fish ALL MEMBERS OF YOUR HOUSEHOLD removed from commercial harvests for personal use during the last year.

Include COMMERCIALLY HARVESTED fish that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If helping others, report ONLY THIS HOUSEHOLD'S share.

Read names below in blanks above	A COMM FISH?	B KEEP?	C INCI?	How many were removed for your OWN USE?[5]	How many were removed for your CREW?[5]	How many were removed to give to OTHERS?	Units[3]	
				number	*number*	*number*	*specify*	*comments*
HERRING	Y N	Y N	Y N				GAL.	
120200001								
HERRING SPAWN ON KELP	Y N	Y N	Y N				GAL.	
120306001								
HERRING SAC ROE	Y N	Y N	Y N				GAL.	
120304001								
STURGEON	Y N	Y N	Y N				IND.	
125800001								
LINGCOD	Y N	Y N	Y N				IND.	
121606001								
PACIFIC COD (GRAY)	Y N	Y N	Y N				IND.	
121004001								
SABLEFISH (BLACK COD)	Y N	Y N	Y N				IND.	
122800001								
UNKNOWN FLOUNDER	Y N	Y N	Y N				IND.	
121499001								
UNKNOWN SOLE	Y N	Y N	Y N				IND.	
123699001								
HALIBUT	Y N	Y N	Y N				LB.	
121800001								

1 *"LAST YEAR" means between January 1, 2014 and December 31, 2014.*

2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*

3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

4 *"INCIDENTAL CATCH" means the fish kept was not being commercially fished. For example, a king salmon kept from a chum commerical fishery.*

5 *Double counting (captains' removals for crew members and crew members' removal for own uses) is fixed in analysis. Collect both.*

RETAINED COMMERCIAL HARVESTS: OTHER FISH

HOUSEHOLD ID

…. CONTINUED from previous page

During the last year,[1]
did you or members of your household...

A … FISH commercially for _____?
B … KEEP any ____ from your commercial catch for your own use[2] or to share?
C Was the ____ that you kept INCIDENTAL[4] catch?

if keep is "yes"

Please estimate how many fish ALL MEMBERS OF YOUR HOUSEHOLD removed from commercial harvests for personal use during the last year.
Include COMMERCIALLY HARVESTED fish that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If helping others, report ONLY THIS HOUSEHOLD'S share.

Read names below in blanks above	A COMM FISH?	B KEEP?	C INCI?	How many were removed for your OWN USE?[5] *number*	How many were removed for your CREW?[5] *number*	How many were removed to give to OTHERS? *number*	Units[3] *specify*	*comments*
BLACK ROCKFISH *(BLACK BASS)*	Y N	Y N	Y N				IND.	
122602001								
RED ROCKFISH	Y N	Y N	Y N				IND.	
122604001								
UNKNOWN ROCKFISH	Y N	Y N	Y N				IND.	
122699001								
GREENLING (POGIES)	Y N	Y N	Y N				IND.	
121600001								
SHARK	Y N	Y N	Y N				IND.	
123299001								
WALLEYE POLLOCK *(WHITING)*	Y N	Y N	Y N				IND.	
121012001								
SCULPIN	Y N	Y N	Y N				IND.	
123000001								
DOLLY VARDEN	Y N	Y N	Y N				IND.	
125006001								
	Y N	Y N	Y N					
	Y N	Y N	Y N					
	Y N	Y N	Y N					

1 *"LAST YEAR" means between January 1, 2014 and December 31, 2014.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*
4 *"INCIDENTAL CATCH" means the fish kept was not being commercially fished. For example, a king salmon kept from a chum commerical fishery.*
5 *Double counting (captains' removals for crew members and crew members' removal for own uses) is fixed in analysis. Collect both.*

RETAINED COMMERCIAL HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID

1. Do you or members of your household USUALLY participate in a commercial fishery for MARINE INVERTEBRATES? Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household PARTICIPATE in a commercial fishery for MARINE INVERTEBRATES? ..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page ...

During the last year,[1] did you or members of your household...

A ... FISH commercially for _____?

B ... KEEP any ____ from your commercial catch for your own use[2] or to share?

C Was the ____ that you kept INCIDENTAL[4] catch?

if keep is "yes"

Please estimate how many fish ALL MEMBERS OF YOUR HOUSEHOLD removed from commercial harvests for personal use during the last year.

Include COMMERCIALLY HARVESTED fish that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If helping others, report ONLY THIS HOUSEHOLD'S share.

Read names below in blanks above	A COMM FISH?	B KEEP?	C INCI?	How many were removed for your OWN USE?[5] *number*	How many were removed for your CREW?[5] *number*	How many were removed to give to OTHERS? *number*	Units[3] *specify*	*comments*
RAZOR CLAMS	Y N	Y N	Y N				GAL.	
500612001								
PACIFIC LITTLENECK CLAMS *(STEAMERS)*	Y N	Y N	Y N				GAL.	
500608001								
DUNGENESS CRAB	Y N	Y N	Y N				IND.	
501004001								
KING CRAB	Y N	Y N	Y N				IND.	
501008991								
TANNER CRAB	Y N	Y N	Y N				IND.	
501012991								
OCTOPUS	Y N	Y N	Y N				IND.	
502200001								
SHRIMP	Y N	Y N	Y N				LB.	
503400001								
	Y N	Y N	Y N					
	Y N	Y N	Y N					
	Y N	Y N	Y N					

1 *"LAST YEAR" means between January 1, 2014 and December 31, 2014.*

2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*

3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

4 *"INCIDENTAL CATCH" means the fish kept was not being commercially fished. For example, a king salmon kept from a chum commerical fishery.*

5 *Double counting (captains' removals for crew members and crew members' removal for own uses) is fixed in analysis. Collect both.*

HARVESTS: SALMON

HOUSEHOLD ID

1. Do you or members of your household USUALLY fish for salmon ?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014)
did you, or members of your household USE or TRY TO HARVEST salmon?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page ...

Please estimate how many salmon ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014, including with a rod and reel. INCLUDE salmon you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with others, report ONLY YOUR SHARE of the catch. Do not include fish caught and released.

	In 2014 did members of your household ...					In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST WITH						# of those used just for dog food?
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	SET GILL NET	SEINE NET	FISH WHEEL	ROD & REEL	OTHER GEAR (specify type)	UNITS	
Read names below	(circle)					(number harvested by each gear type)				amount / type	specify	amt.
CHINOOK (KING) SALMON	Y N	Y N	Y N	Y N	Y N					/	IND.	
113000000												
CHUM (DOG) SALMON	Y N	Y N	Y N	Y N	Y N					/	IND.	
111000000												
SOCKEYE (RED) SALMON	Y N	Y N	Y N	Y N	Y N					/	IND.	
115000000												
PINK SALMON (HUMPIES)	Y N	Y N	Y N	Y N	Y N					/	IND.	
114000000												
COHO SALMON (SILVERS)	Y N	Y N	Y N	Y N	Y N					/	IND.	
112000000												
LANDLOCKED SALMON	Y N	Y N	Y N	Y N	Y N					/	IND.	
116000000												
UNKNOWN SALMON	Y N	Y N	Y N	Y N	Y N					/	IND.	
119000000												

These columns should include ALL the salmon HARVESTED by members of this household in 2014.

ASSESSMENTS: SALMON 110000000

Between January 1, 2014 and December 31, 2014…

To conclude our salmon section, I am going to ask a few general questions about salmon.

Last year…

… did your household use LESS, SAME, or MORE salmon than in recent years? …….. X L S M

IF LESS or MORE … X = do not use

WHY was your use different? _____ 1

_____ 2

Last year…

…did your household GET ENOUGH salmon?..... Y N

If NO…

What KIND of salmon did you need? _____

How would you describe the impact to your household of not getting enough salmon last year?

… not noticable?	… minor ?	… major?	… Severe?
(0)	(1)	(2)	(3)

SALMON: 04 **CORDOVA: 104**

FISHERY PARTICIPATION — HOUSEHOLD ID

SALMON

If the houshold harvested salmon in the previous section, continue this section. If the household did not harvest salmon go to the PARTICIPATION questions below…

Last year, did your household get a subsistence salmon permit?.....		Y N	
If YES …how many members of your household were listed on the permit?	*(# HH Members)*		
…were there other people outside of your household listed on the permit?		Y N	
…if yes how many people besides those in your household were listed on the permit?	*(# outside HH)*		
…did you share your net with another household?		Y N	
... if yes how many other households?	*(# Other HH)*		
If NO …were you listed on another household's permit?.....		Y N	
Does your household own a net for harvesting salmon?		Y N	
Does your houshold own a boat?		Y N	
If YES what size?	*(boat size in feet)*		
Is your boat used for commercial fishing?		Y N	

PARTICIPATION IN FISHERIES AND COMMUNITY

Does a member of your household participate in the commercial fishery? Y N

If YES, continue this section

Is a member of your household.. *1. Permit holder* *2. Crew* *3. Both*

How much of your household income comes from commercial fishing?

0%	*1-25%*	*26-50%*	*50-75%*	*76-100%*
(0)	*(1)*	*(2)*	*(3)*	*(4)*

Do you usually retain Chinook salmon for home use? Y N

Do you usually retain sockeye salmon for home use? Y N

If you retain salmon for home use, do you still usually participate in subsistence fishing? Y N

(Usually is the past 5 years)

COMMUNITY AND ECONOMY

In your opinion, what are the reasons you continue to live in Cordova? List most important reason first.

1 _____

2 _____

3 _____

Do you plan on leaving in the future? Y N

If so why? _____

Do you consider commercial fishing to be important for the economy of Cordova? Y N

Not Important ☐ *(0)* Somewhat Important ☐ *(1)* Very Important ☐ *(2)*

HARVESTS: OTHER FISH

HOUSEHOLD ID

1. Do you or members of your household USUALLY fish for other fish?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household USE or TRY TO HARVEST other fish?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many other fish ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014, including with a rod and reel. INCLUDE other fish you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with others, report ONLY YOUR SHARE of the catch. Do not include fish caught and released.

