Technical Paper No. 470

The Harvest and Use of Salmon by Residents of King Salmon, Naknek, and South Naknek, Alaska, 2017 and 2018

by
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and
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September 2020

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in Division of Subsistence reports. All others, including deviations from definitions listed below, are noted in the text at first mention, in the titles or footnotes of tables, and in figures or figure captions.

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

TECHNICAL PAPER NO. 470

THE HARVEST AND USE OF SALMON BY RESIDENTS OF KING SALMON, NAKNEK, AND SOUTH NAKNEK, ALASKA, 2017 AND 2018

by

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September 2020

Development and publication of this manuscript were partially financed by Alaska Sustainable Salmon Fund (AKSSF) under Project No. 44363.

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.

Technical Paper series reports are available through the Alaska Resources Library and Information Services (ARLIS), the Alaska State Library, and on the Internet: http://www.adfg.alaska.gov/sf/publications/. This publication has undergone editorial and professional review.

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This document should be cited as:
Jones, B. and M. Cunningham. 2020. The Harvest and Use of Salmon by Residents of King Salmon, Naknek, and South Naknek, Alaska, 2017 and 2018. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 470, Anchorage.

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ABSTRACT

This report provides updated information about the harvests of salmon by the communities of King Salmon, Naknek, and South Naknek, Alaska. This report details the results of a household survey administered for the study years of 2017 and 2018 for harvests and uses of wild salmon by households in these Bristol Bay Borough communities. Also, this report includes information from in-depth interviews conducted with key respondents and during participant observation fishing trips. The three study communities are located along the Naknek River in Bristol Bay in Southwest Alaska. As in the past, during the 2017 and 2018 study years, many residents of these study communities relied on fishing for nutrition and to support their way of life. The household surveys found that, in both study years, subsistence harvests of salmon were important in the communities: more than 70% of the number of salmon harvested for King Salmon, and more than 80% of the salmon harvested for Naknek and South Naknek, were caught by subsistence net.

Overall, the per capita harvests in 2017 were: 79 lb per capita in King Salmon, 138 lb per capita in Naknek, and 194 lb per capita in South Naknek. Sockeye salmon, followed by either Chinook salmon or coho salmon, composed the largest portions of salmon harvests (in pounds usable weight) for the three communities in 2017. In 2018, the harvests of salmon increased to 116 lb per capita for King Salmon, but decreased to 108 lb per capita for Naknek, and for South Naknek the per capita harvest decreased to 116 lb. Mirroring 2017, for study year 2018 sockeye salmon, followed by either Chinook salmon or coho salmon, composed the largest portions of salmon harvests for the three study communities. This study is part of the effort to collect data about the full range of wild salmon harvests and uses, and areas of harvest, to understand in all its complexity the importance of salmon as a subsistence resource. The project was funded by the Alaska Sustainable Salmon Fund (AKSSF). This information was collaboratively collected by research staff of the Alaska Department of Fish and Game (ADF&G) Division of Subsistence, and research staff from the Natural Resources Department of Bristol Bay Native Association (BBNA).

Key words: subsistence, salmon, Naknek River, Bristol Bay, Southwest Alaska, King Salmon, Naknek, South Naknek

1. INTRODUCTION

This report summarizes the results of a harvest survey and ethnographic project that investigated the subsistence uses of salmon by the communities of King Salmon, Naknek, and South Naknek, all of which are located along the Naknek River in the Bristol Bay region of Alaska (Figure 1-1). The project included two years of post-season salmon harvest surveys, key respondent interviews, and researcher participant observations in all three communities. The study community populations span a wide range. According to the most recent five-year (2014–2018) American Community Survey (ACS) estimated average, the populations of King Salmon, Naknek, and South Naknek were 385, 464, and 41, respectively; the percentage of community members that self-identified as Alaska Native was 24% in King Salmon, 51% in Naknek, and 88% in South Naknek (U.S. Census Bureau n.d.).

All five species of Pacific salmon found in Alaska were used for subsistence by residents of King Salmon, Naknek, and South Naknek (Table 1-1). This study documented the continuing importance of subsistence salmon fishing to the residents of the three study communities. The mandate of the Division of Subsistence requires research into the subsistence uses of wild resources by Alaska residents, and this research is used to inform management decisions regarding the customary and traditional uses of those resources.[1] This project supports the division's mandate by providing data that may be used by managers, the Alaska Board of Fisheries, and the public to incorporate into best management practices for salmon fisheries of Naknek River and Naknek Lake.

Project Background

The funding for this project was awarded by the Alaska Sustainable Salmon Fund (AKSSF), in October 2016, as part of the 2015 call for research proposals. The communities of King Salmon, Naknek, and South Naknek make up the entire Bristol Bay Borough and are situated along the Naknek River in the Bristol Bay region of Southwest Alaska. Salmon are a primary source of subsistence food for local residents of these three communities. The Naknek River watershed has a complex regulatory history, and prior to this research project salmon harvest regulatory changes were made (effective 2016—see Chapter 2: "Background and Regulations Overview" for detail) and subsequent subsistence harvest activity had not been surveyed at the time AKSSF awarded funding for this proposal. This project was designed to address data gaps and provide updated quantitative information regarding the subsistence harvests of salmon within the Naknek River watershed, as well as qualitative ethnographic data describing the cultural context of subsistence salmon fishing within the communities. The goal of this report is to provide the communities, fisheries managers, and the Alaska Board of Fisheries with reliable data to use to provide reasonable opportunity for success in harvesting salmon for subsistence uses in the Naknek River.

Study Objectives

The project had the following four objectives:

- Describe the subsistence salmon harvest, harvest methods, participation levels, and sharing networks for Naknek, South Naknek, and King Salmon for 2017 and 2018;
- Document the environmental, economic, social, cultural, and regulatory factors that shape subsistence salmon harvests in the study communities today and in the past;
- Evaluate the permit reporting system by comparing survey harvest data with permit return data and provide more accurate data to support fisheries management; and
- Identify adjustments in subsistence salmon fishing activity related to recent regulatory and management changes.

1. Alaska Department of Fish and Game, "Division of Subsistence: Division Overview." http://www.adfg.alaska.gov/index.cfm?adfg=divisions.subsoverview (accessed Dec. 1, 2019).

Figure 1-1.–Map of study communities, 2013.

Table 1-1.–Resources used by study community households, 2017 and 2018.

Resource	Scientific name
Chum salmon	*Oncorhynchus keta*
Coho salmon	*Oncorhynchus kisutch*
Chinook salmon	*Oncorhynchus tshawytscha*
Pink salmon	*Oncorhynchus gorbuscha*
Sockeye salmon	*Oncorhynchus nerka*

Source ADF&G Division of Subsistence household surveys, 2018 and 2019.

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*[2] and by the National Science Foundation, Office of Polar Programs in its *Principles for the Conduct of Research in the Arctic*[3], 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

This project was carried out as a partnership between the Alaska Department of Fish and Game (ADF&G) Division of Subsistence and the Bristol Bay Native Association (BBNA). Bronwyn Jones, Subsistence Resource Specialist III with the Division of Subsistence, was the Principal Investigator for this project, and Cody Larson, Subsistence Fisheries Scientist with BBNA, was the Co-Principal Investigator (Table 1-2). The Division of Subsistence took the lead on overall project management, which included fieldwork logistics, survey and interview design and implementation, data analysis, report writing, and communicating with the funding agency. Bristol Bay Native Association supported research efforts by providing communication with local Alaska Native governments, and by assisting with fieldwork, survey and interview implementation, and report writing.

Signed resolutions of project support were provided by the Naknek Native Village Council and the South Naknek Village Council (Appendix A). Additionally, Jones and Larson traveled to King Salmon, Naknek, and South Naknek to introduce the study plan at public scoping meetings to provide community residents an opportunity to ask questions about or comment on the study design. On June 23, 2017, a joint community meeting was held for Naknek and King Salmon in Naknek; in total, eight community members attended this meeting. A community scoping meeting was held in South Naknek on June 24, 2017, and three residents attended this meeting (Table 1-3).

Systematic Household Surveys and Sample Achievement

The primary method for collecting subsistence harvest and use information in this project was a systematic household survey. Following receipt of comments at the scoping meetings, ADF&G finalized the survey instrument in December 2017. A key goal was to structure the survey instrument to collect demographic and salmon harvest and use data that are comparable with information collected in other household surveys

2. Alaska Federation of Natives. "Alaska Federation of Natives Guidelines for Research," Alaska Native Knowledge Network, http://ankn.uaf.edu/IKS/afnguide.html (last modified August 15, 2006, accessed December 20, 2019).
3. Interagency Arctic Research Policy Committee (IARPC). 2018. "Principles for Conducting Research in the Arctic." National Science Foundation, Office of Polar Programs, https://www.nsf.gov/geo/opp/arctic/conduct.jsp (accessed December 20, 2019).

Table 1-2.–Project staff.

Task	Name	Organization
Southern Regional Program Manager	Robin Dublin	ADF&G Division of Subsistence
Pervious Southern Regional Program Manager	Brian Davis	ADF&G Division of Subsistence
Principal Investigator	Bronwyn Jones	ADF&G Division of Subsistence
Co-Investigator	Cody Larson	Bristol Bay Native Association
Data Management Lead	David S. Koster	ADF&G Division of Subsistence
Data Management Assistant	Margaret Cunningham	ADF&G Division of Subsistence
Administrative support	Tamsen Coursey-Willis	ADF&G Division of Subsistence
Administrative support	Pamela Amundson	ADF&G Division of Subsistence
Administrative support	Zayleen Kalalo	ADF&G Division of Subsistence
Programmer	Margaret Cunningham	ADF&G Division of Subsistence
Data entry	Halia Janssen	ADF&G Division of Subsistence
Data entry	Alexzandria DePue	ADF&G Division of Subsistence
Data entry	Alea Robinson	ADF&G Division of Subsistence
Data cleaning/validation	Margaret Cunningham	ADF&G Division of Subsistence
Data analysis	Margaret Cunningham	ADF&G Division of Subsistence
Cartography	Margaret Cunningham	ADF&G Division of Subsistence
Cartography	Gayle Neufeld	ADF&G Division of Subsistence
Editorial Review Lead	Mary Lamb	ADF&G Division of Subsistence
Field research lead	Bronwyn Jones	ADF&G Division of Subsistence
Field research staff	Gabriela Halas	ADF&G Division of Subsistence
Field research staff	Katheryn Hayden	ADF&G Division of Subsistence
Field research staff	Zayleen Kalalo	ADF&G Division of Subsistence
Field research staff	Theodore Krieg	ADF&G Division of Subsistence
Field research staff	Cody Larson	Bristol Bay Native Association
Field research staff	Morgan MacConnell	ADF&G Division of Subsistence
Field research staff	Jessie Merriam	ADF&G Division of Subsistence
Summer Project Graduate Intern	Catherine Sopow	Bristol Bay Native Association
Local research assistant	Steven Angasan	Naknek and King Salmon
Local research assistant	Lucinda Tallekpalek	Naknek and King Salmon
Local research assistant	Josie Savo	South Naknek
Local research assistant	Travis Wassille	South Naknek

Table 1-3.–Community scoping meetings, study communities, 2017 and 2018.

		Attendance	
Community	Date	Community residents	Staff
Kign Salmon and Naknek	6/23/2017	8	Jones and Larson
South Naknek	6/24/2017	3	Jones and Larson

in the study communities and with data in the Community Subsistence Information System (CSIS[4]). Estimated salmon harvests by study community households are reported in numbers of fish and in pounds usable weight; the estimates include resources harvested by any member of the surveyed households during the study years. "Use" of salmon means any fish harvested, given away, or used by a household, and salmon 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. Additionally, the household survey included questions about gear types used to harvest salmon, harvest effort, and resource use assessment questions. The survey instrument also included a series of questions to gather observations about Naknek River salmon stocks.[5] The study objectives included a salmon sharing network component (see Appendix B, page 10); however, due to staffing changes at the Division of Subsistence, this portion of the survey was not analyzed and therefore results are not included in this final report.[6] Finally, the household survey also included a series of questions about subsistence salmon permits for the Naknek River to address the study objective to evaluate the current harvest reporting and monitoring system that is based on subsistence permit returns. Note that when completing the post-season surveys, division staff, if possible, brought a spreadsheet that contained permit return data by household to each surveyed household that obtained a permit before the fishing season and returned the permit before survey administration occurred. When harvest amount questions were asked for the survey, the permit data were used to verify harvest numbers. In addition, the households were asked if any more harvests occurred after the permit was returned and, if so, those harvests were noted during the interview and added to the permit when staff returned from the field. For those households for which division staff were unable to locate returned permit data, members of the household used recall to answer harvest amount questions for surveys. Also, researchers issued permits during survey administration to those surveyed households that harvested subsistence salmon but did not originally obtain a permit. Appendix B is an example of the survey instrument used in this project.

The survey sample goal of this study was to survey one-half of the total number of households in King Salmon and Naknek due to the larger size of these communities. Because South Naknek is a much smaller community, the goal was to survey all eligible households. In order to create a household list for King Salmon and Naknek, Division of Subsistence and BBNA researchers obtained satellite imagery of the communities from the Bristol Bay Borough. The satellite imagery was used while ground-truthing to determine the number of occupied households in each community. A list of households was developed based upon the ground-truthing efforts. The list of households was randomized and 50% of the households were selected to be surveyed. The household list was edited by researchers and local research assistants (LRAs) throughout the survey process as new information about households was learned. For King Salmon, these efforts established an estimate of 99 eligible households to be surveyed in 2017 and 102 in 2018 (Table 1-4). For Naknek, these efforts established an estimate of 154 eligible households to be surveyed in 2017 and 153 in 2018. For South Naknek, project staff worked with a combination of LRAs, knowledgeable community members, and tribal administrators to develop a household list for both study years, and these efforts established an estimate of 28 eligible households to be surveyed in 2017 and 26 households in 2018.

4. ADF&G Community Subsistence Information System: http://www.adfg.alaska.gov/sb/CSIS/ (hereinafter cited as CSIS).
5. The survey design focused questions on salmon as a resource category rather than on individual salmon species. Therefore, results from this series of survey questions were not included in this report due to the inability to produce elucidative data separated by salmon species.
6. Data from surveys will be retained by the Division of Subsistence and may be used for comparison analysis if a future project addressing salmon sharing networks is conducted.

Table 1-4.–Estimated households and sample achievement, study communities, 2017 and 2018.

	King Salmon		Naknek		South Naknek	
Sample information	2017	2018	2017	2018	2017	2018
Number of dwelling units	185	158	253	154	30	29
Interview goal	50	51	77	77	28	26
Households interviewed	54	54	78	80	23	19
Households failed to be contacted	13	4	10	7	4	7
Households declined to be interviewed	2	5	6	5	1	0
Households moved or occupied by nonresident	86	58	99	6	2	3
New households	0	2	0	5	0	0
Total households attempted to be interviewed	69	63	94	92	28	26
Refusal rate	3.6%	8.5%	7.1%	5.9%	4.2%	0.0%
Final estimate of permanent households	99	102	154	153	28	26
Percentage of total households interviewed	54.5%	52.9%	50.6%	52.3%	82.1%	73.1%
Interview weighting factor	1.83	1.89	1.97	1.91	1.22	1.37
Sampled population	133	128	209	227	28	28
Estimated population	243.8	241.8	412.6	434.1	46.3	38.3

Source ADF&G Division of Subsistence household surveys, 2018 and 2019.

Table 1-5.–Survey duration, study communities, 2107 and 2018.

Community	Study year	Interview length (in minutes)		
		Average	Minimum	Maximum
King Salmon	2017	14	4	66
Naknek	2017	18	3	70
South Naknek	2017	20	5	64
King Salmon	2018	11	3	68
Naknek	2018	14	1	54
South Naknek	2018	11	4	25

Source ADF&G Division of Subsistence household surveys, 2018 and 2019.

During the survey effort, for each residence that researchers attempted to contact, a disposition was applied. The disposition categories included:

- Contains residents who are eligible to participate in the survey based on length of residency (lived in community for at least six months) (survey attempted).
- Vacant (no survey attempted).
- Not a dwelling (commercial building or no dwelling exists) (no survey attempted).

If researchers were initially unsuccessful at contacting an eligible household, two more attempts to survey the household were made. When a reasonable effort was made to survey the household and no contact could be made, this household was assigned a "no contact" disposition. Contacted households could also decline to participate in the survey. Following is a description of the sample achievement for each study community for both study years.

King Salmon

The sample achievement goal of 50% was successfully attained for King Salmon during both study years. In 2017, of the 99 qualifying households, researchers attempted to survey a total of 69 households (Table 1-4). Of those 69 households, 13 were designated as failed to be contacted, two declined to participate in the survey, and 54 were successfully surveyed, resulting in a sample achievement of 55%. During the 2017 survey effort, the average survey length was 14 minutes, with the longest survey lasting 66 minutes and the shortest survey taking four minutes (Table 1-5). For 2018, of the 102 eligible households, the total number of attempted household surveys was 63 (Table 1-4). Of those 63 households, researchers failed to contact four households, five declined to participate in the survey, and 54 were successfully surveyed, resulting in a sample achievement of 53%. In 2018, the average survey length was 11 minutes, with the longest survey lasting 68 minutes and the shortest survey taking three minutes (Table 1-5).

Naknek

The sample achievement goal of 50% was successfully attained for Naknek during both study years. In 2017, of the 154 qualifying households, researchers attempted to survey a total of 94 households (Table 1-4). Of those 94 households, 10 were designated as failed to be contacted, six declined to participate in the survey, and 78 were successfully surveyed, resulting in a sample achievement of 51%. In 2017, the average survey length was 18 minutes, with the longest survey lasting 70 minutes and the shortest survey taking three minutes (Table 1-5). In 2018, of the 153 eligible households, the total number of attempted household surveys was 92 (Table 1-4). Of those 92 households, researchers failed to contact seven households, five declined to participate in the survey, and 80 were successfully surveyed, resulting in a sample achievement of 52%. In 2018, the average survey length was 14 minutes, with the longest survey lasting 54 minutes and the shortest survey taking one minute (Table 1-5).

South Naknek

During the 2017 survey effort in South Naknek, of the 28 qualifying households, 23 were successfully surveyed, resulting in a sample achievement of 82% (Table 1-4). One household declined to participate in the study, and four households could not be contacted after three attempts. In 2017, the average survey length was 20 minutes, with the longest survey taking 64 minutes and the shortest lasting five minutes (Table 1-5). Of the 26 qualifying households identified in 2018, 19 were successfully surveyed, resulting in a sample achievement of 73% (Table 1-4). Seven households could not be contacted after three attempts, which contributed to the sample achievement rate being lower in 2018 compared to 2017; however, no households declined to participate in the survey in the second study year. In 2018, the average survey length was 11 minutes, with the longest survey lasting 25 minutes and the shortest survey taking four minutes (Table 1-5).

Mapping Locations of Subsistence Fishing

During household surveys, the researchers asked respondents to indicate the locations of their fishing activities during the study year. Project research staff established a standard mapping method. Points, lines, and polygons were used to mark fishing and harvest locations. Generally, points were used to mark harvest locations such as subsistence set gillnet sites. However, sometimes points were also used to designate a harvest effort location, especially if fishing from a riverbank. Some lines were also drawn in order to depict when the harvesting activity did not occur at a specific point; for example, lines were used to depict courses taken while trolling for fish. Polygons were used to designate areas where fish were harvested in a large area, such as while seining for spawned-out sockeye salmon in Naknek Lake.

Harvest locations and fishing areas were documented on iPads[7] using the Collector application (ESRI, or Environmental Systems Research Institute) customized for Division of Subsistence data collection needs. The point, polygon, or line was drawn on a U.S. Geological Survey topographic relief map downloaded on the iPad. The iPad allowed the user to zoom in and out to the appropriate scale, and the ability to document harvesting activities wherever they occurred in the state of Alaska. Once a feature was accepted, an attribute box was filled out by the researcher that noted the species harvested, gear type, harvest amount, method of access to the resource, and month(s) of harvest. Once data collection was complete, the data were uploaded through ArcGIS Online to the ESRI cloud server for storage.

Once a survey was complete researchers conducted a quality control exercise by matching the map data to the survey form to ensure all map data had been documented. This was completed in the field before the surveys were submitted to the lead researcher. Once the data had been uploaded, researchers also verified that the household data were logged into the server. The data were first sorted by community, and then resource. Maps were then produced at the species-specific level for each study year separately.

Household Survey Implementation

For the 2017 study year, the survey team consisted of Bronwyn Jones, Cody Larson, Gabriela Halas, Theodore Krieg, Zayleen Kalalo, and Jessie Merriam. Jones, Halas, Merriam, and David Koster (Division of Subsistence Research Analyst IV) arrived in King Salmon on February 18, 2017. The team of four spent the first two days ground-truthing King Salmon and Naknek to establish household lists for both communities. During the first two days, Jones held an LRA training session. On February 20, Koster departed, and Kalalo, Larson, and Krieg arrived. Survey administration for King Salmon and Naknek occurred until February 26, 2017. On February 22, Merriam, Kalalo, and Krieg traveled to South Naknek to complete surveys. Krieg trained LRAs, while remaining survey team members surveyed households. After the survey team departed South Naknek at the end of the day, the LRAs followed up with households that were not yet contacted and sent completed surveys to ADF&G.

The 2018 survey team consisted of Bronwyn Jones, Cody Larson, Gabriela Halas, Zayleen Kalalo, Kathryn Hayden, and Morgan MacConnell. Jones and Kalalo arrived in King Salmon on January 11, 2018, to update

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

the household list for King Salmon and Naknek and held an LRA training. On January 12, the remaining team members arrived to assist with conducting the surveys. Survey administration for King Salmon and Naknek occurred until January 19, 2018. On February 14, Jones, Larson, and Hayden traveled to South Naknek to complete surveys. Jones trained LRAs while other survey team members surveyed households. After the survey team departed South Naknek at the end of the day, the LRAs followed up with households that were not yet contacted and sent completed surveys to ADF&G.

Key Respondent Interviews

While researchers were in the study communities they consulted with local governments, community councils, and LRAs to identify key respondents to interview. The purpose of the key respondent interviews (KRIs) was to provide additional context for the quantitative data and to provide information for the community background information, harvest-over-time analysis, salmon health assessments, permit participation assessments, gear type use, and to gather community comments and concerns. In King Salmon, a total of seven key respondents were interviewed for this project; in Naknek the number of key respondents was nine, and in South Naknek four key respondents were interviewed for this project. KRIs were semi-structured and directed by KRI protocols designed by Jones and Larson (see appendices C and D). In addition to gathering qualitative data through the KRI protocol, staff took notes during interviews to provide additional context to quantitative results for this report. Jones analyzed KRI responses and interview notes in preparation for writing this report. Key respondents were informed that, to maintain anonymity, their names would not be included in this report.

Participant Observation

Participant observation is an important method used by researchers to gain an in-depth understanding of the salmon harvest timing, location, methods, logistical considerations, and social organization that combine to create the subsistence salmon harvest patterns practiced by residents of the three study communities. For participant observation, researchers worked with community members to help harvest and process salmon during the summer season, and, in the fall, researchers participated in subsistence pursuits for spawned-out sockeye salmon. Summer participant observations occurred from June 22–June 30, 2017, and from July 26–August 2, 2018. Summer participant observations involved assisting with setting out gillnets, observing how harvests were being recorded on permits, and participating in cutting and processing salmon. Researchers also spent time observing community members commercial fishing and sport fishing while they were in the communities during the summer months. Fall participant observations occurred from September 22–October 1, 2017, and from October 5–October 11, 2018. Fall participant observations involved assisting community members with harvesting spawned-out sockeye salmon in various parts of Naknek Lake and participating in processing these salmon.

Data Analysis and Review

Survey Data Entry and Analysis

Surveys were coded for data entry in each community by research staff and reviewed by Jones 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 the 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 site. 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 one 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 21. 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 fish were converted to pounds usable weight using standard factors (see Appendix E for conversion factors).

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:

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

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

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 for each community. 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 SD, V, and SE:

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

where:

s = sample standard deviation,

n = sampled households,

N = total number of households in the community,

$t_{\alpha/2}$ = 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 will be added to the Division of Subsistence CSIS. This publicly accessible database includes community-level study findings.

Population Estimates and Other Demographic Information

As noted above, a goal of the research was to collect demographic information for a 50% sample of households in King Salmon and Naknek, and for all year-round households in South Naknek. For this study, "year-round" was defined as being domiciled in the community when the surveys took place and for at least six months during the study years 2017 and 2018. Because not all households were interviewed, population estimates for each community were calculated by multiplying the average household size of interviewed households by the total number of year-round households, as identified by Division of Subsistence researchers in consultation with community officials and other knowledgeable respondents.

There may be several reasons for the differences among the population estimates for each community generated from the division's surveys and other demographic data developed by the 2010 federal census, the U.S. Census Bureau's American Community Survey, and the Alaska Department of Labor and Workforce Development (ADLWD 2019; U.S. Census Bureau n.d.). Sampling of households, timing of survey implementation, or eligibility criteria for inclusion in the survey may explain differences in the population estimates. Two possible reasons for the differences may relate to varying sample sizes and factors for expansion, and the time and season of data collection. Differing population estimates may also relate to the criteria agencies used to determine "full-time" residency and eligibility in the particular study. Population estimates are discussed in the section "Demography" in the individual community chapters.

Map Data Entry and Analysis

As discussed above, maps were generated based on data collected using an iPad. All data were entered on the iPad and map features were matched to the survey form to ensure that all harvest data were recorded accurately. Once all data were uploaded to the cloud server, Division of Subsistence Information Management staff created search and harvest location maps for each salmon species in ArcGIS 10.6.1 using a standard template for reports. Maps were reviewed by community members at a community review meeting to ensure accuracy.

Key Respondent Analysis

The KRIs were audio recorded upon approval by the key respondent and recordings were later transcribed. If no audio recording occurred, researcher notes served to document KRI responses and those notes complemented transcriptions of other interviews. Analysis for the KRIs was done using QSR NVivo version 10.0, a qualitative program that allowed the researcher to thematically group the interview content. This iterative process organized themes and sub-themes into categories of linked responses. This allowed for quick and effective retrieval of respondent narratives related to each theme. QSR NVivo version 10.0 software is able to produce a series of reports based on themes, creating an efficient tool from which to draw out quotations and ethnographic information. This analysis process was also applied to survey comment data, which were responses to open-ended questions that allowed respondents to add comments regarding the harvest and use of salmon.

Participant Observation Analysis

For participant observation analysis, fieldwork notes, photographs, and recordings from the participant observation trips in 2017 and 2018 were organized and sorted by category. Data from these sources were categorized by themes and sub-themes pertaining to the qualitative information categories developed during KRI analysis.

Community Review Meetings

In January and February 2020, Jones and Larson presented preliminary survey findings and associated search area and harvest maps at meetings in each of the three study communities. The purpose of the community review meetings was to provide an opportunity for community members to comment on the findings of the study and for researchers to capture concerns that were not documented during the survey, but that community members felt were important.

Table 1-6.–Community review meetings, study communities, 2017 and 2018.

Community	Date	Attendance	
		Community residents	Staff
King Salmon	1/29/2020	4	Jones and Larson
Naknek	1/30/2020	2	Jones and Larson
South Naknek	1/30/2020	6	Jones and Larson
Naknek	2/13/2020	4	Larson

The LRAs, tribal administrators, and local government agencies were informed about the review meetings. Flyers with meeting information were posted in public places in each study community and a flyer was also posted online (Appendix F). A total of four community members attended the community review meeting in King Salmon. For Naknek, two meetings were held due to a conflict with another community event that occurred at the same time as the original meeting date. Two community members attended the first meeting on January 30, 2020, and four community members attended the second meeting on February 13, 2020. Six community members participated in the South Naknek meeting, which was held on January 30, 2020 (Table 1-6).

Final Report Organization

This report summarizes the results of systematic household surveys, key respondent interviews, and participant observation conducted by staff from ADF&G, BBNA, as well as by LRAs, and the report also summarizes resident feedback provided at the community review meetings. The findings are organized as follows:

- Chapter 2 provides a history of the study area, a summary of subsistence regulations, and an overview of the subsistence permit and harvest assessment program.
- Chapter 3 presents King Salmon community background and demographic information for the 2017 and 2018 study years. This chapter includes a discussion of historical and contemporary (2017 and 2018) harvests and an assessment of the uses of salmon by King Salmon residents, addresses the subsistence salmon permit system for King Salmon, and summarizes community comments and concerns.
- Chapter 4 provides community background for Naknek and demographic information for the 2017 and 2018 study years. This chapter includes a discussion of historical and contemporary (2017 and 2018) harvests and an assessment of the uses of salmon by Naknek residents, addresses participation in the subsistence salmon permit system, and summarizes comments and concerns provided by Naknek community members.
- Chapter 5 focuses on South Naknek. First, community background and demographic information for the 2017 and 2018 study years is presented. This chapter includes a discussion of historical and contemporary (2017 and 2018) harvests and an assessment of the uses of salmon by South Naknek residents, addresses the subsistence salmon permit system, and summarizes community comments and concerns.
- Chapter 6 provides an overview of the three study communities' salmon harvest and use data and contains a section that compares salmon uses and harvests in 2017 and 2018 with data from previous years. This chapter also summarizes the assessments of the permit reporting system. A discussion of the factors shaping local subsistence fishing in this region is also provided in Chapter 6, followed by study conclusions.

As mentioned previously, the survey form included questions about gear used to fish for salmon, which included questions about involvement in commercial fishing as a means for obtaining fish for home use, and also participation in the subsistence salmon permit system. The final tables in this chapter present select survey results for all communities for both study years pertaining to those topics; narratives in chapters 3, 4, and 5 will refer to these tables as separate community survey results are discussed.

ADF&G provided a draft report to BBNA for review and comment. After receipt of comments, the report was finalized. ADF&G distributed copies of the report to the King Salmon Tribal Council, Native Council of Naknek, South Naknek Village Council, the Naknek and South Naknek public libraries, the Bristol Bay Borough School District Library, and the ADF&G King Salmon Office. Additionally, a short (four-page) summary of community-specific study findings was distributed to each U.S. Post Office box holder in all three study communities (Appendix G).

Table 1-7.–Estimated households owning a net or boat, study communities, 2017 and 2018.

Community	Study year	Estimated households	Households owning a _____ . net		boat		boat used for commercial fishing	
			Number	Percent	Number	Percent	Number	Percent
King Salmon	2017	99	56.8	57.4%	64.2	64.8%	12.8	13.0%
	2018	102	56.7	55.6%	60.4	59.3%	11.3	11.1%
Naknek	2017	154	104.6	67.9%	84.9	55.1%	59.2	38.5%
	2018	153	72.7	47.5%	80.3	52.5%	47.8	31.3%
South Naknek	2017	28	24.3	87.0%	14.6	52.2%	12.2	43.5%
	2018	26	21.9	84.2%	16.4	63.2%	12.3	47.4%

Source ADFG Division of Subsistence household surveys, 2018 and 2019.

Table 1-8.–Reported household commercial fishing role, study communities, 2017 and 2018.

Community	Study year	Commercial fishery role		
		Permit holder	Crew	Both
King Salmon	2017	8	8	0
	2018	7	12	0
Naknek	2017	35	33	0
	2018	25	47	0
South Naknek	2017	13	4	0
	2018	8	3	0

Source ADF&G Division of Subsistence household surveys, 2018 and 2019.

Table 1-9.–Estimated household commercial salmon retention and subsistence salmon fishery participation, study communities, 2017 and 2018.

Community	Study year	Household usually retains salmon from commercial fishing		Household retains salmon from commercial fishing, and participates in subsistence salmon fishing	
		Number	Percent	Number	Percent
King Salmon	2017	5.5	5.6%	5.5	5.6%
	2018	17.3	17.0%	13.2	13.0%
Naknek	2017	51.3	33.3%	43.4	28.2%
	2018	50.4	32.9%	36.3	23.8%
South Naknek	2017	11.0	39.1%	7.3	26.1%
	2018	6.8	26.3%	4.1	15.8%

Source ADF&G Division of Subsistence household surveys, 2018 and 2019.

2. BACKGROUND AND REGULATIONS OVERVIEW

Introduction

The Bristol Bay Borough is in Southwest Alaska and was incorporated as the first borough in Alaska in 1962.[1] The Bristol Bay Borough communities—King Salmon, Naknek, and South Naknek—are located on the banks of the Naknek River. This river flows for approximately 30 miles from the headwaters at Naknek Lake into Kvichak Bay, which is an arm of Bristol Bay. Naknek and South Naknek are both located within one mile of the confluence of the Naknek River with Kvichak Bay: Naknek is on the north shore and South Naknek is on the south shore. King Salmon is on the north shore of the Naknek River and located halfway between the outlet at Naknek Lake and confluence with Kvichak Bay. The communities of Naknek and King Salmon are approximately 15 miles apart and are connected year-round by the paved Alaska Peninsula Highway. During winter months when the ice on the Naknek River is sufficiently frozen, vehicles can cross the Naknek River at New Savonoski (approximately five miles east of South Naknek) to link travel between the three communities. The Naknek River watershed supports all five Pacific salmon species found in Alaska. For centuries, the Central Yup'ik, and Alutiiq people living along the Naknek River and Naknek Lake have relied on salmon, predominantly sockeye salmon, as a key subsistence resource.

This chapter provides an overview of regional historical information, followed by an overview of the history of subsistence management in the study area, and the subsistence regulations from the study period time frame. This chapter concludes with an overview of both commercial salmon fishing and Naknek River sport fishing information.

Naknek Area History and Background

Early Human Inhabitants

Approximately 10,000 years ago, Pleistocene-era glaciers covered the entire Naknek region; those glaciers obliterated any evidence of prehistoric people living there prior to that time (Rennick 1989). The glaciers began retreating approximately 9,000 years ago; since then, there have been 10 different volcanic eruptions that spread ash deposits over the region. Soil buildup on top of each ash layer created an alternating stratigraphy of ash and soil. Archaeologists use these ash deposits to date cultural remains of the various groups that have occupied this area throughout the past 8,000 years (Dumond 2005).

According to archaeologist Don E. Dumond (2005), as glaciers retreated, people of the Paleo-Arctic tradition moved into the Naknek area, often occupying the narrows of glacial Naknek Lake that later became the Brooks River. Over time, the moraine that created glacial Naknek Lake eroded and the water level in the lake dropped as much as 85 feet (Dumond 2005). The human occupation sites that were located next to the lake became separated from the lakeshore, and those sites were then abandoned; later, new locations closer to the developing Brooks River were occupied.

Following the Paleo-Arctic tradition (approximately 6000 B.C. to 5500 B.C.), there was a period for which there was no recovered evidence of human activity in the Naknek area. However, the Northern Archaic tradition was documented on the Alaska Peninsula from 3000 B.C. to 1900 B.C. Hunters of the Northern Archaic tradition may have made seasonal use of caribou resources in the Naknek area, such as along the Brooks River. Around 1900 B.C., the Arctic Small Tool tradition from the north exerted influence in the Naknek area. The Naknek region was but one part of the area occupied by the Arctic Small Tool culture, which stretched along the coastal zone of North America from the Alaska Peninsula to Greenland. These ancestors of historical Eskimo populations were fishermen, caribou hunters, and, in some places, seal hunters. Following a 700-year break in cultural sequences, elements of the Norton tradition appeared

1. Bristol Bay Borough. 2015. "Since 1962." http://www.bristolbayboroughak.us/index.php (accessed May 2020).

in the Naknek area by approximately 400 B.C. at a Naknek River site called Smelt Creek. The amount of ceramic and stone artifacts recovered suggests year-round occupancy, and residents were able to carry out a full array of domestic activities centered on resource harvesting within the surrounding environs. From the same time period came evidence in the Naknek River of fishing activity using lines or nets. Notched pebbles, identified as sinkers, suggested technological advances allowing access to the salmon-rich Naknek River where deep, swift water precluded wading as a means of reaching the fish (Dumond 1981).

Thule, the last prehistoric cultural tradition identified in the Naknek area, was present by A.D. 1100. A complicated pattern of seasonal movements was indicated by the variety of dwelling types, some of which appear to have been used year-round while others were used on a seasonal, but recurrent, basis. The Thule tradition spread rapidly into the Naknek area (Dumond 1981; Morris 1985). The three most recent Thule cultural phases started with the Brooks River Camp Phase, which was followed by the Brooks River Bluffs Phase, and the most recent was the Pavik Phase. The Brooks River Camp Phase ended about A.D. 1300 as a result of a major volcanic eruption, likely at Aniakchak Volcano. The Brooks River Bluffs Phase began in about A.D. 1350 when people moved back into the area. The Brooks River Bluffs Phase ended and the Pavik Phase began when two separate cultures moved in the Naknek area: one culture (Aglurmiut) occupied the western portion of Naknek Lake in the lowlands, while the other culture (Severnovsk) was located on the more mountainous eastern shores of Naknek Lake (Dumond 2005).