	In 2014 did members of your household …					In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST WITH ….						# of those used just for dog food?
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	SET GILL NET	SEINE NET	FISH WHEEL	ROD & REEL	OTHER GEAR (specify type)	UNITS	
Read names below	(circle)					(number harvested by each gear type)				amount / type	specify	amt.
HERRING	Y N	Y N	Y N	Y N	Y N					/	GAL.	
120200000												
HERRING ROE	Y N	Y N	Y N	Y N	Y N					/	GAL.	
120300000												
EULACHON (HOOLIGAN)	Y N	Y N	Y N	Y N	Y N					/	GAL.	
120404000												
UNKNOWN SMELT	Y N	Y N	Y N	Y N	Y N					/	GAL.	
120499000												
SABLEFISH (BLACK COD)	Y N	Y N	Y N	Y N	Y N					/	IND.	
122800000												
PACIFIC COD (GRAY)	Y N	Y N	Y N	Y N	Y N					/	IND.	
121004000												
LINGCOD	Y N	Y N	Y N	Y N	Y N					/	IND.	
121606000												
PACIFIC TOM COD	Y N	Y N	Y N	Y N	Y N					/	IND.	
121008000												
STARRY FLOUNDER	Y N	Y N	Y N	Y N	Y N					/	IND.	
121406000												
SOLE	Y N	Y N	Y N	Y N	Y N					/	IND.	
123699000												
HALIBUT	Y N	Y N	Y N	Y N	Y N					/	LB.	
121800000												
BLACK ROCKFISH	Y N	Y N	Y N	Y N	Y N					/	IND.	
122602000												

These columns should include ALL the other fish HARVESTED by members of this household in 2014.

HARVESTS: OTHER FISH

HOUSEHOLD ID

…continued from previous page

Read names below	In 2014 did members of your household … USE? (circle)	TRY TO HARVEST? (circle)	HARVEST? (circle)	RECEIVE? (circle)	GIVE AWAY? (circle)	In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST WITH …. SET GILL NET (number harvested by each gear type)	SEINE NET	FISH WHEEL	ROD & REEL	OTHER GEAR (specify type) amount / type	UNITS specify	# of those used just for dog food? amt.
UNKNOWN ROCKFISH	Y N	Y N	Y N	Y N	Y N					/	IND.	
122699000												
GREENLING (POGIES)	Y N	Y N	Y N	Y N	Y N					/	IND.	
121600000												
WALLEYE POLLOCK *(WHITING)*	Y N	Y N	Y N	Y N	Y N					/	IND.	
121012000												
SHARK	Y N	Y N	Y N	Y N	Y N					/	IND.	
123299000												
SKATES	Y N	Y N	Y N	Y N	Y N					/	IND.	
123400000												
DOLLY VARDEN	Y N	Y N	Y N	Y N	Y N					/	IND.	
125006000												
LAKE TROUT	Y N	Y N	Y N	Y N	Y N					/	IND.	
125010000												
RAINBOW TROUT	Y N	Y N	Y N	Y N	Y N					/	IND.	
126204000												
STEELHEAD	Y N	Y N	Y N	Y N	Y N					/	IND.	
126206000												
CUTTHROAT TROUT	Y N	Y N	Y N	Y N	Y N					/	IND.	
126202000												
SEA BASS	Y N	Y N	Y N	Y N	Y N					/	IND.	
120602000												
WOLF EEL (WOLF FISH)	Y N	Y N	Y N	Y N	Y N					/	IND.	
124200000												
GRAYLING	Y N	Y N	Y N	Y N	Y N					/	IND.	
125200000												
PIKE	Y N	Y N	Y N	Y N	Y N					/	IND.	
125500000												

These columns should include ALL the other fish HARVESTED by members of this household in 2014.

OTHER FISH: 06 **CORDOVA: 104**

HARVESTS: OTHER FISH

HOUSEHOLD ID

…continued from previous page

Read names below	In 2014 did memers of your household … USE? (circle)	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST WITH …. SET GILL NET (number harvested by each gear type)	SEINE NET	FISH WHEEL	ROD & REEL	OTHER GEAR (specify type) amount / type	UNITS specify	# of those used just for dog food? amt.
WHITEFISH	Y N	Y N	Y N	Y N	Y N					/	IND.	
126499000												
IRISH LORD	Y N	Y N	Y N	Y N	Y N					/	IND.	
123006000												
UNKNOWN SCULPIN	Y N	Y N	Y N	Y N	Y N					/	IND.	
123099000												
EEL	Y N	Y N	Y N	Y N	Y N					/	IND.	
121200000												
	Y N	Y N	Y N	Y N	Y N					/		
	Y N	Y N	Y N	Y N	Y N					/		

These columns should include ALL the other fish HARVESTED by members of this household in 2014.

ASSESSMENTS: OTHER FISH 120000000

Between January 1, 2014 and December 31, 2014…

To conclude our other fish section, I am going to ask a few general questions about other fish.

Last year…

… *did your household use LESS, SAME, or MORE other fish than in recent years?* …….. X L S M

IF LESS or MORE … X = do not use

WHY was your use different? _____ 1

_____ 2

Last year…

…did your household GET ENOUGH other fish?..... Y N

If NO…

What KIND of other fish did you need? _____

How would you describe the impact to your household of not getting enough other fish last year? *… not noticable? (0)* *… minor ? (1)* *… major? (2)* *… Severe? (3)*

Think back to about ten years ago (2004). Would you say that *HALIBUT* available to harvest in this area are less, the same, or more than ten year ago? L S M

If not the same, why? _____ 1

_____ 2

Think back to about ten years ago (2004). Would you say that *HERRING* available to harvest in this area are less, the same, or more than ten year ago? L S M

If not the same, why? _____ 1

_____ 2

Do you think *HERRING* from your traditional harvest areas are safe for you to eat? Y N

If NOT safe, why? _____ 1

_____ 2

OTHER FISH: 06 **CORDOVA: 104**

HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID

1. Do you or members of your household USUALLY attempt to harvest marine invertebrates?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household USE or TRY TO HARVEST marine invertebrates?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many marine invertebrates ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014. INCLUDE marine invertebrates you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If harvesting with others, report ONLY YOUR SHARE of the harvest.

	In 2014 did members of your household …					In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST….		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	AMOUNT	UNITS	COMMENTS
Read names below	*(circle)*					*(amt)*	*specify*	*(text)*
BUTTER CLAMS	Y N	Y N	Y N	Y N	Y N		GAL.	
500602000								
RAZOR CLAMS	Y N	Y N	Y N	Y N	Y N		GAL.	
500612000								
LITTLENECK CLAMS	Y N	Y N	Y N	Y N	Y N		GAL.	
500608000								
PINKNECK (SURF) CLAMS	Y N	Y N	Y N	Y N	Y N		GAL.	
500610000								
HORSE CLAMS (GAPER)	Y N	Y N	Y N	Y N	Y N		GAL.	
500606000								
UNKNOWN CLAMS	Y N	Y N	Y N	Y N	Y N		GAL.	
500699000								
DUNGENESS CRAB	Y N	Y N	Y N	Y N	Y N		IND.	
501004000								
KING CRAB	Y N	Y N	Y N	Y N	Y N		IND.	
501008000								
TANNER CRAB, BAIRDI *(SNOW CRAB)*	Y N	Y N	Y N	Y N	Y N		IND.	
501012020								
UNKNOWN CRABS	Y N	Y N	Y N	Y N	Y N		IND.	
501099000								
COCKLES	Y N	Y N	Y N	Y N	Y N		GAL.	
500899000								
WEATHERVANE SCALLOPS	Y N	Y N	Y N	Y N	Y N		GAL.	
502602000								

Include ALL the marine invertebrates HARVESTED by members of this household in 2014.

MARINE INVERTEBRATES: 08 **CORDOVA: 104**

HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID

…continued from previous page

Read names below	In 2014 did memers of your household … USE? (circle)	TRY TO HARVEST? (circle)	HARVEST? (circle)	RECEIVE? (circle)	GIVE AWAY? (circle)	In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST…. AMOUNT (amt)	UNITS specify	COMMENTS (text)
MUSSELS	Y N	Y N	Y N	Y N	Y N		GAL.	
502099000								
BLACK BIDARKIS (CHITONS)	Y N	Y N	Y N	Y N	Y N		GAL.	
500408000								
RED (LARGE) BIDARKIS	Y N	Y N	Y N	Y N	Y N		GAL.	
500404000								
SEA URCHIN	Y N	Y N	Y N	Y N	Y N		GAL.	
503200000								
SHRIMP	Y N	Y N	Y N	Y N	Y N		LBS.	
503400000								
OCTOPUS	Y N	Y N	Y N	Y N	Y N		IND.	
502200000								
SNAILS	Y N	Y N	Y N	Y N	Y N		GAL.	
503600000								
LIMPETS	Y N	Y N	Y N	Y N	Y N		GAL.	
501800000								
SEA CUCUMBER	Y N	Y N	Y N	Y N	Y N		GAL.	
503099000								
WHELK	Y N	Y N	Y N	Y N	Y N		GAL.	
504000000								
	Y N	Y N	Y N	Y N	Y N			
	Y N	Y N	Y N	Y N	Y N			
	Y N	Y N	Y N	Y N	Y N			
	Y N	Y N	Y N	Y N	Y N			

Include ALL the marine invertebrates HARVESTED by members of this household in 2014.

MARINE INVERTEBRATES: 08 **CORDOVA: 104**

HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID

…continued from previous page

Read names below	In 2014 did memers of your household … USE? (circle)	TRY TO HARVEST? (circle)	HARVEST? (circle)	RECEIVE? (circle)	GIVE AWAY? (circle)	In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST…. AMOUNT (amt)	UNITS specify	COMMENTS (text)
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	

Include ALL the marine invertebrates HARVESTED by members of this household in 2014.

ASSESSMENTS: MARINE INVERTEBRATES 500000000

Between January 1, 2014 and December 31, 2014…

To conclude our marine invertebrates section, I am going to ask a few general questions about marine invertebrates.

Last year…

… did your household use LESS, SAME, or MORE marine invertebrates than in recent years? …… X L S M

IF LESS or MORE … X = do not use

WHY was your use different? _____ 1

_____ 2

Last year…

…did your household GET ENOUGH marine invertebrates?..... Y N

If NO…

What KIND of marine invertebrates did you need? _____

How would you describe the impact to your household of not getting enough marine invertebrates last year? *… not noticable? (0)* *… minor ? (1)* *… major? (2)* *… Severe? (3)*

Think back to about ten years ago (2004). Would you say that *BIDARKIES (CHITONS)* available to harvest in this area are less, the same, or more than ten year ago? L S M

If not the same, why? _____ 1

_____ 2

Do you think the *BIDARKIES (CHITONS)* from your traditional harvest areas are safe to eat?..... Y N

If NOT safe, why? _____ 1

_____ 2

Think back to about ten years ago (2004). Would you say that *CLAMS* available to harvest in this area are less, the same, or more than ten year ago? L S M

If not the same, why? _____ 1

_____ 2

Do you think the *CLAMS* from your traditional harvest areas are safe to eat?..... Y N

If NOT safe, why? _____ 1

_____ 2

MARINE INVERTEBRATES: 08 **CORDOVA: 104**

HARVESTS: LARGE LAND MAMMALS

HOUSEHOLD ID

1. Do you or members of your household USUALLY hunt for large land mammals?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014)
did you, or members of your household USE or TRY TO HARVEST large land mammals?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many large land mammals ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014. INCLUDE large land mammals you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the harvest.

	In 2014 did members of your household …					In 2014 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST….												
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS
Read names below	(circle)					M/F	(specify amount harvested per month)													(specify)
MOOSE	Y N	Y N	Y N	Y N	Y N	M														IND
						F														IND
211800000						Unk														IND
211800001						1														
211800002						2														
211800009						-9														
CARIBOU	Y N	Y N	Y N	Y N	Y N	M														IND
						F														IND
211000000						Unk														IND
211000001						1														
211000002						2														
211000009						-9														
BLACK BEAR	Y N	Y N	Y N	Y N	Y N															IND
210600000						1														
DEER	Y N	Y N	Y N	Y N	Y N															IND
211200000						1														
MOUNTAIN GOAT	Y N	Y N	Y N	Y N	Y N															IND
211600000						1														
DALL SHEEP	Y N	Y N	Y N	Y N	Y N															IND
212200000						1														

Include ALL the large land mammals HARVESTED by members of this household in 2014.

ASSESSMENTS: LARGE LAND MAMMALS 210000000

Between January 1, 2014 and December 31, 2014…

To conclude our large land mammals section, I am going to ask a few general questions about large land mammals.

Last year…

… *did your household use LESS, SAME, or MORE large land mammals than in recent years?* ..... X L S M

IF LESS or MORE …

WHY was your use different? _____ 1

_____ 2

X = do not use

Last year…

…did your household GET ENOUGH large land mammals?..... Y N

If NO…

What KIND of large land mammals did you need? _____

How would you describe the impact to your household of not getting enough large land mammals last year?

… not noticable?	… minor ?	… major?	… Severe?
(0)	(1)	(2)	(3)

LARGE LAND MAMMALS: 10 **CORDOVA: 104**

HARVESTS: SMALL LAND MAMMALS

HOUSEHOLD ID

1. Do you or members of your household USUALLY hunt or trap for small land mammals?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household USE or TRY TO HARVEST small land mammals?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many small land mammals ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014. INCLUDE small land mammals you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting or trapping with others, report ONLY YOUR SHARE of the harvest.

Read names below	In 2014 did members of your household …					In 2014 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST….													
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	HOW MANY _____ WERE USED FOR FUR ONLY?	UNITS
	(circle)					*(specify amount harvested per month)*													*(amount)*	*(specify)*
PORCUPINE	Y N	Y N	Y N	Y N	Y N															IND.
222600000																				
RED FOX	Y N	Y N	Y N	Y N	Y N															IND.
220804000																				
BEAVER	Y N	Y N	Y N	Y N	Y N															IND.
220200000																				
MUSKRAT	Y N	Y N	Y N	Y N	Y N															IND.
222400000																				
SNOWSHOE HARE	Y N	Y N	Y N	Y N	Y N															IND.
221004000																				
RIVER OTTER	Y N	Y N	Y N	Y N	Y N															IND.
221200000																				
MINK	Y N	Y N	Y N	Y N	Y N															IND.
222200000																				
WEASEL	Y N	Y N	Y N	Y N	Y N															IND.
223000000																				
MARTEN	Y N	Y N	Y N	Y N	Y N															IND.
222000000																				
LYNX	Y N	Y N	Y N	Y N	Y N															IND.
221600000																				
COYOTE	Y N	Y N	Y N	Y N	Y N															IND.
220400000																				
WOLF	Y N	Y N	Y N	Y N	Y N															IND.
223200000																				

Include ALL the small land mammals HARVESTED by members of this household in 2014.

SMALL LAND MAMMALS: 14 **CORDOVA: 104**

HARVESTS: SMALL LAND MAMMALS

HOUSEHOLD ID

…continued from previous page

Read names below	In 2014 did members of your household … USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	In 2014 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST…. JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	HOW MANY _____ WERE USED FOR FUR ONLY? (amount)	UNITS (specify)
	(circle)					(specify amount harvested per month)														
WOLVERINE	Y N	Y N	Y N	Y N	Y N															IND.
223400000																				
TREE SQUIRREL	Y N	Y N	Y N	Y N	Y N															IND.
222804000																				
PARKA SQUIRREL (GROUND)	Y N	Y N	Y N	Y N	Y N															IND.
222802000																				
	Y N	Y N	Y N	Y N	Y N															
	Y N	Y N	Y N	Y N	Y N															
	Y N	Y N	Y N	Y N	Y N															
	Y N	Y N	Y N	Y N	Y N															
	Y N	Y N	Y N	Y N	Y N															

Include ALL the small land mammals HARVESTED by members of this household in 2014.

ASSESSMENTS: SMALL LAND MAMMALS 220000000

Between January 1, 2014 and December 31, 2014…

To conclude our small land mammals section, I am going to ask a few general questions about small land mammals.

Last year…

… did your household use LESS, SAME, or MORE small land mammals than in recent years? …… X L S M

IF LESS or MORE …

X = do not use

WHY was your use different? _____ 1

_____ 2

Last year…

…did your household GET ENOUGH small land mammals?…… Y N

If NO…

What KIND of small land mammals did you need? _____

How would you describe the impact to your household of not getting enough small land mammals last year?

… not noticable? (0) *… minor ?* (1) *… major?* (2) *… Severe?* (3)

SMALL LAND MAMMALS: 14 **CORDOVA: 104**

HARVESTS: MARINE MAMMALS

HOUSEHOLD ID

1. Do you or members of your household USUALLY hunt for marine mammals ?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household USE or TRY TO HARVEST marine mammals?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many marine mammals ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014. INCLUDE marine mammals you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the harvest.

Read names below	In 2014 did members of your household … USE? (circle)	TRY TO HARVEST? (circle)	HARVEST? (circle)	RECEIVE? (circle)	GIVE AWAY? (circle)	SEX M/F	In 2014 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST…. JANUARY (specify amount harvested per month)	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS (specify)
HARBOR SEAL	Y N	Y N	Y N	Y N	Y N	M														IND
						F														IND
300806000						Unk														IND
300806001						1														
300806002						2														
300806009						-9														
SEA LION	Y N	Y N	Y N	Y N	Y N	M														IND
						F														IND
301200000						Unk														IND
301200001						1														
301200002						2														
301200009						-9														
SEA OTTER	Y N	Y N	Y N	Y N	Y N															IND
301000000						1														
	Y N	Y N	Y N	Y N	Y N															
						1														
	Y N	Y N	Y N	Y N	Y N															
						1														
	Y N	Y N	Y N	Y N	Y N															
						1														

Include ALL the marine mammals HARVESTED by members of this household in 2014.

HARVESTS: MARINE MAMMALS

HOUSEHOLD ID

ASSESSMENTS: MARINE MAMMALS 300000000

Between January 1, 2014 and December 31, 2014…

To conclude our marine mammals section, I am going to ask a few general questions about marine mammals.

Last year…

… *did your household use LESS, SAME, or MORE marine mammals than in recent years?* …… X L S M

IF LESS or MORE … X = do not use

WHY was your use different? _____ 1

_____ 2

Last year…

…did your household GET ENOUGH marine mammals?..... Y N

If NO…

What KIND of marine mammals did you need? _____

How would you describe the impact to your household of not getting enough marine mammals last year?

… not noticable?	… minor ?	… major?	… Severe?
(0)	(1)	(2)	(3)

Think back to about ten years ago (2004). Would you say that *HARBOR SEALS* available to harvest in this area are less, the same, or more than ten year ago? L S M

If not the same, why? _____ 1

_____ 2

Do you think the *HARBOR SEALS* from your traditional harvest areas are safe to eat?..... Y N

If NOT safe, why? _____ 1

_____ 2

MARINE MAMMALS: 12 **CORDOVA: 104**

HARVESTS: DUCKS

HOUSEHOLD ID

1. Do you or members of your household USUALLY hunt for ducks?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household USE or TRY TO HARVEST ducks?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many ducks ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014. INCLUDE ducks you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the harvest.

	In 2014 did members of your household …					In 2014 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST….					
						WINTER	SPRING	SUMMER	FALL		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	JANUARY FEBRUARY MARCH APRIL	MAY JUNE	JULY AUGUST SEPTEMBER	OCTOBER NOVEMBER DECEMBER	UNKNOWN SEASON	UNITS
Read names below	*(circle)*					*(specify amount harvested per season)*					*(specify)*
WIGEON	Y N	Y N	Y N	Y N	Y N						IND.
410236020											
TEAL	Y N	Y N	Y N	Y N	Y N						IND.
410232990											
MALLARD	Y N	Y N	Y N	Y N	Y N						IND.
410214000											
NORTHERN PINTAIL	Y N	Y N	Y N	Y N	Y N						IND.
410220000											
SHOVELER	Y N	Y N	Y N	Y N	Y N						IND.
410230000											
BLACK SCOTER	Y N	Y N	Y N	Y N	Y N						IND.
410228020											
SURF SCOTER	Y N	Y N	Y N	Y N	Y N						IND.
410228040											
WHITE-WINGED SCOTER	Y N	Y N	Y N	Y N	Y N						IND.
410228060											
BUFFLEHEAD	Y N	Y N	Y N	Y N	Y N						IND.
410202000											
GOLDENEYE	Y N	Y N	Y N	Y N	Y N						IND.
410210000											
SCAUP (BLUEBILL)	Y N	Y N	Y N	Y N	Y N						IND.
410226990											
EIDER (UNKNOWN/SPECIFY)	Y N	Y N	Y N	Y N	Y N						IND.
410206990											

Include ALL the ducks HARVESTED by members of this household in 2014.

DUCKS: 15 **CORDOVA: 104**

HARVESTS: DUCKS AND GEESE

HOUSEHOLD ID

…continued from previous page

	In 2014 did members of your household …					In 2014 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST….					
						WINTER	SPRING	SUMMER	FALL		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	JANUARY FEBRUARY MARCH APRIL	MAY JUNE	JULY AUGUST SEPTEMBER	OCTOBER NOVEMBER DECEMBER	UNKNOWN SEASON	UNITS
Read names below	*(circle)*					*(specify amount harvested per season)*					*(specify)*
HARLEQUIN DUCK	Y N	Y N	Y N	Y N	Y N						IND.
410210990											
LONG-TAILED DUCK (OLDSQUAW)	Y N	Y N	Y N	Y N	Y N						IND.
410218000											
MERGANSER	Y N	Y N	Y N	Y N	Y N						IND.
410216000											
CANADA GOOSE	Y N	Y N	Y N	Y N	Y N						IND.
410404990											
WHITE-FRONTED GEESE	Y N	Y N	Y N	Y N	Y N						IND.
410410000											
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						

Include ALL the ducks HARVESTED by members of this household in 2014.