The Pavik Phase is characterized by the archaeology of the Paugvik site located close to the mouth of the Naknek River, and this phase relates to the history of the people living at Paugvik—namely the Aglurmiut. The tool types and materials found in the archaeological record and the design of the semi-subterranean houses excavated at Paugvik suggest the Aglurmiut arrived in the Naknek drainage from the Kuskokwim region to the north. However, archaeological and historical evidence suggest another culturally distinct group from the Central Yup'ik-speaking Aglurmiut people occupied two settlements on the Savonoski River during this time as well. This other group is referred to as the Severnovsk, and this group spoke the Alutiiq or Sugpiaq language. The Severnovsk were part of the Alutiiq groups that inhabited almost the entire northern Alaska Peninsula from south of Port Heiden and Chignik Bay almost to the Kvichak River and Iliamna Lake to the north. The only area on the Alaska Peninsula not occupied by Alutiiq was the area from Egegik to Naknek, which was occupied by the Aglurmiut.

Russian Arrival in the Naknek Region

Russians arrived in the region around 1800. The European trade goods brought by the Russians that are present in the archaeological record help to define the Pavik Phase (Dumond 2005; Rennick 1989). As the fur exploitation by the Russian American Company in other areas of Alaska declined due to the reduction of fur-bearing animal populations, the company decided to move into southwestern Alaska. It was believed that profits could be obtained by trading with the Alaska Native inhabitants there for the furs of beavers and other animals. Historical evidence suggests that the first contact by Russians in the Naknek region may have occurred at Paugvik in 1791 when a hunting party led by Vasilii Medvednikov and Dmitri Bocharov visited the mouth of the Naknek River. The hunting party likely traveled from the Gulf of Alaska on the east side of the Alaska Peninsula to the Bering Sea on the west side of the Alaska Peninsula by portaging via Becharof Lake, the lake named after Bocharov with a different spelling (Dumond 2005). In 1818, Petr Korsakovskiy, apparently following the same route as Bocharov, visited Paugvik during an expedition to establish fur trading networks in the area. He found that the people living there were Central Yup'ik-speaking Aglurmiut and that they already had experience trading with Russians, presumably from visits by Medvednikov and Bocharov.

In regard to the Severnovsk people, Korsakovskiy's journal from 1818 indicates that "some of the Severnovsk people were unfriendly both to inhabitants of Katmai and to the Russians" (Dumond 2005:47). Historical evidence suggests the Aglurmiut forced the Severnovsk people out of the Paugvik site, forcing them to relocate on the eastern end of Naknek Lake along the Savonoski River. Due to this conflict, the Aglurmiut and the Severnovsk people were enemies and did not intermingle along the Naknek drainage. In 1818, Korsakovskiy left some members of his party at the mouth of the Nushagak River and in 1819 he

established a trading post known as *Aleksandrovskiy odinochka* at Nushagak Point about six miles south of present-day Dillingham (VanStone 1988:7–8).

The Korsakovskiy expedition in the Naknek River area provided early information about the area but no map. Ivan Ya. Vasil'ev produced the earliest map of the area from an 1831–1832 expedition that featured the Naknek drainage area from Bristol Bay to Shelikof Strait (Dumond 2005:59). At the mouth of the Naknek River, the map shows the villages of Paugvik (near the present-day location of Naknek) on the north side of the river and Kougumik (at the present-day location of South Naknek) on the south side of the river. These settlements were occupied by the Aglurmiut. Two other settlements occupied by the Severnovsk people—Ikak (now known as Old Savonoski) and Alinnak—were shown about 70 miles to the east of the mouth of the Naknek River at the opposite end of the Naknek drainage near where the Savonoski River flows into the Iliuk Arm of Naknek Lake (Dumond 2005).

Throughout the 1820s and 1830s, the Aglurmiut at Paugvik traded furs with the Russian hunting stations at Katmai and at Nushagak Point. According to Dumond and VanStone (1995:8): "The strategic location of *Aleksandrovskiy Redoubt* and the efforts of Fedor Kolmakov brought about, within a period of little more than 20 years, extensive exposure of the natives of southwestern Alaska to the fur trade. Acculturation was most rapid among the Aglurmiut who lived closest to the post, including the inhabitants of Paugvik." In 1841, a record from the Kodiak Russian Orthodox church showed the baptism of 46 individuals in the Severnovsk settlements and 57 individuals at Katmai (on the coast of Shelikof Strait). In 1842, a church mission was established near *Aleksandrovskiy odinochka* at Nushagak Point. However, by the mid-1840s, trade goods began arriving in Bristol Bay from Cook Inlet through a small post on Iliamna Lake, instead of by boat across the Bering Sea to *Aleksandrovskiy odinochka*, resulting in less use of this Nushagak Point trading post.

The First Commercial Salmon Salteries and Canneries

The Aglurmiut abandoned Paugvik and moved to the newer settlement of Naknek upstream from Paugvik beginning in 1870. In 1890, two commercial salmon salteries were operating in the Naknek region. There was the Arctic Packing Company saltery, where present-day South Naknek is located, and L.A. Pedersen saltery, which was built one mile upstream from the original settlement of Paugvik (Branson 2007). In 1893, the Arctic Packing Company saltery was sold to Alaska Packers Association, and in 1894 a cannery was built at that spot. This cannery was known as Diamond NN. In 1893, the Naknek Packing Company bought the Pedersen saltery and built a cannery beside it (Dumond and VanStone 1995). These canneries were established by enterprises from outside of Alaska. Very few local people were hired to work in the canneries; instead, most of the workforce—including cannery maintenance workers, fish processing workers, and fishermen—traveled to Alaska by ships from Seattle and San Francisco. After the season ended, the workforce returned to the contiguous United States the same way they came.

> In 1900 the cannery of the Alaska Packers Association on the Naknek River employed 58 Euro-American fishermen and 54 Euro-American cannery workers, trap and beach men, and salters; 20 employees were local natives and 140 were Chinese. In the same year the Naknek Packing Company across the river employed 60 Euro-American fishermen and beach hands, while 12 Euro-Americans, 11 natives, and 131 Chinese worked in the cannery. (Dumond and VanStone 1995:10)

After several seasons since the commencement of the commercial salmon industry in the Naknek region, the opportunities for local people to obtain employment grew. More people moved permanently and seasonally into Naknek and South Naknek. During this era, labor jobs were available to local people, but there were not many opportunities to fish.

> By 1905 cannery output had doubled again, with 60 Natives employed in the Naknek canneries, and at least that many more in canneries near the mouth of the Kvichak River a short distance to the north. In 1909 output was three times that of 1900, and thereafter, although the size of the pack fluctuated from year to year it did not significantly decrease in the Naknek-Kvichak area, despite the massive volcanic

> eruption that would shortly occur. Thus, although the employment opportunities for local Native people increased slowly at first, by the end of the first decade of the twentieth century such opportunities were by no means insignificant. (Dumond 2005:83)

Novarupta-Katmai Eruption of 1912

Leading up to the Novarupta-Katmai volcanic eruption, people living in the Naknek region reported feeling earthquakes for several days. The June 6, 1912, Novarupta-Katmai volcanic eruption was the 20th century's most voluminous volcanic eruption, releasing four cubic miles of airborne pumice that initially blew to the east toward Kodiak Island (Hildreth and Fierstein 2012:87). Violent explosions of pumice lasted for three days and during that time dust and ash continued to fall on Kodiak Island. Thunder and lightning accompanied the explosions and eruptions of pumice and ash in the Severnovsk area, where ashfall was more than one foot deep. On the lower Naknek River it was not until June 12 that about an inch of ash arrived, and then ash fell again on June 15 for about an hour (Hildreth and Fierstein 2012:21). The valley that flows into the Uykak River was filled to a thousand feet with a pyroclastic flow of sand-sized particles that reached the Uykak River less than 10 miles south of Old Savonoski.

Fortunately, no one was killed in the eruption. Most families from the Severnovsk area and families from Katmai Village were in Naknek or Kodiak at the time of the eruption, since people were employed in the commercial fishing industry during the salmon fishing season (Schaaf 2004). However, there were a few Severnovsk residents in the area when the eruption occurred, and among them was Petr Kayagvak (also known as American Pete). An account describing that day from American Pete is as follows:

> The Katmai mountain blew up with lots of fire and fire came down trail from Katmai with lots of smoke. We go fast Savonoski. Everybody get bidarka (skin boat). Helluva job. We come Naknek one day, dark, no could see. Hot ash fall. Work like hell. (Griggs 1922:17)

All the families from the Severnovsk area and Katmai Village were left without homes to return to as a result of the June eruption, and it was impossible to reestablish communities in the same locations due to the damaged landscape. Some families left the area by boarding the U.S. Revenue Cutter *Manning* to establish a new village on the Alaska Peninsula. After several failed attempts at picking a site for the new village, a final selection was made 200 miles southwest of their former villages: this new settlement was named Perry (now Perryville) (Schaaf 2004). For those who remained in the Naknek region, a meeting was held in the fall of 1912, moderated by the Russian Orthodox priest from Nushagak, between the Native leaders of Naknek and the leaders of the Severnovsk settlements. An agreement was reached that allowed the Severnovsk people to settle at a location on the Naknek River about six miles upstream on the south side of the river. This settlement became known as New Savonoski and was originally listed as Novo Savonoski in church records (Dumond 2005:87). New Savonoski has since been abandoned as families moved to South Naknek located five miles downriver at the mouth of the Naknek River (Schaaf 2004).

Shortly after the eruption, from 1912 to 1919, the National Geographic Society began conducting volcanic research in the Katmai region. The area most effected by the eruption became known as the Valley of Ten Thousand Smokes. The work done by the National Geographic Society emphasized the scientific importance of preserving the area, and, in 1918, President Woodrow Wilson created the Valley of Ten Thousand Smokes National Monument.[2]

Naknek River Salmon Canneries and Influenza Epidemic

The establishment of canneries in the Naknek River brought in people from all over the world. "A cannery was like a small town and every spring they'd load up the boats from Seattle, Bellingham, San Francisco,

2. National Park Service. 2018. "History – Katmai: Scientific Exploration (1912-1920s)." https://www.nps.gov/katm/learn/historyculture/history.htm (accessed May 2020).

and come north."[3] Many Scandinavian men came to fish and stayed in the region year-round trapping in the winter and fishing in the summer. Some of these European men married Alaska Native women; the surnames in the Naknek area today reflect that Scandinavian heritage. Each season, when the canneries started operating, many local people would move from their villages closer to the canneries for the opportunity to work during the summer. After the season, they would move back to their winter residence and resume subsistence activities such as hunting in the fall for caribou or moose and then trapping furbearers in the winter, followed by spring subsistence hunting and fishing until the start of the salmon season. The number of canneries grew as time went on. By 1915, there were four canneries located along the Naknek River (Branson 2007). The influence of the canneries, the influx of many people for the commercial fishery, and the cash economy that was introduced to the local population produced a profound change over a short time in the Naknek region.

The 1918 and 1919 influenza epidemic did not appear in Bristol Bay until May 1919. The first Alaska Packers Association cannery boat arrived that season on May 22, 1919, and the first case of the influenza was diagnosed by the cannery physician on May 26. Many more people were infected shortly after that first case. The canneries had doctors and nurses to serve the cannery workers and the local Native population living in villages around the region, but within a week the number of cases had grown so rapidly that those physicians sought the help of the federal government. The United States Commissioner's office in Dillingham was alerted by radio about dire conditions in Naknek; however, very little could be done to help because Dillingham was also experiencing profound effects caused by the epidemic. By June 8, it was reported that 80 people in Naknek had died from the flu, approximately 21 people were reported to have died at Ugashik, and 13 people in New Savonoski died; also, 32 orphans from the Naknek area were transported to the Kanakanak Hospital, the government-owned hospital in Dillingham (Dumond 2005).

After the influenza epidemic ended, the local area residents began reestablishing their communities. American-style schools came to Naknek and South Naknek during this time. The schools were first operated by the U.S. Department of Education, but shortly thereafter the Bureau of Indian Affairs took over school operations in the Naknek Region (Partnow *In press*). Following the epidemic, the Naknek area canneries continued seasonal operations, and the salmon fishing industry continued to grow. The Naknek area canneries owned the boats that fishermen used, and the canneries decided who got to fish in the boats. Double-ender sailboats had been used to fish in Bristol Bay since the inception of the commercial fishery. However, in 1922, power boats were introduced into the fishery. Canneries were opposed to the use of power watercraft because they were afraid that local fishermen using their own power boats would usurp the cannery monopoly of the industry. The canneries lobbied that fishing only by sailboat be put into regulation after 1923 (Branson 2007). More independent fishermen appeared in Bristol Bay in the mid-1920s; these fishermen were both Alaska Native and Euro-American fishermen who were (or became) full-time residents of the area. In 1927, there were 35 independent boats operated by Natives and 28 operated by Euro-Americans. In 1930, there were 125 independent Native fishing boats and 66 independent Euro-American boats (Branson 2007:7).

When power boats were finally allowed permanently by non-cannery boat operators after 1951, the commercial fishery started to become more fast-paced and produced much higher volumes of salmon products. More independent fishermen with their own powerboats "gradually loosened the powerful control of the canneries over the entire industry and enhanced the earning power of local fishermen. There were only 20 fishermen-owned boats in Bristol Bay in the early 1950s but by 1955, there were 150 … " (Branson 2007:8). Also by 1955, eleven canneries had been built on the lower Naknek River and another dozen canneries had been built on Kvichak Bay and the Kvichak River downstream from Levelock, though some closed so they were not all operating simultaneously (Branson 2007).

3. Lori Townsend, interview with Katie Ringsmuth, historian, and Tim Troll, Executive Director of Bristol Bay Heritage Land Trust, "1919: The Spanish Flu in Dillingham," *Alaska Public Media*, September 28, 2016, podcast audio: https://media.aprn.org/2016/ann-20160928-04.mp3 or transcript: https://www.alaskapublic.org/2016/09/28/1919-the-spanish-flu-in-dillingham/ (accessed May 2020).

King Salmon Air Station

As a defense strategy during the World War II era, the U.S. government established military installations in locations throughout rural Alaska, and the Naknek area was identified as a place to locate one of these bases. In 1941, the U.S. military chose a site approximately one-half mile north of Naknek for a new army airfield; however, after consulting with local residents, a flatter landscape, located roughly 15 miles to the east, was identified for the location of the air station (Feldman 2001). The area chosen for the air station was scarcely developed or occupied, with the exception of a few trappers' cabins and a reindeer herd in the area (Morris 1985).

Construction on the Naknek Army Air Base, as it was named at the time, started on July 1, 1942, and was completed September 22, 1943, "when the physical area of the station was deemed complete" although improvements continued through 1944, which included paving of the airstrips.[4] The army airfield supported operations throughout Alaska, but especially the Alaska–Siberia aircraft ferry route. After the war ended, the airfield (runway) was transferred to the Civil Aeronautics Authority, later known as the Federal Aviation Administration. The remainder of the physical air station was controlled by the military.

In the early 1950s, with the start of the Cold War with the Soviet Union, the airfield was designated one of 10 original aircraft control and warning sites constructed as part of the establishment of a permanent air defense system in Alaska. The Naknek Army Air Base was renamed King Salmon Air Station in 1954, and after Alaska became a state in 1959, the Civil Aeronautics Authority transferred the airfield to the State of Alaska. However, the U.S. Air Force still retained direction of the aircraft and the radar site operations, monitoring and responding to Soviet-attempted incursions into U.S. airspace during the Cold War.

Over time, different communications systems and aircraft were maintained at King Salmon Air Station. Beginning in 1964 aircraft from the King Salmon Air Station intercepted more than 100 Soviet aircraft approaching Alaska. The station closed military operations in 1994 as the Cold War ended and defense funding diminished. The King Salmon Air Station is currently in "caretaker status."[5]

Katmai National Park and Preserve

The 1,700-square-mile refuge created when President Woodrow Wilson designated the Valley of Ten Thousand Smokes as a national monument was slow to become a tourist destination. The first tourism flightseeing trip to the Valley of Ten Thousand Smokes occurred in 1929. Two years later, in 1931, the monument was expanded to include much of the area around Naknek Lake and Brooks Lake, areas previously occupied by and used by the Severnovsk for subsistence fishing and hunting (Schaaf 2004).[6] Bristol Bay community residents—such as the people living in New Savonoski, who continued to harvest salmon at Brooks Camp in the summer and fall—continued to pursue subsistence and commercial trapping activities in the expanded monument. Many people were unaware that they were within the boundaries of a national monument since little had changed in the area.

In the 1950s, two recreation camps at the outlet of Naknek Lake (Lake Camp) and at the foot of Naknek River rapids (Rapids Camp) were built for military personnel stationed in King Salmon to use. A popular activity at these camps was sport fishing, and word of the outstanding sport fishing opportunities in the Naknek area spread throughout Alaska and the contiguous United States. As sport fishing became popularized in the area, tourism in the monument increased significantly. In 1950, the National Park Service (NPS) stationed a full-time ranger and constructed a ranger station at Brooks Camp. Several private lodges were established in the area as well during this time. As a response to the amount of sport fishing occurring within the monument,

4. James Brown, Jr., n.d. "King Salmon Airport (King Salmon AFS, AK) History." Air Force Radar Museum Association, Inc. https://www.radomes.org/museum/parsehtml.php?html=KingSalmonAFSAKhistory.html&type=doc_html (accessed May 2020)
5. Bristol Bay Borough Chamber of Commerce. n.d. "What You Need to Know." http://www.bristolbaychamber.com/what-you-need-to-know-/ (accessed May 2020).
6. National Park Service. 2018. "History – Katmai." https://www.nps.gov/katm/learn/historyculture/history.htm (accessed May 2020).

Naknek area residents proposed that the area should also be open for commercial fishing, hunting, trapping, and mining. In response to the user interests, in 1953, the NPS conducted a study and concluded that the national monument should remain, but better access and park facilitates were needed (Rennick 1989). Throughout the 1960s and 1970s, the boundary of what was renamed the Katmai National Monument continued to expand; by 1969 almost all of Naknek Lake fell within the monument boundary (Morris 1985).

With the passage of the Alaska National Interest Lands Conservation Act (ANILCA) in 1980, one million additional acres were added to the existing monument; the resulting four million-acre area became Katmai National Park and Preserve, which extends from the east boundary of the Bristol Bay Borough to the east across the Alaska Peninsula to the Gulf of Alaska shoreline at Shelikof Strait. Park regulations limited harvesting activities to rod-and-reel fishing and berry picking throughout the park, while subsistence fishing, hunting, and trapping were allowed only in the preserve (Morris 1985).

In the 1980s, the Brooks River area, and later the Katmai coast, became popular wildlife viewing destinations. As it is explained by Rennick (1989:57): "Recreation in Katmai can be summed up in three words: volcanoes, bears and fish." Today, the majority of the park's visitors fly into King Salmon, or directly to Brooks Camp, from Anchorage to access recreation opportunities in the park. Brooks Camp is located on Naknek Lake, which is a short walk from Brooks Falls and Brooks Lake where brown bears can be viewed in large concentrations from wooden boardwalks and sport fishermen can catch a variety of fish (including all five species of salmon, as well as rainbow and lake trout, Dolly Varden, Arctic char, northern pike, and Arctic grayling). A 23-mile road extends from Brooks Camp to the Valley of Ten Thousand Smokes, providing access for hikers and rafters who want to witness the landscape left behind by the Novarupta-Katmai eruption of 1912.

Subsistence in Katmai National Park and Preserve

For subsistence users, a major effect of the transition of Katmai National Monument into a national park and preserve was the introduction of regulations outlawing subsistence hunting and fishing within the park boundary. Prior to the land status change, the NPS funded the University of Alaska Fairbanks to document information on subsistence resource harvest activities in the vicinity of proposed additions to Katmai National Monument to help assess the potential effect of the status change (Behnke 1978). According to Behnke (1978), many of the areas within the proposed boundary expansion were heavily utilized by residents of King Salmon, Naknek, and South Naknek for harvesting fish and game through subsistence means. For example, Behnke (1978:145) reported:

> … a few families from Naknek and South Naknek continue traditional patterns by travelling up into Naknek Lake in the fall to get "red" fish, red salmon which are beginning to spawn and have turned bright red. These fish are split and hung on racks to dry in the air. They provide a favorite food to a few Native families and are eaten with seal oil, rendered bear fat, or butter. Small numbers of these fish are taken at lagoons along the upper Naknek River, and a traditional location for fall fishing is at the mouth of Brooks River in Katmai National Monument.

As mentioned above, Katmai National Monument became a national park and preserve in 1980, and with this change, the NPS rules prohibited all subsistence hunting and fishing within Katmai National Park but allowed subsistence activities to occur within the preserve boundary. The park formation meant an important subsistence salmon fishing area at the outlet of Naknek Lake was now within the park boundary, and therefore closed to subsistence fishing for the first time. This area is known as "Trefon's Cabin" and had previously been used for subsistence fishing for "red fish," which are spawning sockeye salmon, for generations by local area residents.

For several years, local community members continued to fish for red fish at Trefon's Cabin and at Brooks Camp in their traditional manner, and the NPS employees did not enforce the regulations that prohibited subsistence fishing in these locations. However, beginning in 1991, the NPS began enforcing regulations and ticketing people for subsistence fishing within the park boundary (Partnow *In press*). As a result, local area residents banded together and began seeking ways to change the regulations.

In 1992, a local area resident, Trefon Angasan, Jr., brought the red fish issue before the U.S. Senate Select Committee on Indian Affairs at a hearing held in Anchorage (U.S. Congress 1992123–125). This resulted in the formation of a nonprofit organization called the Council of Katmai Descendants (Ringsmuth et al. 2013:163, 170). The nonprofit's mission was to represent the interests and subsistence rights of Alaska Natives who had ancestral ties to lands within Katmai National Park. After three years of work, in 1996, Congress passed Sec. 1035, PL 104-333, which states that "local residents who are descendants of Katmai residents who lived in the Naknek Lake and River Drainage shall be permitted, subject to reasonable regulations established by the Secretary of the Interior, to continue their traditional fishery for red fish within Katmai National Park … ."[7] As a collaboration between the NPS and the Council of Katmai Descendants, a list was created that had approximately 60 households in King Salmon, Naknek, and South Naknek that were eligible to participate in the fishery based on traditional use and ancestry (Ringsmuth et al. 2013:173). The NPS put into place regulations and a procedure for issuing permits to the list of descendants (Partnow *In press*; Ringsmuth et al. 2013:173–174).

At the time, the State of Alaska, through the Alaska Board of Fisheries (BOF), developed subsistence fishing regulations while legal disputes were in progress about navigable waters within federally designated lands being managed by the State of Alaska or federal government (further details on the genesis of federal subsistence fishing regulations are provided later in the chapter). Therefore, following the Congressional action in 1996 that allowed the pursuit of red fish within Katmai National Park, the BOF at its February 1998 meeting adopted an amended version of Agenda Change Request (ACR) 20, submitted by the South Naknek Village Council "to establish a redfish subsistence fishery in Katmai National Park" (ADF&G 2015:63). The original ACR requested subsistence fishing opportunities at three specified locations within the park with several gear types, including rod and reel. As amended and adopted by the BOF, the only major change was to delete rod and reel as a gear type for this subsistence fishery because rod and reel is defined as a sport fishing gear type under most state regulations.[8]

According to a KRI account collected during fieldwork for this project, in the fall of 2012, a group of local subsistence users returned to the Naknek Lake boat launch with red fish harvested by gillnet in Johnny's Lake[9] and were approached by two NPS employees. The employees were not aware of the regulation allowing for the harvest of red fish by subsistence means. The employees issued a citation and confiscated the red fish from the group. The incident revealed a lack of communication between the local NPS staff and local subsistence users. A federal subsistence Regional Advisory Council member stated[10] in October 2012:

> There's a broken situation where, you know, I sat on the BBNC board for many, many years and we went to Congress and passed a law that said we could put a net in the park, [but NPS enforcement] never heard of [regulations allowing for subsistence harvests of spawning sockeye salmon in the park] before. And so we worked that out on the local level, and then we had a gathering with the [NPS] Staff before they went out into the field.

7. Alaska Department of Fish and Game. 2015. "Alaska Board of Fisheries Meeting Information: Bristol Bay Finfish – December 2–8, 2015, Record Copy (RC) — Submitted during the meeting (RC 049)," http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=12-02-2015&meeting=anchorage (accessed May 2020).
8. James Fall, Subsistence Program Manager, ADF&G, Anchorage, 2020, personal communication.
9. A portion of Naknek Lake open to subsistence fishing for spawning sockeye salmon (5 AAC 01.320(b)(2)(B)).
10. Bristol Bay Alaska Federal Subsistence Regional Advisory Council Meeting—Public Meeting: Volume I, October 24, 2012, U.S. Department of the Interior, Federal Subsistence Board Regional Advisory Council (RAC) Meeting Transcripts, https://www.doi.gov/sites/doi.gov/files/migrated/subsistence/library/transcripts/upload/Region-4-24-Oct-12.pdf (accessed May 2020).

As a result of the 2012 incident, the local tribal and village councils worked collaboratively with the King Salmon NPS office to address any issues associated with this subsistence fishery. This resulted in BOF proposals (proposals 78 and 81)[11] to add a new subsistence gear type and changed several dates or locations for legally harvesting spawning sockeye salmon. At the December 2015 Bristol Bay BOF meeting, the two proposals to change subsistence salmon fishing regulations were amended to follow Record Copy (RC) 136 and were adopted by the BOF.[12, 13] The regulations opened a new area at the outlet of Idavain Creek on the north side of Naknek Lake for the harvest of spawning sockeye salmon. Additionally, beach seine was added as an allowable gear type to the list of already allowed gear—spear, dip net, and gillnet—in four open areas of Naknek Lake and fishing was allowed in those areas from August 30 through December 31 on the west shore of Naknek Lake near the outlet to Naknek River (was August 30 through September 30); at Johnny's Lake on the northwestern side of Naknek Lake (was August 15 through September 15); at the outlet of Idavain Creek (new area); and at the mouth of the Brooks River from September 18 through December 31 (was October 1 through November 15) (5 AAC 01.320(b)).

Contemporary Background for Study Area

Bristol Bay Borough in Study Years 2017 and 2018

During the 2017 and 2018 study years, the Bristol Bay Borough remained the travel hub for eastern Bristol Bay with the largest airport in the region located in King Salmon. As previously mentioned, Bristol Bay is home to the largest sustainable, natural, returning run of sockeye salmon in the world, and Naknek is the major port for the Naknek and Kvichak sections of the Bristol Bay Area commercial salmon fishery. The commercial salmon industry is the economic driver of the Bristol Bay Borough. The Naknek River drainage has a long history of people coming into the region during the summer to participate in the commercial salmon fishery as a commercial setnetter, commercial driftnetter, salmon processor, or as an employee of any of the many agencies and businesses that provide services and support to the commercial fishing industry. According to a report by the National Oceanic and Atmospheric Administration, in 2017 the Port of Bristol Bay–Naknek was the third most valuable commercial fishery port in the United States with landings that valued $154 million, and in 2018 Naknek was the second most valuable commercial fishery port in the United States with landings that valued $195 million (Liddel and Yencho 2020:13). The large influx of people that come to the Bristol Bay Borough in the summer results in the opportunity for many Alaska residents who do not live permanently in the Bristol Bay region to participate in the Naknek River subsistence salmon fishery.

King Salmon in Study Years 2017 and 2018

The greater community of King Salmon is spread out along the Alaska Peninsula Highway and connecting roads. The focal point of King Salmon is the King Salmon Airport terminal area. Near the airport are numerous businesses, including two restaurants/bars, a motel, several bed-and-breakfasts, two small grocery stores, one liquor store, two gas stations, a bank, and a gift shop. Also nearby and adjacent to the airport are the Bristol Bay Telephone Cooperative, Inc.; King Salmon Visitor Center; U.S. Fish and Wildlife Service Alaska Peninsula/Becharof National Wildlife Refuge headquarters; Katmai National Park and Preserve and Aniakchak National Monument and Preserve headquarters; the ADF&G office and support facilities; and the National Weather Service and Federal Aviation Administration facilities. The main offices of the Lake

11. Alaska Department of Fish and Game. 2015. "Alaska Board of Fisheries Meeting Information: Bristol Bay Finfish – December 2–8, 2015, Meeting Proposals (Subsistence, Sport, Commercial Herring, Area Boundary–Bristol Bay Subsistence: Proposal 78 and Proposal 81)," http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=12-02-2015&meeting=anchorage (accessed May 2020).
12. Alaska Department of Fish and Game, Alaska Board of Fisheries. 2015. "Preliminary Summary of Actions." http://www.adfg.alaska.gov/static-f/regulations/regprocess/fisheriesboard/pdfs/2015-2016/bristolbay/bb_soa_2015.pdf (accessed May 2020).
13. Alaska Department of Fish and Game. 2015. "Alaska Board of Fisheries Meeting Information: Bristol Bay Finfish – December 2–8, 2015, Record Copy (RC) —Submitted during the meeting (RC 136)," http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=12-02-2015&meeting=anchorage (accessed May 2020).

and Peninsula Borough and the Lake and Peninsula School District are also in King Salmon. Located to the north and east of the 8,901-foot main airport runway is the former King Salmon Air Station; the Southwest Alaska Vocational and Education Center (SAVEC) is housed within one of the larger buildings in the main compound.

The Alaska Peninsula Highway crosses King Salmon Creek approximately three miles west of the airport and one-half mile west of that is a U.S. Post Office. Dwellings are connected by roads to the north of the Alaska Peninsula Highway both east and west of where King Salmon Creek bisects the highway. The dwelling area on the west side of King Salmon Creek is accessed by a road just to the west of the post office and extends to the north and west for two miles. Along this road, the King Salmon Village Council office is about one-half mile north from the post office. Many of the King Salmon tribal members reside in this area. To the east of King Salmon Creek by about one-half mile, and south of the Alaska Peninsula Highway, is a road that accesses a concentration of federal housing units that are available for rent by the various federal agency employees working in King Salmon. Beyond the post office, moving west to Pauls Creek, a loop road and other roads extend south of the Alaska Peninsula Highway. The loop road parallels the Naknek River for approximately 1.5 miles; connected roads provide access to fishing lodges and a few dwellings along the river. A small number of dwellings are located away from the Naknek River. Along the stretch of the Alaska Peninsula Highway spanning from the post office toward Pauls Creek, a few dwellings are also located north of the Alaska Peninsula Highway. The distance from the airport to Pauls Creek is approximately five miles.

A road to the north and east of the airport that becomes Lake Camp Road extends about 9.5 miles to Lake Camp. Lake Camp is within the boundaries of the preserve area of Katmai National Park and Preserve and located near the headwaters of the Naknek River at Naknek Lake. At mile 4.5 of Lake Camp Road, Rapids Road branches off and extends for two miles to its terminus at the Naknek River. Rapids Road provides access to Rapids Camp Lodge and a few other lodges. On the south side of the airport an extension of the Alaska Peninsula Highway extends for approximately 1.5 miles to the small airplane parking area. An extension from this road down along the Naknek River provides access to a boat storage area, boat ramp for access to the river, and float plane charter business docks.

Naknek in Study Years 2017 and 2018

The core and oldest section of Naknek originated from property obtained by the Russian Orthodox Church under the Homestead Act (Morris 1985). Among the buildings located there are the borough offices and Naknek Native Village Council building, as well as a clinic, library, museum, gas station, lumber yard, general store, two bars, two bar/restaurant/hotel businesses, and two churches. This core area is the western terminus of the Alaska Peninsula Highway; beyond that, to the west for about one-half mile are fish processing facilities and services, including the old Peter Pan cannery. At the Peter Pan buildings and dock, an important beach access road is maintained that allows vehicles to drive down onto the beach and along the Naknek River at low tide where commercial salmon setnet sites and subsistence fishing sites are located. Beach access is also provided by a road that extends from the core of Naknek northwest for about 2.25 miles to the shoreline of Kvichak Bay. The highway generally parallels the Naknek River as one travels east on the Alaska Peninsula Highway for approximately three miles to Leader Creek. There are canneries located in that three-mile section, as well as the Port of Bristol Bay–Naknek main facility and dock, and support services for participants in the Bristol Bay commercial salmon fishery.

The high bluff along the Naknek River allows only limited access to the river from the Alaska Peninsula Highway. Private homes and dwellings are interspersed along this bluff area also. From Leader Creek, east toward King Salmon to Pauls Creek, spanning about six miles, houses have been built in areas where private property could be accessed from the Alaska Peninsula Highway. The Alaska Native people living in the area, extending about nine miles from downtown Naknek to Pauls Creek, are affiliated with the Naknek Native Village Council. A dirt road near Leader Creek loops north and then west for about six miles to the Pederson Point cannery on the shore of Kvichak Bay.

South Naknek in Study Years 2017 and 2018

The core of South Naknek, where most of the residents live, is generally consolidated in the area east of the historic Diamond NN Cannery. Built originally in 1890 as a saltery by the Arctic Packing Company, the property was absorbed by the Alaska Packers Association (APA) and converted into a salmon cannery in 1895. The cannery was acquired by Trident Seafoods in 1995 and operated almost continuously until 2015 when it ceased operations.[14] The closure of the cannery severely impacted the community since many commercial fishing jobs were lost with the closure.

The South Naknek Village Council building, health clinic, library, church, fire hall, and the no-longer-used school building are in the area east of the cannery. From there the community spreads out to the east and west by a system of dirt roads leading to old canneries, some dwellings, the airport, post office, and the borough-maintained cargo dock. The dirt road extends approximately three miles west to the shore of Kvichak Bay and east approximately three miles to Morakas Point along the Naknek River. An unmaintained dirt road extends approximately five miles from the core of South Naknek east to New Savonoski where, in years when the river freezes sufficiently, the river is crossed with vehicles to access the Alaska Peninsula Highway.

Subsistence Management and Regulations

These following sections summarize: 1) a historical overview of the development of state and federal subsistence fishing regulations in the study area, 2) the subsistence salmon permit and harvest assessment program, and 3) current state subsistence salmon fishing regulations in the Naknek and Kvichak sections of the Bristol Bay Area.

Historical Subsistence Management Overview

Following is a brief history of the legislative, legal, and bureaucratic events that resulted in dual state and federal subsistence fisheries management in Alaska, and specifically how state and federal subsistence salmon fishing regulations apply to the communities of King Salmon, Naknek, and South Naknek. Proximity to multiple drainages and varied land ownership interests factored into the development of the salmon fishing regulatory structure in the area surrounding the study communities. For example, north of Naknek River are the drainages of the Kvichak River and the Alagnak River; south of the Naknek River is Becharof National Wildlife Refuge and the beginning of the Alaska Peninsula. The three communities are positioned within land owned by the Bristol Bay Borough; however, lands adjacent to the communities are the federal lands of Katmai National Park and Preserve and Becharof National Wildlife Refuge.

The Alaska Native Claims Settlement Act (ANCSA) was passed by the U.S. Congress in 1971. The catalyst for the act was the need to determine land ownership so that the pipeline to carry oil from the North Slope to the Port of Valdez could be constructed. ANCSA also established the 12 land-holding Alaska Native regional corporations that were given title to land and monetary compensation for the settlement of land claims within the state of Alaska. Aboriginal hunting and fishing rights were extinguished by ANCSA, but during discussions held before the act was passed there was an expression of Congressional intent that action by the Secretary of the Interior and the State of Alaska would provide protection for the subsistence needs of Alaska Natives.[15]

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14. National Park Service. 2019. "Series: Canneries of Alaska—Diamond NN Cannery: A Case Study." https://www.nps.gov/articles/alaska-cannery-diamond-nn-cannery.htm (accessed May 2020).
15. U.S. Department of the Interior, Federal Subsistence Management Program, "Overview and History of Subsistence Management in Alaska," https://www.doi.gov/subsistence/library/history (accessed February 2020).