HARVESTS: OTHER BIRDS

HOUSEHOLD ID

1. Do you or members of your household USUALLY hunt for other birds?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household USE or TRY TO HARVEST other birds?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many other birds ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014. INCLUDE other birds you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the harvest.

Read names below	In 2014 did members of your household … USE? (circle)	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	In 2014 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST…. WINTER: JANUARY FEBRUARY MARCH APRIL (specify amount harvested per season)	SPRING: MAY JUNE	SUMMER: JULY AUGUST SEPTEMBER	FALL: OCTOBER NOVEMBER DECEMBER	UNKNOWN SEASON	UNITS (specify)
CRANE	Y N	Y N	Y N	Y N	Y N						IND.
410802000											
GROUSE (UNKNOWN/SPECIFY)	Y N	Y N	Y N	Y N	Y N						IND.
421802990											
CORMORANTS	Y N	Y N	Y N	Y N	Y N						IND.
411204000											
MURRE	Y N	Y N	Y N	Y N	Y N						IND.
411218000											
PUFFIN	Y N	Y N	Y N	Y N	Y N						IND.
411222990											
GULL (UNKNOWN/SPECIFY)	Y N	Y N	Y N	Y N	Y N						IND.
411212990											
BLACK LEGGED KITTIWAKE	Y N	Y N	Y N	Y N	Y N						IND.
411214020											
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						
	Y N	Y N	Y N	Y N	Y N						

Include ALL the other birds HARVESTED by members of this household in 2014.

OTHER BIRDS: 15 **CORDOVA: 104**

HARVESTS: BIRD EGGS

HOUSEHOLD ID

1. Do you or members of your household USUALLY try to harvest bird eggs ?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household USE or TRY TO HARVEST bird eggs?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many bird eggs ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014. INCLUDE bird eggs you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If harvesting with others, report ONLY YOUR SHARE of the harvest.

	In 2014 did members of your household …					In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST….		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	AMOUNT	UNITS	COMMENTS
Read names below	(circle)					(amt)	specify	(text)
DUCK EGGS (UNKNOWN/SPECIFY)	Y N	Y N	Y N	Y N	Y N		IND.	
430299000								
GOOSE EGGS (UNKNOWN/SPECIFY)	Y N	Y N	Y N	Y N	Y N		IND.	
430499000								
GULL EGGS (UNKNOWN/SPECIFY)	Y N	Y N	Y N	Y N	Y N		IND.	
431212990								
TERN EGGS	Y N	Y N	Y N	Y N	Y N		IND.	
431226000								
BLACK OYSTERCATCHER EGGS	Y N	Y N	Y N	Y N	Y N		IND.	
431004000								
OTHER EGGS (SPECIFY)	Y N	Y N	Y N	Y N	Y N		IND.	
439900000								
	Y N	Y N	Y N	Y N	Y N			

Include ALL the bird eggs HARVESTED by members of this household in 2014.

ASSESSMENTS: BIRDS AND EGGS

400000000

Between January 1, 2014 and December 31, 2014…

To conclude our birds and eggs section, I am going to ask a few general questions about birds and eggs.

Last year…

… did your household use LESS, SAME, or MORE birds and eggs than in recent years? ..... X L S M

IF LESS or MORE … X = do not use

WHY was your use different? _____ 1

_____ 2

Last year…

…did your household GET ENOUGH birds and eggs?..... Y N

If NO…

What KIND of birds and eggs did you need? _____

How would you describe the impact to your household of not getting enough birds and eggs last year?

… not noticable?	… minor ?	… major?	… Severe?
(0)	(1)	(2)	(3)

Think back to about ten years ago (2004). *Would you say that SEA DUCKS available to harvest in this area are less, the same, or more than ten year ago?* L S M

If not the same, why? _____ 1

_____ 2

BIRD EGGS: 08 **CORDOVA: 104**

HARVESTS: PLANTS AND BERRIES

HOUSEHOLD ID

1. Do you or members of your household USUALLY try to harvest plants and berries?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014)
did you, or members of your household USE or TRY TO HARVEST plants and berries?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many plants and berries ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014. INCLUDE plants and berries you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If harvesting with others, report ONLY YOUR SHARE of the harvest.

	In 2014 did members of your household …					In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST….		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	AMOUNT	UNITS	COMMENTS
Read names below	(circle)					(amt)	specify	(text)
BLUEBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
601002000								
HIGH BUSH CRANBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
601006000								
LOW BUSH CRANBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
601004000								
SALMONBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
601022000								
WILD CELERY	Y N	Y N	Y N	Y N	Y N		GAL.	
602032000								
SPRUCE TIPS	Y N	Y N	Y N	Y N	Y N		GAL.	
602030000								
WILD ROSE HIPS	Y N	Y N	Y N	Y N	Y N		GAL.	
602036000								
GOOSEBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
601010000								
NAGOONBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
601018000								
STRAWBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
601026000								
BEACH ASPARAGUS	Y N	Y N	Y N	Y N	Y N		GAL.	
602002000								
HUDSON BAY TEA	Y N	Y N	Y N	Y N	Y N		GAL.	
602018000								

Include ALL the plants and berries HARVESTED by members of this household in 2014.

PLANTS AND BERRIES: 17 **CORDOVA: 104**

HARVESTS: PLANTS AND BERRIES

HOUSEHOLD ID

…continued from previous page

Read names below	In 2014 did members of your household … USE? (circle)	TRY TO HARVEST? (circle)	HARVEST? (circle)	RECEIVE? (circle)	GIVE AWAY? (circle)	In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST…. AMOUNT (amt)	UNITS specify	COMMENTS (text)
FIDDLEHEAD FERNS	Y N	Y N	Y N	Y N	Y N		GAL.	
602014000								
DEVILS CLUB	Y N	Y N	Y N	Y N	Y N		GAL.	
602012000								
WILD PARSLEY	Y N	Y N	Y N	Y N	Y N		GAL.	
602034000								
SOURDOCK	Y N	Y N	Y N	Y N	Y N		GAL.	
602028000								
MUSHROOMS	Y N	Y N	Y N	Y N	Y N		GAL.	
602040000								
OTHER WILD GREENS	Y N	Y N	Y N	Y N	Y N		GAL.	
602038000								
	Y N	Y N	Y N	Y N	Y N		GAL.	

	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?
FIREWOOD	Y N	Y N	Y N	Y N	Y N
604000000					

Include ALL the plants and berries HARVESTED by members of this household in 2014.

Please estimate the percentage of your household's heating needs in 2014 that came from firewood.

0%	1% - 25%	26% - 50%	51% - 75%	76% - 99%	100%
(0)	(1)	(2)	(3)	(4)	(5)

(circle one)

ASSESSMENTS: PLANTS AND BERRIES 600000000

Between January 1, 2014 and December 31, 2014…

To conclude our plants and berries section, I am going to ask a few general questions about plants and berries.

Last year…

… did your household use LESS, SAME, or MORE plants and berries than in recent years? …… X L S M

IF LESS or MORE …

X = do not use

WHY was your use different? _____ 1

_____ 2

Last year…

…did your household GET ENOUGH plants and berries?…… Y N

If NO…

What KIND of plants and berries did you need? _____

How would you describe the impact to your household of not getting enough plants and berries last year?

… not noticable?	*… minor ?*	*… major?*	*… Severe?*
(0)	*(1)*	*(2)*	*(3)*

PLANTS AND BERRIES: 17 **CORDOVA: 104**

HARVESTS: SEAWEED

HOUSEHOLD ID

1. Do you or members of your household USUALLY try to harvest seaweed?..... Y N

2. During the last year (between January 1, 2014 and December 31, 2014) did you, or members of your household USE or TRY TO HARVEST seaweed?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer is *YES*, continue on this page …

Please estimate how many seaweed ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2014. INCLUDE seaweed you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If harvesting with others, report ONLY YOUR SHARE of the harvest.

	In 2014 did members of your household …					In 2014 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST….		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	AMOUNT	UNITS	COMMENTS
Read names below	(circle)					(amt)	specify	(text)
BLACK SEAWEED	Y N	Y N	Y N	Y N	Y N		GAL.	
603002000								
BULL KELP	Y N	Y N	Y N	Y N	Y N		GAL.	
603004000								
RED SEAWEED	Y N	Y N	Y N	Y N	Y N		GAL.	
603006000								
SEA RIBBONS	Y N	Y N	Y N	Y N	Y N		GAL.	
603008000								
GIANT KELP (MACROCYSTIS)	Y N	Y N	Y N	Y N	Y N		GAL.	
603010000								
ALARIA	Y N	Y N	Y N	Y N	Y N		GAL.	
603012000								
UNKNOWN SEAWEED	Y N	Y N	Y N	Y N	Y N		GAL.	
603099000								

Include ALL the seaweed HARVESTED by members of this household in 2014.

ASSESSMENTS: SEAWEED 603000000

Between January 1, 2014 and December 31, 2014…

To conclude our seaweed section, I am going to ask a few general questions about seaweed.

Last year…

… *did your household use LESS, SAME, or MORE seaweed than in recent years?* ……. X L S M

IF LESS or MORE …

X = do not use

WHY was your use different? _____ 1

_____ 2

Last year…

…did your household GET ENOUGH seaweed?..... Y N

If NO…

What KIND of seaweed did you need? _____

How would you describe the impact to your household of not getting enough seaweed last year?

… not noticable?	… minor ?	… major?	… Severe?
(0)	(1)	(2)	(3)

SEAWEED: 17 **CORDOVA: 104**

HARVEST SUMMARY: ALL RESOURCES

HOUSEHOLD ID

ASSESSMENTS: ALL RESOURCES 0

To conclude our subsistence harvests section, I am going to ask a few general questions about wild resources.

During the last year,[1]

… did your household use LESS, SAME, or MORE wild resources than in recent years? …… X L S M

IF LESS or MORE … X = do not use

WHY was your use different? _____ 1

_____ 2

During the last year,[1]

…did your household GET ENOUGH wild resources?..... Y N

If NO…

What KIND of wild resources did you need? _____

How would you describe the impact to your household of not getting enough wild resources last year? ……

… not noticable?	… minor ?	… major?	… Severe?
(0)	(1)	(2)	(3)

Are there any subsistence foods from your traditional areas that you are concerned about eating? ..... Y N

If YES, whay are the species and why are you concerned? _____

_____

_____

_____

HEALTH IMPACT ASSESSMENTS

We know things change throughout the year, but in general, over the whole year, how often are wild foods such as fish, game, birds, berries, and other wild resources served in your household?

(circle ONE response)

None, don't use (0)	less than once per week (1)	1 - 3 times per week (2)	4 - 6 times per week (3)	once per day (4)	2 times per day (5)	3 or more times per day (6)

If this household does NOT USE wild foods, go to the next page

Otherwise, continue below…

Please list the most important wild foods that are used in your household each year. Include wild foods that may not be available now, but are important at other times of the year. Please list most important wild foods first.

(Not necessary to fill out every line)

	Wild Food 1	Wild Food 2	Wild Food 3	Wild Food 4	Wild Food 5
TOP FIVE WILD FOODS					

If your household cannot get or runs short of wild foods, what do members of your household eat instead? These can be foods from the store or garden, such as: meat, grains, prepared foods, or fruits and vegetables. Please list your most important alternative foods first.

(Not necessary to fill out every line)

	Other Food	Other Food	Other Food	Other Food	Other Food
OTHER FOODS[2] (1 TO 5)					
OTHER FOODS[2] (6 TO 10)					

1 *"LAST YEAR" means between January 1, 2014 and December 31, 2014.*

2 *For "OTHER FOODS", we are not interested in condiments or staples, such as sugar, flour, coffee, or butter etc... We are interested in foods used in place of traditional foods for meals or snacks. This includes foods substituted by personal preference or out of necessity (traditional food not available).*

ASSESSMENTS OF ALL RESOURCES: 66 **CORDOVA: 104**

SUBSISTENCE OBSERVATIONS

RECOVERY

In your view have subsistence resources recovered since the oil spill[1]? Y N

If NO, what do you think should be done to help in the recovery of subsistence resources?

1 _____

2 _____

_____

_____

_____

SUBSISTENCE SKILLS

Do you think that young adults are learning enough hunting, fishing, and processing skills? Y N

If YES, how are they learning these skills?

1 _____

2 _____

_____

_____

_____

If NO, why? 1 _____

2 _____

_____

_____

_____

ELDERS

Over the last ten years, do you think the influence of elders in teaching subsistence skills and values in the community has decreased, stayed the same, or increased?

Don't Use	*Decreased*	*Stayed the same*	*Increased*	*Don't Know*
(0)	*(1)*	*(2)*	*(3)*	*(-8)*

If not the same, why?

1 _____

2 _____

_____

_____

_____

SUBSISTENCE WAY OF LIFE

Do you think the traditional way of life was affected by the oil spill[1]? Y N

If YES, in your view has the traditional way of life recovered since the oil spill[1]? Y N

If NOT recovered, what do you think is needed to help the traditional way of life recover?
[Consider spill and non-spill factors]

1 _____

2 _____

_____

_____

_____

1 Exxon Valdez oil spill in Prince William Sound on March 24, 1989

ASSESSMENTS CORDOVA: 104

FOOD SECURITY

HOUSEHOLD ID

The questions on this page have been asked all over the United States to find out if Americans have enough to eat. We would like to know if people in your community have enough to eat. I'd like you to think about all your household's food, both wild food and store-bought...

Which of these three statements best describes the food eaten in your household in the last 12 months...

(Circle one)

	STATEMENT 1. We had enough of the kinds of food we wanted to eat……	1	2	3	HH1
❷	**STATEMENT 2**. We had enough food, but not always the KIND of food we wanted to eat……				
❸	**STATEMENT 3**. Sometimes, or often, we did **NOT HAVE ENOUGH** food to eat……				If 2 or 3

If STATEMENT 2 or STATEMENT 3 was TRUE, continue with food security questions on this page. Otherwise, go to next section…

Now I am going to read you several statements about different food situations.
Please tell me whether EACH statement was true for your household (HH) in the last 12 months.

❹ **STATEMENT 4. We WORRIED that our household would run out of food before we could get more.** HH2

In the last 12 months, was this ever true for your household?..... Y N ?

If YES…

…in which months did this happen?..... J F M A M J J A S O N D

…did this happen because your household couldn't get WILD FOOD,
your HH couldn't get STORE-BOUGHT food, or your HH couldn't get BOTH KINDS of food?..... WILD STOR BOTH

❺ **STATEMENT 5. We could not get the kinds of foods we wanted to eat because of a LACK OF RESOURCES** HH4

By "lack of resources," we mean your household did NOT have what you needed to hunt, fish, gather, OR did not have enough money to buy food.

In the last 12 months, was this ever true for your household?..... Y N ?

If YES…

…in which months did this happen?..... J F M A M J J A S O N D

…did this happen because your household couldn't get WILD FOOD,
your HH couldn't get STORE-BOUGHT food, or your HH couldn't get BOTH KINDS of food?..... WILD STOR BOTH

❻ **STATEMENT 6. The food we had JUST DID NOT LAST, and we could not get more.** HH3

In the last 12 months, was this ever true for your household?..... Y N ?

If YES…

…in which months did this happen?..... J F M A M J J A S O N D

Now, think just about your household's WILD FOOD…

STATEMENT 7. The SUBSISTENCE food we had JUST DID NOT LAST, and we could not get more.

In the last 12 months, was this ever true for your household?..... Y N ?

If YES…

…in which months did this happen?..... J F M A M J J A S O N D

Now, think just about your household's STORE-BOUGHT food…

STATEMENT 8. The STORE-BOUGHT food we had JUST DID NOT LAST, and we could not get more.

In the last 12 months, was this ever true for your household?..... Y N ?

If YES…

…in which months did this happen?..... J F M A M J J A S O N D

If any ONE of the STATEMENTS 4, 5, OR 6 was "YES," continue with food security questions on next page. Otherwise, go to next section…

FOOD SECURITY

HOUSEHOLD ID

If any ONE of the STATEMENTS 4, 5, or 6 on previous page was "YES," continue with food security questions below. Otherwise, go to next section…

In the past 12 months, did you or other adults in your household ever CUT THE SIZE OF YOUR MEALS OR SKIP MEALS because the HH could not get the food that was needed? …… Y N ? AD1

If YES…

…in which months did this happen?..... J F M A M J J A S O N D

In the last 12 months, did you or other adults in your household ever EAT LESS THAN YOU FELT YOU SHOULD because the HH could not get the food that was needed?..... Y N ? AD2

In the last 12 months, were adults in the HH ever HUNGRY BUT DID NOT EAT because there was not enough food?..... Y N ? AD3

In the last 12 months, did adults in the HH LOSE WEIGHT because there was not enough food?..... Y N ? AD4

In the last 12 months, were adults in the HH ever NOT EAT FOR A WHOLE DAY because there was not enough food?..... Y N ? AD5

If YES…

…in which months did this happen?..... J F M A M J J A S O N D

EMPLOYMENT

HOUSEHOLD ID

The next few pages ask about jobs and income. We ask about these things because we are trying to understand all parts of the community economy. Many people use wages from jobs to support subsistence activities.

Between January 1, 2014 and December 31, 2014 ...

…Did any members of your household earn money from a JOB or from SELF EMPLOYMENT?..... Y N

Starting with the first head of your household, what job or jobs did he or she have last year?

For each member of this household born before 1999, list EACH JOB held last year. For household members who did not have a job, write: RETIRED, UNEMPLOYED, STUDENT, HOMEMAKER, DISABLED, etc..

			INCLUDE EACH PERSON 16 YEARS AND OLDER EVEN IF THEY DID NOT HAVE A JOB				WORK SCHEDULE[2]					
			Person code from page 2	What kind of work did he or she do in this job?	For whom did he or she work in this job?	In the past year, what months did he or she work in this job?	FULL TIME	PART TIME	SHIFT - FULL TIME	ON-CALL, VARIES	SHIFT - PART TIME	In the past year how much did he or she earn in this job?
			(ID #)	*(job title [1])*	*(employer)*	*(circle each month worked)*	*(circle one)*					*gross income [3]*
	1ST JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
1	6	910100000		*SOC:*	*SIC:*		*schedule:*					
	2ND JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
2	6	910100000		*SOC:*	*SIC:*		*schedule:*					
	3RD JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
3	6	910100000		*SOC:*	*SIC:*		*schedule:*					
	4TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
4	6	910100000		*SOC:*	*SIC:*		*schedule:*					
	5TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
5	6	910100000		*SOC:*	*SIC:*		*schedule:*					
	6TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
6	6	910100000		*SOC:*	*SIC:*		*schedule:*					
	7TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
7	6	910100000		*SOC:*	*SIC:*		*schedule:*					
	8TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
8	6	910100000		*SOC:*	*SIC:*		*schedule:*					
	9TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
9	6	910100000		*SOC:*	*SIC:*		*schedule:*					
	10TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / YR
10	6	910100000		*SOC:*	*SIC:*		*schedule:*					

If a person FISHES COMMERCIALLY or is otherwise SELF-EMPLOYED, list that as a separate job. For job title, enter COMMERCIAL FISHER, CARVER, SEWER, BAKER, etc. Work schedule usually will be ON CALL. For gross income from self-employment, enter revenue MINUS expenses.

If a person does not earn money from any kind of work, enter RETIRED, UNEMPLOYED, DISABLED, STUDENT, or HOMEMAKER or other appropriate description as the job title.

Leave employer, months worked, schedule, and gross income blank.

WORK SCHEDULE

FT *- Fulltime (35+ hr/wk)*
PT *- Parttime (<35 hr/wk)*
SF *- Shift (2wks on/2wks off, etc.)*
SP *- Shift - part time*
OC *- Irregular, on call*
-- -Unemployed

GROSS INCOME is the same as TAXABLE INCOME on a W-2 form. Self-employment, enter revenue - expense

EMPLOYMENT: 23 **CORDOVA: 104**

OTHER INCOME

HOUSEHOLD ID

Between January 1, 2014 and December 31, 2014 ...

…Did any members of your household receive a dividend from the Permanent Fund or a native corporation?..... Y N

IF NO, go to the next section on this page

IF YES, continue below…

		Did anyone in your household receive income from _____ in 2014 (circle one)		TOTAL amount all members of your household received from _____ in 2014 (dollars)	
DIVIDENDS	ALASKA PERMANENT FUND DIVIDEND	Y	N	$	/ YR
	32				
	NATIVE CORPORATION DIVIDENDS	Y	N	$	/ YR
	13				

Alaska PFD IN 2014	
1	*PFD = $1,884*
2	*PFDs = $3,768*
3	*PFDs = $5,652*
4	*PFDs = $7,536*
5	*PFDs = $9,420*
6	*PFDs = $11,304*
7	*PFDs = $13,188*
8	*PFDs = $15,072*
9	*PFDs = $16,956*
10	*PFDs = $18,840*
11	*PFDs = $20,724*

Regional corporations	*Dividend*

Village Corporation(s)	*Dividend*

Between January 1, 2014 and December 31, 2014 ...