In 1978, the state subsistence law was adopted by the state legislature and created a priority for subsistence uses over all other uses of fish and wildlife, but it did not define subsistence users.[16] Then, the Alaska National Interest Lands Conservation Act (ANILCA) was enacted by the U.S. Congress in 1980, which established refuges, parks, and preserves throughout the state of Alaska.[17] Title VIII of ANILCA defined a subsistence priority for all rural residents, which established that if restrictions were required to conserve a fish or wildlife resource, then rural Alaska residents would have harvest priority over other uses of the resource. Title VIII stipulated that the State of Alaska could regulate subsistence activities on federally owned public lands (in addition to its own jurisdiction over state and private lands) if it would enact and implement a subsistence priority that defined subsistence uses and users in a way that was consistent with the federal law.[18] In 1982, the Alaska Joint Board of Fisheries and Game adopted regulations creating a rural subsistence priority that complied with Title VIII of ANILCA. By adopting the rural priority into state regulations, the State of Alaska had the authority to manage fish and wildlife for subsistence uses on both state and federal lands and waters.

In February 1985, the *Madison et al. v. ADF&G and Alaska Board of Fisheries* decision by the Alaska Supreme Court ruled that the Alaska boards of Fisheries and Game did not have the authority to limit the subsistence priority to rural residents, which rendered the state out of compliance with Title VIII of ANILCA (Norris 2002:116). In May 1986, the Alaska Legislature amended the subsistence statute to define subsistence uses of fish and game as customary and traditional uses by residents of rural areas (ADF&G 1988:81). The amended statute established that subsistence was a priority over other uses. Additionally, the BOF was given the authority to create personal use fisheries for nonrural residents of the state.

In late 1989, the Alaska Supreme Court decision in the case *McDowell et al. v. State of Alaska, ADF&G, Alaska Board of Fisheries, Alaska Board of Game, and Don W. Collinsworth* determined that, under the state constitution, all Alaska residents have equal access to the state's fish and wildlife resources; therefore, the rural subsistence priority in state law, adopted to comply with ANILCA, was unconstitutional, placing the state out of compliance with Title VIII of ANILCA (Norris 2002:162–164). State regulations could no longer be used to manage subsistence uses on federal public lands in Alaska.

On July 1, 1990, because the State of Alaska was not in compliance with ANILCA, the federal government assumed management of subsistence trapping, hunting, and limited fishing on federal public lands and waters.[19] In 1992, the federal government adopted final subsistence management regulations for federal public lands in Alaska. In 1993, federal subsistence Regional Advisory Councils (RACs), as required by ANILCA, were created and the Federal Subsistence Board (FSB) process was established. The FSB—the federal decision-making body that is the counterpart to the Alaska boards of Fisheries and Game—determines subsistence fishing and hunting regulations on federal public waters and lands. The federal subsistence RACs provide an opportunity for Alaskans to participate in the management of subsistence resources by giving resource users the opportunity to comment upon and offer input about subsistence issues during council meetings (Federal Subsistence Management Program n.d.:4).

As a result of the Katie John dispute regarding the closure of subsistence fishing at a site in the Copper River drainage that was traditionally used by upper Ahtna ancestors and the court opinion provided for *Alaska v. Babbitt* in 1995, "The Ninth Circuit Court of Appeals rules that the Federal Subsistence Board

16. U.S. Department of the Interior, Federal Subsistence Management Program, "Overview and History of Subsistence Management in Alaska," https://www.doi.gov/subsistence/library/history (accessed February 2020).
17. U.S. Fish and Wildlife Service, "Digest of Federal Resource Laws and Interest to the U.S. Fish and Wildlife Service: Alaska National Interest Lands Conservation Act of 1980," https://www.fws.gov/laws/lawsdigest/alaskcn.html (accessed February 2020).
18. Alaska Federation of Natives, "Subsistence Chronology: A Short History of Subsistence Policy in Alaska Since Statehood (revised edition, 1998)." Alaska Native Curriculum and Teacher Development Project, www.alaskool.org/projects/ancsa/subsistence_chron/subchron.htm (accessed February 2020).
19. U.S. Department of the Interior, Federal Subsistence Management Program, "Overview and History of Subsistence Management in Alaska," https://www.doi.gov/subsistence/library/history (accessed February 2020).

should expand its management of subsistence fisheries to include all navigable waters in which the United States holds reserve water rights, such as waters on or next to wildlife refuges, national parks, and national forests."[20] After 1995, several Congressional moratoriums provided opportunities for the state to comply with Title VIII. After several failed attempts by the state to enact legislation to comply with Title VIII, the federal government assumed management of subsistence fisheries in waters within federal public lands.

> On October 1, 1999, the Secretaries of the Interior and Agriculture published regulations (36 CFR 242 and 50 CFR 100) to provide for Federal management of subsistence fisheries on Alaska rivers and lakes and limited marine waters within and adjacent to Federal public lands. This was directed by the 9th Circuit Court in the Katie John case, and meets the requirements of the rural subsistence priority in Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA). … The Alaska Department of Fish & Game regulations continue to apply statewide to all commercial fisheries, sport fisheries, personal use fisheries, and subsistence fisheries, unless otherwise superseded by Federal regulations. (Federal Subsistence Management Program n.d.:3)

The genesis of federal subsistence fisheries regulations in 1999 was State of Alaska regulations (Norris 2002:164–165). The original 1999 federal fisheries regulations duplicated state subsistence fishing regulations with the rural priority in Title VIII of ANILCA applied to federal public lands and waters. The initial goal was to keep the regulations on federal public waters consistent with state regulations, as much as possible, with the understanding that through the FSB federal regulations could be changed.

Federal fishing regulations apply to qualified rural Alaska residents of communities having a positive customary and traditional use determination (see 5 AAC 99.010(b)). For the Bristol Bay Brough, this includes specifically the residents of the communities of King Salmon, Naknek, and South Naknek. State fishing regulations apply to nonqualified rural residents, nonrural residents, and nonresidents on federal public lands and waters unless specifically closed to them.

Subsistence Salmon Permits and Harvest Assessment Program

Subsistence Salmon Permit Overview

With the advent of statehood (1959), subsistence salmon fishing permits in Bristol Bay, by state regulation, were required for harvesting salmon for subsistence (Morris 1985:126). Although the permits had been required since statehood, the permit program was gradually introduced throughout the Bristol Bay region in the late 1960s to document the harvest of salmon for subsistence uses. Initially compliance was low for Naknek River communities until people learned more about the permit process (Morris 1985:131). The Division of Subsistence was established by the Alaska Legislature in 1978 with its passage of Alaska's first subsistence statute. Since that time, the division has scientifically investigated and documented the customary and traditional uses of wild subsistence resources, including subsistence harvest numbers.[21]

From 1979 to 1980 a substantial increase in the number of people who obtained subsistence salmon permits for the Naknek River occurred; in 1979, 243 permits were issued, and, in 1980, 358 permits were issued. Of the 358 permits issued in 1980, 41% were issued to people with an address in a community outside of the Bristol Bay area. Additionally, a portion of the permits was issued to people with a General Delivery address in Naknek and King Salmon. The General Delivery addresses were considered likely to be summer transients (Behnke 1980:5).

In 1980, Steven Behnke became a staff member for the Division of Subsistence in the Dillingham ADF&G office. In 1981, Molly Chythlook and John Wright started working in the Dillingham office and Judith Morris began working for the Division of Subsistence in the King Salmon ADF&G office. In 1981, with a

20. U.S. Department of the Interior, Federal Subsistence Management Program, "Overview and History of Subsistence Management in Alaska," https://www.doi.gov/subsistence/library/history (accessed February 2019).

21. Alaska Department of Fish and Game, "Division of Subsistence: Division Overview," https://www.adfg.alaska.gov/index.cfm?adfg=divisions.subsoverview (accessed February 2019).

full Division of Subsistence staff working in the Bristol Bay region, the division assumed responsibility to hire permit vendors in every Bristol Bay community, issue subsistence salmon permits, and follow up to remind permit holders to return their subsistence salmon permit harvest numbers every year.[22] Much of the increase in the number of permits issued in later years reflects: 1) a greater compliance with the permitting and reporting requirements, 2) an increased level of effort expended by ADF&G in making permits available (including issuance by area vendors), 3) an increased effort to contact individuals to remind them to return the harvest forms, and 4) a growing regional population.

By regulation, between 1981–1984, only residents of the Naknek-Kvichak drainage could obtain a subsistence permit to participate in the subsistence salmon fishery. However, in 1982, a personal use fishery was established in the Naknek River, allowing nonlocal residents to fish for salmon under personal use regulations (Morris 1985:130). For two years (1985 and 1986) the subsistence fishery was open to all Alaska residents. The eligibility regulations changed back to permitting only local residents for the next three years. As a result of the case *McDowell et al. v. State of Alaska,* from 1990 to today, the state subsistence fishery is open to all Alaska residents.

Subsistence Salmon Harvest Assessment Program Overview

According to Halas and Neufeld (2018:4) in a report presented to the BOF, in 1983 the Division of Subsistence started performing data entry and analysis for the Bristol Bay subsistence salmon harvest permit program. Since 1983, the Division of Subsistence has compiled annual subsistence salmon harvest numbers and, based on reported harvest data, produced community harvest estimates to account for any unreturned permits for the Bristol Bay Area. In addition to Division of Subsistence reports and publications, the annual subsistence salmon harvest estimates are published every year in Bristol Bay Area annual management reports produced by the ADF&G Division of Commercial Fisheries. Reports and publications by the Division of Subsistence for the Bristol Bay Area do not present subsistence salmon harvest data recorded prior to 1983.

State Subsistence Fishing Regulations in Study Years 2017 and 2018

The Alaska BOF found that salmon of the Bristol Bay Area support customary and traditional (subsistence) uses (5 AAC 01.336). In 1993, the board established a range of 157,000–172,171 salmon as the amount reasonably necessary for subsistence uses (ANS[23]). For all of Bristol Bay, subsistence salmon permits issued at any ADF&G office are required and there is a limit of one permit per household; however, for the Naknek River, permits must be obtained from the King Salmon ADF&G office (5 AAC 01.330(d)). The permit must be returned with a record of harvest (5 AAC 01.015(b)(5–6)). If salmon are retained by a commercial fisher from commercial catches, a subsistence fishing permit is not required (5 AAC 01.015(a)). Note that the Naknek River Subsistence Salmon Fishery Permit has a yes-or-no question asking if the household fished commercially and a box where the number of salmon retained from a commercial catch can be recorded, although there is no regulatory requirement for recording those salmon on the subsistence fishing permit. However, commercial fishers are required to report the number of Chinook and coho salmon retained for their own use on an ADF&G commercial fish ticket at the time of landing (5 AAC 06.377(b)).

Prior to 2016, local area salmon managers for the Naknek River imposed subsistence salmon harvest limits on the subsistence salmon permits that were issued at the King Salmon ADF&G office (Appendix H). However, beginning in 2016, as a result of the *Estrada et al. v. State of Alaska* ruling, lacking action by the BOF, no subsistence salmon seasonal or annual limits could be written on the subsistence permits for the Naknek River. Therefore, currently, there are no regulatory harvest limits, except that no more than 200 sockeye salmon may be harvested after August 20 in the Naknek District (5 AAC 01.345(a)).

22. James Fall, Subsistence Program Manager, ADF&G, Anchorage, 2018, personal communication.

23. Under AS 16.05.258(a), the board is charged with identifying fish stocks, or portions of stocks, that "are customarily and traditionally taken or used for subsistence" (known as a C&T use finding). If a portion of these stocks having a positive C&T use finding can be harvested consistent with sustained yield principles, the board "shall determine the amount of the harvestable portion that is reasonably necessary for subsistence uses," which is known as the ANS (AS 16.05.258(b)).

For the Naknek River, allowable subsistence gear includes drift and set gillnets in waters open to commercial fishing. In other waters, only set gillnets are allowable gear with specific exceptions. Exceptions that are relevant to the Naknek River drainage are as follows: gillnets, spears, beach seines, and dip nets may be used along a 100-yd length of the west shore of Naknek Lake near the outlet to the Naknek River, at Johnny's Lake, and at the outlet of Idavain Creek on the north side of Naknek Lake from August 30 through December 21, and at the mouth of the Brooks River at Naknek Lake from September 18 through December 31 (5 AAC 01.320(b)(2–3)). Also, taking of red fish (post-spawn sockeye salmon) in portions of Naknek Lake is allowed.[24]

On the north shore of Naknek River, approximately 300 feet upstream from the north commercial fishing boundary to 1,300 ft upstream from the north commercial section boundary, salmon may be taken only by a person 60 years of age or older from June 23 through July 17 (5 AAC 01.310(h)). According to 5 AAC 01.310(a–b), subsistence fishing is allowed at any time unless fishing occurs inside a commercial fishing district, in which case there are restrictions to when subsistence fishing may occur depending on the date as well as according to other stipulations that may apply according to the Naknek River Sockeye Salmon Special Harvest Area Management Plan defined in 5 AAC 06.360.

Federal subsistence regulations for salmon in the Naknek River are identical to state regulations; federally qualified residents must acquire a state subsistence fishing permit (U.S. Fish and Wildlife Service, Office of Subsistence Management 2019:41–42).

Relationships Among State-Managed Salmon Fisheries

For the residents of King Salmon, Naknek, and South Naknek, both commercial and sport fisheries affect subsistence fishing efforts in several ways. It is important to study the relationships among the various salmon fisheries in order to understand how they affect each other. Therefore, an understanding of the rules, regulations, and levels of participation in all Naknek River fisheries is important for completely comprehending subsistence patterns of the residents of the Bristol Bay Borough.

Commercial Salmon Fishing

Annual commercial catches for the recent 20-year span for the Bristol Bay Area (1998–2017) averaged approximately 24.7 million sockeye, 45,000 Chinook, 1,000,000 chum, 488,000 (even-years only) pink, and 92,000 coho salmon (Salomone et al. 2019:1). The Bristol Bay area is divided into five commercial salmon management districts (Naknek-Kvichak, Egegik, Ugashik, Nushagak, and Togiak) that correspond to major river systems. Almost all King Salmon, Naknek, and South Naknek community members who participate in commercial fishing do so in the Naknek-Kvichak District.

Naknek-Kvichak District Overview

There were no in-season emergency orders issued during the 2017 study year announcing special commercial fisheries management rules. In 2017, based upon fishery statistics collected by the Division of Commercial Fisheries, 30 King Salmon residents held commercial salmon fishing permits, and 28 of those permits were fished during the 2017 season, landing 1,672,627 lb of salmon.[25] In 2017, 99 Naknek residents held commercial salmon fishing permits, and 80 of those permits were fished during the 2017 season, landing

24. Only descendants of Katmai residents who lived in the Naknek Lake and River drainage may participate in this fishery.

25. Alaska Commercial Fisheries Entry Commission, "Fishery Statistics – Participation and Earnings, Permit & Fishing Activity by Year, State, Census Area, or City: 2017, Totals by Alaskan Community—King Salmon, Fishery Group Salmon," https://www.cfec.state.ak.us/gpbycen/2017/060106.htm (accessed May 2020).

4,364,308 lb of salmon.[26] In 2017, 19 South Naknek residents held commercial salmon fishing permits, and 18 of those permits were fished during the 2017 season, landing 549,328 lb of salmon.[27]

In July 2018, the Naknek River Special Harvest Area (NRSHA) was opened to drift gillnet gear by in-season emergency order (Appendix I). In 2018, 30 permits were issued to King Salmon residents, and 29 of those permits were fished during the 2018 season, landing 1,743,432 lb of salmon.[28] In 2018, 96 Naknek residents held commercial salmon fishing permits, and 83 of those permits were fished during the 2018 season, landing at least 5,079,246 lb of salmon.[29] In 2018, 21 South Naknek residents held commercial salmon fishing permits, and 19 of those permits were fished during the 2018 season, landing 818,943 lb of salmon.[30]

For reference, Plate 2-1, which appears at the end of this chapter, provides excerpts of state fishing regulations (pages 33–53) as they apply to commercial fishing for salmon in the Naknek-Kvichak District of Bristol Bay Area.

Naknek River Sport Fishing

The Naknek River is a popular destination within Bristol Bay for recreational anglers. Chinook salmon is the most harvested species of salmon by sport anglers in the Naknek River, and harvests from this fishery account for roughly 21% of all the Chinook salmon harvested by sport fishermen in the Bristol Bay Management Area (Dye and Borden 2018:18). Sport fishing angler effort is composed of nonresident guided anglers who access the river and lake from nearby lodges and charter operations and also local and nonlocal unguided anglers. Several factors contribute to the popularity of the Naknek River, including ease of access and regularly scheduled airline service into King Salmon. The Chinook salmon sport fishery on the Naknek River is concentrated in a 15-mile stretch of the Naknek River adjacent to the community of King Salmon. The Naknek River Chinook salmon sport fishery commences May 1 and continues through July 31. The peak sportfishing weeks are from June 22 to July 15.

Naknek River Sport Fishing Regulations and Escapement Monitoring Overview

Concern for low escapements and increasing sport harvests prompted the BOF to adopt regulations in 1987 addressing Naknek River Chinook salmon (Dye and Borden 2018:18). The three key elements were as follows: 1) establish May 1 to July 31 as the season for Chinook salmon, 2) designate use of artificial lures only, and 3) reduce bag and possession limits to three Chinook salmon per day, no more than one of which may be longer than 28 inches. Another measure taken by the BOF to protect Chinook salmon stocks included increasing closed portions of Pauls and King Salmon creeks to Chinook salmon fishing to protect spawning stocks in these waters in the early 1990s. In 1995, the outlets of Pauls and King Salmon creeks into the Naknek River were closed to angling to protect critical holding areas for Chinook salmon. However, in 1997, closures to Chinook salmon angling in Pauls and King Salmon creeks were removed,

26. Alaska Commercial Fisheries Entry Commission, "Fishery Statistics – Participation and Earnings, Permit & Fishing Activity by Year, State, Census Area, or City: 2017, Totals by Alaskan Community—Naknek, Fishery Group Salmon," https://www.cfec.state.ak.us/gpbycen/2017/060108.htm (accessed May 2020).
27. Alaska Commercial Fisheries Entry Commission, "Fishery Statistics – Participation and Earnings, Permit & Fishing Activity by Year, State, Census Area, or City: 2017, Totals by Alaskan Community—South Naknek, Fishery Group Salmon," https://www.cfec.state.ak.us/gpbycen/2017/060109.htm (accessed May 2020).
28. Alaska Commercial Fisheries Entry Commission, "Fishery Statistics – Participation and Earnings, Permit & Fishing Activity by Year, State, Census Area, or City: 2018, Totals by Alaskan Community—King Salmon, Fishery Group Salmon," https://www.cfec.state.ak.us/gpbycen/2018/060106.htm (accessed May 2020).
29. Alaska Commercial Fisheries Entry Commission, "Fishery Statistics – Participation and Earnings, Permit & Fishing Activity by Year, State, Census Area, or City: 2018, Totals by Alaskan Community—Naknek, Fishery Group Salmon," https://www.cfec.state.ak.us/gpbycen/2018/060108.htm (accessed May 2020).
30. Alaska Commercial Fisheries Entry Commission, "Fishery Statistics – Participation and Earnings, Permit & Fishing Activity by Year, State, Census Area, or City: 2018, Totals by Alaskan Community—South Naknek, Fishery Group Salmon," https://www.cfec.state.ak.us/gpbycen/2018/060109.htm (accessed May 2020).

and an annual limit of five Chinook salmon per sport angler was adopted for this fishery. This annual harvest limit was also areawide in the Bristol Bay Management Area (BBMA) and required anglers to record the date when and location where each Chinook salmon was taken. With the advent of the annual limit on Chinook salmon, Naknek River sport anglers proposed taking smaller Chinook salmon. In January 2001, the BOF added the opportunity to harvest 10 Chinook salmon per day that were under 20 inches in length and prohibited anglers from removing Chinook salmon from the water if the fish were to be released (Dye and Borden 2018:18). During the January 2001 meeting, in an effort to conserve the Chinook salmon stock, the BOF also restricted most of Big Creek to catch-and-release angling for Chinook salmon and, in 2013, Big Creek and waters of the Naknek River drainage within a one-quarter mile radius of its confluence with Big Creek were closed to sport fishing for Chinook salmon.

The Chinook salmon escapement goal and surveys to estimate abundance for Naknek River Chinook salmon were dropped in 2015 due to budget shortfalls and concerns over the ability to reliably estimate abundance using aerial surveys. Prior to 2010, escapement of Chinook salmon in Naknek River was estimated by fixed-wing aerial surveys of the four primary spawning areas during the presumed peak of spawning in early- to mid-August. Aerial count data were left unexpanded and were considered minimum estimates of escapement. Results of the escapement surveys indicated the mainstem of the Naknek River, along with Big Creek, composed approximately 90% of the observed escapement. Surveys were not conducted from 2010 through 2018 due to budget shortfalls, and the escapement goal was removed (Dye and Borden 2018:21).

Contemporary Sport Fishing Regulations

For reference, Plate 2-1, which appears at the end of this chapter, provides excerpts of state sport fishing regulations (pages 54–58). A summary of regulations is provided in this section.

The Naknek River drainage is within the BBMA. Sport fishing regulations for seasons; size limits; and annual, possession, and bag limits[31] are included in 5 AAC 67.020; also, special provisions for methods and means are included in 5 AAC 67.022—excerpts from both are in Plate 2-1.

By state regulation, because there is an annual limit of five fish (20 inches or longer) for the sport harvest of Chinook salmon for the Bristol Bay region, anyone who sport fishes must record his or her harvest on a Sport Fishing Harvest Record Card. Harvest Record Cards are available at no cost on the ADF&G website, and from ADF&G offices or fishing license vendors.[32] If fishing for Chinook salmon, a Chinook salmon stamp must also be purchased every year by residents and nonresidents.[33] Chinook salmon stamps may be purchased[34] on the ADF&G website and from a license vendor. To illustrate the application of the harvest limits, consider that if fishing for one day in the Naknek River drainage, residents and nonresidents can

31. Pertinent definitions are provided in 5 AAC 75.995:
    - "bag limit" means the maximum legal take of fish per person per day, in the area in which the person is fishing, even if part or all of the fish are immediately preserved;
    - "possession limit" means the maximum number of unpreserved fish, except halibut, that a person may have in possession; and
    - "preserved fish" means fish prepared in such a manner, an in an existing state of preservation, as to be fit for human consumption after a 15-day period, and does not include unfrozen fish temporarily stored in coolers that contain ice or dry ice or fish that are lightly salted.
32. Alaska Department of Fish and Game. 2018. "Southwest Alaska Sport Fishing Regulations Summary, 2018 (Effective Until the 2019 Summary is Issued)." Alaska Department of Fish and Game, Division of Sport Fish, Anchorage. https://adfg.alaska.gov/static/regulations/fishregulations/PDFs/Southwest/2018sw_sfregs_complete.pdf (accessed May 2020).
33. Note that the following fishers are not required to purchase Chinook salmon stamps: residents under age 18, nonresidents under age 16, Permanent (Senior) ID Card (PID) and disabled veteran cardholders, and residents who obtain a sport fishing license under the low income and blind person qualifications.
34. For the latest information regarding resident and nonresident sport fish Chinook salmon stamp prices, see the ADF&G website: http://www.adfg.alaska.gov/index.cfm?adfg=license.pricinglist (accessed March 2019).

keep a maximum of three Chinook salmon that are 20 inches or longer in length, and only one of those can be 28 inches or longer in length; plus, 10 Chinook salmon less than 20 inches in length can also be kept. Applying the preserved fish definition to the bag limit, if a freezer is available—for instance, at a local sport fishing lodge—a person staying at the lodge could catch the possession limit one day and place those fish in a freezer; then, the next day, because the previous day's catch is preserved, that person could catch and keep two more Chinook salmon that are 20 inches in length or longer, one of which could be 28 inches or longer in length, and another 10 Chinook salmon that are less than 20 inches in length. The fisher would then have his or her annual limit of five Chinook salmon 20 inches or longer. Because there is no annual limit for Chinook salmon less than 20 inches in length, the sport fisher could continue to fish and keep 10 Chinook salmon less than 20 inches in length per day as long as those fish were frozen every day. Catch-and-release fishing is allowed throughout Bristol Bay including the Naknek River drainage (see 5 AAC 67.020(1)(C) and 5 AAC 67.022(d)(6) in Plate 2-1). As long as a Chinook salmon, when reeled in by a sport fisher, is not lifted out of the water, it can be released and is not counted in the bag limit. There is no limit on the amount of Chinook salmon that can be caught and released (5 AAC 67.020(1)(C)).

Sport Fishing Harvest and In-Season Emergency Orders in Study Years 2017 and 2018

The estimated Naknek River drainage Chinook salmon sport harvest from 2012–2016 ranged from 2,288 in 2012 to a low of 1,071 in 2014, with an average of 1,553 fish harvested (Dye and Borden 2018:16). According to Dye and Borden (2018:16), in 2017 a total of 2,073 Chinook salmon were harvested from the Naknek River by sport fishing, and an estimated 2,029 Chinook salmon were harvested by sport fishing in 2018 according to the 2018 Statewide Harvest Survey by ADF&G.[35] There were no in-season emergency orders issued announcing special fisheries management rules during the 2017 study year. However, in 2018, Emergency Order 2-RS-5-43-18[36] increased the bag and possession limits for sockeye salmon from five per day to 10 per day in all waters of the Naknek River drainage. The limit for other salmon, except Chinook and sockeye salmon, remained at five per day, five in possession. These limits were in combination with the more liberal limit for sockeye salmon. The justification for this Emergency Order was that the passage of sockeye salmon had exceeded the escapement goal for the Naknek River drainage.

35. Lee Borden, Fishery Biologist III, ADF&G, Dillingham, July 10, 2020, e-mail communication.

36. Alaska Department of Fish and Game. 2018. "Naknek River Sockeye Salmon Limits Increased." http://www.adfg.alaska.gov/sf/EONR/index.cfm?ADFG=region.NR&Year=2018&NRID=2622 (accessed May 2020).

Plate 2-1.–Excerpts of state commercial and sport fishing regulations.

State of Alaska Commercial Fishing Regulations Excerpts

Excerpts of state subsistence salmon fishing regulations provided below were taken from the Alaska Administrative Code published online: http://www.legis.state.ak.us/basis/aac.asp.

Title 5: Fish and Game

Part 1: Commercial and Subsistence Fishing and Private Nonprofit Salmon Hatcheries

Chapter 6: Bristol Bay Area

Article 1: Description of Area

5 AAC 06.001. Application of this chapter

Requirements set out in this chapter apply to commercial fishing only, unless otherwise specified. Subsistence, personal use, and sport fishing regulations affecting commercial fishing vessels or affecting any other commercial fishing activity are set out in the subsistence fishing regulations in 5 AAC 01 and 5 AAC 02, personal use fishing regulations in 5 AAC 77, and sport fishing regulations in 5 AAC 67 and 5 AAC 75.

5 AAC 06.100. Description of area

The Bristol Bay Area consists of all waters of Alaska in Bristol Bay including drainages enclosed by a line from Cape Newenham at 58_ 38.88' N. lat., 162_ 10.51' W. long., to Cape Menshikof at 57_ 28.34' N. lat., 157_ 55.84' W. long.

Article 2: Fishing Districts and Sections

5 AAC 06.200. Fishing districts and sections

(b) Naknek-Kvichak District: all waters of Kvichak Bay north and east of a line from 58_ 43.73' N. lat., 157_ 42.71' W. long., to 58_ 36.77' N. lat., 157_ 15.82' W. long., and the Naknek River Special Harvest Area and the Alagnak River Special Harvest Area,

(1) Kvichak Section: all waters of Kvichak Bay enclosed by a line from 58_ 43.73' N. lat., 157_ 42.71' W. long., to 58_ 38.50' N. lat., 157_ 22.23' W. long., to the outer end of Libbyville Dock at 58_ 46.76' N. lat., 157_ 03.57' W. long., then along the dock to the shore at 58_ 46.61' N. lat., 157_ 03.25' W. long.;

(2) Naknek Section: all waters of Kvichak Bay enclosed by a line from 58_ 36.77' N. lat., 157_ 15.82' W. long., to 58_ 38.50' N. lat., 157_ 22.23' W. long., to the outer end of Libbyville Dock at 58_ 46.76' N. lat., 157_ 03.57' W. long., then along the dock to the shore at 58_ 46.61' N. lat., 157_ 03.25' W. long.

5 AAC 06.206. Use of global positioning system (GPS)

In the Bristol Bay Area, boundaries, lines, and coordinates are identified with the global positioning system (GPS). If the global positioning system is not operating, the boundaries, lines, and coordinates are as identified by ADF&G regulatory markers.

Article 3: Salmon Fishery

5 AAC 06.310. Fishing seasons

Salmon may be taken only from June 1 through September 30 and only during open commercial salmon fishing periods.

5 AAC 06.320. Fishing periods

(c) In the Naknek-Kvichak, Egegik, and Ugashik Districts,

(1) from June 1 through 9:00 a.m. July 17, salmon may be taken only during fishing periods established by emergency order;

(2) after 9:00 a.m. July 17, salmon may be taken only from 9:00 a.m. Monday to 9:00 a.m. Sunday, or during fishing periods established by emergency order, except as specified for the

(A) Egegik District in 5 AAC 06.359;

(B) Naknek-Kvichak District in 5 AAC 06.360(g); and

(C) Ugashik District in 5 AAC 06.366(d)(4) and (g) of this section. (d) Repealed 5/14/98.

5 AAC 06.330. Gear

(a) Salmon may be taken with set and drift gillnets only in the districts described in 5 AAC 06.200. Salmon may be taken with set gillnets on the northwest shore of Kvichak Bay from the Naknek-Kvichak District boundary south to 58_ 43.80' N. lat., 157_ 42.70' W. long.

5 AAC 06.331. Gillnet specifications and operations

(a) Gillnet mesh size restrictions are as follows:

(1) gillnet mesh size may not exceed five and one-half inches during periods established by emergency order for the protection of king salmon and in the Naknek-Kvichak and Ugashik District from June 1 through July 22;

(2) gillnet mesh size may not be less than five and three-eighths inches during periods established by emergency order for the protection of pink salmon;

(3) gillnet mesh size may not exceed four and three-quarters inches during periods established by emergency order for the protection of sockeye and coho salmon;

(4) gillnet mesh size may not be less than seven and one-half inches during periods established by emergency order for the protection of sockeye salmon;

(5) from 9:00 a.m. June 15 to 9:00 a.m. July 15, mesh size restrictions for the Togiak District are as provided in 5 AAC 06.369(d);

(6) from June 1 through July 1, mesh size restrictions for the Egegik District are specified in 5 AAC 06.365(e).

(b) No gillnet may be more than 29 full meshes in depth, including the selvages.

(c) Except as provided in 5 AAC 06.333, a person may not operate or assist in the operation of a drift gillnet exceeding 150 fathoms in length or a set gillnet exceeding 50 fathoms in length.

(d) Repealed 3/26/76.

(e) Except as provided in 5 AAC 06.333, a vessel registered for salmon net fishing may not have on board it or any vessel towed by it, during an open fishing period, more than 150 fathoms of drift gillnet gear in the aggregate. Additional gear may be transported to another district under conditions specified by the department.

(f) A person may not operate more than two set gillnets, and the aggregate length of set gillnets operated by that person may not exceed 50 fathoms in length. Notwithstanding 5 AAC 39.240(a), in the Bristol Bay Area, a

(1) person may assist in the operation of additional set gillnet gear when the CFEC interim-use or entry permit card holder of the additional gear is present in compliance with 5 AAC 39.107;

(2) vessel may have more than one legal limit of set gillnet fishing gear on board the vessel.

(g) The operation of a gillnet shall be performed or assisted by the person who holds a valid interim-use or entry permit card for that gear.

(h) Set gillnets shall be operated in substantially a straight line.

(i) A set gillnet must be set on an area of a beach that, at mean low tide, is connected by exposed land to the shore or to land not covered at high tide, except that in the Togiak District between a point on the southernmost mouth of the Kulukak River at 58_ 54.94' N. lat., 159_ 43.81' W. long. and a point at the eastern entrance to Metervik Bay at 58_ 50.47' N. lat., 159_ 45.25' W. long., between Rocky Point at 58_ 53.30' N. lat., 160_ 14.70' W. long. and 160_ 20' W. long., and between Togiak Reef at 58_ 59.62' N. lat., 160_ 30.10' W. long. and a point near Mt. Aeolus at 58_ 54.82' N. lat., 160_ 44.06' W. long., no part of a set gillnet may be more than 500 feet from the mean high tide mark and the set gillnet must be substantially perpendicular to the shoreline.

(j) Picking salmon from a gillnet is considered to be a part of the fishing operation and shall be performed only by a fisherman who holds a crewmember fishing license or a valid interim-use or entry permit card.

(k) Repealed 3/26/76.

(l) Each fisherman shall operate or assist in operating only one type of gear at any one time.

(m) In the Naknek-Kvichak, Egegik, Ugashik, and Togiak Districts, no part of a set gillnet may be more than 1,000 feet from the 18-foot high tide mark, except that

(1) repealed 3/1/92;

(2) repealed 3/1/92;

(3) in the Egegik District, from one mile south of Big Creek to Big Creek, no part of a set gillnet may be more than 1,000 feet from the 18-foot high tide mark or 450 feet from the 13-foot high tide mark;

(4) in the Naknek Section of the Naknek-Kvichak District north of the terminus of the Naknek River,

(A) no more than one set gillnet may be seaward of another set gillnet; and

(B) no part of a set gillnet may be more than 1,200 feet from the 18-foot high tide mark;

(5) in the Kvichak Section of the Naknek-Kvichak District from Libbyville Dock to a point near Graveyard Point at 58_ 52.07' N. lat., 157_ 00.80' W. long. and from the unnamed creek on the northwest shore of Kvichak Bay at 58_ 52.25' N. lat., 157_ 06.75' W. long. north to a point on the northwest shore of Kvichak Bay at 58_ 53.37' N. lat., 157_ 04.26' W. long., the maximum distance that a set gillnet may be operated offshore is as follows:

(A) no part of a set gillnet may be more than 1,000 feet from the 18-foot high tide mark; or

(B) the web of the shoreward end of the set gillnet must go dry at the time of the opening;

(6) deleted;

(7) repealed 6/24/93;

(8) in the Ugashik District, in that portion of the east bank of the Ugashik River from a point at 57_ 30.74' N. lat., 157_ 24.10' W. long. to 57_ 32.27' N. lat., 157_ 24.36' W. long., no part of a set gillnet may be more than 600 feet from the 18-foot high tide mark.

(n) In the Nushagak District, a CFEC salmon interim-use or entry permit holder may not set or operate a set gillnet seaward of set gillnets operated by another CFEC salmon interim-use or entry permit holder. In addition, no part of a set gillnet, anchor, peg, stake, buoy, or other device used to set the gillnet may be seaward of the following offshore locations:

(1) repealed 5/11/85;

(2) from the cannery dock at Clark's Point to First Creek at 58_ 47.15' N. lat., 158_ 30.57' W. long., 500 feet from the mean high tide mark, or the minus three foot low tide mark, whichever location is closer to the mean high tide mark; except that from 58_ 50.10' N.

lat., 158_ 33.52' W. long. to 58_ 49.29' N. lat., 158_ 33.10' W. long., 750 feet from the mean high tide mark, or the minus three foot low tide mark, whichever location is closer to the mean high tide mark;

(3) from First Creek at 58_ 47.15' N. lat., 158_ 30.57' W. long. to Third Creek, at 58_ 46.81' N. lat., 158_ 28.10' W. long., 700 feet from the mean high tide mark;

(4) from Third Creek at 58_ 46.81' N. lat., 158_ 28.10' W. long. to Etolin Point at 58_ 39.37' N. lat., 158_ 19.31' W. long., 1,000 feet from the mean high tide mark.

(o) No salmon CFEC permit holder may set or operate a set gillnet seaward of set gillnets operated by another salmon CFEC permit holder in the following locations:

(1) Togiak, Nushagak, Ugashik, and Egegik Districts;

(2) the west side of the Kvichak Section;

(3) repealed 7/14/85;

(4) the east side of the Kvichak Section north of Happy Creek;

(5) the Naknek Section south of the terminus of the Naknek River.

(p) Setnet anchoring devices must be within the offshore distance requirements set out in (m) and (n) of this section, except as follows:

(1) in the Naknek Section north of the Naknek River, the anchoring device may not be more than 1,300 feet from the 18-foot high tide mark;

(2) in the Nushagak District where offshore restrictions are not in effect, the anchoring device may not be more than 50 feet from the web of the net.

(q) During the hours between sunset and sunrise, each gillnet must display a light. For drift gillnets, the light must be located at the end of the net furthest from the fishing vessel. For set gillnets, the light must be a blinking white light and must be located at the end of the net furthest from the shore.

(r) Notwithstanding 5 AAC 39.105(d)(3), in the Bristol Bay Area, a person may not operate a drift gillnet when the vessel to which it is attached is grounded, or when any part of the gillnet is grounded above the waterline.