…Did any members of your household receive OTHER income such as SENIOR BENEFITS or UNEMPLOYMENT?..... Y N

IF NO, go to the next section on this page

IF YES, continue below…

		Received? (circle one)		Total amount? (dollars)	
EMPLOYMENT RELATED	UNEMPLOYMENT	Y	N	$	/ YR
	12				
	WORKERS' COMP	Y	N	$	/ YR
	8				
	SOCIAL SECURITY	Y	N	$	/ YR
	7				
	PENSION & RETIREMENT	Y	N	$	/ YR
	5				
	DISABILITY	Y	N	$	/ YR
	31				
	VETERANS ASSISTANCE	Y	N	$	/ YR
	35				
ENTITLEMENTS	FOOD STAMPS (QUEST CARD)	Y	N	$	/ YR
	11				
	ADULT PUBLIC ASSISTANCE	Y	N	$	/ YR
	3				
	SUPPLIMENTAL SECURITY INCOME (SSI)	Y	N	$	/ YR
	10				
STATE BENEFIT	ENERGY ASSISTANCE	Y	N	$	/ YR
	9				
	ALASKA SENIOR BENEFITS (LONGEVITY)	Y	N	$	/ YR
	6				

		Received? (circle one)		Total amount? (dollars)	
FAMILY & CHILD	TANF (say "tanif", used to be AFDC)	Y	N	$	/ YR
	2				
	CHILD SUPPORT	Y	N	$	/ YR
	15				
	FOSTER CARE	Y	N	$	/ YR
	41				
OTHER	FUEL VOUCHERS	Y	N	$	/ YR
	49				
	MEETING HONORARIA *(not per diem*)*	Y	N	$	/ YR
	50				
	OTHER (describe)	Y	N	$	/ YR
	OTHER (describe)	Y	N	$	/ YR

* per diem covers travel expenses, and is not counted as income.

Scratch paper for calculations

for _____ *weeks =*
for _____ *weeks =*

for _____ *weeks =*
for _____ *weeks =*

Senior Benefits of $125 per month for 12 months = $1,500 per elder
Senior Benefits of $175 per month for 12 months = $2,100 per elder
Senior Benefits of $250 per month for 12 months = $3,000 per elder

OTHER INCOME: 24 **CORDOVA: 104**

COMMENTS

HOUSEHOLD ID

DO YOU HAVE ANY QUESTIONS, COMMENTS OR CONCERNS?

INTERVIEW SUMMARY: **DON'T FORGET TO FILL IN THE STOP TIME** _____

COMMENTS: 300 **CORDOVA: 104**

APPENDIX B–KEY RESPONDENT INTERVIEW PROTOCOL

Copper River Chinook Salmon Project

Demographic:

Date _____

Interviewee _____

Age _____

Place of Birth _____

Current Residence and #of Yrs_____,

PWS salmon fisheries and # of Yrs

_____,

_____,

Interviewee Initials _____

General:

What do king salmon mean to you and your household?

What changes have you noticed in local king salmon over time? (fish size, run timing, abundance, fish health)

- If any, when did you first start to notice these changes?

Interviewee Initials _____ 2

What do you think are the main stressors on Copper River king salmon?

To what extent do you think marine mammals are impacting Copper River king salmon and have you noticed changes in this over time?

Have you noticed significant changes in local feeder fish populations (herring, hooligan) over time and do you think this has impacted Copper River king salmon? Please explain.

Interviewee Initials _____ 3

What percentage of king salmon homepack do you think is actually reported?

- Why?

- (If not 100%) What changes do you think could be made to increase the accuracy of reporting homepack?

- How do winter kings compare to spring kings in terms of their contribution to meeting your household's subsistence needs?

- How many king salmon does your household need for a year?

Interviewee Initials _____ 4

Have you ever caught or heard of someone catching a sturgeon in the flats? **Y** or **N**

If yes, do you know if it was a green or white sturgeon?

Which sockeye salmon are you harvesting in the Copper River District?

Interviewee Initials _____ 5

Commercial Specific:

Which PWS districts do you commercial fish in for salmon (Copper vs Bering River districts)?

- Are there specific locations within these districts where you seem to catch more kings? [map]

- Do you recall where you caught king salmon with commercial gear in 2015?

How does commercial fishing enhance or limit your access to king salmon for home use?

Interviewee Initials _____ 6

What do you think are the benefits/limitations of dual openers?

Do you retain or receive king salmon from homepack? **Yes or No** [If **NO** skip to bottom of page 8]

- [If **Yes**] Why?

- [If **Yes**] Do you take all of your kings as homepack? **Yes or No**
    - What determines whether you keep them or not?

- [If **Yes**] Do you share those with other households? **Yes or No**
    - [If **Yes**] Are those you share with dependent on you for king salmon?

- [If **Yes**] Does incidental king homepack meet your household needs? **Yes or No**

- [If **No**] Do you sell them or make an effort to release them?
  -If released, why and how? Thoughts on mortality rate?

[**SKIP** TO PAGE 11 Additional Thoughts]

Subsistence Specific:

Where do you subsistence salmon fish? [map]

What do you think are the benefits/limitations of dual openers?

Do you set or driftnet subsistence fish?

Do you own your own net? Boat?

Are there specific locations where you catch more kings?

How accessible is the subsistence fishery to Cordova residents?

Do the current king salmon subsistence limits (5) meet your household needs?

Interviewee Initials _____ 10

To what extent does your household depend on sport-caught king salmon to meet your household needs?

Additional Thoughts:

Interviewee Initials _____ 11

APPENDIX C–CONVERSION FACTORS, CORDOVA, 2014

Conversion factors: Cordova

Resource name	Reported units	Conversion factor
Chum salmon	Individual	5.6388
Chum salmon [CF retention]	Individual	5.6388
Coho salmon	Individual	6.0600
Coho salmon	Pounds	1.0000
Coho salmon [CF retention]	Individual	6.0600
Chinook salmon	Individual	12.7368
Chinook salmon [CF retention]	Individual	12.7368
Pink salmon	Individual	2.4601
Pink salmon [CF retention]	Individual	2.4601
Sockeye salmon	Individual	4.3882
Sockeye salmon [CF retention]	Individual	4.3882
Sockeye salmon [CF retention]	Pounds	1.0000
Landlocked salmon	Individual	1.5000
Unknown salmon	Individual	5.6035
Unknown salmon	Pounds	1.0000
Unknown salmon [CF retention]	Individual	5.6035
Unknown salmon [CF retention]	Pounds	1.0000

APPENDIX D–SUPPLEMENTAL TABLES

Appendix Table D-1.– Composition of estimated per capita salmon harvest, Cordova, 1985, 1988, 1991–1993, 1997, 2003, and 2014.

Year	1985	1988	1991	1992	1993	1997	2003	2014
Chinook salmon	24%	22%	25%	25%	26%	36%	27%	19%
Chum salmon	3%	5%	2%	0%	1%	4%	2%	1%
Coho salmon	46%	54%	51%	51%	40%	31%	40%	36%
Landlocked salmon	0%	0%	0%	0%	0%	0%	0%	0%
Pink salmon	3%	3%	2%	2%	1%	3%	2%	1%
Sockeye salmon	24%	16%	20%	23%	32%	27%	30%	43%
Unknown salmon	0%	0%	1%	0%	1%	0%	0%	0%

Source ADF&G Division of Subsistence, Community Subsistence Information System (CSIS) (http://www.adfg.alaska.gov/sb/CSIS/) for household survey data for 1985–2003; Fall and Zimpelman (2016) for household survey data for 2014.

Appendix Table D-2.– Comparison of commercial fish ticket reports of commercial retention for home use and estimated subsistence harvest survey retention of salmon kept for home use, Cordova, 1985–2014.

Year	Permits reporting retention for home use	Number of salmon											
		Chinook		Sockeye		Coho		Chum		Pink		Total	
		Fish ticket	CSIS	Fish ticket	CSIS	Fish ticket	CSIS	Fish ticket	CSIS	Fish ticket	CSIS	Fish ticket	CSIS
1985	–	–	1,393	–	6,337	–	3,619	–	480	–	629	–	12,458
1986	–	–	–	–	–	–	–	–	–	–	–	–	–
1987	–	–	–	–	–	–	–	–	–	–	–	–	–
1988	–	–	1,371	–	4,313	–	1,468	–	1,147	–	697	–	8,996
1989	–	–	–	–	–	–	–	–	–	–	–	–	–
1990	–	–	–	–	–	–	–	–	–	–	–	–	–
1991	–	–	2,391	–	6,660	–	4,083	–	515	–	1,110	–	14,759
1992	–	–	2,295	–	7,075	–	3,499	–	0	–	688	–	13,557
1993	–	–	1,383	–	9,778	–	2,292	–	291	–	136	–	13,880
1994[a]	113	505	–	661	–	4	–	–	–	–	–	1,170	–
1995	193	1,111	–	–	–	–	–	–	–	–	–	1,111	–
1996	207	1,515	–	–	–	–	–	–	–	–	–	1,515	–
1997	156	749	2,551	–	6,571	–	1,987	–	918	–	831	749	12,858
1998	184	949	–	695	–	–	–	4	–	–	–	1,648	–
1999	180	748	–	781	–	14	–	–	–	–	–	1,543	–
2000	3	12	–		–	–	–	–	–	–	–	12	–
2001	110	404	–	641	–	25	–	–	–	–	–	1,070	–
2002	149	499	–	529	–	144	–	5	–	–	–	1,177	–
2003	181	681	1,119	2,814	5,947	–	1,644	–	100	–	339	3,495	9,148
2004	111	322	–	299	–	–	–	–	–	–	–	621	–
2005	131	503	–	690	–	51	–	–	–	20	–	1,264	–
2006	151	504	–	749	–	78	–	–	–	–	–	1,331	–
2007	167	685	–	1,352	–	158	–	39	–	33	–	2,267	–
2008[b]	139	390	–	953	–	228	–	3	–	9	–	1,583	–
2009	193	624	–	3,975	–	315	–	31	–	4	–	4,949	–
2010	195	668	–	4,669	–	499	–	59	–	6	–	5,901	–
2011	190	890	–	5,484	–	202	–	2	–	10	–	6,588	–
2012	205	625	–	5,524	–	627	–	60	–	929	–	7,765	–
2013	194	392	–	5,000	–	136	–	43	–	19	–	5,590	–
2014	213	490	790	7,140	7,072	728	1,073	24	136	1	170	8,383	9,241

Source AlDF&G Division of Commercial Fisheries, OceanAK for commercial fish ticket data; ADF&G Division of Subsistence, Community Subsistence Information System (CSIS) (http://www.adfg.alaska.gov/sb/CSIS/) for household survey data.

Note Cells containing "–" indicate data are not available.

a. This is the first year that Chinook salmon retained for personal use in the Bering and Copper River districts had to be recorded on fish tickets

b. This is the first year that all salmon retained for personal use statewide had to be recorded on fish tickets.