(s) In the Bristol Bay Area, a person may not use mechanical power to hold a vessel in substantially the same geographical location while attached to a drift gillnet.

(t) A permit holder fishing in the Bristol Bay Area must report the loss of a gillnet, or portion of a gillnet, to the local department office in Dillingham or King Salmon within 15 hours of the loss of the gillnet, or portion of the gillnet. For the purposes of this subsection, the report must be made directly to a local representative of the department in person or by radio or telephone.

(u) Repealed 4/4/2013.

5 AAC 06.333. Requirements and specifications for use of 200 fathoms of drift gillnet in Bristol Bay

(a) Two Bristol Bay drift gillnet CFEC permit holders may concurrently fish from the same vessel and jointly operate up to 200 fathoms of drift gillnet gear under this section, except

(1) in the Togiak District;

(2) in a special harvest area;

(3) in the Bristol Bay Area when the Naknek River Special Harvest Area is open under 5 AAC 06.360.

(b) Before operating drift gillnet gear jointly under this section, both permit holders shall register with the department under 5 AAC 06.370 for the same district indicating the intent to jointly operate gear. The permit holders may not use a vessel for joint operations of drift gillnet gear unless that vessel is registered with the department under 5 AAC 06.370 for the same district as the permit holders. Termination of joint operation of drift gillnet gear under this section is not effective until at least one of the permit holders register the date and time of termination with the department in the manner specified for reregistration in 5 AAC 06.370(b).

(c) When two Bristol Bay drift gillnet CFEC permit holders fish from the same vessel and jointly operate a drift gillnet gear under this section, the vessel must display its ADF&G permanent license plate number followed by the letter "D" to identify the vessel as a dual permit vessel. The letter "D" must be removed or covered when the vessel is operating with only one drift gillnet CFEC permit holder on board the vessel. The identification number and letters must be displayed

(1) in letters and numerals 12 inches high with lines at least one inch wide;

(2) in a color that contrasts with the background;

(3) on both sides of the hull; and

(4) in a manner that is plainly visible at all times when the vessel is being operated.

(d) When two permit holders jointly operate gear under this section, each permit holder is responsible for ensuring that the entire unit of gear is operated in a lawful manner.

(e) Repealed 4/4/2013.

(f) Repealed 2/13/2005.

(g) Repealed 4/4/2013.

5 AAC 06.334. Identification of gear

(a) Each drift gillnet in operation must have

(1) at each end, except an end attached to the vessel operating the gear, a red keg, buoy, or cluster of floats plainly and legibly marked with the permanent vessel license plate (ADF&G) number of the vessel operating the gear in permanent symbols at least four inches high with lines at least one-half inch wide in a color that contrasts with the background; and

(2) at least one cork every 10 fathoms along the cork line that is plainly and legibly marked with the permanent vessel license plate (ADF&G) number of the vessel operating the gear.

(b) Repealed 4/30/91.

(c) The operator of a set gillnet that employs an anchor, peg, stake, or other device to fasten the net at its outermost extremity shall mark the location of the device with a red buoy and a white buoy at all times from June 1 through August 31. From September 1 through September 30, the marking requirements need to be complied with only while the set gillnet is in operation. The buoys must be plainly and legibly marked with the operator's five-digit CFEC permit number. From the mouth of Pile Driver Creek at approximately 58_ 54.00' N. lat., 158_ 29.75' W. long., south to the cannery dock at Clark's Point, set gillnet anchoring devices do not need to be marked unless the set gillnet is in operation. Each set gillnet in operation must have at least one cork

every 10 fathoms along the cork line that is plainly and legibly marked with the operator's five-digit CFEC permit number.

5 AAC 06.335. Minimum distance between units of gear

(a) In the Naknek-Kvichak, Egegik, Ugashik, and Togiak Districts, no part of a set gillnet may be set or operated within 300 feet of any part of another set gillnet. In the Nushagak District, no part of a set gillnet may be set or operated within 450 feet of any part of another set gillnet. The provisions of this subsection do not prohibit a CFEC permit holder from operating a set gillnet seaward of another set gillnet operated under the authority of the same CFEC permit.

(b) No part of a drift gillnet may be operated within 300 feet of the side of a set gillnet and within 100 feet of the offshore end of a set gillnet. The 100-foot restriction does not apply seaward of the offshore setnet distance restrictions set out in 5 AAC 06.331(m) and (n).

(c) In the Nushagak District, no part of a drift gillnet may be operated within 100 feet of the inshore end of a set gillnet, except that in the locations described in 5 AAC 06.331(n), no part of a drift gillnet may be operated inshore of a set gillnet.

5 AAC 06.341. Vessel specifications and operations

(a) No vessel registered for salmon net fishing may be more than 32 feet in overall length. An anchor roller may not extend more than eight inches beyond the 32-foot overall length, and any portion that extends beyond the 32-foot overall length may not be more than eight inches in width or height.

(b) For the purposes of this section,

(1) "anchor roller" means a device used solely in aid of deploying and retrieving anchor gear, and does not provide any additional flotation, planing surface, or structural support to the vessel;

(2) "fish drop-out basket" means a device used solely to prevent the loss of fish from a gillnet after the fish leaves the water and before it is brought on board the vessel; a "fish drop-out basket" does not provide any additional flotation, planing surface, or structural support to the vessel;

(3) "gillnet roller" means a device used solely in aid of deploying and retrieving drift gillnet gear; a "gillnet roller" does not provide any additional flotation or planing surface to the vessel;

(4) "outdrive" means part of the propulsion system of a vessel used for either steering or thrust; an "outdrive" does not provide any additional flotation or planing surface to the vessel;

(5) "outdrive guard" means a device of skeletal construction used solely to protect the outdrive unit of a vessel; an "outdrive guard" does not provide any additional flotation or planing surface and is not used for any other purpose such as a bench, platform, or storage area;

(6) "overall length" means the straight-line measurement between the extremities of the vessel, but does not include fish drop-out baskets, anchor rollers, gillnet rollers, trim tabs, outdrives, or outdrive guards;

(7) "trim tabs" means an extension of the bottom of a vessel, at the transom, which is no more than 18 inches long at its longest point; "trim tabs" do not provide any increased flotation, and their sole function is to provide trim to a vessel while underway.

5 AAC 06.342. Vessel identification Repealed 4/18/86.

5 AAC 06.343. Vessel identification

(a) In addition to the marking requirements in 5 AAC 39.119, a documented salmon gillnet fishing vessel registered for the Bristol Bay Area must display its name

(1) in permanent symbols at least six inches high and with lines at least one inch wide which contrast with the background;

(2) on the transom and both sides of the bow above the water line;

(3) in a manner that is plainly visible and unobscured; and

(4) at all times from June 1 through September 30.

(5) If the vessel is not documented, the vessel's permanent license plate ADF&G number must be displayed as described in (1) - (4) of this section.

(b) A CFEC permit holder who operates a salmon set gillnet vessel that is participating in the set gillnet fishery in salmon net gear Registration Area T, described in 5 AAC 39.120(d), and that has an overall length greater than 14 feet, must display the letters "SN" followed by the five-digit CFEC permit serial number of at least one permit holder who operates that vessel. A vessel marked under this subsection is not restricted to operation by the permit holder. The letters and numbers required under this subsection must be displayed

(1) in permanent letters and numerals 12 inches high with lines at least one inch wide;

(2) in a color that contrasts with the background;

(3) on both sides of the hull; and

(4) in a manner that is plainly visible at all times when the vessel is being operated for set gillnet fishing.

(c) The provisions of (b) of this section do not apply to a vessel participating in the set gillnet fishery that is in compliance with the marking requirements of 5 AAC 39.119 and (a) of this section.

5 AAC 06.350. Closed waters

(b) The following locations in the Naknek-Kvichak District are closed to the taking of salmon:

(1) those waters northeast of a line from a point near Graveyard Point at 58_ 52.10' N. lat., 157_ 00.80' W. long., to a point on the northwest shore of Kvichak Bay at 58_ 53.37' N. lat., 157_ 04.26' W. long., except that the commissioner may, by emergency order, open the Alagnak River Special Harvest Area as provided in 5 AAC 06.373;

(2) those waters of the Naknek River upstream of a line from an ADF&G regulatory marker located at 58_ 43.55' N. lat., 157_ 03.63' W. long. to an ADF&G regulatory marker located at 58_ 42.43' N. lat., 157_ 04.67' W. long.; however, the commissioner may open, by emergency order, waters of the Naknek River as provided in 5 AAC 06.360;

(3) by set gillnets along the southeast shore of the Naknek Section from the Naknek-Kvichak District boundary north to 58_ 37.15' N. lat., 157_ 15.30' W. long.

5 AAC 06.355. Bristol Bay Commercial Set and Drift Gillnet Sockeye Salmon Fisheries Management and Allocation Plan

(a) The purpose of this management and allocation plan is to ensure an adequate escapement, as determined by the department, of sockeye salmon into the river systems of the Nushagak, Naknek-Kvichak, Egegik, and Ugashik Districts and to distribute, to the extent practicable, the harvestable surplus of sockeye salmon to the set and drift gillnet fisheries for the allocation percentages specified in (b) of this section. This plan also provides management guidelines to the department in an effort to preclude allocations conflicts between various users of this resource.

(b) It is the intent of the Board of Fisheries (board) that Bristol Bay sockeye salmon be harvested in the traditional harvest locations and that historical sockeye salmon catches be allocated between drift and set gillnet fisheries by district. To achieve this allocation, the department shall manage, to the extent practicable, the commercial sockeye salmon fisheries to achieve the allocation percentages established in 5 AAC 06.364 (Naknek-Kvichak District), 5 AAC 06.365 (Egegik District), 5 AAC 06.366 (Ugashik District), and 5 AAC 06.367 (Nushagak District).

(c) Repealed 3/30/2007.

(d) The department shall manage, subject to existing management plans, fishery openings, closures, and areas to

(1) achieve adequate escapement from all segments of the run by spacing openings throughout the run and, to the extent practicable, manage for escapements to fall within the lower or upper portions of escapement goals proportional to the run size based on the preseason forecast and inseason assessment of the run size;

(2) maintain and improve stock specific management through the use of district, subdistrict, and section openings and closures;

(3) distribute fish within individual districts and subdistricts through the spacing and duration of openings;

(4) reduce intensive boundary line fishing through the spacing and duration of openings;

(5) reduce harvest of stocks bound for other districts, subdistricts, or sections in accordance with specific regulatory management plans.

5 AAC 06.360. Naknek River Sockeye Salmon Special Harvest Area Management Plan

(a) The goal of this plan is to achieve Kvichak River sockeye salmon spawning escapement goals, while providing opportunities to harvest Naknek River salmon stocks that are in excess of spawning goals. It is the intent of the Board of Fisheries that salmon in the Naknek-Kvichak District should be harvested in the fisheries that have historically harvested them, including the methods, means, times, and locations of those fisheries, using the best biological management techniques and practices. This plan has been adopted to provide management alternatives that can be used by the department when differences in salmon run strengths would preclude the achievement of the goal of this plan using only the fisheries that have historically harvested those salmon.

(b) The Naknek River Special Harvest Area (NRSHA) consists of the waters of the Naknek River from a line between ADF&G regulatory markers located at 58_ 43.37' N. lat., 157_ 03.17' W. long. and at 58_ 42.67' N. lat., 157_ 03.44' W. long. upstream to the power lines across the river.

(c) On or after June 27, when the department projects that the sockeye salmon escapement into the Naknek River will exceed 800,000 fish and the Kvichak River escapement projection is one or more days behind schedule for reaching its escapement goal, the commissioner may open, by emergency order, the NRSHA to the drift gillnet and set gillnet fisheries. The drift gillnet and set gillnet fisheries will open separately, with a seasonal ratio of three drift gillnet gear fishing periods to every one set gillnet fishing period.

(d) The following provisions apply to set gillnet fishing in the NRSHA:

(1) no more than 37.5 fathoms of set gillnet may be used to take salmon;

(2) a set gillnet may not be set or operated within 150 feet of another set gillnet;

(3) beyond 500 feet from shore, all gear associated with set gillnet fishing must be removed when it is not being used to fish in the NRSHA;

(4) repealed 4/4/2013;

(5) set gillnet running lines may not be in the water during a drift gillnet fishing period;

(6) repealed 8/14/2006;

(7) 5 AAC 06.331(i), (m), (o), and (p) do not apply except that the anchoring device may not be more than 50 feet from the web of the net;

(8) a set gillnet may be set and operated seaward of another set gillnet.

(e) The following provisions apply to drift gillnet fishing in the NRSHA:

(1) no more than 75 fathoms of drift gillnet may be used to take salmon;

(2) a CFEC permit holder may not use more than one gillnet to take salmon at any time;

(3) a vessel may not have more than 150 fathoms of drift gillnet or 75 fathoms of set gillnet on board the vessel;

(4) a drift gillnet may not be operated shoreward of the offshore end of a set gillnet; and

(5) no part of a drift gillnet may be operated within 150 feet of the side of a set gillnet.

(f) When the NRSHA is open to commercial fishing, the department shall manage the fishery, to the extent practicable, for an optimal escapement goal of 800,000 - 2,000,000 salmon.

(g) After July 17, when the Naknek-Kvichak District is open to commercial fishing in the NRSHA, the commissioner may establish, by emergency order, new fishing periods other than the periods specified in 5 AAC 06.320(c)(2), during which the requirements for reregistration and the 48-hour transfer notification period specified in 5 AAC 06.370 will apply.

(h) If the preseason forecast for the Kvichak River sockeye salmon is less than 30 percent above the minimum biological escapement goal, the commissioner may, by emergency order, open the NRSHA to the drift gillnet and set gillnet fisheries.

5 AAC 06.364. Naknek-Kvichak District Commercial Set and Drift Gillnet Sockeye Salmon Fisheries Management and Allocation Plan

(a) The purpose of this management plan is to establish the allocation of sockeye salmon between the commercial set and drift gillnet fisheries within the Naknek-Kvichak District and to establish management measures for the department to achieve the allocation.

(b) Consistent with 5 AAC 06.355 and other applicable provisions of this chapter, the department shall manage the Naknek-Kvichak District set and drift gillnet fisheries during the fishing periods specified in 5 AAC 06.320(c)(1) to achieve biological escapement goals into the Kvichak and

Naknek River systems and to distribute the harvestable surplus of sockeye salmon to the drift and set gillnet fisheries as follows:

(1) drift gillnet - 84 percent; and

(2) set gillnet - 16 percent as follows:

(A) Kvichak Section set gillnet fishery - eight percent; and

(B) Naknek Section set gillnet fishery - eight percent;

(3) repealed 3/30/2007.

(c) For the purpose of calculating the set and drift gillnet allocation percentages specified in (b) of this section, the accounting period is from June 1 through 9:00 a.m. July 17.

(d) To achieve the allocations specified in (b) of this section, consistent with the management principles of 5 AAC 06.355 and other applicable provisions of this chapter, the commissioner

(1) may establish, by emergency order, concurrent set and drift gillnet open fishing periods; set and drift gillnet fishing periods may be established at different times to obtain the set and drift gillnet sockeye salmon allocations specified in (b) of this section or at other times consistent with 5 AAC 06.355;

(2) may commence the concurrent open fishing periods at the seven foot tide level;

(3) may use short open commercial fishing periods so that all user groups have the opportunity to harvest fish;

(4) may address changing conditions using publicized short notice openings.

(e) To ensure adequate Kvichak River sockeye salmon spawning escapement goals, the department shall manage, to the extent practicable, a fishery in the Naknek Section to minimize fishing with set and drift gillnet gear during the ebb tide.

(f) For the conservation of king salmon, the department shall, to the extent practicable, open and close commercial fishing periods for drift gillnet gear in the Naknek-Kvichak District to occur only between the seven-foot flood and seven-foot ebb tide stages, as measured at the mouth of the Naknek River.

5 AAC 06.370. Registration and reregistration

(a) Before taking salmon in the Bristol Bay Area, a CFEC salmon drift gillnet permit holder shall register for a district described in 5 AAC 06.200. Before taking salmon in the Nushagak District, a CFEC salmon set gillnet permit holder shall register for a statistical area described in (l) of this section. A CFEC salmon drift gillnet permit holder also shall register for the same district the drift gillnet vessel that the permit holder will be operating. For the purposes of this section, a CFEC salmon drift gillnet permit holder and a drift gillnet vessel may be registered in only one district at a time and a CFEC salmon set gillnet permit holder in the Nushagak District may be registered in only one statistical area at a time. Initial district registration and statistical area registration is accomplished by completing a registration form provided by the department and returning the completed form to the department office in Dillingham or King Salmon or electronically on the department's website.

(b) Except when fishing as a crewmember, a CFEC salmon drift gillnet permit holder intending to transfer to and fish in a new district for which the permit holder is not registered shall register the permit holder and the vessel that the permit holder will use to take salmon for the new district at least 48 hours before fishing in the new district. Reregistration is accomplished by the permit holder or the permit holder's authorized agent completing a form provided by the department and submitting the completed form, in person, to a local representative of the department or electronically on the department's website. The 48-hour district transfer notification period starts when the reregistration form is signed by the local representative of the department or when the permit holder receives the computerized acceptance notification. The drift gillnet permit holder and the drift gillnet vessel may not fish in the original district during the 48-hour notification period. The notification period may be reduced by commissioner's announcement. District reregistration is not required after 9:00 a.m. July 17, except in the Ugashik District, as specified in 5 AAC 06.366(d)(4), the Naknek-Kvichak District, as specified in 5 AAC 06.360(g), and the Egegik District, as specified in 5 AAC 06.359(f).

(c) After use of either drift gillnet or set gillnet gear, use of the other type of gear is not permitted until 24 hours, or a reduced period specified by commissioner's announcement, have elapsed following notification to the department of the type of gear intended to be used. After 9:00 a.m.

July 17, changing to either drift gillnet or set gillnet gear may be done without notification to the department of the type of gear intended to be used.

(d) Notification of a change in gear types may be made with the local representative of the department, and may be accomplished in person or by radio or through a designated representative of the fisherman. However, the 24-hour notification period, or a reduced period specified by commissioner's announcement, does not begin before the time that notification is received and noted by the department.

(e) Repealed 5/14/98.

(f) Except in the Ugashik District, as specified in 5 AAC 06.366(d)(4), the Naknek-Kvichak District, as specified in 5 AAC 06.360(g), and the Egegik District, as specified in 5 AAC 06.359(f), the commissioner shall waive, by announcement, the 48-hour district transfer notification period required by this section when the midpoint of the escapement goal range for sockeye salmon has been achieved for that district.

(g) Repealed 1/29/72.

(h) From June 1 through September 30, an Area T CFEC salmon permit holder may use, to take salmon, only the vessel identified on the permit, unless the permit holder has registered, in person, at the department's King Salmon or Dillingham offices, to use another vessel. An Area T CFEC salmon permit holder on board an unregistered vessel is presumed to have been responsible for the salmon fishing operations of that vessel for that year.

(i) An agent representing a CFEC permit holder on matters of district registration and reregistration must be annually authorized to do so on a form provided by the department. The form must state that registration or reregistration accomplished by a CFEC permit holder's authorization agent does not waive the strict liability standard in 5 AAC 39.002 as it applies to the CFEC permit holder.

(j) A person who receives an emergency transfer (transferee) of a CFEC permit under 20 AAC 05.1740 may not register in a district other than the district in which the CFEC permit holder is registered when the emergency transfer occurs, unless the transferee has complied with the 48-hour district transfer notification period required by this section.

(k) Notwithstanding (b) of this section, a CFEC permit holder and fishing vessel registered before 9:00 a.m. July 17 to fish in the

(1) Togiak District may not take salmon or be used to take salmon in the Nushagak, Naknek-Kvichak, Egegik, or Ugashik District from 9:00 a.m. June 1 to 9:00 a.m. July 27;

(2) Nushagak, Naknek-Kvichak, Egegik, or Ugashik District may not take salmon or be used to take salmon in the Togiak District from 9:00 a.m. June 1 to 9:00 a.m. July 27.

(l) In the Nushagak District, a CFEC salmon set gillnet permit holder intending to transfer to and fish in a new statistical area for which the permit holder is not registered shall register for the new statistical area at least 48 hours before fishing in the new statistical area. Reregistration is accomplished by the permit holder, or the permit holder's authorized agent, completing a form provided by the department and submitting the completed form, in person, to an authorized representative of the department. The 48-hour statistical area transfer notification period begins when the reregistration form is signed by the authorized representative of the department. The set gillnet permit holder may not fish in the original statistical area during the 48-hour notification period. The notification period may be reduced by commissioner's announcement. Reregistration is not required after 9:00 a.m. July 17. For the purpose of this section, statistical areas in the Nushagak District are defined as follows:

(1) Igushik Statistical Area: all waters of the Igushik Section, as described in 5 AAC 06.200(1);

(2) Snake River Statistical Area: all waters of the Snake River Section, as described in 5 AAC 06.200(2);

(3) Coffee Point Statistical Area: all waters of the Nushagak Section, as described in 5 AAC 06.200(3), between a point two miles below Bradford Point at 58_ 58.63' N. lat., 158_ 33.62' W. long. and a point four miles below Coffee Point at 58_ 52.90' N. lat., 158_ 43.30' W. long.;

(4) Ekuk Statistical Area: all waters of the Nushagak Section, as described in 5 AAC 06.200(3), between Ekuk at 58_ 49.15' N. lat., 158_ 33.30' W. long. and Etolin Point at 58_ 39.37' N. lat., 158_ 19.31' W. long.;

(5) Clark's Point Statistical Area: all waters of the Nushagak Section, as described in 5 AAC 06.200(3), between Clark's Point at 58_ 50.71' N. lat., 158_ 32.49' W. long. and Ekuk at 58_ 49.15' N. lat., 158_ 33.30' W. long.;

(6) Queen's Statistical Area: all waters of the Nushagak Section, as described in 5 AAC 06.200(3), enclosed by a line from a point at 58_ 51.27' N. lat., 158_ 30.34' W. long. to the outlet of Queen's Slough at 58_ 51.41' N. lat., 158_ 30.38' W. long.;

(7) Combine Statistical Area: all waters of the Nushagak Section, as described in 5 AAC 06.200(3), between Nushagak Point at 58_ 56.79' N. lat., 158_ 29.53' W. long. and Clark's Point at 58_ 50.71' N. lat., 158_ 32.49' W. long., except those waters described in (6) of this subsection.

(m) A CFEC salmon drift gillnet permit holder who is registered for a district and intends to operate a different vessel in that same district must first reregister with the department identifying the substitute vessel the permit holder will be operating. If the substitute vessel has already been registered in that same district for at least 48 hours, the permit holder may begin fishing as soon as reregistration is completed. If the substitute vessel has not been registered in that same district for at least 48 hours, the permit holder may not begin fishing until the completion of the 48-hour notification requirement.

5 AAC 06.375. Landing requirements

(a) All salmon must be landed in the district in which the salmon were taken, except that

(1) a vessel used to take salmon may have salmon on board when the vessel is no more than one mile outside the district from which the salmon were taken;

(2) a vessel that is more than one-half mile inside the boundary of the Snake River Section of the Nushagak District may not have salmon on board the vessel, except that a set gillnet fishing vessel may have salmon on board in the entire Snake River Section;

(3) when outside a district, a vessel used to take salmon may have on board up to 50 salmon for personal use, if the salmon are headed and gutted;

(4) the commissioner may waive the requirements of this subsection if the commissioner determines it is necessary in order to conduct an orderly fishery.

(b) From January 1 through June 30 and from August 1 through December 31, salmon caught in the Cinder River and Port Heiden Sections of the Alaska Peninsula Area can be legally transferred and sold in the Ugashik District. At the time of sale, the salmon permit holder must state the section in which the fish were caught.

5 AAC 06.377. Reporting requirements

(a) The operator of a floating salmon processing vessel or tender, or a shorebased processing operation, and a company employing aircraft used for transporting salmon, shall report in person or through an authorized agent to the local representative of the department of the initial district of intended operations before the start of processing or buying operations. The report must include the location and the date of intended operations, and identify and describe each vessel or method of transport employed in hauling or processing salmon. Before moving a processing or buying operation to a new district, the operator shall notify the local representative of the department by radio, telephone, or in person. If requested by the department, the operator or authorized agent of the operator must provide information to the department regarding the operator's processing or buying activities, including processing or buying capacity.

(b) Each commercial fisherman shall report, on an ADF&G fish ticket, at the time of landing, the number of king and coho salmon taken but not sold.

5 AAC 06.379. Use of aircraft unlawful

A person may not use or employ an aircraft to locate salmon for the commercial taking of salmon or to direct commercial fishing operations in the Bristol Bay Area one hour before, during, and one hour after a commercial salmon fishing period.

5 AAC 06.380. Unlawful possession of subsistence-taken salmon

It is unlawful to purchase or sell salmon from which both lobes of the caudal fin (tail) or the dorsal fin have been removed.

Title 5: Fish and Game

Part 1: Commercial and Subsistence Fishing and Private Nonprofit Salmon Hatcheries

Chapter 39. General Provisions

Article 1. General

5 AAC 39.010. Retention of fish taken in a commercial fishery

(a) A person engaged in commercial fishing may retain fish from lawfully taken commercial catch for that person's own use, including for the use as bait in a commercial fishery. Fish retained under this section may not be sold or bartered.

(b) Except as otherwise specified in 5 AAC 01 - 5 AAC 39, a commercial fisherman shall report on an ADF&G fish ticket, at the time of delivery of the commercial catch, the number of steelhead retained from the commercial catch but not sold. For the purposes of this subsection "delivery" means the offloading of the finfish for sale or for transport to a buyer for later sale.

State of Alaska Sport Fishing Regulations Excerpts

Excerpts of state subsistence salmon fishing regulations provided below were taken from the Alaska Administrative Code published online: http://www.legis.state.ak.us/basis/aac.asp.

Title 5: Fish and Game

Part 2: Sport Fishing and Personal Use Fishery

Chapter 67: Bristol Bay Area

5 AAC 67.020. General provisions for seasons and bag, possession, annual, and size limits for the Bristol Bay Area

Except as otherwise provided in 5 AAC 67.022, 5 AAC 67.025, or by an emergency order issued under AS 16.05.060, the seasons and bag, possession, annual, and size limits for finfish and shellfish in the Bristol Bay Area are as follows:

(1) king salmon:

(A) in fresh waters, as follows:

(i) 20 inches or greater in length; may be taken only from May 1 through July 31; bag and possession limit of three fish, of which only one fish may be 28 inches or greater in length; annual limit of five fish 20 inches or greater in length taken in combination from fresh waters and salt waters; a harvest record is required as specified in 5 AAC 75.006;

(ii) less than 20 inches in length; may be taken from January 1 through December 31; bag and possession limit of 10 fish;

(B) in salt waters: may be taken only from May 1 through July 31; bag and possession limit of three fish, of which only two fish may be 28 inches or greater in length; annual limit of five fish 20 inches or greater in length taken in combination from fresh waters and salt waters; a harvest record is required as specified in 5 AAC 75.006;

(C) a king salmon removed from the water shall be retained and becomes part of the bag limit of the person originally hooking it; a person may not remove a king salmon from the water before releasing the fish;

(2) salmon, other than king salmon: may be taken from January 1 through December 31; bag and possession limit of five fish; no size limit.

5 AAC 67.022. Special provisions for seasons, bag, possession, and size limits, and methods and means in the Bristol Bay Area

(j) In all fresh water drainages between Cape Newenham and Cape Menshikof a person may not remove a king salmon from the water before releasing the fish.

(k) In the fresh waters of the Bristol Bay Area where the use of bait is not allowed, a sport fishing guide or a guide's client may not place in the water any substance for the purpose of attracting fish by scent, including

(1) fish eggs in any form;

(2) natural or preserved animal, fish, fish oil, shellfish, or insect parts;

(3) natural or processed vegetable matter; and

(4) natural or synthetic chemicals.

Part 2: Sport Fishing and Personal Use Fishery

Chapter 75: Statewide Provisions

Article 2. Methods and Means

5 AAC 75.020. Sport fishing gear

(a) Unless otherwise provided in 5 AAC 47 - 5 AAC 75, sport fishing may only be conducted by the use of a closely attended single line having attached to it not more than

(1) one plug;

(2) one spoon;

(3) one spinner or series of spinners;

(4) two artificial flies; or

(5) two hooks.

(b) An attractor, including a bead, when used with an artificial fly, artificial lure, or bare hook, must be either fixed within two inches of the bare hook, fly, or lure, or be free sliding on the line or leader. For the purposes of this subsection, a bead not attached to the hook is an attractor, not an artificial fly.

(c) A person who gaffs a fish must retain that fish as part of that person's bag and possession limit. A person may not gaff a fish for which the fishing season is closed, that is not of legal size, or that is to be released.

(d) A power-assisted fishing reel may only be used to sport fish if the

(1) power-assisted fishing reel is mounted on a fishing rod by means of a reel seat;

(2) power-assisted fishing reel assembly, motor, gearbox, fishing line, reel-mounted battery, or other reel-mounted attachments weigh no more than 15 pounds in total when detached from the fishing rod.

(e) In this section,

(1) "fishing rod" means a tapered, flexible rod typically used for sport fishing, equipped with a hand grip and a line guide system that guides the line from the reel to the tip of the rod, and upon which is mounted a fishing reel used to deploy and retrieve the sport fishing line;

(2) "gaff" means to puncture any part of a fish with a hook, other than a hook attached to an angler's fishing line;

(3) "power-assisted fishing reel" means a reel used to deploy and retrieve the sport fishing line that is operated or assisted by any electronic, hydraulic, or other mechanical power source other than by hand-cranking a handle attached to the reel;

(4) "reel seat" means an attachment mechanism that holds the fishing reel to the rod using locking, threaded rings, sliding bands, or other attachment devices and is designed to allow the reel to be readily detached from the fishing rod.

5 AAC 75.021. Ice fishing gear

(a) Sport fishing through the ice is permitted with the use of two closely attended lines, provided only one hook or artificial lure is used on each line, except that additional gear may be used for northern pike and burbot as specified by statewide or area regulations.

(b) The maximum number of hooks and type of lines that may be deployed by an angler targeting all species of fish, including northern pike and burbot, is not cumulative and is equal to the maximum number of hooks allowed for northern pike, burbot, or other species, whichever is greater, provided that the maximum number of lines and hooks used to target a species may not exceed the number allowed for that species.

5 AAC 75.022. Freshwater sport fishing

(a) Unless otherwise provided in 5 AAC 47 - 5 AAC 75, a person may not fish in fresh water with

(1) fixed or weighted hooks and lures, except those of standard manufacture;

(2) multiple hooks with gap between point and shank larger than one-half inch;

(3) a spear;

(4) an arrow.

(b) Repealed 3/13/2004.

(c) It is unlawful to intentionally snag or attempt to snag any fish in fresh water. Fish unintentionally hooked elsewhere than in the mouth must be released immediately. "Snag" means hook a fish elsewhere than in the mouth.

(d) Beginning January 1, 2012, the use of footgear with absorbent felt or other fiber material on the soles is prohibited while sport fishing in fresh water.

5 AAC 75.023. Gear for single-hook waters

Repealed.

5 AAC 75.024. Gear for fly-fishing-only waters

In waters designated as fly-fishing-only waters, sport fishing is permitted only as follows:

(1) with not more than one single-hook artificial fly that weighs less than one-fourth ounce, including the hook, and with a gap between the point and shank of the hook that is three-eighths inch or less;

(2) weights may be used and any weights used must be 18 inches or more ahead of the artificial fly;

(3) an attractor as described in 5 AAC 75.020(b) may be used.

3. KING SALMON

Community Setting

King Salmon is located 290 airmiles southwest of Anchorage. The community is spread out on the north shore along the middle portion of Naknek River, which flows into Naknek Lake. The Alaska Peninsula Highway links King Salmon to Naknek, which is also along the north shore of the Naknek River downriver from King Salmon. The western boundary for the King Salmon area used in this study was Pauls Creek.

The natural environment surrounding King Salmon is diverse. Portions of the community are spotted with tundra and kettle ponds, while there are areas covered with fields of wild grasses and cotton fields along the Alaska Peninsula Highway. Much of the lands along Lake Camp Road leading from the King Salmon Airport to Naknek Lake are composed of dense black spruce and alder forests, while the shore of Naknek River has large sections of flat sandy beaches and other sections with steep rocky cliffs.

The regional airport is located in King Salmon, as well as other services such as a grocery store, bank, and post office. Several federal and state agencies have offices in King Salmon, including the U.S. Fish and Wildlife Service, the National Park Service, the National Weather Service, the Alaska State Troopers, and the Alaska Department of Fish and Game (ADF&G). There is a motel in this community, and several fishing and hunting lodges located along the Naknek River near King Salmon.

Population Estimates and Demographic Information: 2017 and 2018

This study found an estimated population for King Salmon in 2017 of 244 individuals in 99 households, and in 2018 the population was estimated to be 242 individuals in 102 households (Table 3-1). For both years, the population estimates from this study were lower than the 2010 U.S. federal census of 374 individuals in 157 households, and the American Community Survey (ACS) five-year average estimates for 2013–2017 (361 individuals in 132 households) and 2014–2018 (385 individuals in 135 households) (Figure 3-1; Table 3-1). A reason these estimates differ may relate to different criteria used by the agencies to determine full-time residency. The criteria employed in this study required at least six months of occupancy in the community during the study years (2017 and 2018) and self-identification as a full-time resident.

The population of King Salmon has decreased since the mid-1990s (Figure 3-2). According to the Alaska Department of Labor population estimates, the community experienced population decline beginning in 1994 when the population declined by 308 residents from the previous year; this decline coincides with the 1993 closure of the King Salmon Air Force Station.[1] The Alaska Department of Labor and the U.S. Census Bureau include people residing in group quarters, such as those at the King Salmon Air Force Station, in population estimates while Division of Subsistence estimates do not include group quarters; this contributes to the difference between division population estimates and those from other sources as depicted in Figure 3-2. Based on population data collected by the Alaska Department of Labor, the U.S. Census Bureau, and the Division of Subsistence, between 1995 and 2018 the population of King Salmon fluctuated slightly between years, but overall the population trend continued to decline during this time span. For 2017 and 2018, the Alaska Department of Labor estimated a slightly higher population (309 and 287 residents, respectively) than the Division of Subsistence estimated (244 and 242 residents, respectively).

While in neighboring study community Naknek the majority (64%) of the population was Alaska Native in both study years, a smaller proportion of the King Salmon population was Alaska Native (Table 4-1; Table 3-1). In 2017, an estimated 24% of the population was Alaska Native, which increased slightly to 31% in 2018. The 2017 study estimated the average age of King Salmon residents to be 40 years old, with the youngest individual being 1 year old and the oldest individual being 80 years old (Table 3-1). The 2018 study estimated the average age of King Salmon residents to be 38 years old with the youngest individual being less than 1 year old and the oldest individual being 81 years old.

1. Bristol Bay Chamber of Commerce. n.d. "What You Need to Know." http://www.bristolbaychamber.com/what-you-need-to-know-/ (accessed May 2020).

Table 3-1.–Sample and demographic characteristics, King Salmon, 2010, 2017, and 2018.

Characteristics	2017	2018
Sampled households	54	54
Eligible households	99	102
Percentage sampled	54.5%	52.9%
Sampled population	133	128
Estimated community population	243.8	241.8
Range[a]	219 – 269	215 – 268
Household size		
Mean	2.5	2.4
Minimum	1.0	1.0
Maximum	7.0	6.0
Age		
Mean	39.6	37.9
Minimum[b]	1	0
Maximum	80	81
Median	43	37
Alaska Native		
Estimated households[c]		
Number	25.7	32.7
Percentage	25.9%	32.1%
Estimated population		
Number	58.7	74.1
Percentage	24.1%	30.6%
Range[a]	33 – 84	41 – 108
U.S. Census	**2010**	
Households	157	
Population	374	
Alaska Native population	132	
ACS 5-year average	**(2013–2017)**	**(2014–2018)**
Households	132	135
Range[d]	111 – 153	107 – 163
Population	361	385
Range[d]	302 – 420	317 – 453
Alaska Native population	96	94
Range[d]	74 – 118	68 – 120

Sources U.S. Census Bureau (n.d.) for 2010 decennial census data, and for American Community Survey (ACS) five-year estimate for 2107 (2013–2017) and 2018 (2014–2018); and ADF&G Division of Subsistence household surveys, 2018 for 2017 estimate, and 2019 for 2018 estimate.

a. Range for estimates represent a 95% confidence interval.

b. A minimum age of 0 (zero) is used for infants who are less than 1 year of age.

c. The estimated number of households in which at least one head of household is Alaska Native.

d. ACS data range is the reported margin of error.

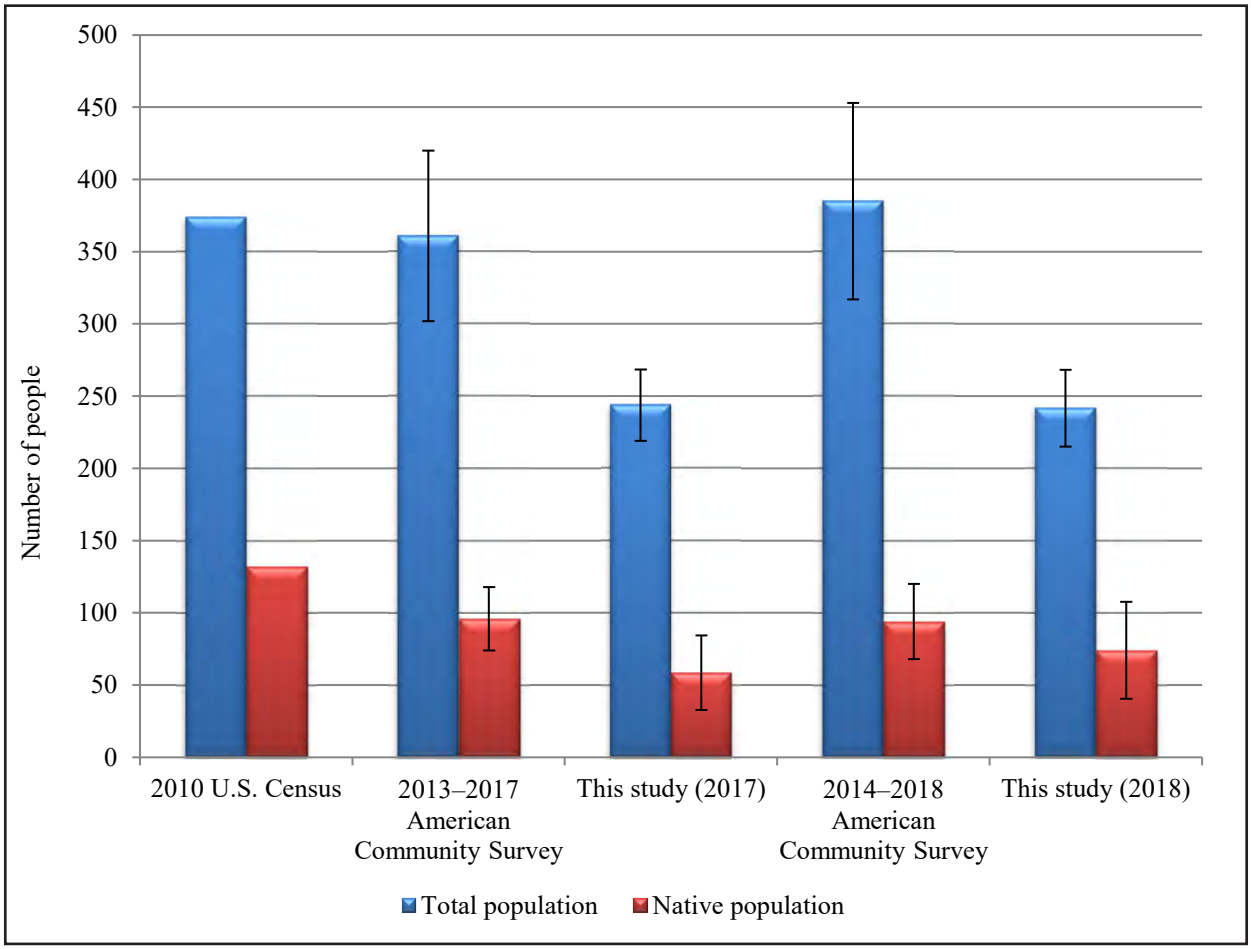


Figure 3-1.–Alaska Native and overall population estimates, King Salmon, 2010, 2017, and 2018.

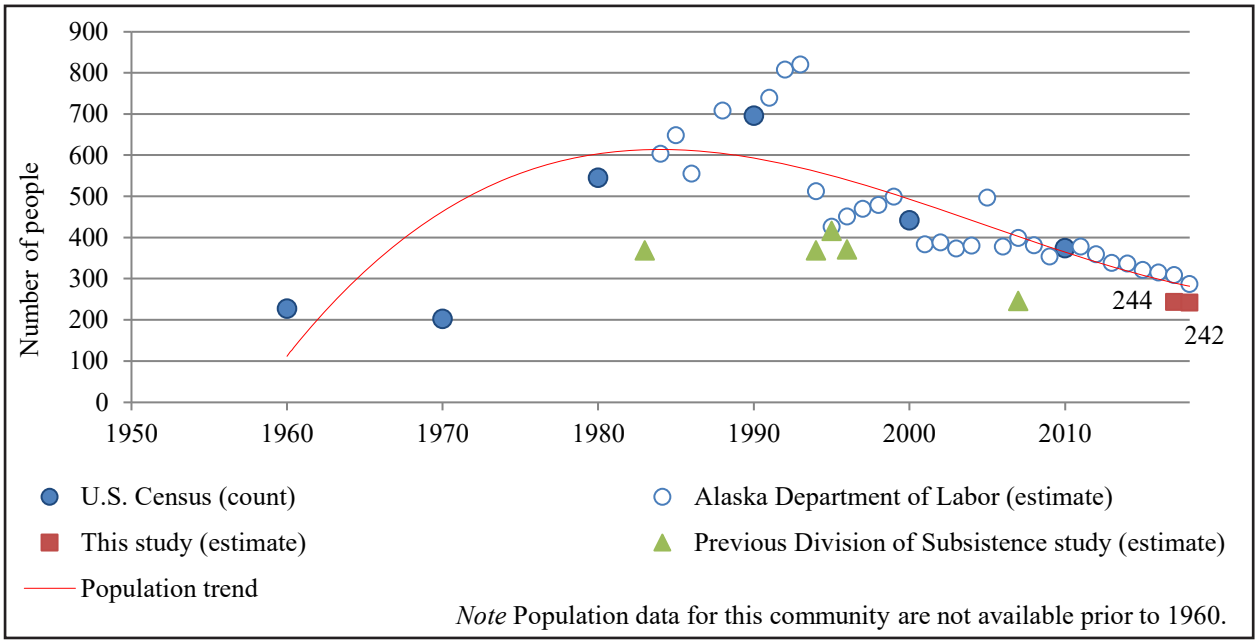


Figure 3-2.–Historical population estimates, King Salmon, 1950–2018.

The King Salmon population did not have a large representation of youth in the community during the two study years, as evidenced by the infrequency of individuals under the age of 19 residing in King Salmon. Individuals in youth age cohorts made up less than 25% of the total population in both study years; however, the ratio of youth males-to-females was relatively even during the study years (Figure 3-3; Table 3-2; Figure 3-4; Table 3-3). Overall, both the 2017 and 2018 population profiles indicate that the ratio of males versus females was unevenly distributed within many non-youth age cohorts in King Salmon. During the 2017 study year, the largest female age cohorts were for the ages of 45–49, 55–59, and 65–99 (Table 3-2; Figure 3-3). The two largest male age cohorts in 2017 were for the ages of 30–34 and 55–59. In 2018, the largest female age cohorts were for the ages of 0–4, 25–29, and 45–49 (Figure 3-4; Table 3-3). The largest male age cohorts in 2018 were for the ages of 30–34 and 70–74. In both study years, approximately 50% of the population was adults the age of 40 or older (Table 3-2; Table 3-3).

From the 2017 survey, an estimated 70% of household heads' parents were living outside of Alaska in other parts of the United States at the time of their birth, while 4% of household heads' parents were living in King Salmon at the time of their birth (Table 3-4). In 2017, 59% of King Salmon's total population had parents living outside of Alaska in other parts of the country when they were born, while 14% of the total population had parents living in King Salmon at the time of their birth (Table 3-5). For the 2018 study year, 66% of household heads' parents were living outside of Alaska in other parts of the United States at the time of their birth, and 6% of household heads' parents were living in King Salmon at the time of their birth (Table 3-6). In comparison, in 2018, 53% of King Salmon's total population had parents living outside of Alaska in other parts of the country when they were born, and 19% of the total population had parents living in this community when they were born (Table 3-7).

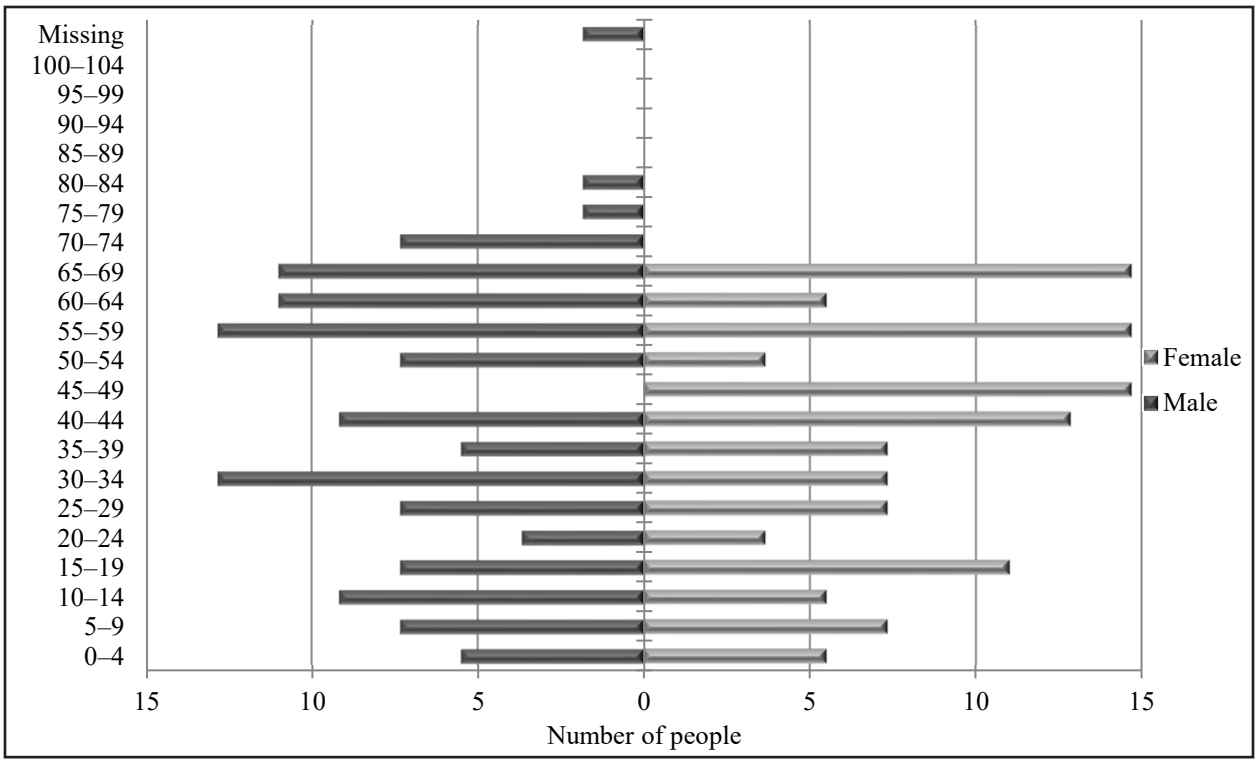


Figure 3-3.–Population profile, King Salmon, 2017.

Table 3-2.–Population profile, King Salmon, 2017.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	5.5	4.5%	4.5%	5.5	4.5%	4.5%	11.0	4.5%	4.5%
5–9	7.3	6.0%	10.4%	7.3	6.1%	10.6%	14.7	6.0%	10.5%
10–14	9.2	7.5%	17.9%	5.5	4.5%	15.2%	14.7	6.0%	16.5%
15–19	7.3	6.0%	23.9%	11.0	9.1%	24.2%	18.3	7.5%	24.1%
20–24	3.7	3.0%	26.9%	3.7	3.0%	27.3%	7.3	3.0%	27.1%
25–29	7.3	6.0%	32.8%	7.3	6.1%	33.3%	14.7	6.0%	33.1%
30–34	12.8	10.4%	43.3%	7.3	6.1%	39.4%	20.2	8.3%	41.4%
35–39	5.5	4.5%	47.8%	7.3	6.1%	45.5%	12.8	5.3%	46.6%
40–44	9.2	7.5%	55.2%	12.8	10.6%	56.1%	22.0	9.0%	55.6%
45–49	0.0	0.0%	55.2%	14.7	12.1%	68.2%	14.7	6.0%	61.7%
50–54	7.3	6.0%	61.2%	3.7	3.0%	71.2%	11.0	4.5%	66.2%
55–59	12.8	10.4%	71.6%	14.7	12.1%	83.3%	27.5	11.3%	77.4%
60–64	11.0	9.0%	80.6%	5.5	4.5%	87.9%	16.5	6.8%	84.2%
65–69	11.0	9.0%	89.6%	14.7	12.1%	100.0%	25.7	10.5%	94.7%
70–74	7.3	6.0%	95.5%	0.0	0.0%	100.0%	7.3	3.0%	97.7%
75–79	1.8	1.5%	97.0%	0.0	0.0%	100.0%	1.8	0.8%	98.5%
80–84	1.8	1.5%	98.5%	0.0	0.0%	100.0%	1.8	0.8%	99.2%
85–89	0.0	0.0%	98.5%	0.0	0.0%	100.0%	0.0	0.0%	99.2%
90–94	0.0	0.0%	98.5%	0.0	0.0%	100.0%	0.0	0.0%	99.2%
95–99	0.0	0.0%	98.5%	0.0	0.0%	100.0%	0.0	0.0%	99.2%
100–104	0.0	0.0%	98.5%	0.0	0.0%	100.0%	0.0	0.0%	99.2%
Missing	1.8	1.5%	100.0%	0.0	0.0%	100.0%	1.8	0.8%	100.0%
Total	**122.8**	**100.0%**	**100.0%**	**121.0**	**100.0%**	**100.0%**	**243.8**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2018.

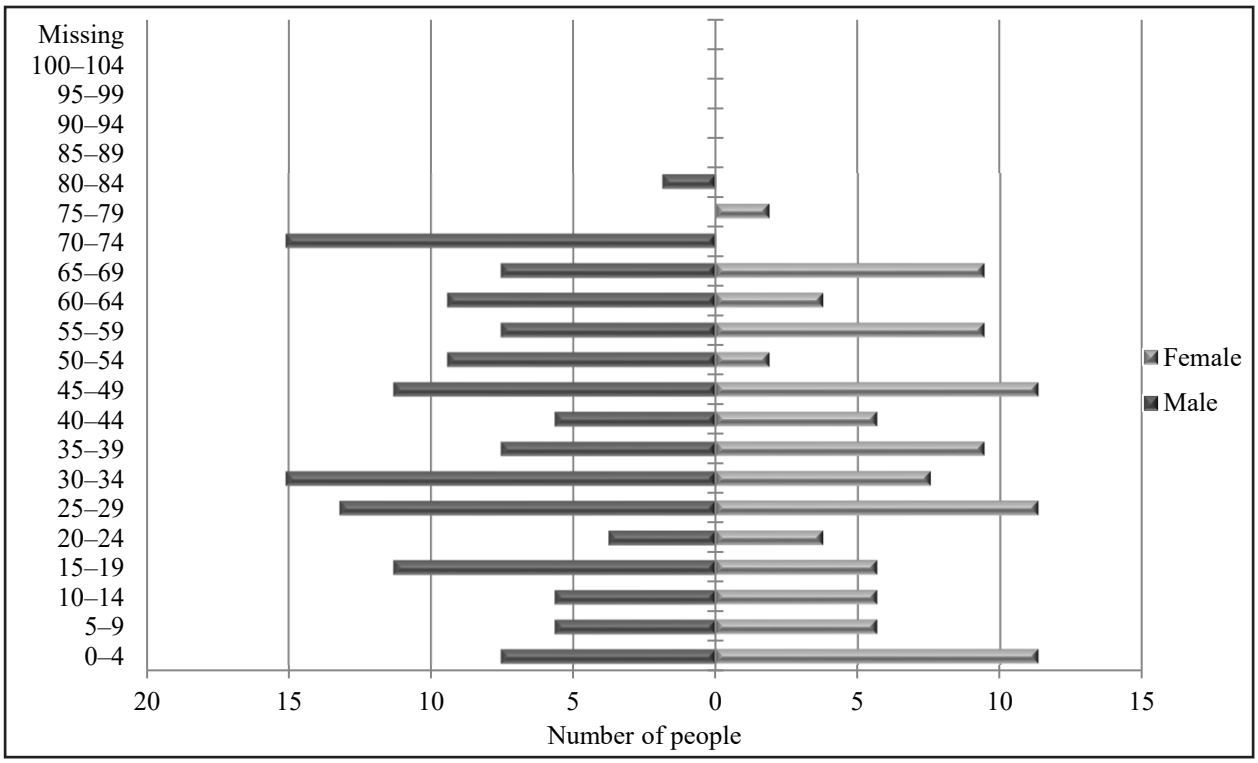


Figure 3-4.–Population profile, King Salmon, 2018.

Table 3-3.–Population profile, King Salmon, 2018.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	7.6	5.5%	5.5%	11.3	10.9%	10.9%	18.9	7.8%	7.8%
5–9	5.7	4.1%	9.6%	5.7	5.5%	16.4%	11.3	4.7%	12.5%
10–14	5.7	4.1%	13.7%	5.7	5.5%	21.8%	11.3	4.7%	17.2%
15–19	11.3	8.2%	21.9%	5.7	5.5%	27.3%	17.0	7.0%	24.2%
20–24	3.8	2.7%	24.7%	3.8	3.6%	30.9%	7.6	3.1%	27.3%
25–29	13.2	9.6%	34.2%	11.3	10.9%	41.8%	24.6	10.2%	37.5%
30–34	15.1	11.0%	45.2%	7.6	7.3%	49.1%	22.7	9.4%	46.9%
35–39	7.6	5.5%	50.7%	9.4	9.1%	58.2%	17.0	7.0%	53.9%
40–44	5.7	4.1%	54.8%	5.7	5.5%	63.6%	11.3	4.7%	58.6%
45–49	11.3	8.2%	63.0%	11.3	10.9%	74.5%	22.7	9.4%	68.0%
50–54	9.4	6.8%	69.9%	1.9	1.8%	76.4%	11.3	4.7%	72.7%
55–59	7.6	5.5%	75.3%	9.4	9.1%	85.5%	17.0	7.0%	79.7%
60–64	9.4	6.8%	82.2%	3.8	3.6%	89.1%	13.2	5.5%	85.2%
65–69	7.6	5.5%	87.7%	9.4	9.1%	98.2%	17.0	7.0%	92.2%
70–74	15.1	11.0%	98.6%	0.0	0.0%	98.2%	15.1	6.3%	98.4%
75–79	0.0	0.0%	98.6%	1.9	1.8%	100.0%	1.9	0.8%	99.2%
80–84	1.9	1.4%	100.0%	0.0	0.0%	100.0%	1.9	0.8%	100.0%
85–89	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
90–94	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
95–99	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
100–104	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
Missing	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
Total	**137.9**	**100.0%**	**100.0%**	**103.9**	**100.0%**	**100.0%**	**241.8**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2019.

Table 3-4.–Birthplaces of household heads, King Salmon, 2017.

Birthplace	Percentage
Anchorage	1.0%
Chignik Lake	1.0%
Cordova	1.0%
Dillingham	1.0%
Egegik	2.1%
Fairbanks	2.1%
Igloo	1.0%
King Salmon	4.2%
Kokhanok	2.1%
Levelock	2.1%
Manley Hot Springs	1.0%
Naknek	1.0%
South Naknek	2.1%
Saint Paul	1.0%
Other U.S.	69.8%
Foreign	4.2%
Missing	3.1%

Source ADF&G Division of Subsistence household surveys, 2018.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 3-5.–Birthplaces of population, King Salmon, 2017.

Birthplace	Percentage
Anchorage	2.3%
Chignik Lake	0.8%
Cordova	0.8%
Dillingham	1.5%
Egegik	1.5%
Fairbanks	3.8%
Igloo	0.8%
King Salmon	13.5%
Kokhanok	1.5%
Levelock	1.5%
Manley Hot Springs	0.8%
Naknek	0.8%
South Naknek	2.3%
Saint Paul	0.8%
Wasilla	1.5%
Other U.S.	59.4%
Foreign	4.5%
Missing	2.3%

Source ADF&G Division of Subsistence household surveys, 2018.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 3-6.–Birthplaces of household heads, King Salmon, 2018.

Birthplace	Percentage
Anchorage	2.3%
Cantwell	1.1%
Chignik Lake	1.1%
Cordova	1.1%
Dillingham	2.3%
Egegik	1.1%
Fairbanks	1.1%
Igiugig	1.1%
Iliamna	1.1%
King Salmon	5.7%
Levelock	1.1%
Naknek	3.4%
Newhalen	1.1%
Portage	1.1%
South Naknek	4.6%
Other U.S.	65.5%
Foreign	3.4%
Missing	1.1%

Source ADF&G Division of Subsistence household surveys, 2019.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 3-7.–Birthplaces of population, King Salmon, 2018.

Birthplace	Percentage
Anchorage	2.3%
Cantwell	0.8%
Chignik Lake	0.8%
Cordova	0.8%
Dillingham	2.3%
Egegik	0.8%
Fairbanks	1.6%
Igiugig	0.8%
Iliamna	0.8%
King Salmon	18.7%
Levelock	0.8%
Naknek	4.7%
Newhalen	0.8%
Portage	0.8%
South Naknek	3.1%
Wasilla	1.6%
Other U.S.	53.1%
Foreign	3.1%
Missing	2.3%

Source ADF&G Division of Subsistence household surveys, 2019.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Summary of Salmon Harvest and Use Patterns

All five species of Pacific salmon found in Alaska enter the Naknek River on the way to freshwater spawning grounds. In this chapter, harvest survey results for King Salmon (2017 and 2018) are first presented, which include harvest estimates, identifying the gear types used to harvest salmon, and fishing locations.

Following an overview of survey results is a discussion of subsistence permit participation in King Salmon. Next, the results of the salmon use assessment questions from the household surveys are presented. Assessment questions attempt to gauge to what degree salmon harvest and use patterns by the community have changed over time. Finally, the 2017 and 2018 salmon harvest data are compared to harvest survey results from previous study years 2007, 1983, and 1982, and also compared to the subsistence salmon harvest permit data for 1983–2018. Results from those previous study years are published by the Division of Subsistence in Holen et al. (2011), Morris (1982; 1985), and also the CSIS; permit-based harvest estimates are published by the Division of Subsistence in an annual report, which was last published by Fall et al. (2020). Following presentation of these data, local community comments and concerns are presented. Information for the final section of this chapter came from the harvest surveys and is contextualized with qualitative information obtained from key respondent interviews and participant observation.

Household Salmon Harvest and Use Characteristics in King Salmon: 2017

In 2017, King Salmon residents harvested an estimated total of 19,140 lb, or 79 lb per capita, of salmon (Table 3-8). In terms of total pounds harvested and harvest proportion by percentage of harvest weight by salmon resource, the greatest harvest was sockeye salmon (12,976 lb, 53 lb per capita, or 68% of the total salmon harvest), which was followed by coho salmon (3,854 lb, 16 lb per capita, or 20%), Chinook salmon (2,251 lb, 9 lb per capita, or 12%), and very small harvests that each totaled less than 1 lb per capita (less than 1% of harvest) of chum salmon (35 lb) and pink salmon (25 lb) (Table 3-8; Figure 3-5).

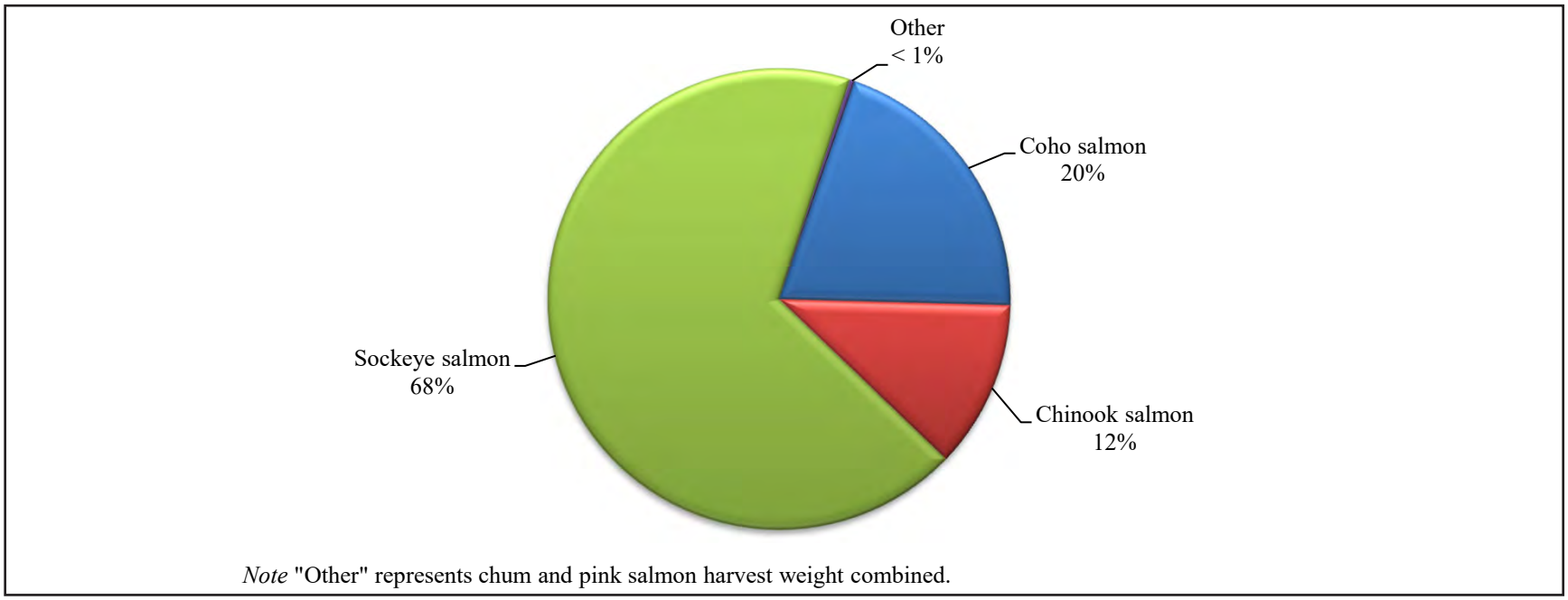
In study year 2017, an estimated 57% of King Salmon households owned a gillnet to harvest salmon and 65% of households owned a boat (Table 1-7). Overall, an estimated 13% of households in King Salmon owned a boat that was used for commercial fishing. For 2017, there were 16 households that indicated a person either held a commercial fishery permit or a person who participated as a commercial fishing crew member resided at the residence: eight households had crew members, and eight households had permit holders residing at the residence; none had both (Table 1-8). Based on responses from surveyed households that retained salmon from commercial catches in 2017, an estimated six King Salmon households usually retain salmon from commercial fishing for home use, and of those estimated six households, all six retain salmon from commercial fishing for home use and also participate in subsistence salmon fishing (Table 1-9).

Table 3-9 lists in number of fish and pounds each salmon species harvested by King Salmon residents in 2017; Figure 3-6 is a complementary visual representation of the salmon harvest weight caught by gear type. King Salmon residents harvested the majority of their salmon by subsistence gillnets (66% of salmon harvest weight); the other methods used to harvest salmon were rod and reel (27%), removals from commercial catches (6% of harvest weight), and dip net (2% of harvest weight) (Table 3-10). The low proportion of the total salmon harvest coming from commercially caught salmon retained for home use aligns with the community characteristic that few sampled King Salmon households reported a role in commercial fishing (Table 1-8; Table 3-10). The majority (85%) of the sockeye salmon harvest was caught using subsistence gillnets, 9% was harvested using rod and reel, 3% removed from commercial catches, and the remaining 3% was harvested using dip net. Out of a total 4,365 salmon harvested, an estimated 83 sockeye salmon caught by dip net composed 96% of the dip net harvest; four pink salmon harvested made up the remainder of the dip net harvest (Table 3-9; Table 3-10). For coho salmon, 75% of the harvest weight was caught using rod and reel, 24% was harvested using subsistence gillnets, and the remaining 1% was removed from commercial catches (Table 3-10). Slightly less than one-half (45%) of the Chinook salmon harvest weight was caught using rod and reel, 32% was removed from commercial catches, and 23% of Chinook salmon were harvested using subsistence gillnets. All chum salmon harvests were caught using subsistence gillnets. For pink salmon, 60% were harvested using subsistence gillnets, and the other 40% of the pink salmon harvest was caught using dip net.

Table 3-8.–Estimated use and harvest of salmon, King Salmon, 2017.

	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	**98.1**	**79.6**	**75.9**	**48.1**	**44.4**	**19,140.4**	**193.3**	**78.5**	**4,365.2**	**ind**	**44.1**	**25.7**
Chum salmon	7.4	7.4	5.6	1.9	1.9	34.5	0.3	0.1	7.3	ind	0.1	81.5
Coho salmon	51.9	46.3	38.9	14.8	13.0	3,854.4	38.9	15.8	808.5	ind	8.2	39.5
Chinook salmon	74.1	50.0	44.4	35.2	25.9	2,250.9	22.7	9.2	271.3	ind	2.7	42.9
Pink salmon	7.4	7.4	5.6	1.9	0.0	25.0	0.3	0.1	9.2	ind	0.1	79.8
Sockeye salmon	68.5	51.9	46.3	29.6	31.5	12,975.6	131.1	53.2	3,268.8	ind	33.0	33.6
Spawning sockeye 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	3.7	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2018.



Note "Other" represents chum and pink salmon harvest weight combined.

Figure 3-5.–Composition of salmon harvest in pounds usable weight, King Salmon, 2017.

Table 3-9.–Estimated harvest of salmon by gear type and resource, King Salmon, 2017.

	Removed from commercial catch		Subsistence methods									
			Gillnet[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**198.0**	**1,166.0**	**3,054.3**	**12,544.5**	**86.2**	**337.5**	**3,140.5**	**12,882.0**	**1,026.7**	**5,092.4**	**4,365.2**	**19,140.4**
Chum salmon	0.0	0.0	7.3	34.5	0.0	0.0	7.3	34.5	0.0	0.0	7.3	34.5
Coho salmon	9.2	43.7	190.7	909.0	0.0	0.0	190.7	909.0	608.7	2,901.7	808.5	3,854.4
Chinook salmon	86.2	714.8	62.3	517.1	0.0	0.0	62.3	517.1	122.8	1,019.0	271.3	2,250.9
Pink salmon	0.0	0.0	5.5	15.0	3.7	10.0	9.2	25.0	0.0	0.0	9.2	25.0
Sockeye salmon	102.7	407.5	2,788.5	11,068.9	82.5	327.5	2,871.0	11,396.4	295.2	1,171.7	3,268.8	12,975.6
Spawning sockeye 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
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

Source ADF&G Division of Subsistence household surveys, 2018.

a. Gillnet harvests may include both set and drift gillnet.

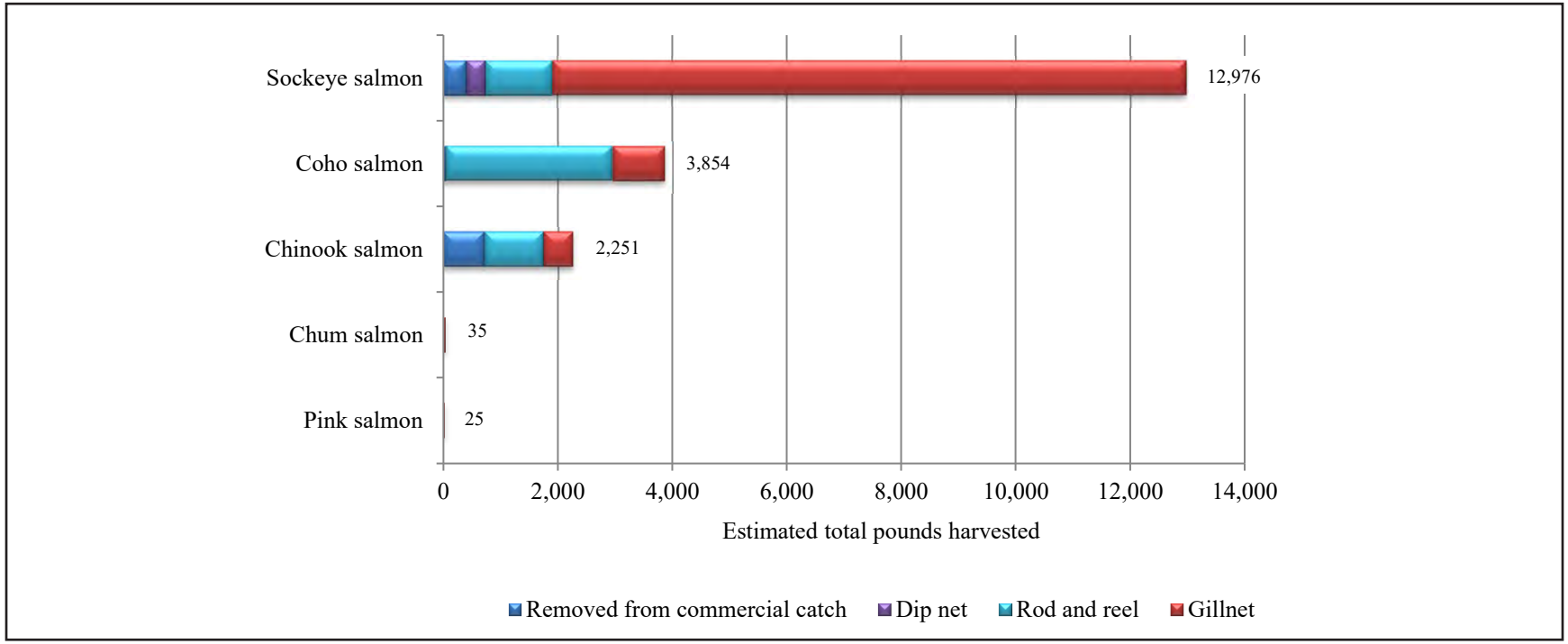


Figure 3-6.–Estimated harvest of salmon in pounds usable weight by gear type and resource, King Salmon, 2017.

Table 3-10.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, King Salmon, 2017.

Resource	Percentage base	Removed from commercial catch		Subsistence methods									
				Gillnet[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**Gear type**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**4.5%**	**6.1%**	**70.0%**	**65.5%**	**2.0%**	**1.8%**	**71.9%**	**67.3%**	**23.5%**	**26.6%**	**100.0%**	**100.0%**
	Total	**4.5%**	**6.1%**	**70.0%**	**65.5%**	**2.0%**	**1.8%**	**71.9%**	**67.3%**	**23.5%**	**26.6%**	**100.0%**	**100.0%**
Chum salmon	Gear type	0.0%	0.0%	0.2%	0.3%	0.0%	0.0%	0.2%	0.3%	0.0%	0.0%	0.2%	0.2%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.2%	0.2%
Coho salmon	Gear type	4.6%	3.7%	6.2%	7.2%	0.0%	0.0%	6.1%	7.1%	59.3%	57.0%	18.5%	20.1%
	Resource	1.1%	1.1%	23.6%	23.6%	0.0%	0.0%	23.6%	23.6%	75.3%	75.3%	100.0%	100.0%
	Total	0.2%	0.2%	4.4%	4.7%	0.0%	0.0%	4.4%	4.7%	13.9%	15.2%	18.5%	20.1%
Chinook salmon	Gear type	43.5%	61.3%	2.0%	4.1%	0.0%	0.0%	2.0%	4.0%	12.0%	20.0%	6.2%	11.8%
	Resource	31.8%	31.8%	23.0%	23.0%	0.0%	0.0%	23.0%	23.0%	45.3%	45.3%	100.0%	100.0%
	Total	2.0%	3.7%	1.4%	2.7%	0.0%	0.0%	1.4%	2.7%	2.8%	5.3%	6.2%	11.8%
Pink salmon	Gear type	0.0%	0.0%	0.2%	0.1%	4.3%	3.0%	0.3%	0.2%	0.0%	0.0%	0.2%	0.1%
	Resource	0.0%	0.0%	60.0%	60.0%	40.0%	40.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.0%	0.0%	0.2%	0.1%
Sockeye salmon	Gear type	51.9%	34.9%	91.3%	88.2%	95.7%	97.0%	91.4%	88.5%	28.8%	23.0%	74.9%	67.8%
	Resource	3.1%	3.1%	85.3%	85.3%	2.5%	2.5%	87.8%	87.8%	9.0%	9.0%	100.0%	100.0%
	Total	2.4%	2.1%	63.9%	57.8%	1.9%	1.7%	65.8%	59.5%	6.8%	6.1%	74.9%	67.8%
Spawning sockeye salmon	Gear type	0.0%	0.0%	0.0%	0.0%	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%	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%	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%	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%	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%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Gillnet may inlcude both set and drift gillnet.