Appendix Table D-3.– Number of permits reporting retention of salmon and number of salmon retained from commercial catch for personal use, all permit holders, Prince William Sound Area, 1994–2014.

Year	Number of permits[a]	Number of salmon harvested					
		Chinook	Sockeye	Coho	Pink	Chum	Total
1994	198	768	991	21	–	14	1,794
1995	321	1,700	–	–	–	–	1,700
1996	348	2,200	–	–	–	–	2,200
1997	284	1,246	–	–	–	–	1,246
1998	319	1,436	1,482	32	4	6	2,960
1999	303	1,123	1,414	151	1	68	2,757
2000	250	742	702	2	–	9	1,455
2001	301	946	2,177	44	–	2	3,169
2002	257	784	1,194	187	–	26	2,191
2003	296	1,099	4,100	–	–	1	5,200
2004	177	540	654	2	–	1	1,197
2005	237	767	1,897	226	21	27	2,938
2006	269	781	1,598	166	10	5	2,560
2007	290	1,029	2,087	353	43	102	3,614
2008	241	615	2,421	449	53	14	3,552
2009	335	876	6,528	767	61	67	8,299
2010	364	957	8,183	1,168	21	152	10,481
2011	370	1,346	10,091	1,152	82	184	12,855
2012	435	940	10,805	1,298	3,629	1,295	17,967
2013	393	657	10,810	313	248	81	12,109
2014	430	823	13,687	1,480	191	131	16,312
2015	408	1,193	12,973	1,523	169	147	16,005
2016	381	776	11,519	1,699	721	64	14,779
2017	451	829	11,721	2,625	921	239	16,335
2018	414	183	6,293	3,970	1,511	335	12,292
Total	**660**	**24,356**	**123,327**	**17,628**	**7,686**	**2,970**	**175,967**

Source ADF&G Division of Commercial Fisheries, OceanAK for commercial fish ticket data.

Note Cells containing "–" indicate data are not available.

a. Number of commercial salmon permits that reported any salmon retention for home use.

Appendix Table D-4.– Number of permits reporting retention of salmon and number of Chinook salmon retained from commercial catch for personal use, by address cited on permit, Prince William Sound Area, 1994–2014.

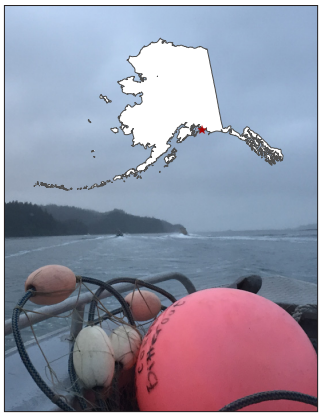
	Cordova addresses		All addresses		Percentage of change	
Year	Permits[a]	Harvest	Permits[a]	Harvest	Permits[a]	Harvest
1994	113	505	198	768	75.2%	52.1%
1995	193	1,111	321	1,700	66.3%	53.0%
1996	207	1,515	348	2,200	68.1%	45.2%
1997	156	749	284	1,246	82.1%	66.4%
1998	184	949	319	1,436	73.4%	51.3%
1999	180	748	303	1,123	68.3%	50.1%
2000	3	12	250	742	8,233.3%	6,083.3%
2001	110	404	301	946	173.6%	134.2%
2002	149	499	257	784	72.5%	57.1%
2003	181	681	296	1,099	63.5%	61.4%
2004	111	322	177	540	59.5%	67.7%
2005	131	503	237	767	80.9%	52.5%
2006	151	504	269	781	78.1%	55.0%
2007	167	685	290	1,029	73.7%	50.2%
2008	139	390	241	615	73.4%	57.7%
2009	193	624	335	876	73.6%	40.4%
2010	195	668	364	957	86.7%	43.3%
2011	190	890	370	1,346	94.7%	51.2%
2012	205	625	435	940	112.2%	50.4%
2013	194	392	393	657	102.6%	67.6%
2014	213	490	430	823	101.9%	68.0%
Average, 1994–2014[b]	168	663	308	1,032	83.5%	55.7%

Source ADF&G Division of Commercial Fisheries, OceanAK for commercial fish ticket data.

a. Number of commercial salmon permits that reported any salmon retention for home use.

b. The averages exclude outlier data from 2000.

APPENDIX E–SUMMARY OF FINDINGS



COMMUNITY SUMMARY - Technical Paper No. 444

Cordova

The Intersection of Commercial Fisheries and the Subsistence Way of Life in Cordova, 2014

Subsistence activities remain a vital component of life in Cordova, whose residents have adapted to the particular regulatory structure surrounding local commercial and subsistence fishing activities.

Background and Methods

This report presents an integration of the results of 2 studies conducted to better understand the intersection of commercial fisheries and the subsistence way of life in Cordova, Alaska. The results presented within the report provide insight into Cordova fishermen's decision-making processes concerning retention of salmon from commercial catches, as well as discussion of residents' access to salmon for home use through various means. Commercial fishing activities supplement, and occasionally supplant, traditional subsistence activities.

This study is part of the State of Alaska Chinook Salmon Research Initiative (CSRI) program, an effort to help state and federal resource management agencies better understand the factors affecting Chinook salmon abundance in Alaska. The program recommends "an analysis of the harvest of Chinook salmon in the subsistence fishery in Copper River District of Prince William Sound, as well as commercial removals of Chinook salmon for personal use" to help address stock specific information gaps. This CSRI program study of the Copper River focused on factors relating to commercial removals of Chinook salmon for personal use.

Working with the residents of the study community of Cordova, researchers addressed 2 overarching research questions: 1) what is the relationship between subsistence harvests and uses of wild resources and involvement in commercial fisheries; and 2) how and why are commercially caught Chinook salmon selected for home use and noncommercial exchange, instead of commercial sale, in the study community?

The project had the following objectives:

- Analyze the harvest of Chinook salmon in the subsistence fishery in the Copper River District of Prince William Sound, as well as commercial removals of Chinook salmon for home/personal use.
- Identify factors that influence harvest and use of Chinook salmon in commercial and subsistence fisheries.
- Refine estimates of Chinook salmon "home pack."

The primary data gathering methods were in-depth key respondent interviews (KRIs) and participant observation.

Key respondents selected for interviews for the CSRI study were long-term community residents, active participants in the local commercial and subsistence fisheries, and/or commercial permit holders who had reported home pack on their fish tickets. Over the course of the CSRI study, ADF&G researchers recorded KRIs with 11 Cordovans. The respondents ranged in age from 37 to 77 and 91% were male. In addition to in-depth interviews, researchers used several opportunities to engage in participant observation of activities related to the commercial and subsistence salmon fisheries in the Cordova area, including enforcement flights for commercial salmon openers, being on-board a tender vessel during a commercial salmon opener, and participating with a driftnetter during a subsistence salmon opener. To incorporate analysis of the subsistence harvest of Chinook salmon, this Copper River salmon study draws from a contemporaneous ADF&G Division of Subsistence project designed to explore continuing effects of the *Exxon Valdez* oil spill, which included surveys about salmon harvest and use by Cordova residents (Fall and Zimpelman 2016).

Photographs by Hannah Johnson and Joshua T. Ream, staff, ADF&G Division of Subsistence. This study was conducted by the ADF&G Division of Subsistence in cooperation with the Native Village of Eyak.

Source for this information
Sill, L. A., G. Halas, and D. Koster. 2019. *Copper River Chinook Salmon: The Intersection of Commercial Fisheries and the Subsistence Way of Life in Cordova, Alaska*. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 444: Anchorage.

Electronic copy of this report
http://www.subsistence.adfg.state.ak.us/TechPap/TP444.pdf

Community Subsistence Information System (CSIS)
http://www.subsistence.adfg.state.ak.us/CSIS

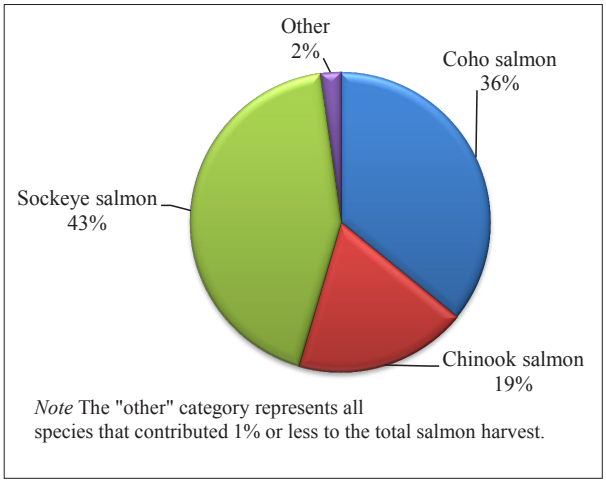


Figure 1.–Salmon harvest (lb) composition, Cordova, 2014.

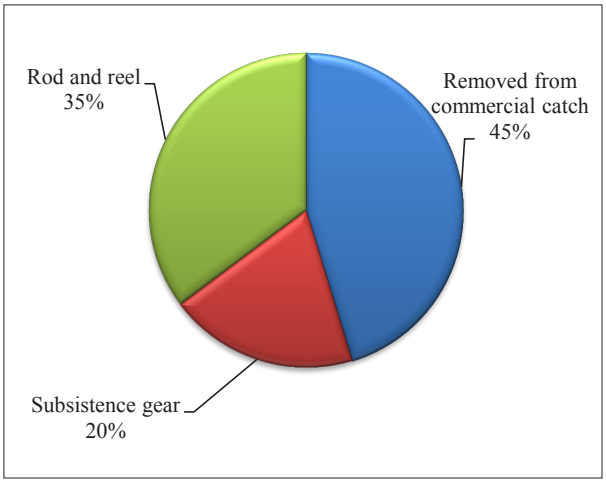


Figure 2.–Estimated harvests of salmon (ind) by gear type, Cordova, 2014.

Findings

A majority of Cordovans harvest and process salmon. In 2014, approximately 114,031 lb usable weight of salmon, equal to 120 lb of salmon per household, or 44 lb per capita, was harvested by Cordova households. The salmon harvest was dominated by sockeye salmon (43%), followed by coho salmon (36%), and Chinook salmon (19%) (Figure 1).

In 2014, removal from commercial catches accounted for the largest number of salmon harvested; 9,241 salmon (45%) were removed from commercial harvests (Figure 2). Removal from commercial catches was the most common harvest method for chum, Chinook, and sockeye salmon. Rod and reel was used to harvest 7,192 salmon (35%), which would include harvests under state sport fishing regulations as well as federal subsistence regulations. The majority of coho salmon were harvested with rod and reel. Subsistence gear was used to harvest the least amount of salmon in 2014: 3,976 salmon (20%). Pink salmon was the only species harvested mainly with subsistence gear (42% of the pink salmon harvest); however, nearly one-third of the Chinook salmon harvest was caught by subsistence methods—mainly driftnets.