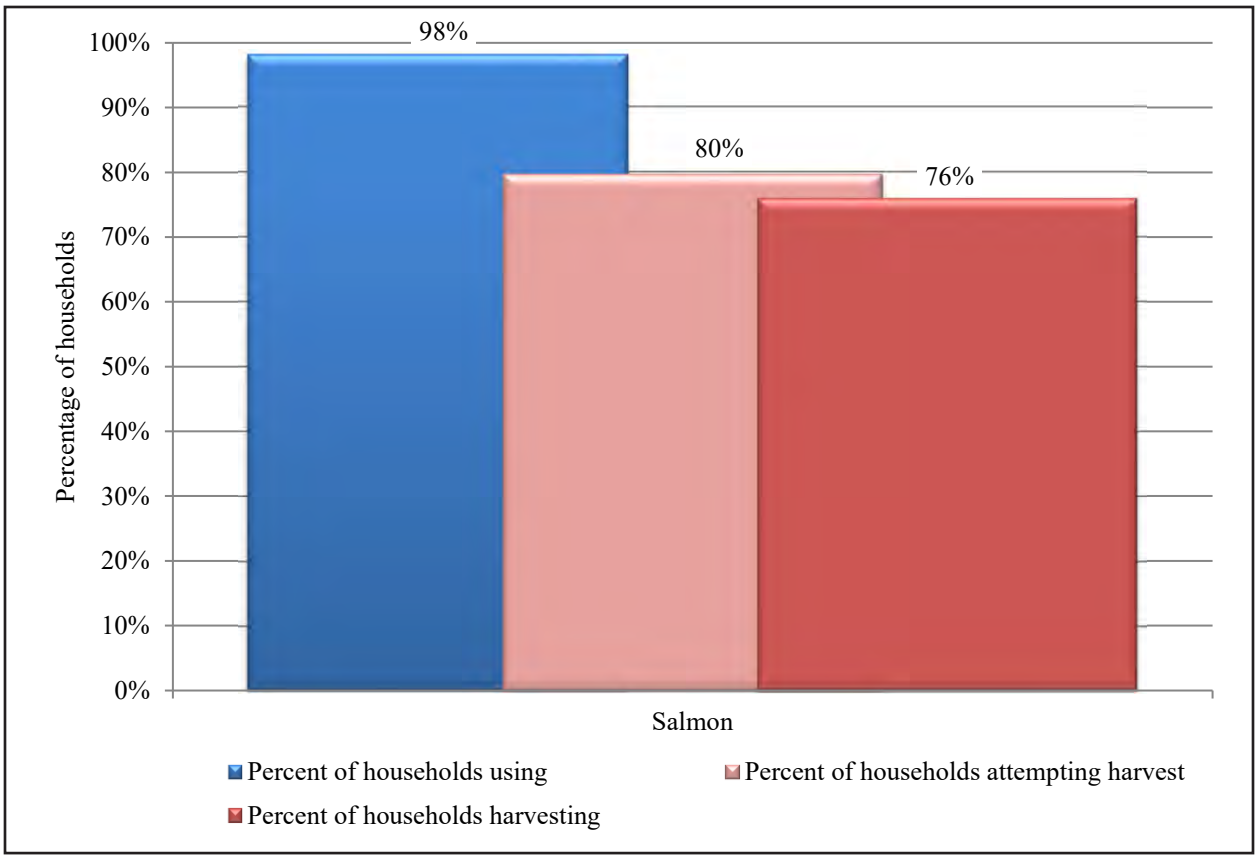


Figure 3-7.–Percentages of household using, attempting to harvest, or harvesting salmon, King Salmon, 2017.

Figure 3-7 shows the percentages of households that used, attempted to harvest, and harvested salmon. During 2017, 98% of King Salmon households used salmon, 80% attempted to harvest salmon, and 76% of community households were successful in their salmon harvest pursuits. A little less than one-half of the King Salmon households shared salmon in 2017: 44% of households gave salmon away, and 48% of households received salmon during the study year (Table 3-8). Chinook salmon, despite composing only 12% of the total salmon harvest weight, was the most used species in King Salmon in 2017. An estimated 74% of households used Chinook salmon, whereas 69% of households used sockeye salmon, which composed most of the total harvest weight and sockeye salmon were harvested by slightly more households (46%) than Chinook salmon (44%). Sharing appears to be a factor in the more widespread use of Chinook salmon: 35% of households received Chinook salmon, and fewer households (30%) received sockeye salmon. However, more households gave away sockeye salmon (32%) than Chinook salmon (26%); this may be an indication that sharing with households from another community played a role in the sharing practices of King Salmon households. A little more than one-half (52%) of King Salmon households used coho salmon in 2017, 39% of households harvested coho salmon, 13% gave away this salmon species, and 15% received coho salmon. A small percentage of households in King Salmon used (7%) and harvested (6%) pink and chum salmon in 2017. No households reported using spawning sockeye salmon during the study year. A small proportion of households (4%) received and used unknown salmon resources.

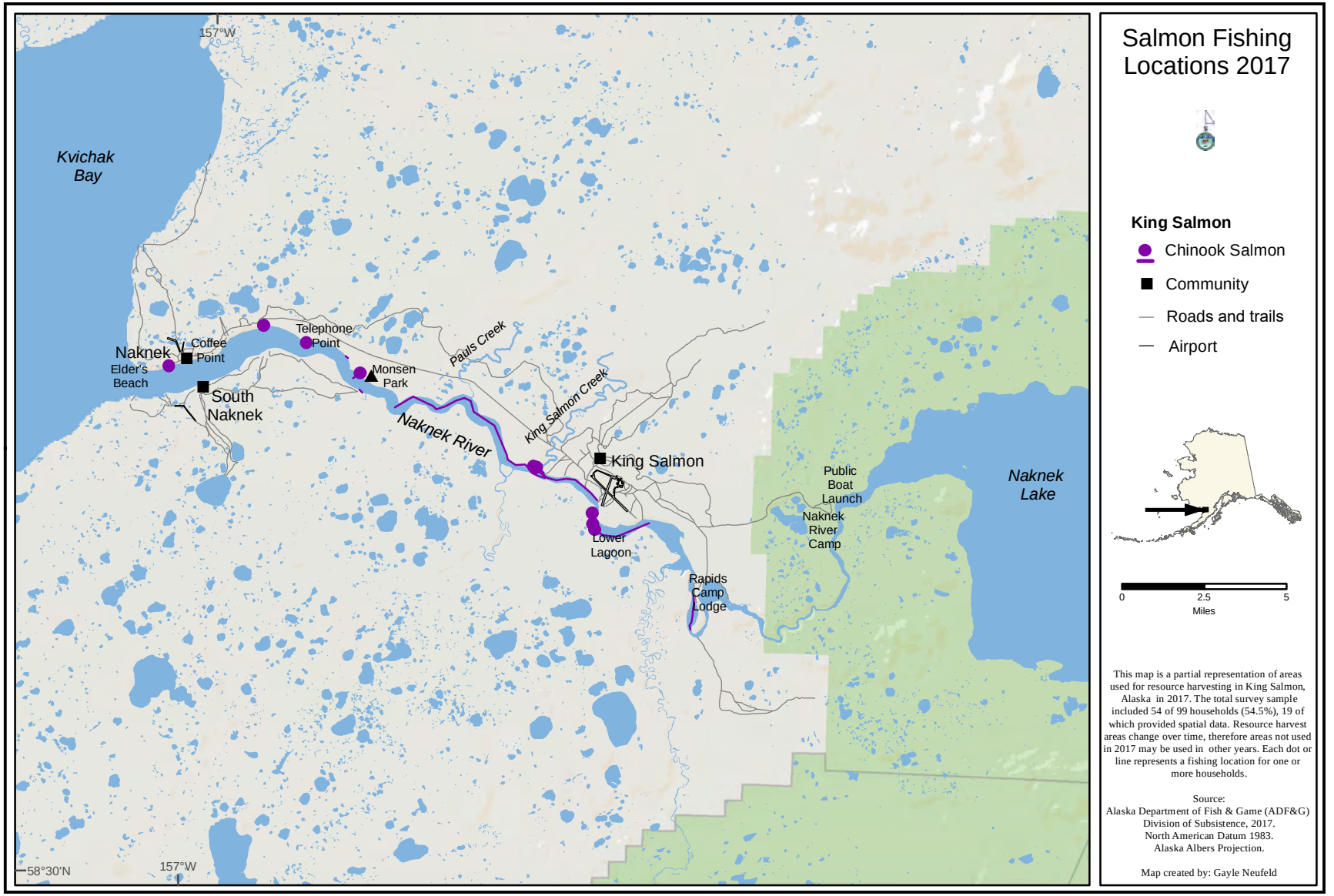


Figure 3-8.–Fishing and harvest locations of Chinook salmon, King Salmon, 2017.

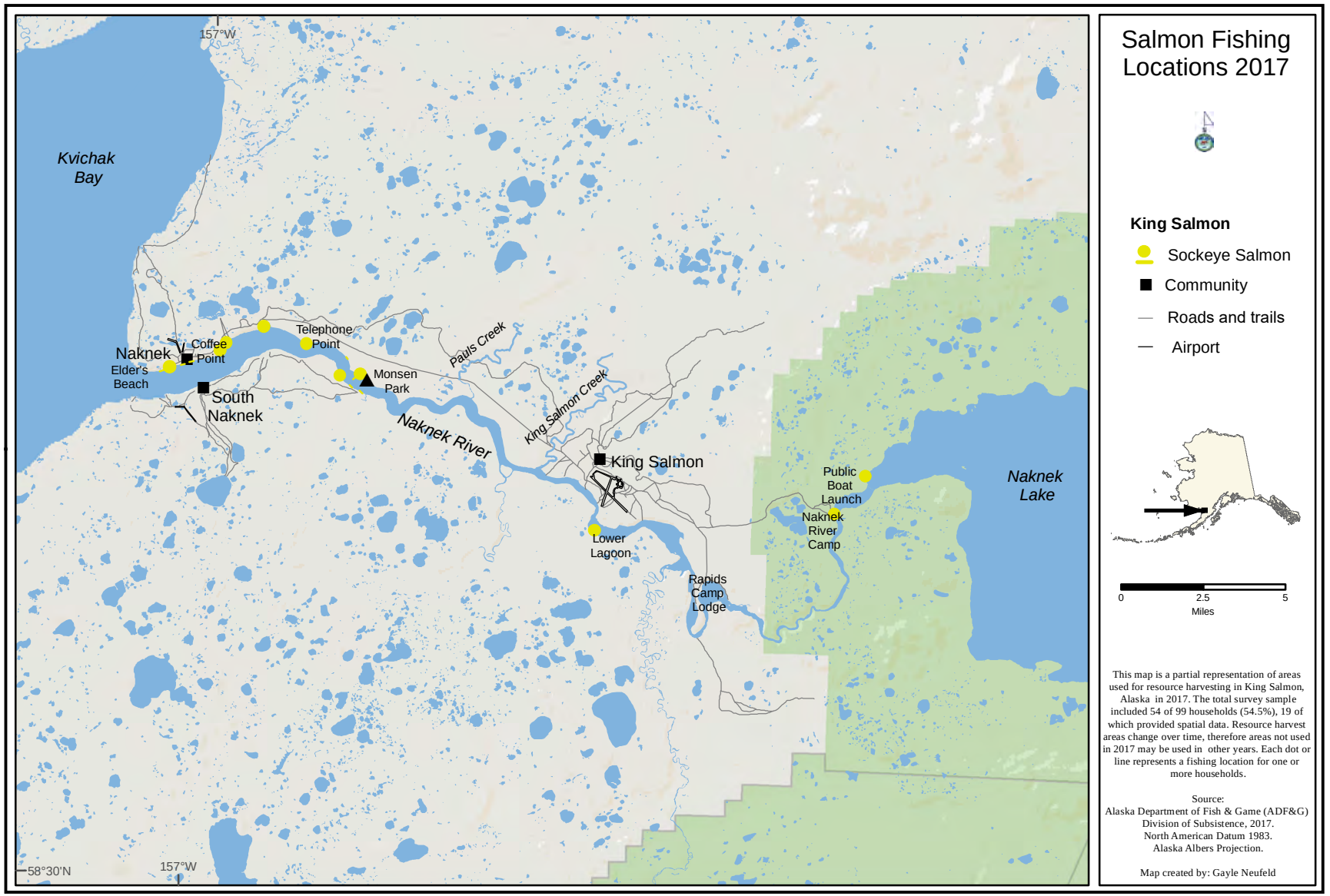


Figure 3-9.–Fishing and harvest locations of sockeye salmon, King Salmon, 2017.

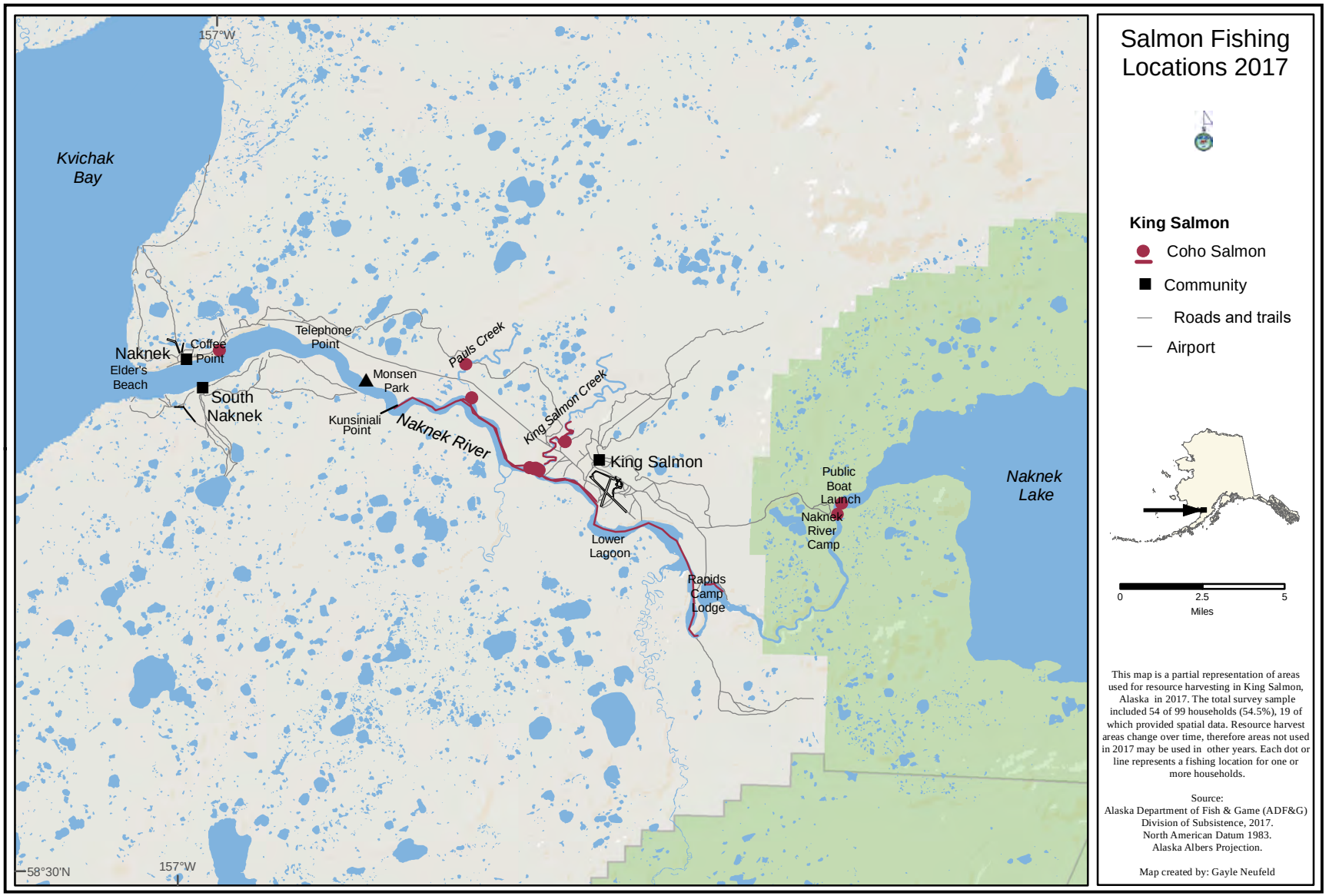


Figure 3-10.–Fishing and harvest locations of coho salmon, King Salmon, 2017.

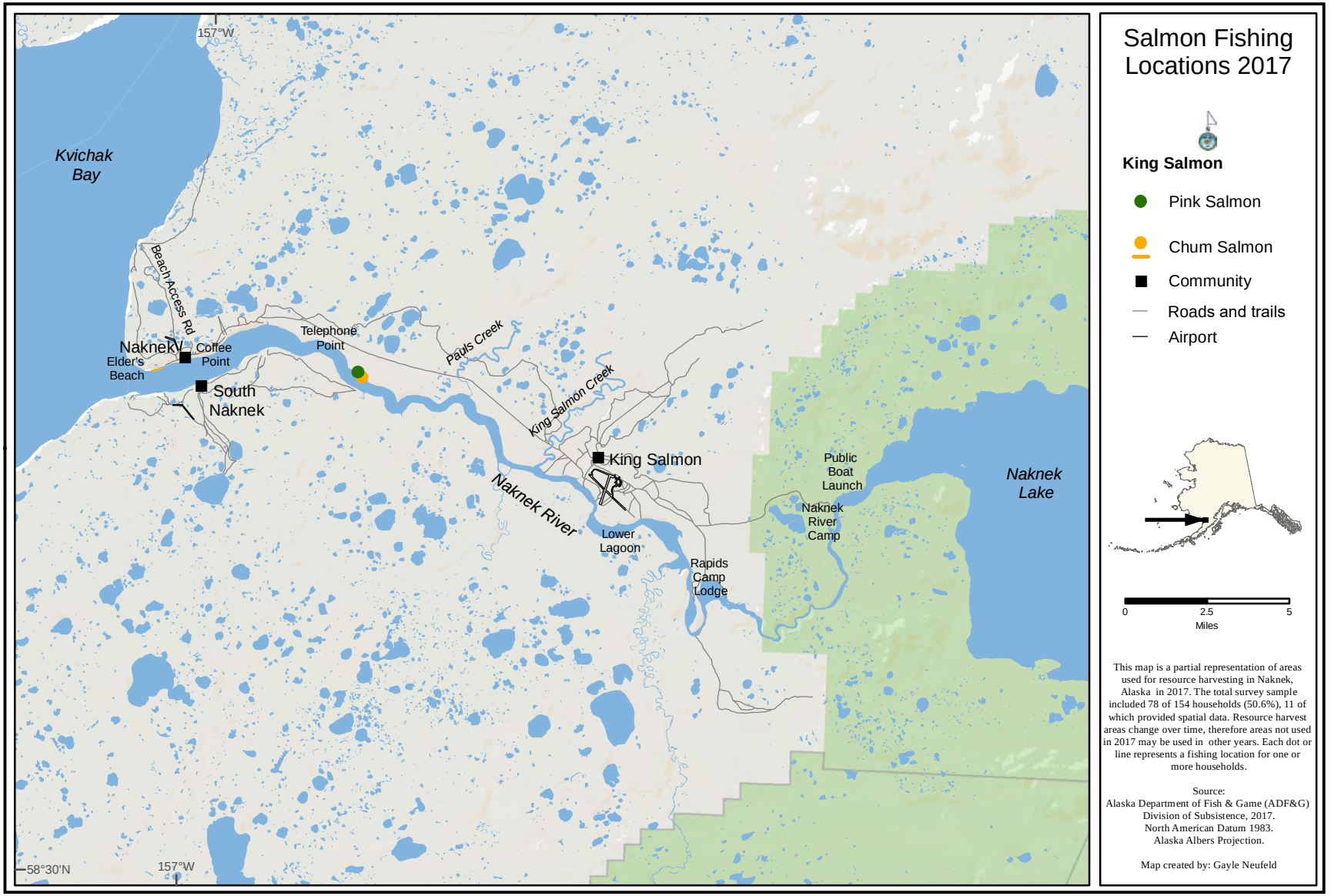


Figure 3-11.–Fishing and harvest locations of pink and chum salmon, King Salmon, 2017.

In 2017, starting from the west and moving toward the east, King Salmon respondents reported harvesting Chinook salmon near the mouth of the Naknek River at Elder's Beach, Telephone Point, and Martin Monsen Park (Figure 3-8). King Salmon community members also reported harvesting Chinook salmon in the Naknek River from Telephone Point to Lower Lagoon, as well as near Rapids Camp Lodge. During the first study year, like Chinook salmon, sockeye salmon were harvested near the mouth of the Naknek River at Elder's Beach, Coffee Point, Telephone Point, and Monsen Park, and also at Lower Lagoon; although, different from Chinook salmon fishing efforts, sockeye salmon were not pursued continuously between Telephone Point and Lower Lagoon (Figure 3-9). However, sockeye salmon were also harvested on the south side of the Naknek River across from Telephone Point, near Naknek River Camp, and north of the public boat launch along the northwest shore of Naknek Lake. In 2017, coho salmon were harvested near Coffee Point and Monsen Park (Figure 3-10). Coho salmon were also harvested in Pauls Creek, King Salmon Creek, and in the Naknek River between Kunsiniali Point and Rapids Camp Lodge. Additionally, during the first study year, coho salmon were harvested near Naknek River Camp and near the public boat launch. The other salmon species (pink and chum salmon) were harvested at Elder's Beach and slightly west of Telephone Point (Figure 3-11).

Household Salmon Harvest and Use Characteristics in King Salmon: 2018

In 2018, King Salmon residents harvested an estimated total of 28,154 lb, or 116 lb per capita, of salmon (Table 3-11). In terms of total pounds harvested and harvest proportion by percentage of harvest weight by salmon resource, the greatest harvest was sockeye salmon (16,087 lb, 67 lb per capita, or 57% of the total salmon harvest), which was followed by coho salmon (6,522 lb, 27 lb per capita, or 23%), spawning sockeye salmon (3,380 lb, 14 lb per capita, or 12%), Chinook salmon (1,943 lb, 8 lb per capita, or 7%), chum salmon (132 lb), and pink salmon (90 lb); the per capita harvest of both chum and pink salmon was less than 1 lb (less than 1% of harvest weight) (Table 3-11; Figure 3-12).

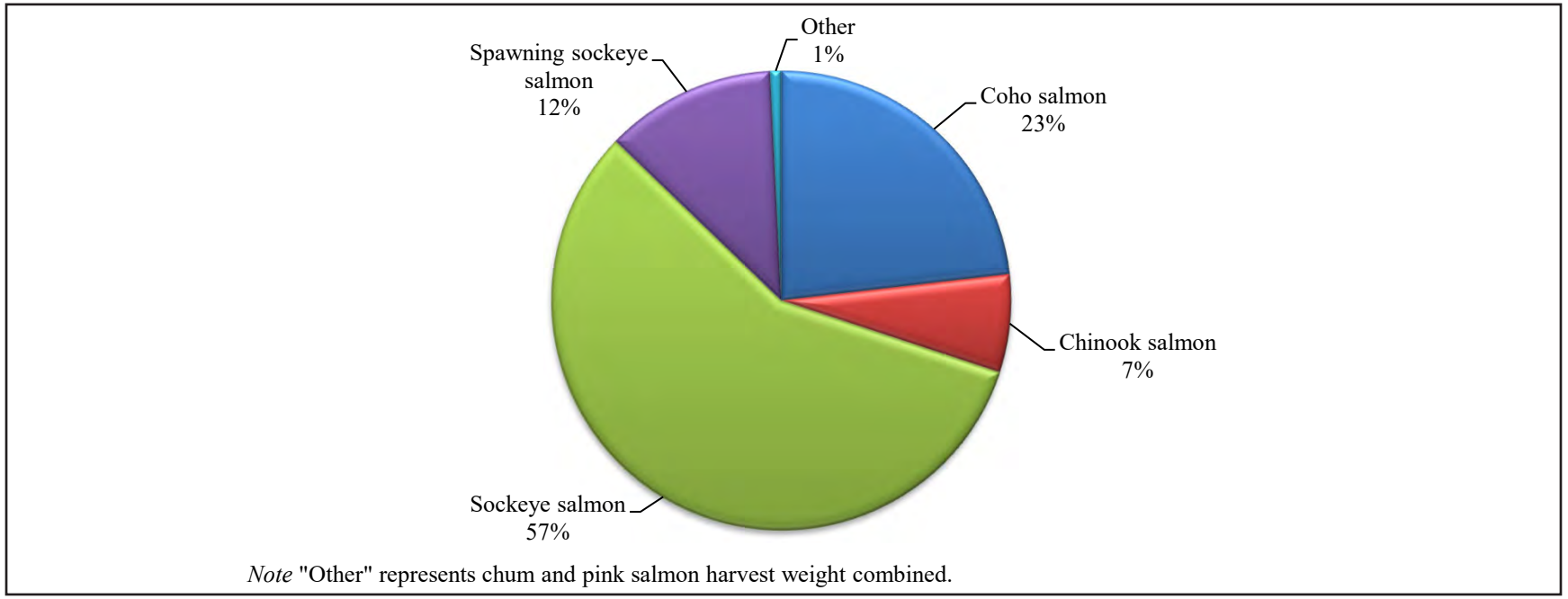
In 2018, an estimated 56% of King Salmon households owned a gillnet to harvest salmon and 59% of households owned a boat (Table 1-7). Overall, an estimated 11% of households in King Salmon owned a boat that was used for commercial fishing. For 2018, there were 19 households that indicated a person from the residence either held a commercial fishery permit or participated as a commercial fishing crew member: 12 households had crew members, seven households had permit holders in residence, and none had both (Table 1-8). Based on responses from surveyed households that retained salmon from commercial catches in 2018, an estimated 17 households usually retain salmon from commercial fishing for home use, and an overall estimated 13 households that retain salmon from commercial fishing for home use also participate in subsistence salmon fishing (Table 1-9).

Table 3-12 lists in number of fish and pounds each salmon resource harvested by King Salmon residents in 2018; Figure 3-13 is a complementary visual representation of the salmon harvest weight caught by gear type. King Salmon residents harvested the majority of their salmon by subsistence nets (84% of salmon harvest weight); the other methods used to harvest salmon were rod and reel (10%), removals from commercial catches (6% of harvest weight), and dip net (less than 1% of harvest weight) (Table 3-13). Out of a total 6,769 salmon harvested, an estimated 3,800 fish were sockeye salmon harvested by subsistence nets, or 56% of the total individual fish harvested (Table 3-12; Table 3-13). Almost all (90%) of the sockeye salmon harvest weight was caught using subsistence nets, 8% was removed from commercial catches, 2% harvested using rod and reel, and less than 1% was harvested using dip net (Table 3-13). For coho salmon, 64% of the harvest weight was caught using subsistence nets, and 36% was harvested using rod and reel. More than one-half (66%) of the Chinook salmon harvest weight was harvested using subsistence nets, 19% was removed from commercial catches, and 15% caught using rod and reel. All chum, pink, and spawning sockeye salmon were harvested using subsistence nets.

Table 3-11.–Estimated use and harvest of salmon, King Salmon, 2018.

	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	**87.0**	**64.8**	**63.0**	**51.9**	**46.3**	**28,153.9**	**276.0**	**116.4**	**6,769.3**	**ind**	**66.4**	**33.3**
Chum salmon	9.3	9.3	7.4	1.9	0.0	132.3	1.3	0.5	28.3	ind	0.3	95.7
Coho salmon	46.3	42.6	40.7	14.8	16.7	6,521.5	63.9	27.0	1,336.9	ind	13.1	38.7
Chinook salmon	59.3	42.6	40.7	29.6	22.2	1,942.7	19.0	8.0	256.9	ind	2.5	36.1
Pink salmon	13.0	11.1	11.1	1.9	0.0	90.3	0.9	0.4	34.6	ind	0.3	92.1
Sockeye salmon	75.9	44.4	42.6	42.6	37.0	16,086.6	157.7	66.5	4,224.7	ind	41.4	42.9
Spawning sockeye salmon	7.4	5.6	5.6	1.9	3.7	3,380.4	33.1	14.0	887.8	ind	8.7	97.5
Unknown salmon	3.7	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2019.



Note "Other" represents chum and pink salmon harvest weight combined.

Figure 3-12.–Composition of salmon harvest in pounds usable weight, King Salmon, 2018.

Table 3-12.–Estimated harvest of salmon by gear type and resource, King Salmon, 2018.

	Removed from commercial catch		Subsistence methods									
			Subsistence net[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**396.9**	**1,695.7**	**5,775.5**	**23,527.9**	**1.9**	**7.2**	**5,777.3**	**23,535.1**	**595.0**	**2,923.0**	**6,769.3**	**28,153.9**
Chum salmon	0.0	0.0	28.3	132.3	0.0	0.0	28.3	132.3	0.0	0.0	28.3	132.3
Coho salmon	0.0	0.0	855.2	4,171.9	0.0	0.0	855.2	4,171.9	481.7	2,349.6	1,336.9	6,521.5
Chinook salmon	49.1	371.4	170.0	1,285.6	0.0	0.0	170.0	1,285.6	37.8	285.7	256.9	1,942.7
Pink salmon	0.0	0.0	34.6	90.3	0.0	0.0	34.6	90.3	0.0	0.0	34.6	90.3
Sockeye salmon	347.8	1,324.3	3,799.5	14,467.4	1.9	7.2	3,801.4	14,474.6	75.6	287.7	4,224.7	16,086.6
Spawning sockeye salmon	0.0	0.0	887.8	3,380.4	0.0	0.0	887.8	3,380.4	0.0	0.0	887.8	3,380.4
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

Source ADF&G Division of Subsistence household surveys, 2019.
a. Subsistence net may inlcude set gillnet, drift gillnet, and seine.

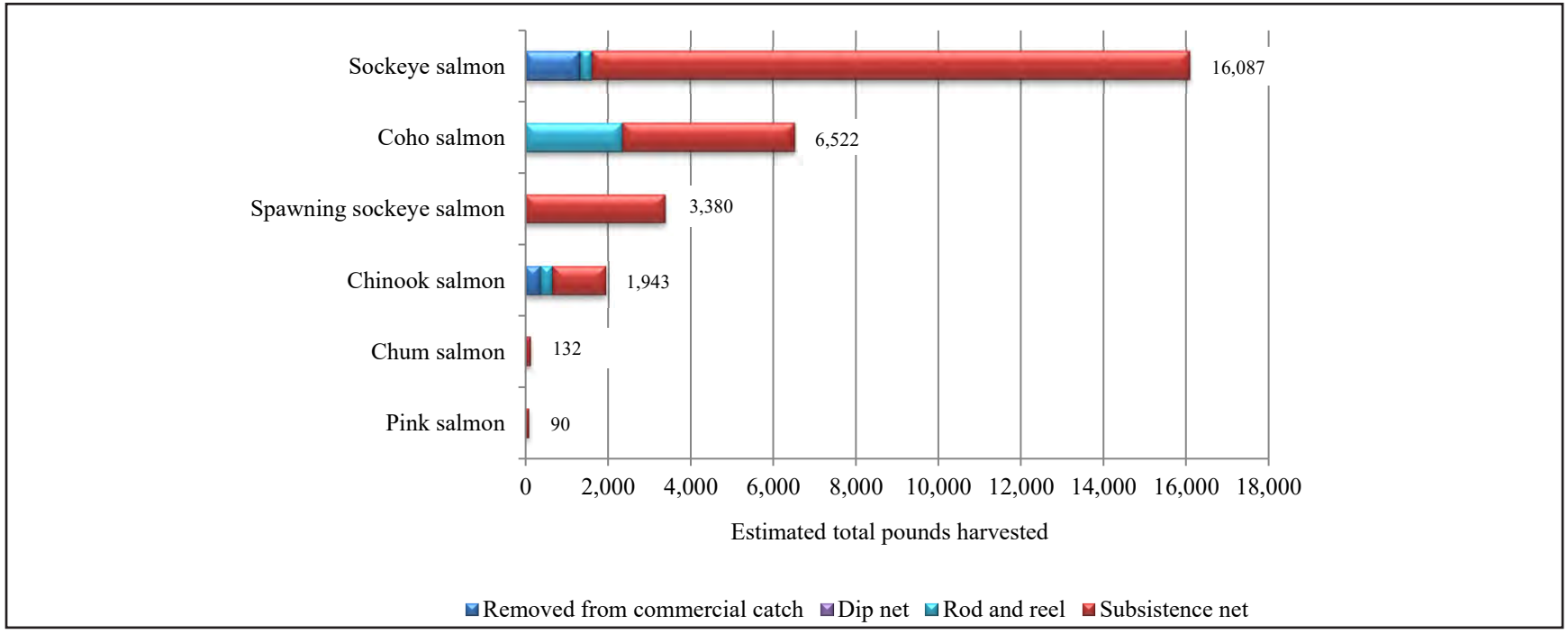


Figure 3-13.–Estimated harvest of salmon in pounds usable weight by gear type and resource, King Salmon, 2018.

Table 3-13.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, King Salmon, 2018.

Resource	Percentage base	Removed from commercial catch		Subsistence methods									
				Subsistence net[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**Gear type**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**5.9%**	**6.0%**	**85.3%**	**83.6%**	**0.0%**	**0.0%**	**85.3%**	**83.6%**	**8.8%**	**10.4%**	**100.0%**	**100.0%**
	Total	**5.9%**	**6.0%**	**85.3%**	**83.6%**	**0.0%**	**0.0%**	**85.3%**	**83.6%**	**8.8%**	**10.4%**	**100.0%**	**100.0%**
Chum salmon	Gear type	0.0%	0.0%	0.5%	0.6%	0.0%	0.0%	0.5%	0.6%	0.0%	0.0%	0.4%	0.5%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.4%	0.5%	0.0%	0.0%	0.4%	0.5%	0.0%	0.0%	0.4%	0.5%
Coho salmon	Gear type	0.0%	0.0%	14.8%	17.7%	0.0%	0.0%	14.8%	17.7%	81.0%	80.4%	19.7%	23.2%
	Resource	0.0%	0.0%	64.0%	64.0%	0.0%	0.0%	64.0%	64.0%	36.0%	36.0%	100.0%	100.0%
	Total	0.0%	0.0%	12.6%	14.8%	0.0%	0.0%	12.6%	14.8%	7.1%	8.3%	19.7%	23.2%
Chinook salmon	Gear type	12.4%	21.9%	2.9%	5.5%	0.0%	0.0%	2.9%	5.5%	6.3%	9.8%	3.8%	6.9%
	Resource	19.1%	19.1%	66.2%	66.2%	0.0%	0.0%	66.2%	66.2%	14.7%	14.7%	100.0%	100.0%
	Total	0.7%	1.3%	2.5%	4.6%	0.0%	0.0%	2.5%	4.6%	0.6%	1.0%	3.8%	6.9%
Pink salmon	Gear type	0.0%	0.0%	0.6%	0.4%	0.0%	0.0%	0.6%	0.4%	0.0%	0.0%	0.5%	0.3%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.5%	0.3%	0.0%	0.0%	0.5%	0.3%	0.0%	0.0%	0.5%	0.3%
Sockeye salmon	Gear type	87.6%	78.1%	65.8%	61.5%	100.0%	100.0%	65.8%	61.5%	12.7%	9.8%	62.4%	57.1%
	Resource	8.2%	8.2%	89.9%	89.9%	0.0%	0.0%	90.0%	90.0%	1.8%	1.8%	100.0%	100.0%
	Total	5.1%	4.7%	56.1%	51.4%	0.0%	0.0%	56.2%	51.4%	1.1%	1.0%	62.4%	57.1%
Spawning sockeye salmon	Gear type	0.0%	0.0%	15.4%	14.4%	0.0%	0.0%	15.4%	14.4%	0.0%	0.0%	13.1%	12.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	13.1%	12.0%	0.0%	0.0%	13.1%	12.0%	0.0%	0.0%	13.1%	12.0%
Unknown salmon	Gear type	0.0%	0.0%	0.0%	0.0%	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%	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%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Subsistence net harvests may inlcude set gillnet, drift gillnet, and seine.

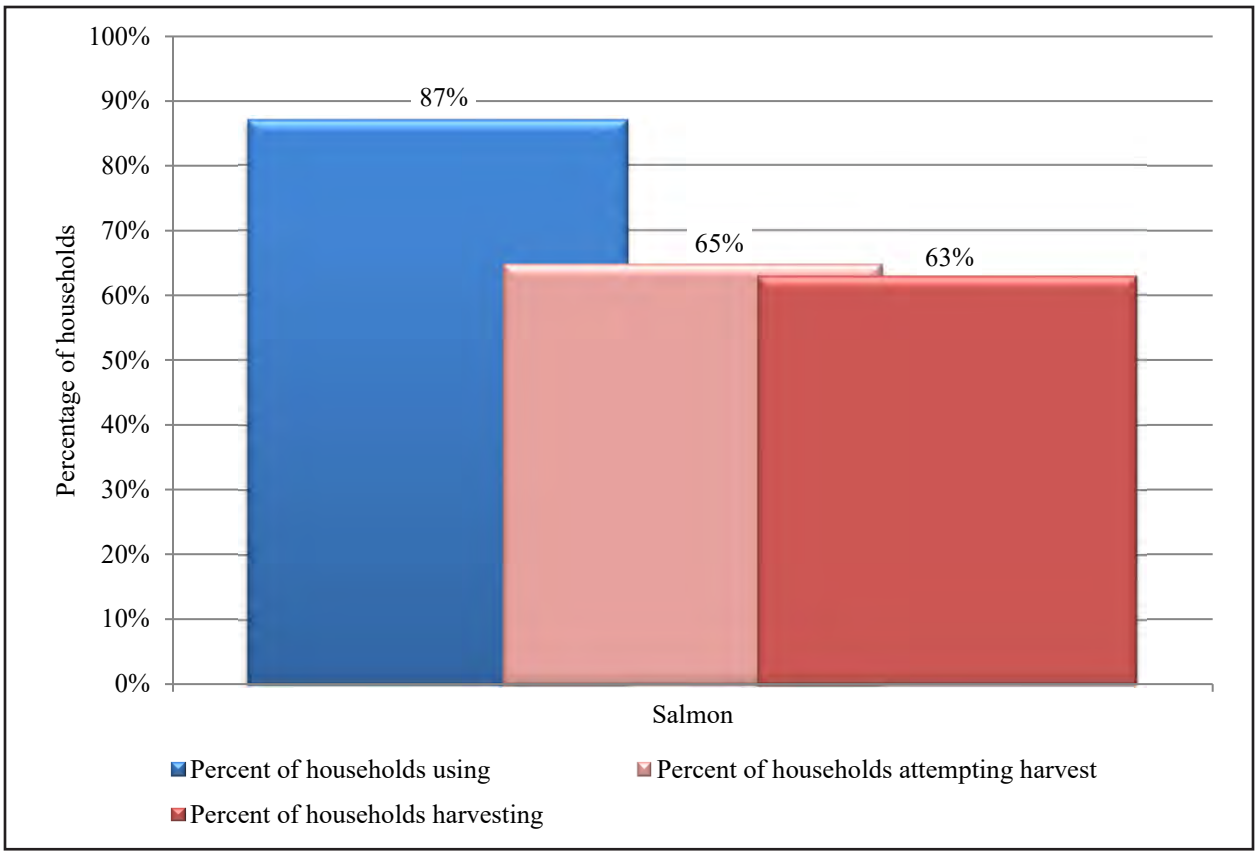


Figure 3-14.–Percentage of households using, attempting to harvest, and harvesting salmon, King Salmon, 2018.

During 2018, an estimated 87% of King Salmon households used salmon, 65% attempted to harvest salmon, and nearly as many households (63%) were successful harvesters (Figure 3-14). Approximately one-half of the King Salmon households shared salmon in 2018: 46% of households gave salmon away and 52% of households received salmon during the study year (Table 3-11). Sockeye salmon was the most used salmon species in 2018. The majority (76%) of King Salmon households used sockeye salmon during the study year, 44% of households attempted to harvest sockeye salmon, 43% of community households successfully harvested this salmon species, 37% gave away this salmon species, and 43% of households received sockeye salmon. In 2018, more than one-half (59%) of King Salmon households used Chinook salmon, 41% harvested this salmon species, 22% gave away Chinook salmon, and 30% of households received this salmon species. For coho salmon, a little less than one-half (46%) of King Salmon households used this resource during the study year, 41% of households harvested coho salmon, 17% gave away this salmon species, and 15% received coho salmon. A small portion of King Salmon households used (7%) and harvested (6%) spawning sockeye salmon in 2018; however, the harvest weight of spawning sockeye salmon was greater than several other salmon species: specifically, Chinook salmon, chum salmon, and pink salmon. For chum salmon, 9% of King Salmon households used this salmon species in 2018 and 7% of households harvested this species during the study year. Though the harvest weight was less than the chum salmon harvest, a greater percentage of households in King Salmon used (13%) pink salmon in 2018, and 11% of households harvested pink salmon during the study year.

In 2018, starting from the west and moving toward the east, King Salmon respondents reported harvesting Chinook salmon near the mouth of the Naknek River at Elder's Beach, Coffee Point, and Telephone Point (Figure 3-15). Fishing locations for Chinook salmon in 2018 were concentrated solely close to the mouth of Naknek River, which represented a reduced search and harvest area compared to 2017 when Chinook

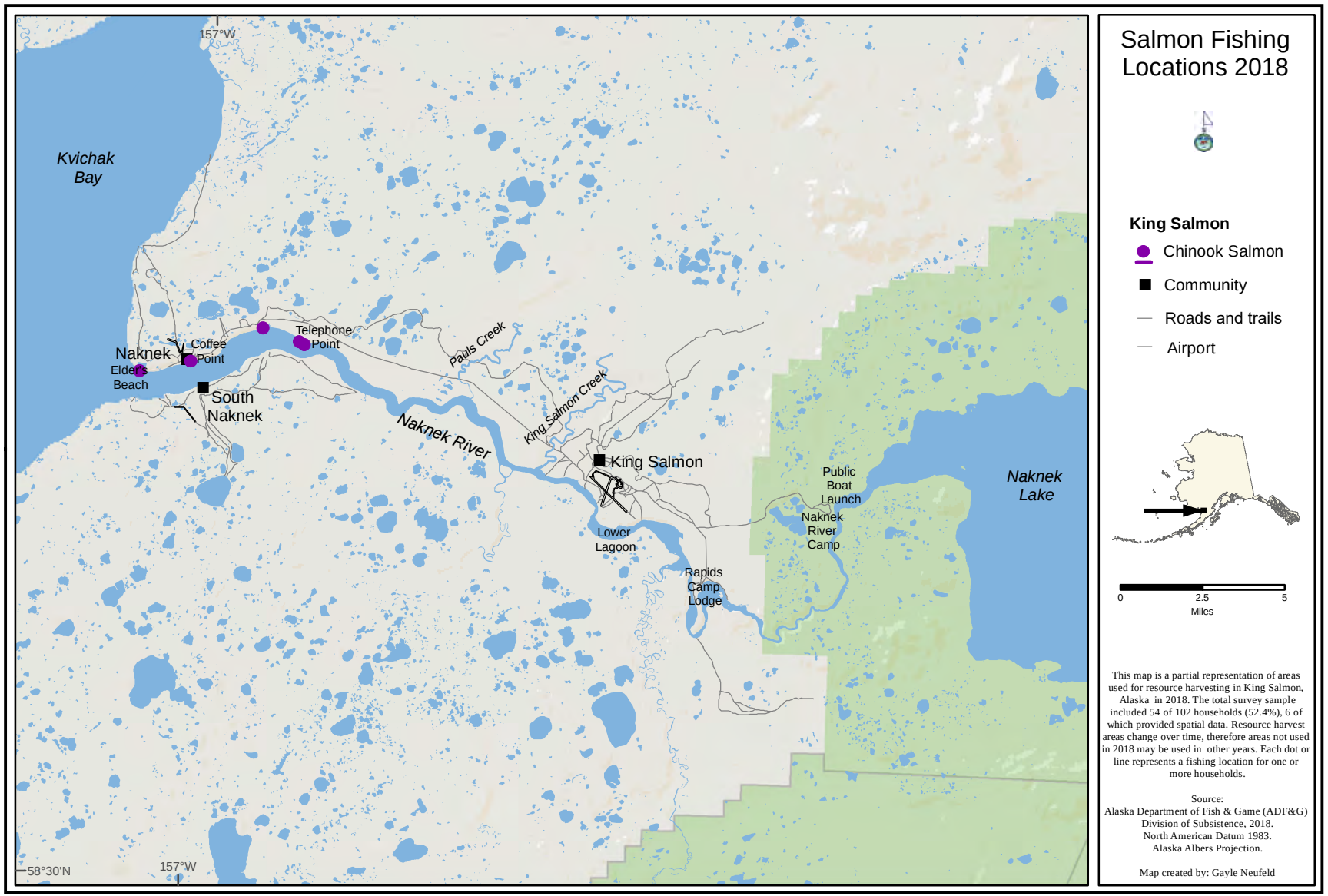


Figure 3-15.–Fishing and harvest locations of Chinook salmon, King Salmon, 2018.

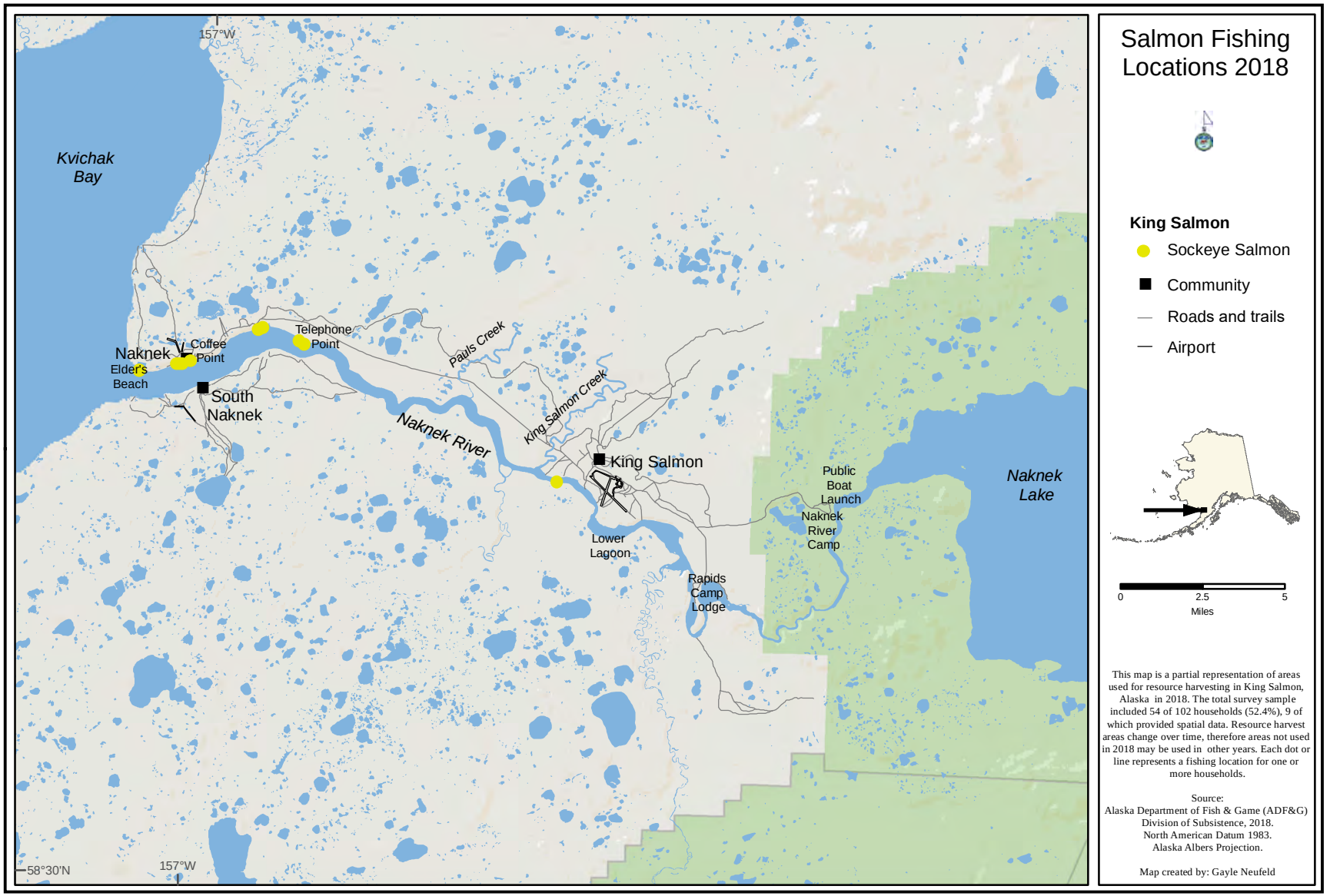


Figure 3-16.–Fishing and harvest locations of sockeye salmon, King Salmon, 2018.

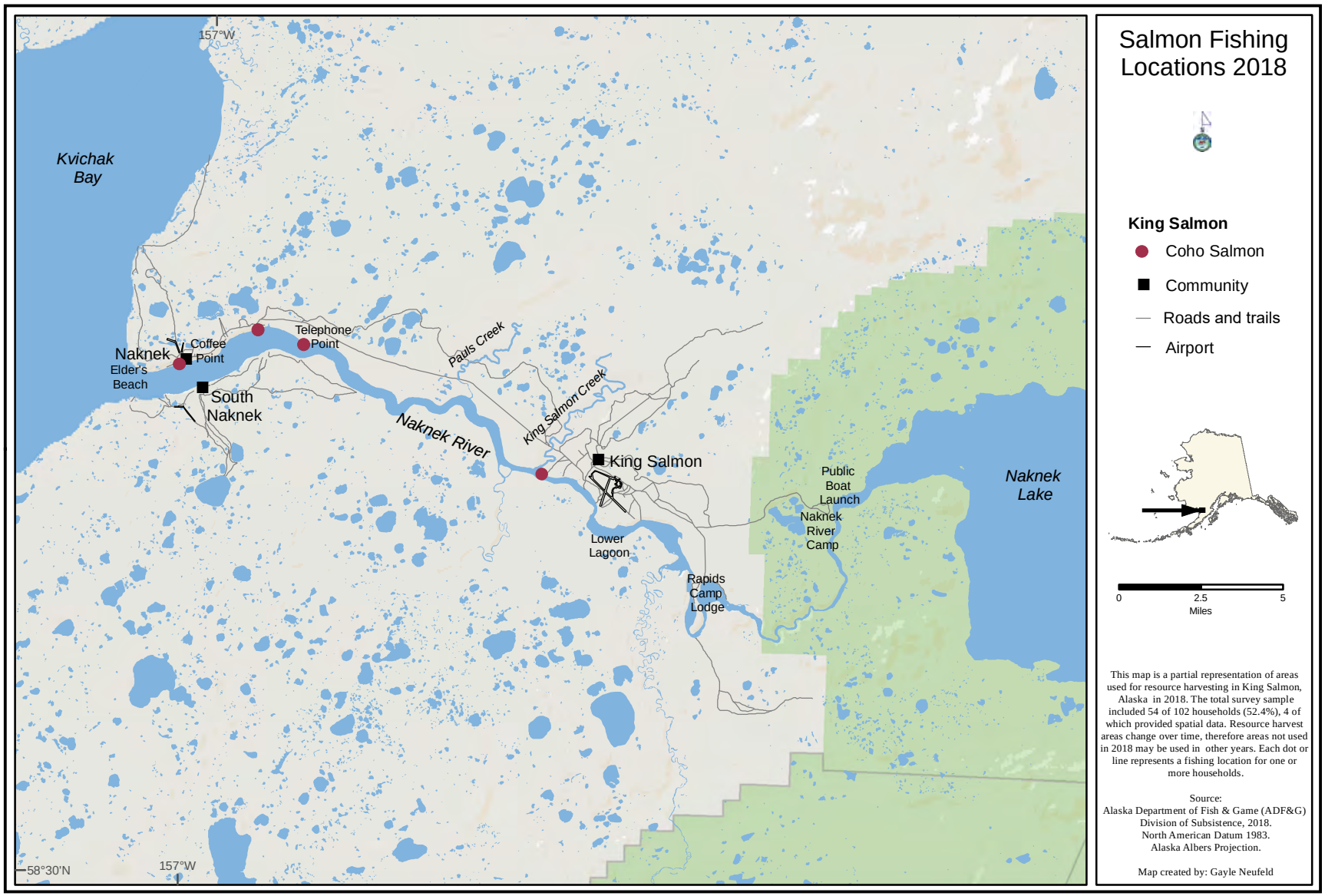


Figure 3-17.–Fishing and harvest locations of coho salmon, King Salmon, 2018.

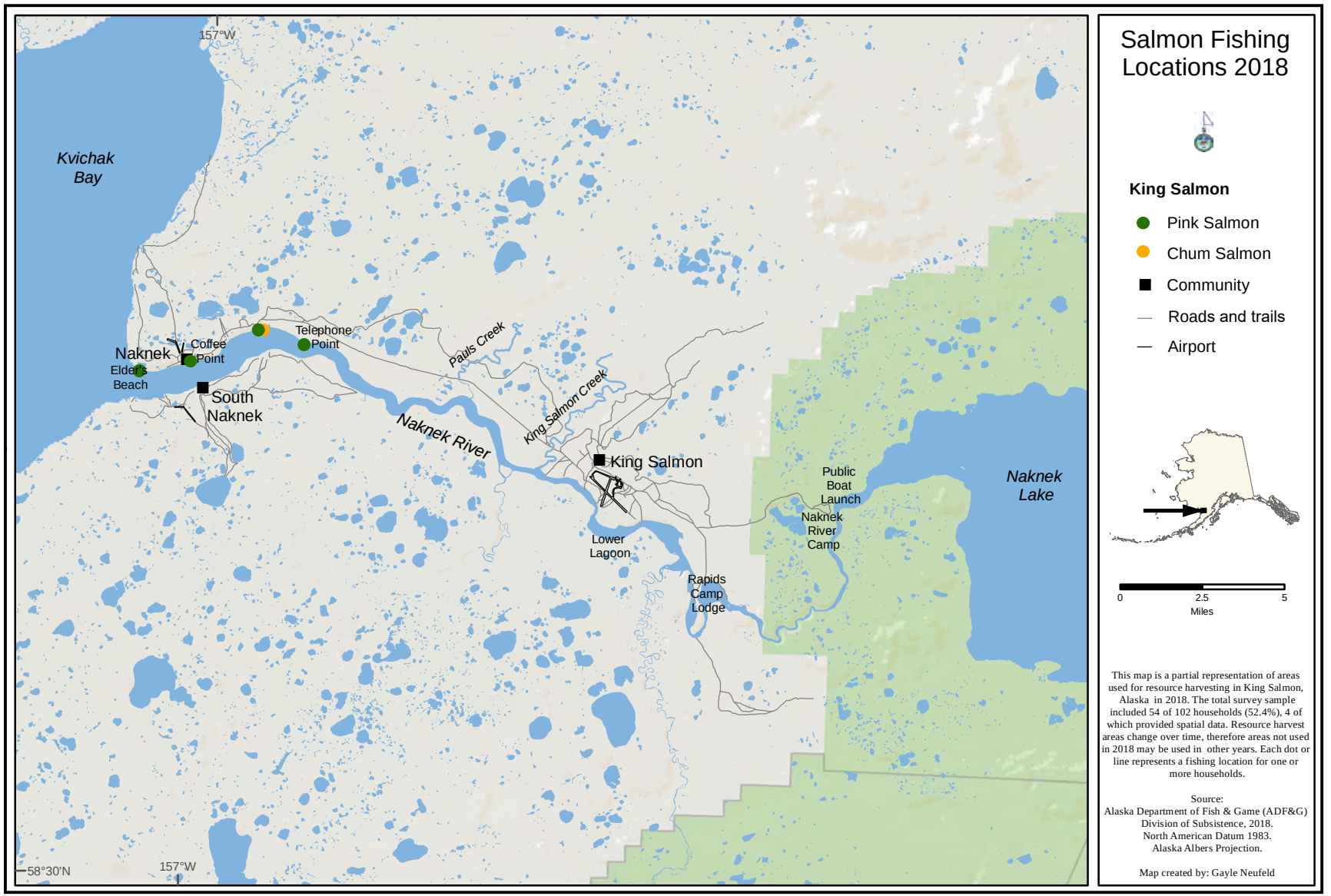


Figure 3-18.–Fishing and harvest locations of pink and chum salmon, King Salmon, 2018.

salmon were fished for as far upriver as Rapids Camp Lodge (Figure 3-15; Figure 3-8). During the second study year, like Chinook salmon, sockeye salmon were harvested near the mouth of the Naknek River at Elder's Beach, Coffee Point, and Telephone Point (Figure 3-16). However, sockeye salmon were also harvested in the Naknek River near the tributary of King Salmon Creek. In 2018, no fishing for sockeye salmon occurred close to Naknek Lake in the boat launch area, which was a harvest area in 2017 (Figure 3-16; Figure 3-9). Coho salmon were harvested at Coffee Point and in the Naknek River near the tributary of King Salmon Creek; these few discrete fishing sites represent a reduced search and harvest area compared to 2017, especially with regard to there being no reported fishing in 2018 in Pauls or King Salmon creeks (Figure 3-17; Figure 3-10). The other salmon species (pink and chum salmon) were harvested in 2018 at Elder's Beach, Coffee Point, Telephone Point, and between the latter two places (Figure 3-18). No harvest location data were reported for spawning sockeye salmon harvested in 2018.

Comparing 2017 and 2018 Harvest and Use Characteristics

The overall estimated salmon harvest weight increased by 9,014 lb from 2017 to 2018, or by 38 lb per capita (Table 3-8; Table 3-11). The species that contributed the greatest harvest weight increase from 2017 (12,976 lb) to 2018 (19,467 lb) was sockeye salmon (a combination of spawning sockeye salmon and sockeye salmon). For spawning sockeye salmon, there was no recorded harvest in 2017; however, in 2018 the harvest weight was 3,380 lb, and, for sockeye salmon, the harvest weight increased by 3,111 lb from 2017 to 2018. Out of the total harvest weight increase of 9,014 lb, an estimated 6,491 lb (72%) came from the sockeye salmon resources. For coho salmon, the harvest weight increased by 2,267 lb from year one to year two, which accounted for 25% of the total increased harvest weight. The harvest weight increased between the two study years for chum salmon by 98 lb, and for pink salmon by 65 lb. However, for Chinook salmon, the harvest weight was 308 lb more in 2017 than it was in 2018. The 2018 Chinook salmon harvest represented a reduced total Chinook harvest weight by approximately 14% in the second study year. For sockeye salmon, about the same proportion of the harvest was caught by subsistence net: 85% of fish in 2017 and 90% of fish in 2018. But the coho salmon harvest changed from predominantly rod and reel harvests in 2017 (75% of fish in 2017) to subsistence net harvests in 2018 (64% of fish in 2018). Also, the total spawning sockeye harvest was caught by subsistence net in 2018.

Interestingly, even though the overall harvest weight of` salmon increased from 2017 to 2018, the percentage of King Salmon households using, attempting to harvest, and harvesting any species of salmon decreased by a difference of 11% (using), 15% (attempting to harvest), and 13% (harvesting), respectively (Figure 3-7; Figure 3-14). Regarding household participation for individual salmon species, spawning sockeye salmon were not pursued in 2017, but in 2018 the percentage of King Salmon households that attempted to harvest and harvested this resource increased to 6%. For both chum salmon and pink salmon there were increases in the percentage of King Salmon households attempting to harvest (by 2% for chum salmon, 4% for pink salmon) and harvesting (by 1% for chum salmon, 5% for pink salmon) these species. The percentage of King Salmon households attempting to harvest and harvesting sockeye salmon decreased from 2017 to 2018 by a difference of 8% and 4%, respectively; for coho and Chinook salmon, there were similar declines in household participation with a difference of 3%–8% fewer households fishing for and harvesting these species.

King Salmon residents used more harvest areas for salmon in 2017 than in 2018 (Figure 3-19; Figure 3-20). Salmon harvest areas reported in 2017 but not reported in 2018 include: Naknek Lake, large portions of the lower Naknek River, and small tributaries of the Naknek River such as King Salmon Creek and Pauls Creek. Generally, Chinook salmon and coho salmon were the two species of salmon harvested in the areas used in 2017 that were not used by King Salmon residents in 2018.

Whereas the same number of households were surveyed in King Salmon for study years 2017 and 2018, changes to the households selected to be surveyed by the random sample may account for the changes in the harvest weight and composition between 2017 and 2018 (see tables 1-4, 3-8, and 3-11). For example, as previously illustrated, in 2017 no households selected to be surveyed normally participate in harvesting spawning sockeye salmon; however, in 2018 several households selected in the random sample harvested large quantities of spawning sockeye salmon and reported doing so each year.

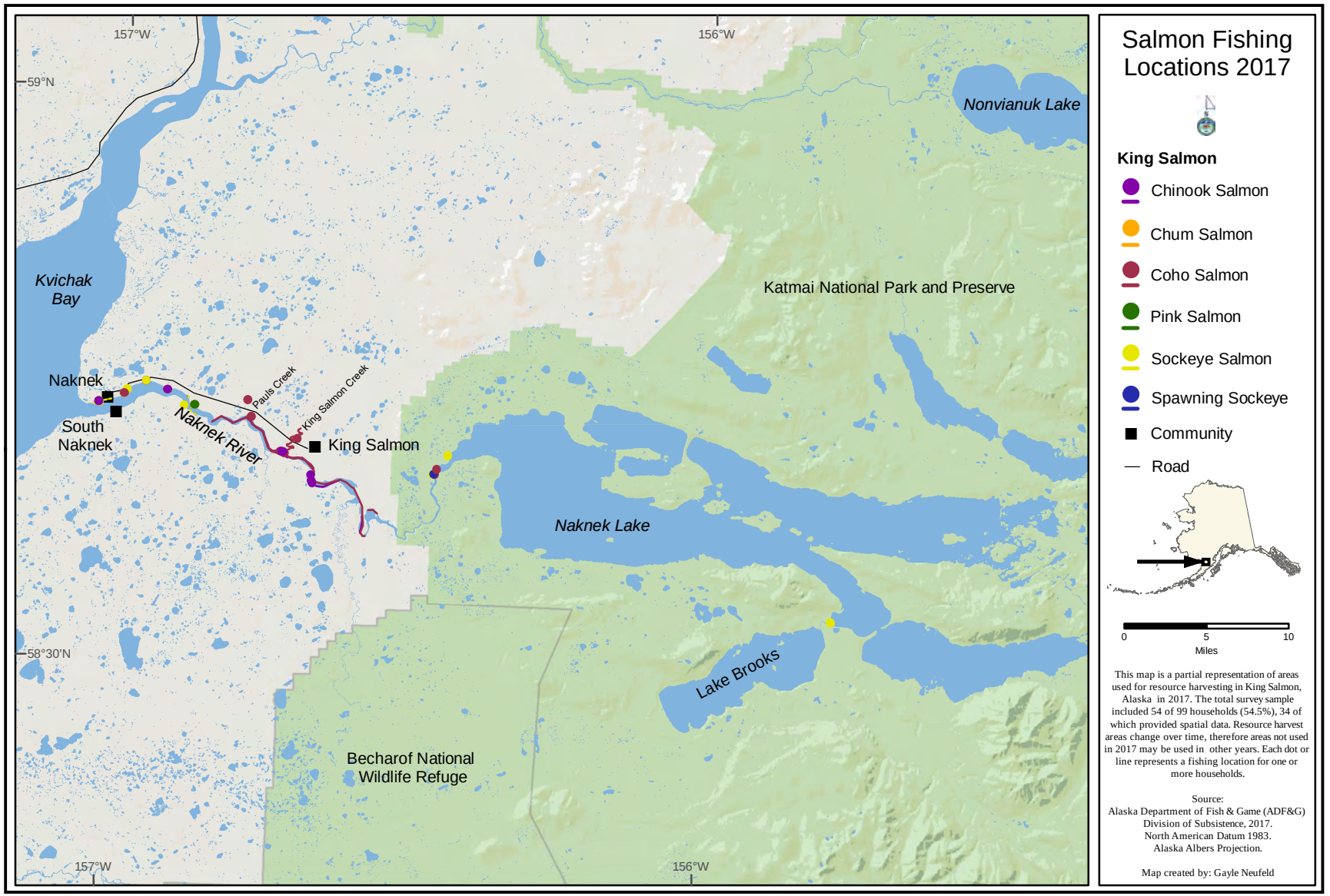


Figure 3-19.–Fishing and harvest locations of all salmon species, King Salmon, 2017.

Figure 3-20.–Fishing and harvest locations of all salmon species, King Salmon, 2018.

The Subsistence Salmon Permit System

Evaluating Subsistence Salmon Permit System Harvest Estimates from Before and After Post-Season Household Surveys

Each year, subsistence salmon household permits are issued and collected for the Naknek District to estimate harvests by each community. Harvest estimates are recorded in the ADF&G Alaska Subsistence Fisheries Database (ASFDB) and published in an annual report by the Division of Subsistence; the latest annual report was published by Fall et al. (2020) and presented subsistence salmon harvest estimates for 2017. The post-season salmon harvest surveys administered for this project in King Salmon for 2017 and 2018 complement the permit system and increase the accuracy of documented subsistence salmon harvest levels. As noted in Chapter 1: "Introduction," during survey administration, permit data were provided and reviewed with households that had previously returned permits, or households returned a permit during the survey, to verify harvest information and to assist with recall. This section reviews the changes to the reported and estimated salmon harvests as the result of reconciling post-season survey data with returned permits, which helps to illustrate how well the permit system generally performs as a tool for documenting harvests. There is a set of tables (two for each year) that compares: 1) subsistence salmon permit participation based on surveys and returned permits (Table 3-14; Table 3-16), and 2) harvest estimates from before and after the time that post-season surveys occurred (Table 3-15; Table 3-17). The following paragraph explains how the total number of households was developed and how participation values of both permits and surveys were used for estimating harvests.

The estimated number of households included in the assessment of subsistence salmon harvests in King Salmon is based on the total number of year-round households plus an estimate of seasonal Alaska residents using a King Salmon address on their permit. This estimate was derived by computing the proportion of surveyed households obtaining a permit and applying that to unsurveyed households to estimate the number of year-round permit holders. The remaining permit holders were assumed to be seasonal and added to the total year-round households. The total estimated harvest from both permits and surveys was computed by first estimating harvests based on total permits and returns. Then, an additional correction was added based on the estimated number of unsurveyed households in the community fishing without a permit. The correction factor is the number of estimated unsurveyed households fishing without a permit multiplied by the average harvests by surveyed households holding permits.

Harvest Survey and Subsistence Permit Participation in King Salmon: 2017

In 2017, there were 75 permits issued to households with King Salmon addresses for the subsistence salmon fishery, and 61 of those permits were returned prior to the post-season salmon harvest survey (81% return rate) (Table 3-14). During the 2017 survey, nine permits were collected by research staff or LRAs from community households that had not already returned their permit. The nine additional returned permits increased the number of returned permits to 70, or a 93% return rate. Overall, there were 132 households that were eligible for the household survey or cited King Salmon as the permit holder's place of residence but were likely seasonal residents. This includes 99 year-round households and an estimated 33 seasonal resident households that had subsistence permits and gave King Salmon as their place of residence. Of these 132 households, including 23 permit holders that were surveyed, 101 (76%) were contacted through either the permit system (70 returned permits) or post-season household surveys (31 surveyed households that did not subsistence fish and had no permit) (Table 1-4; Table 3-14).

Table 3-14.–Subsistence salmon permit participation estimates based on returned permits and surveys, King Salmon, 2017.

	King Salmon
Permits	
Before surveys	
Number of permits issued	75
Number of permits returned	61
Initial return rate	81.3%
After surveys	
Number of previously issued permits returned during survey	9
Surveyed households that fished without a permit[a]	0
Estimated total number of households that fished without a permit	0
Number of permits issued[b]	75
Revised number of permits returned	70
Final return rate	93.3%
Participation	
Total number of households[c]	132
Total contacts	101
Proportion of contacted households	76.6%

Source ADF&G Division of Subsistence household surveys, 2018, and inseason catch permits, 2017.

a. According to both permit and survey returns combined.

b. Permits issued ex post facto were provided only to those households that were interviewed during post-season surveys. No surveyed King Salmon households fished without a permit in 2017.

c. Note that 23 permits were issued to households that were surveyed and 52 household permits were issued to people with King Salmon addresses who were not surveyed, and their status as permanent (year-round) or seasonal residents of the community could not be directly determined. Based upon the percentage of surveyed households that had permits (23 of 54, or 43%), an estimated 42 of the 99 year-round King Salmon households had subsistence permits. Therefore, 33 permits (75 permits minus 42 permits) were held by seasonal households.

Harvest by Species in King Salmon: 2017

Prior to the 2017 household surveys, the reported subsistence Chinook salmon harvest from the 61 returned King Salmon permits was 105 fish, which was expanded to an initial estimated harvest of 130 Chinook salmon (Table 3-14; Table 3-15). No surveyed King Salmon households fished without a permit in 2017; however, harvests of an additional 16 Chinook salmon were reported during the household surveys (three added to previously returned permits, and 13 recorded on permits returned during surveys) (Table 3-15). The initial harvested 105 Chinook salmon reported from the permits and the additional 16 harvests recorded during the household surveys increased the reported Chinook salmon harvest to 121 fish, which was expanded to a community harvest estimate of 130 Chinook salmon in 2017, which was the same as the initial permit-based estimate for the ASFDB because the average harvest for reporting households did not change significantly. Also, the post-season estimates for permit holders (ASFDB value) and all (132) households (from both permits and surveys) are the same because there were no surveyed households that fished without a permit. If we had interviewed unpermitted households that fished, and projected that there were additional, unsurveyed fishing households that lacked a permit, then the harvest estimate for both permits and surveys would have been higher than the ASFDB value because the harvest estimate for both permits and surveys would include harvest amounts for these projected unpermitted fishing households.

For sockeye salmon, prior to the 2017 household surveys, the reported subsistence harvest from the 61 returned King Salmon permits was 4,051 fish, which was expanded to an initial estimated harvest of 4,981 sockeye salmon. An additional harvested 737 sockeye salmon were reported during the household surveys (180 added to previously returned permits, and 557 recorded on permits returned during surveys). The initial 4,051 sockeye salmon reported from the permits and the additional 737 salmon recorded during the household surveys increased the reported sockeye salmon harvest to 4,788 fish, which was expanded to a community harvest estimate of 5,130 sockeye salmon in 2017. The updated permit returns changed the expansion factor and average household harvest for estimating community harvests; therefore, the initial estimated harvest for all permit holders of 4,981 increased based on the post-season total estimated harvest from both permits and surveys. The estimated post-season sockeye salmon harvest by King Salmon residents for the Naknek District for 2017 recorded in the ASFDB was 5,130 fish. The estimated total community harvest (from both permits and surveys) was the same as the estimate for permit holders because no households fished without a permit.

Prior to the 2017 household surveys, the reported subsistence coho salmon harvest from the 61 returned King Salmon permits was 129 fish, which was expanded to an initial estimated harvest of 159 coho salmon. An additional harvested 60 coho salmon were reported during the household surveys from permits returned during surveys. The initial harvested 129 coho salmon reported from the permits and the additional 60 fish recorded during the household surveys increased the reported coho salmon harvest to 189 fish, which was expanded to a community harvest estimate of 203 coho salmon in 2017. For the same reasons noted above for sockeye salmon, the subsistence coho salmon estimate in the ASFDB permit database was also 203 fish.

For chum salmon, prior to the 2017 household surveys, the reported subsistence harvest from the 61 returned King Salmon permits was 26 fish, which was expanded to an initial estimated harvest of 32 chum salmon. No additional chum salmon harvests were reported during the household surveys; however, because nine more permits were returned during surveys, the expansion factor for estimating harvests changed (initial estimated harvest was 32) and the final estimated harvest of chum salmon recorded in the ASFDB permit database was lower (28 fish) than the estimate from prior to surveys being completed.

Prior to the 2017 household surveys the reported subsistence harvest of pink salmon from the 61 returned King Salmon permits was 24 fish, which was expanded to an initial estimated harvest of 30 pink salmon. An additional four pink salmon harvests were reported during the household surveys from permits returned during surveys. The initial harvested 24 pink salmon reported from the permits and the additional four fish recorded during the household surveys increased the reported pink salmon harvest to 28 fish, which was expanded to a community harvest estimate of 30 pink salmon in 2017, which, for the same reasons noted above for Chinook salmon, was the same as the initial permit-based estimate for the ASFDB.