Looking over a longer time period, in comparing the 2014 household harvest survey data to the average harvest by gear types over 8 study years, home pack composed a smaller percentage of the overall harvest as well as of individual salmon species harvests in 2014 (Table 1). Some of the variability in the percentage of the community's harvest coming from commercial retention stems from changes in commercial fishing permit ownership. However, the number of permits retaining commercially caught fish has not changed substantially, but the amount of reported retention has generally increased steadily since 2009 (when all retained salmon from any fishing district was required to be reported). Fish ticket data include permit holders with Cordova addresses who are not year-round residents of Cordova and are therefore not included in the household survey data. Changing harvest patterns between these 2 groups may account for some of the observed changes, but investigating that was beyond the scope of this study.

Given that removal from commercial harvests is the main source of salmon for Cordova residents, the interaction between the subsistence and commercial fisheries in Cordova is complex and varied, as many of the interviews with residents attest. Several themes emerged during these interviews, including use of home pack, access to the fishery, and subsistence salmon needs of Cordova residents.

Table 1.–Percentage of salmon harvest (ind) for home use from commercial retention, Cordova households, prior study years.

Resource	1985	1988	1991	1992	1993	1998	2003	2014	8-year average
Chinook salmon	82 %	86 %	80 %	88 %	47 %	74 %	37 %	47 %	66 %
Chum salmon	80 %	95 %	84 %	0 %	92 %	84 %	16 %	64 %	77 %
Coho salmon	42 %	14 %	27 %	24 %	20 %	27 %	14 %	16 %	23 %
Pink salmon	38 %	46 %	70 %	55 %	18 %	49 %	27 %	33 %	45 %
Sockeye salmon	82 %	84 %	77 %	72 %	77 %	70 %	48 %	63 %	70 %
Unknown salmon			30 %		17 %			0 %	23 %
All salmon	**62** %	**45** %	**51** %	**48** %	**49** %	**56** %	**31** %	**45** %	**48** %

Source Fall and Zimpelman (2016) for 2014, and Community Subsistence Information System (CSIS) online at http://www.adfg.alaska.gov/sb/CSIS/ (accessed November 2018) for the remaining years.

Note Blank cells indicate no recorded harvest of the resource.

"Some of it gets down to lifestyle and tradition and stuff. There are some people that value those kings so highly that they're going to bring them home—there's no price that could buy them. They value having them in their household so much."

The role of home pack salmon retained from the commercial salmon fishery for personal home use represents an important resource where commercial fishermen can choose which fish to bring home based on preferred species of salmon and the intended use of that species, such as canning or freezing. The factors that influence the harvest and use of Chinook salmon seem to be dependent on both the needs of an individual or household, as well as the price of Chinook salmon in the commercial fishery each year. Chinook salmon, even when highly valued in the commercial industry, still tended to be brought home as an important nutritional and culturally significant resource. Depending on the commercial fisherman, however, some opted to sell all their Chinook salmon because prices for selling this species dictated the economic importance to a household's income. Several interviewees expressed that losing income from not selling Chinook salmon in the commercial fishery was not a major inhibitor to keeping Chinook salmon for home use.

The commercial fleet members expressed that being able to retain Chinook salmon for home use was the best way to get Chinook for their households. Although an individual commercial fisherman can choose the number of Chinook salmon used for home pack, interview participants, when asked about the 5-fish subsistence Chinook salmon harvest limit, overall expressed that 5 Chinook salmon were enough for a household. During subsistence fishing, it can be difficult to harvest the limit of 5 Chinook salmon before harvesting the limit of sockeye salmon, at which point the subsistence fisher is required to stop fishing. Most of the interviewees indicated that Chinook salmon were used for a specific purpose (fresh eating, canning, smoking), and that the greater sockeye availability helped to fulfill the needs of residents.

"When it's a good king run it means a major income for us, because that is when we need money the most—when we start because we spend everything we have in the winter. But kings get scarce."

Most of the respondents reported that they believe home pack reporting is accurate. Comparing household survey data to fish ticket data in 2014, it is evident that the number of retained sockeye salmon (the most frequently retained species) estimated through both data collection methods is approximately the same at around 7,000 sockeye salmon (Figure 3). Harvest differences based on the 2 methods for collecting home pack values are larger for the other species, however they may not be significantly different. Commercial fishery participants who were interviewed indicated that they report home pack and that there is no reason to not report Chinook salmon that one is taking home. One interviewee estimated home pack reporting participation at 90%, and another valued it at 75%–80%, with some underreporting being assessed as the case due to either tender boats or fishermen forgetting to report. ADF&G research intern Emilie

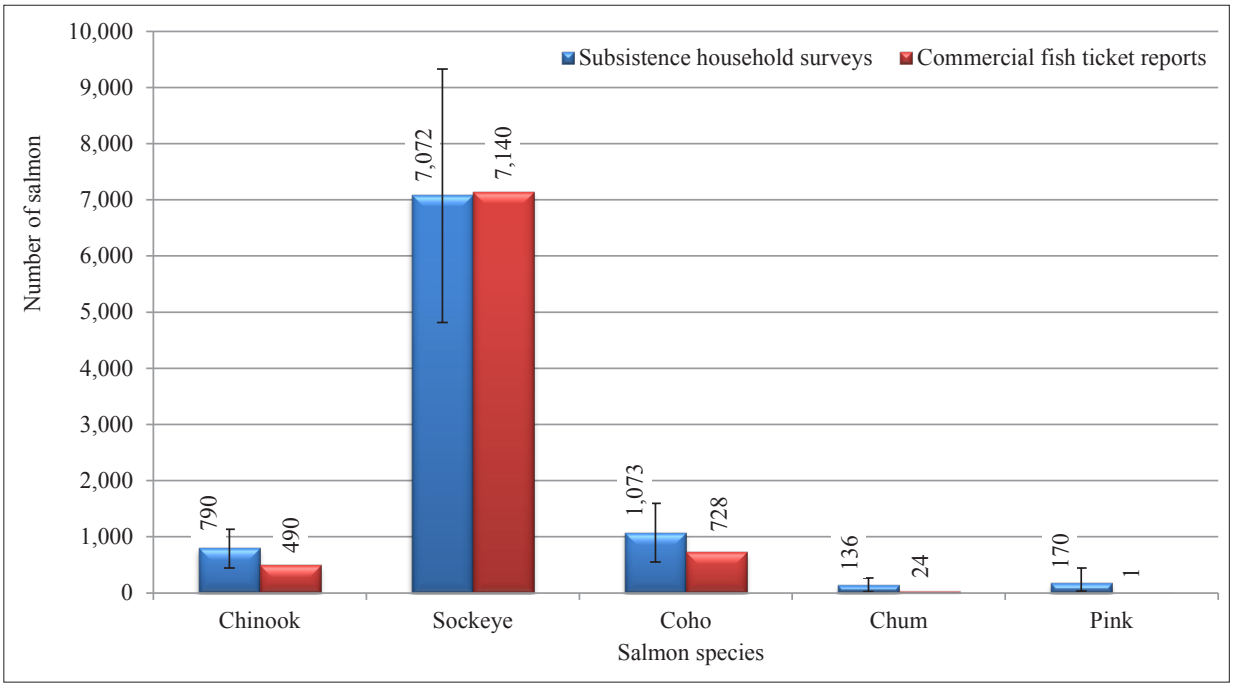


Figure 3.–Comparison of number of salmon retained as home pack as reported on commercial fish tickets and estimated through household surveys, by salmon species, Cordova, 2014.

Springer conducted participant observation on a tender boat and described the nature of rapid fish transfer, weighing, and catch reporting, and described that this may prove challenging to accurate fish harvest reporting.

Home pack has played such a vital role in Cordovans' supply of salmon for a variety of reasons, including poor access to the subsistence fishery and difficulty in participating in both commercial and subsistence fisheries. The general sentiment among 5–6 interview respondents, and most of the EVOS study household survey respondents who commented on the topic of access to the subsistence fishery in Cordova, was that it is limited, poor, or totally absent. This is mainly due to cost (fuel, equipment), lack of access to equipment needed (boats, nets), conflicts in time (the need to work during subsistence fishing openers), location (dangerous waters to navigate, especially with smaller boats), unpredictable weather (general safety concerns), and demographics (elders are unable to go out into certain conditions); if conditions are not conducive for fishing at a time when all the other factors are positively lined up, residents are not able to go subsistence salmon fishing. As such, these residents predominantly harvest coho salmon because Chinook and sockeye salmon are not as available in accessible rod and reel fisheries.

Until 2018, there were only concurrent openers in the subsistence and commercial fisheries, causing commercial fishermen to choose between commercial fishing and subsistence fishing for salmon; if they chose to commercial fish, then they did not have much of an opportunity to subsistence fish for salmon. Most respondents were in support of subsistence fishing periods being offered independent of the commercial fishery schedule. Beginning in 2018, a regulatory change allowed for the subsistence fishery to open on Saturdays, independent of the commercial periods, which may change participation patterns.

Interview participants were asked questions regarding any changes they noticed over time in terms of Chinook salmon size, run abundance and timing, and general fish health. Respondents were then asked about general historical timelines of when these changes were noted. Not all key respondents noticed changes to Chinook salmon, or they indicated a healthy Chinook salmon population. Other respondents were very specific about decadal downward shifts in the Chinook salmon population, the size of Chinook salmon having diminished, and potential diseases or parasites.

Conclusion

Commercial retention of salmon has been, and remains, a vital component of Cordova households' access to salmon, especially Chinook, coho, and sockeye salmon. Since the 2018 fishing season marked a regulatory change with additional subsistence opportunity provided on Saturdays, when the commercial fishery is closed, there may be less need to retain fish from a fisherman's commercial catch. However, home pack is likely to remain an important source of salmon because retaining commercially caught salmon will continue to be an efficient means of procuring salmon for use in the home. In addition, for some fishers, the added effort of changing out commercial gear for subsistence gear in order to participate in both fisheries will not be worthwhile.

With the regulatory changes that have occurred, a follow-up study on how Cordova families are meeting their needs and how commercial retention patterns may or may not have changed is necessary. Further regulatory changes may need to be considered if the community continues to express an increased need for subsistence salmon fishing opportunity.

Fall, J.A. and G. Zimpelman, editors. 2016. *Update on the Status of Subsistence Uses in Exxon Valdez Oil Spill Area Communities, 2014*. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 412: Anchorage. http://www.adfg.alaska.gov/techpap/TP412.pdf

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