Table 3-15.–Subsistence salmon harvest estimates based on returned permits and surveys, King Salmon, 2017.

Harvest	Chinook	Sockeye	Coho	Chum	Pink
Before surveys					
Initial harvest reported on permits	105	4,051	129	26	24
Initial estimated harvest, all permit holders	130	4,981	159	32	30
After surveys					
Additional harvest added to previously returned permits	3	180	0	0	0
Harvest recorded on permits returned during the survey	13	557	60	0	4
Harvest by households that did not have permits	0	0	0	0	0
Reported harvest from both permits and surveys	121	4,788	189	26	28
Total estimated harvest, from both permits and surveys	130	5,130	203	28	30
Estimated harvest, from Alaska Subsistence Fisheries Database[a]	130	5,130	203	28	30

Source ADF&G Division of Subsistence household surveys, 2018, and inseason catch permits, 2017.

a. Based only on known fishers.

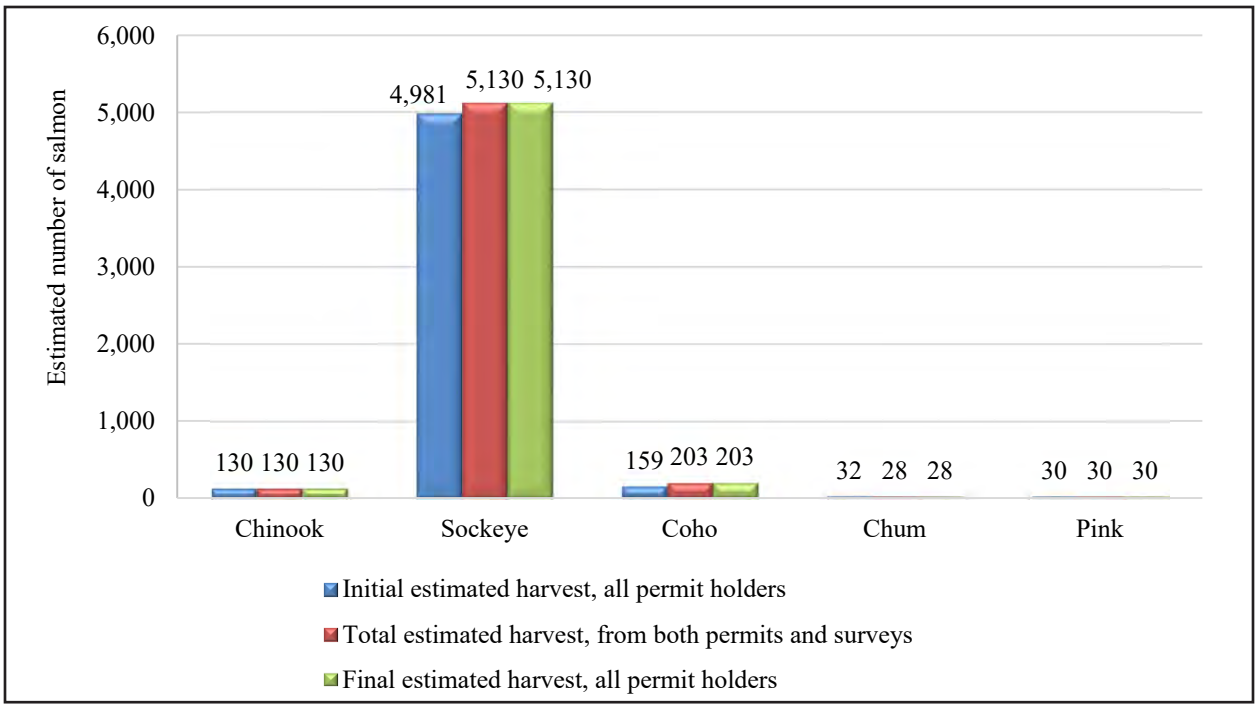


Figure 3-21.–Initial estimated salmon harvest based on returned permits compared to final estimated salmon harvest based on returned permits and surveyed households, King Salmon, 2017.

In comparing the initial estimated harvest for permit holders against the revised, post-survey community subsistence harvest estimate for 132 total households, the coho salmon harvest exhibited the most significant change: the harvest increased by 28%, or 44 more fish; however, whereas the harvest estimate increased by 3% for sockeye salmon (or 149 fish), the difference between the two estimates was largest for this species (Table 3-14; Figure 3-21). For Chinook salmon and pink salmon, there was no difference in comparing the initial estimated harvest for permit holders against the revised, post-survey community subsistence harvest estimates.

Harvest Survey and Subsistence Permit Participation in King Salmon: 2018

In 2018, there were 76 permits issued to households with King Salmon addresses for the subsistence salmon fishery, and 54 of those permits were returned prior to the post-season salmon harvest survey (71% return rate) (Table 3-16). During the 2018 survey, 10 permits were collected by research staff or LRAs from community households that had not already returned their permit. Two other surveyed households that did not obtain a permit but did fish with subsistence gear were issued a permit that was completed based on respondents' recall of harvests during the survey and the data were incorporated into the permit database (i.e., ASFDB) after the surveys were finished. The additional two permits issued increased the total 2018 subsistence permits issued for King Salmon from 76 to 78. The combination of the two new permits and 10 additional returned permits increased the number of returned permits to 68, or an 87% return rate. Overall, there were 135 households that were eligible for the household survey or cited King Salmon as the permit holder's place of residence but were likely seasonal residents. This includes 102 year-round households and an estimated 33 seasonal resident households that had subsistence permits and gave King Salmon as their place of residence. Of these 135 households, including 24 permit holders that were surveyed, 98 (73%) were contacted through either the permit system (68 returned permits) or post-season household surveys (30 surveyed households that did not subsistence fish and had no permit) (Table 1-4; Table 3-16).

Table 3-16.–Subsistence salmon permit participation estimates based on returned permits and surveys, King Salmon, 2018.

	King Salmon
Permits	
Before surveys	
Number of permits issued	76
Number of permits returned	54
Initial return rate	71.1%
After surveys	
Number of previously issued permits returned during survey	10
Surveyed households that fished without a permit[a]	2
Estimated total number of households that fished without a permit	4
Number of permits issued[b]	78
Revised number of permits returned	68
Final return rate	87.2%
Participation	
Total number of households[c]	135
Total contacts	98
Proportion of contacted households	72.8%

Source ADF&G Division of Subsistence household surveys, 2019, and inseason catch permits, 2018.

a. According to both permit and survey returns combined.

b. Permits issued ex post facto were provided only to those households that were interviewed during post-season surveys.

c. Note that 24 permits were issued to households that were surveyed and 54 household permits were issued to people with King Salmon addresses who were not surveyed, and their status as permanent (year-round) or seasonal residents of the community could not be directly determined. Based upon the percentage of surveyed households that had permits (24 of 54, or 44%), an estimated 45 of the 102 year-round King Salmon households had subsistence permits. Therefore, 33 permits (78 permits minus 45 permits) were held by seasonal households.

Harvest by Species in King Salmon: 2018

Prior to the 2018 household surveys, the reported subsistence Chinook salmon harvest from the 54 returned King Salmon permits was 133 fish, which was expanded to an initial estimated harvest of 187 Chinook salmon (Table 3-16; Table 3-17). An additional harvested 30 Chinook salmon were reported during the household surveys (20 recorded on permits returned during surveys, and 10 from households that did not have a permit while fishing) (Table 3-17). The initial harvested 133 Chinook salmon reported from the permits and the additional 30 harvests recorded during the household surveys increased the reported Chinook salmon harvest to 163 fish, which was expanded to a community harvest estimate of 193 Chinook salmon in 2018. Only the harvests reported by two surveyed households that fished without a permit (and were issued a permit after being surveyed) were added to the ASFDB, and not the estimated harvest for the estimated two additional households in King Salmon that fished without a permit and were not surveyed. Also, the updated permit return rate changed the expansion factor for estimating harvests; the estimated post-season Chinook salmon harvest by King Salmon residents for the Naknek District for 2018 recorded in the ASFDB was 187 fish, which was the same as the initial permit-based estimate for the ASFDB because the average household Chinook salmon harvest did not change significantly.

For sockeye salmon, prior to the 2018 household surveys, the reported subsistence harvest from the 54 returned King Salmon permits was 4,178 fish, which was expanded to an initial estimated harvest of 5,880 sockeye salmon. An additional harvested 1,166 sockeye salmon were reported during the household surveys (seven added to previously returned permits, 809 recorded on permits returned during surveys, and 350 from households that did not have a permit while fishing). The initial 4,178 sockeye salmon reported from the permits and the additional 1,166 salmon recorded during the household surveys increased the reported sockeye salmon harvest to 5,344 fish, which was expanded to a community harvest estimate of 6,357 sockeye salmon in 2018. Only the harvests reported by two surveyed households that fished without a permit (and were issued a permit after being surveyed) were added to the ASFDB, and not the estimated harvest for the estimated two additional households in King Salmon that fished without a permit and were not surveyed. Also, the updated permit return changed the expansion factor and average household harvest for estimating harvests; therefore, the estimated post-season sockeye salmon harvest by King Salmon residents for the Naknek District for 2018 recorded in the ASFDB was 6,219 fish.

Prior to the 2018 household surveys, the reported subsistence coho salmon harvest from the 54 returned King Salmon permits was 280 fish, which was expanded to an initial estimated harvest of 394 coho salmon. An additional harvested 190 coho salmon were reported during the household surveys (110 recorded on permits returned during surveys, and 80 from households that did not have a permit while fishing). The initial harvested 280 coho salmon reported from the permits and the additional 190 fish recorded during the household surveys increased the reported coho salmon harvest to 470 fish, which was expanded to a community harvest estimate of 560 coho salmon in 2018. For the same reasons noted above for sockeye salmon, the subsistence coho salmon estimate recorded in the permit database was 539 fish.

For chum salmon, prior to the 2018 household surveys, the reported subsistence harvest from the 54 returned King Salmon permits was 16 fish, which was expanded to an initial estimated harvest of 23 chum salmon. An additional harvested 13 chum salmon were recorded on permits returned during household surveys. The initial harvested 16 chum salmon reported from the permits and the additional 13 harvests recorded during the household surveys increased the reported chum salmon harvest to 29 fish, which was expanded to a community harvest estimate of 35 chum salmon in 2018. For the same reasons noted above for sockeye salmon, the subsistence chum salmon estimate recorded in the permit database was 33 fish.

Prior to the 2018 household surveys the reported subsistence harvest of pink salmon from the 54 returned King Salmon permits was 16 fish, which was expanded to an initial estimated harvest of 23 pink salmon. An additional 14 pink salmon harvested were recorded on permits returned during household surveys. The initial harvested 16 pink salmon reported from the permits and the additional 14 fish recorded during the household surveys increased the reported pink salmon harvest to 30 fish, which was expanded to a community harvest estimate of 36 pink salmon in 2018. For the same reasons noted above for sockeye salmon, the subsistence pink salmon estimate in the permit database was 34 fish.

Table 3-17.–Subsistence salmon harvest estimates based on returned permits and surveys, King Salmon, 2018.

Harvest	Chinook	Sockeye	Coho	Chum	Pink
Before surveys					
Initial harvest reported on permits	133	4,178	280	16	16
Initial estimated harvest, all permit holders	187	5,880	394	23	23
After surveys					
Additional harvest added to previously returned permits	0	7	0	0	0
Harvest recorded on permits returned during the survey	20	809	110	13	14
Harvest by households that did not have permits	10	350	80	0	0
Reported harvest from both permits and surveys	163	5,344	470	29	30
Total estimated harvest, from both permits and surveys	193	6,357	560	35	36
Estimated harvest, from Alaska Subsistence Fisheries Database[a]	187	6,219	539	33	34

Source ADF&G Division of Subsistence household surveys, 2019, and inseason catch permits, 2018.

a. Based only on known fishers.

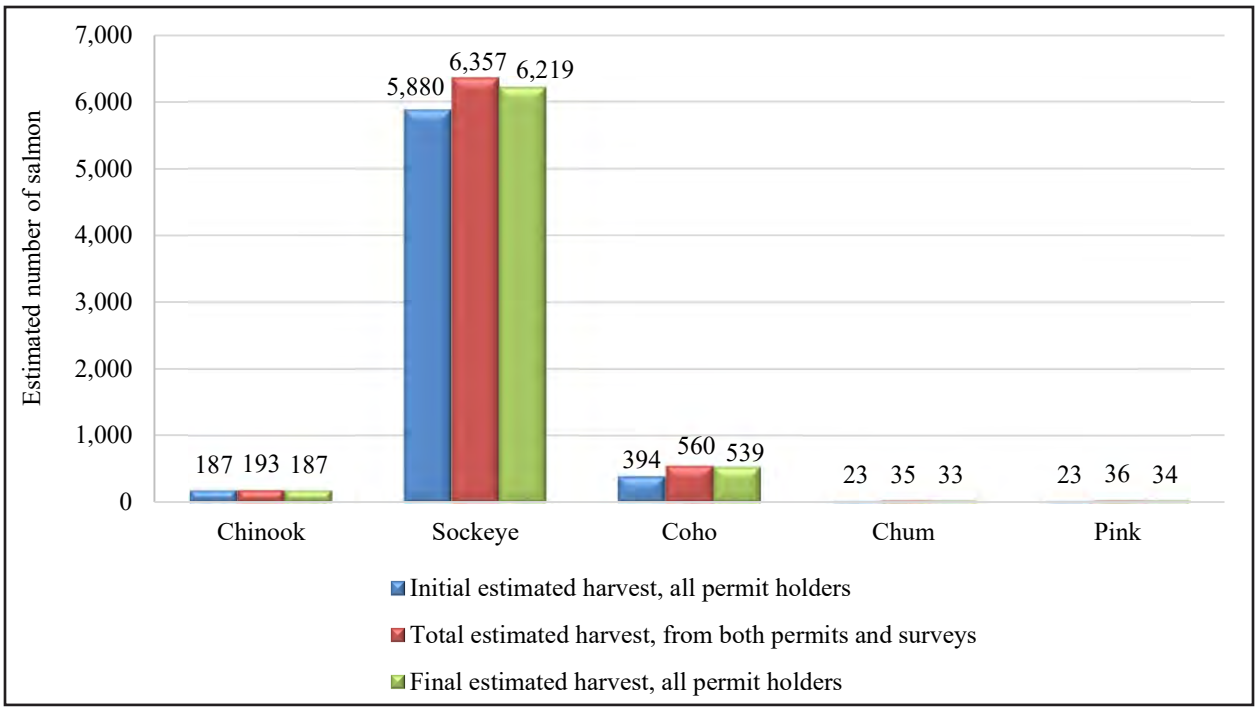


Figure 3-22.–Initial estimated salmon harvest based on returned permits compared to final estimated salmon harvest based on returned permits and surveyed households, King Salmon, 2018.

In comparing the initial estimated harvest for permit holders against the revised, post-survey community subsistence harvest estimate for 135 households, the pink and chum salmon harvests exhibited the most significant change: an increase of 57% and 52%, respectively; however, the difference between the initial and total estimated pink salmon and chum salmon harvests was low: an increase of only about a dozen fish (Table 3-16; Figure 3-22). The Chinook salmon total harvest estimate also differed by very little following post-season survey administration: an increase of only six fish, or 3%. But, in comparing the initial estimated harvest for permit holders of the top two most harvest salmon species (coho and sockeye salmon) against the revised, post-survey community subsistence harvest estimate for 135 total households, the coho salmon harvest exhibited the most significant change: the harvest estimate increased by 42% (166 fish); finally, the harvest estimate increased by 8% for sockeye salmon, but this was the largest difference in harvest estimates with an increase of 477 fish.

Comparing Uses and Harvests in 2017 and 2018 with Previous Years

Assessments of Use

Researchers asked respondents to assess their salmon use in two ways: whether they used more, less, or about the same amount of salmon in each study year as in the past five years, and whether they "got enough" salmon. Households also were asked to provide reasons if their use was different or if they were unable to get enough salmon. Also, if they did not get enough, respondents were asked to evaluate the severity of the impact to their household as a result of not getting enough. They were further asked how much salmon did the household need annually and whether they did anything differently (such as supplement with store-bought food or switch to a different subsistence resource) because they did not get enough. Households were also asked to assess whether their salmon fishing efforts or locations changed during the study years compared to usual activities. Because not every household uses salmon resources, some households did not respond to the assessment questions. Additionally, some households that do typically use salmon resources simply did not answer questions. For each type of assessment, households could give more than one reason

for changes to resource use, not having enough salmon, or increased effort or travel to get salmon. This section discusses responses to those questions.

2017

In 2017, out of 53 responding households, 52 King Salmon households reported using salmon, 21 (40%) stated that they used the same amount of salmon as they used in previous years, 19 (36%) reported less use, and 12 households (23%) reported more use of salmon (Table 3-18; Figure 3-23). When asked for reasons why salmon use was less, 37% of respondents indicated it was due to family/personal reasons, 26% cited lack of effort, and 16% cited working/no time (Table 3-19). Additionally, 11% of households indicated less use of salmon was caused by each of the following: they did not need as much salmon, resources were less available, and less sharing of salmon. Of the 11 households that provided a reason for increased salmon use, 36% of respondents stated more use was due to increased effort, 27% of households needed more, 18% received more, and 18% cited more success (Table 3-20). When asked if the household got enough salmon in 2017, 78% of sampled households indicated that they did, while 19% indicated that they did not get enough salmon (Figure 3-24). Of the 10 responding households that did not get enough salmon in 2017, 10% of these households reported the impact as major, 50% reported the impact as minor, and 30% reported the impact as not noticeable (Table 3-21). When asked what households that did not get enough salmon did as the result of not getting enough, 25% (two households) indicated that they bought/bartered, 25% used more commercial foods, 25% replaced salmon with other subsistence foods, 13% obtained food from other sources, and 13% indicated less sharing (Table 3-22). The 10 households that did not have enough salmon were asked how many are needed annually, and responses indicated an average of 110 salmon (Table 3-23). In 2017, six King Salmon households reported having to work harder than usual to obtain enough salmon. Of those households that provided a response, specific reasons provided for why households had to work harder to obtain enough salmon in 2017 included: unsuccessful (three households), and family/personal reasons (one household) (Table 3-24). In 2017, one household reported having had to travel farther, and two households reported traveling to different locations than normal to obtain enough salmon for their household needs (Table 3-25).

2018

In 2018, 50 King Salmon households reported using salmon, 30% (16 households) stated they used the same amount of salmon as they used in previous years, 43% (23 households) reported less use, and 20% (11 households) reported more use of salmon (Table 3-26; Figure 3-25). When asked the reasons why salmon use was less, 33% of 21 respondents indicated it was due to family/personal reasons, 29% cited working/no time, 24% cited did not need as much salmon, 14% cited lack of effort, and 10% of households indicated less sharing (Table 3-27). Additionally, 5% of households indicated less use of salmon was due to the following: resources less available, unsuccessful, and competition. Of the 11 households that provided a reason for increased salmon use, 73% of respondents stated more use was due to increased effort, 27% received more, and 9% of households stated more salmon was needed (Table 3-28). When asked if the household got enough salmon in 2018, 67% of sampled households indicated that they did, while 20% indicated that they did not (Figure 3-26). Of the 11 responding households that reported that they did not get enough salmon in 2018, six households provided an assessment of the impact of not getting enough salmon: one household reported the impact as not noticeable, three households reported it was minor, one household reported a major impact, and one household reported the impact was severe (Table 3-29). These six households also explained what they did as the result of not getting enough salmon: 50% cited using more commercial foods, 33% indicated less sharing, 17% indicated that they bought/bartered, and 17% asked others for help (Table 3-30). The 11 households that did not have enough salmon were asked how many are needed annually, and responses indicated an average of 188 salmon (Table 3-31). In 2018, two King Salmon households reported having to work harder than usual to obtain enough salmon and these households indicated family/personal reasons (one household) and more time needed (one household) as reasons for why (Table 3-32). In 2018, one household reported having to travel farther in 2018, and one household reported traveling to different locations than normal to obtain enough salmon for their household needs (Table 3-33).

Table 3-18.–Changes in household uses of salmon compared to recent years, King Salmon, 2017.

Sampled households	Valid responses[a]	Households reporting use								Households not using	
		Total households		Less		Same		More			
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
54	53	52	98.1%	19	35.8%	21	39.6%	12	22.6%	1	1.9%

Source ADF&G Division of Subsistence household surveys, 2018.
a. Valid responses do not include households that did not provide any response.

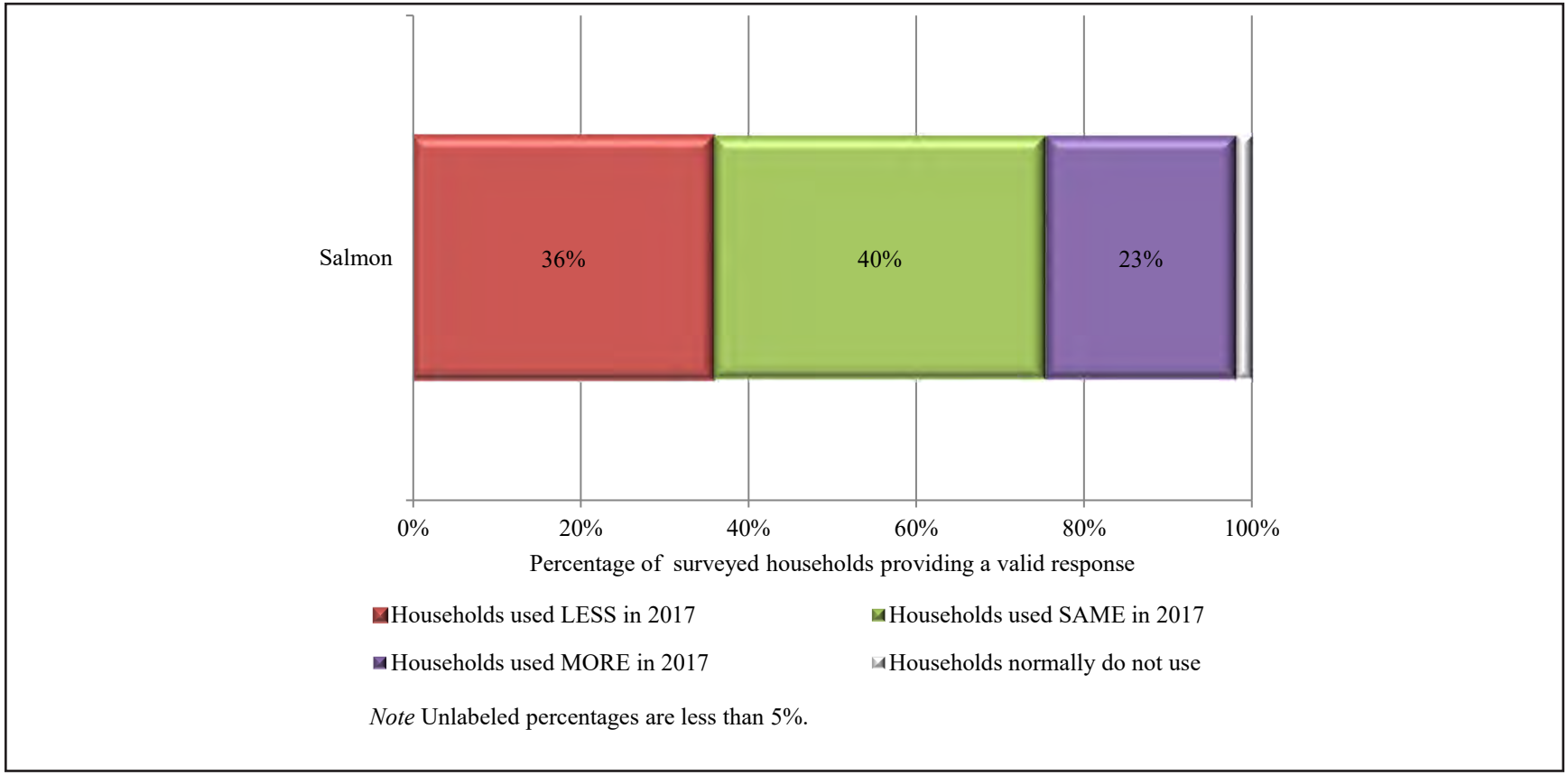


Figure 3-23.–Changes in household uses of salmon compared to recent years, King Salmon, 2017.

Table 3-19.–Reasons for less household uses of salmon compared to recent years, King Salmon, 2017.

Valid responses[a]	Households reporting reasons for less use	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
53	19	7	36.8%	2	10.5%	0	0.0%	1	5.3%	2	10.5%	5	26.3%	0	0.0%	0	0.0%

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Table 3-19.–Continued.

Valid responses[a]	Households reporting reasons for less use	Working/ no time		Regulations		Did not need		Gas/equipment too expensive		Used other resources		Competition		Had no help		Other reasons	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
53	19	3	15.8%	0	0.0%	2	10.5%	0	0.0%	0	0.0%	1	5.3%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

Table 3-20.–Reasons for more household uses of salmon compared to recent years, King Salmon, 2017.

Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Favorable weather		Received more		Needed more		Increased effort	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
53	11	0	0.0%	0	0.0%	0	0.0%	2	18.2%	3	27.3%	4	36.4%

-continued-

Table 3-20.–Continued.

Valid responses[a]	Households reporting reasons for more use	More success		Had more time		Got/fixed equipment		Substitute for unavaialable resource(s)		Had more help		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
53	11	2	18.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

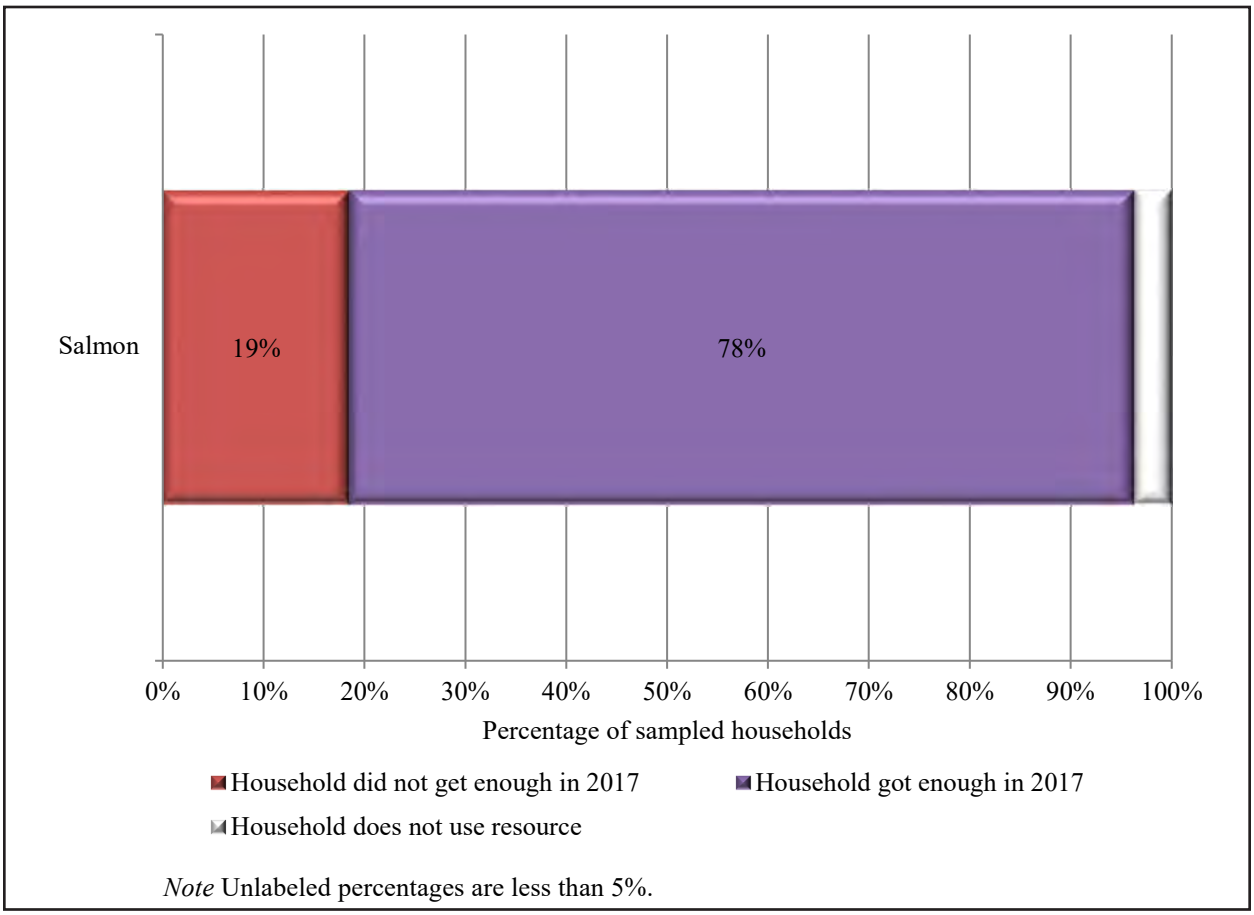

Figure 3-24.–Percentage of sampled households reporting whether they had enough salmon, King Salmon, 2017.

Table 3-21.–Reported impact to households reporting that they did not get enough salmon, King Salmon, 2017.

Sampled households	Households not getting enough salmon				Impact to those not getting enough salmon									
	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
54	52	96.3%	10	19.2%	1	10.0%	3	30.0%	5	50.0%	1	10.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 3-22.–Things households reported doing differently as the result of not getting salmon, King Salmon, 2017.

Valid responses[a]	Bought/bartered		Used more commercial foods		Replaced with other subsistence foods		Asked others for help		Increased effort	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
8	2	25.0%	2	25.0%	2	25.0%	0	0.0%	0	0.0%

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Table 3-22.–Continued.

Valid responses[a]	Made do without		Obtained food from other sources		Got public assistance		Less sharing		Other reasons	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
8	0	0.0%	1	12.5%	0	0.0%	1	12.5%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 3-23.–Amount of salmon needed by households that did not have enough, King Salmon, 2017.

Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
10	1,103	110

Source ADF&G Division of Subsistence household surveys, 2018.

Table 3-24.–Reasons that households worked harder to get more salmon, King Salmon, 2017.

Sampled households	Valid responses	Households reporting… not working harder than usual	working harder than usual	Family/personal Number	Family/personal Percentage	Resource availability Number	Resource availability Percentage	Unsuccessful Number	Unsuccessful Percentage	More time Number	More time Percentage
54	43	37	6	1	16.7%	0	0.0%	3	50.0%	0	0.0%

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Table 3-24.–Continued.

Sampled households	Valid responses	Households reporting… not working harder than usual	working harder than usual	Small or diseased resources Number	Small or diseased resources Percentage	No equipment Number	No equipment Percentage	Other reasons Number	Other reasons Percentage	No response Number	No response Percentage
54	43	37	6	0	0.0%	0	0.0%	2	33.3%	1	16.7%

Source ADF&G Division of Subsistence household surveys, 2018.

Table 3-25.–Households reporting that they traveled farther or to different locations, King Salmon, 2017.

Sampled households	Valid responses	Households reporting that they... traveled further	traveled to different locations
54	43	1	2

Source ADF&G Division of Subsistence household surveys, 2018.

Table 3-26.–Changes in household uses of salmon compared to recent years, King Salmon, 2018.

Sampled households	Valid responses[a]	Households reporting use								Households not using	
		Total households		Less		Same		More			
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
54	54	50	92.6%	23	42.6%	16	29.6%	11	20.4%	4	7.4%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households that did not provide any response.

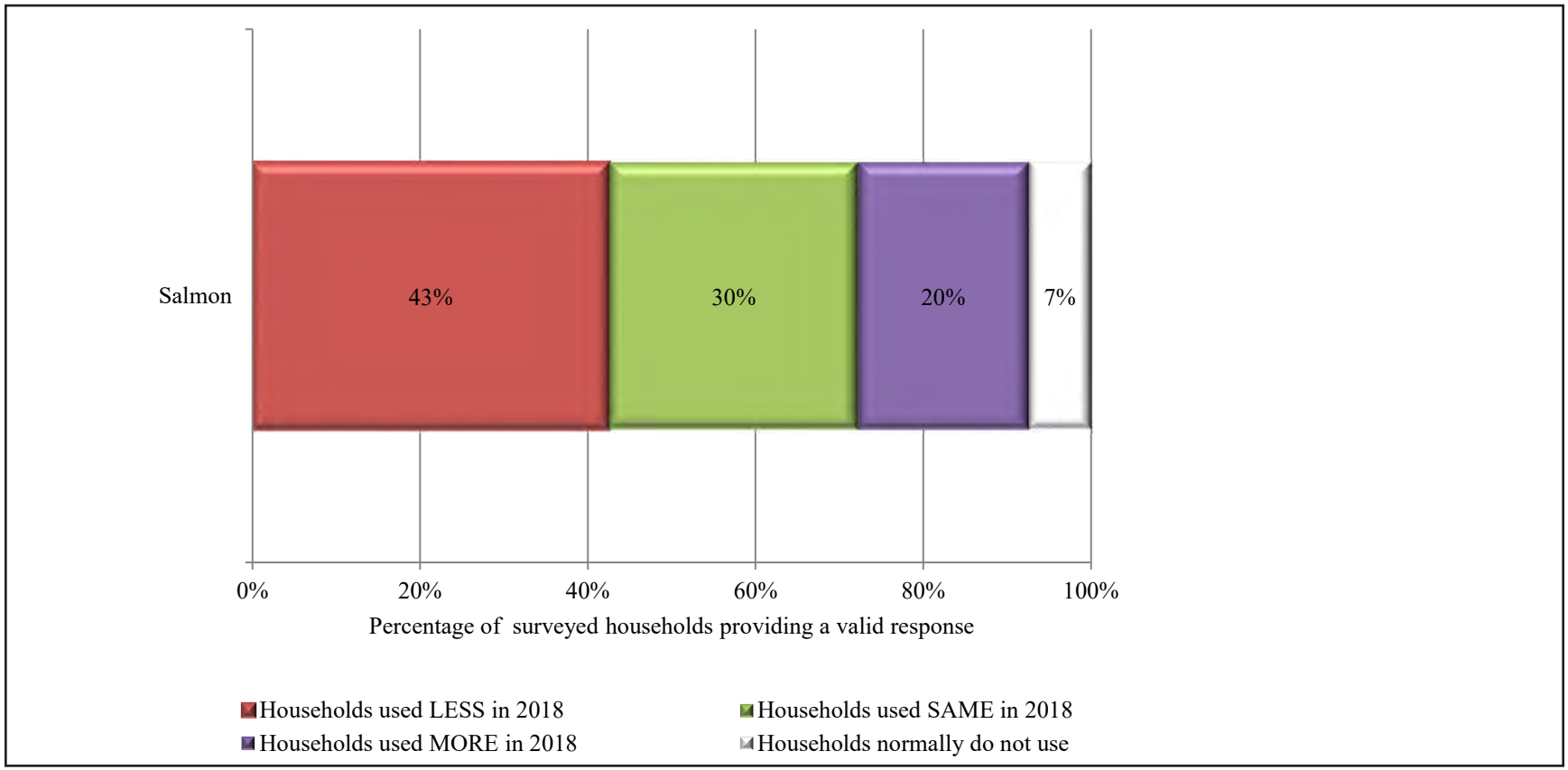

Figure 3-25.–Changes in household uses of salmon compared to recent years, King Salmon, 2018.

Table 3-27.–Reasons for less household uses of salmon compared to recent years, King Salmon, 2018.

Valid responses[a]	Households reporting reasons for less use	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
54	21	7	33.3%	1	4.8%	0	0.0%	0	0.0%	2	9.5%	3	14.3%	1	4.8%	0	0.0%

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Table 3-27.–Continued.

Valid responses[a]	Households reporting reasons for less use	Working/ no time		Regulations		Did not need		Gas/equipment too expensive		Used other resources		Competition		Had no help		Other reasons	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
54	21	6	28.6%	0	0.0%	5	23.8%	0	0.0%	0	0.0%	1	4.8%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

Table 3-28.–Reasons for more household uses of salmon compared to recent years, King Salmon, 2018.

Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Favorable weather		Received more		Needed more		Increased effort	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
54	11	0	0.0%	0	0.0%	0	0.0%	3	27.3%	1	9.1%	8	72.7%

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Table 3-28.–Continued.

Valid responses[a]	Households reporting reasons for more use	More success		Had more time		Got/fixed equipment		Substitute for unavaialable resource(s)		Had more help		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
54	11	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

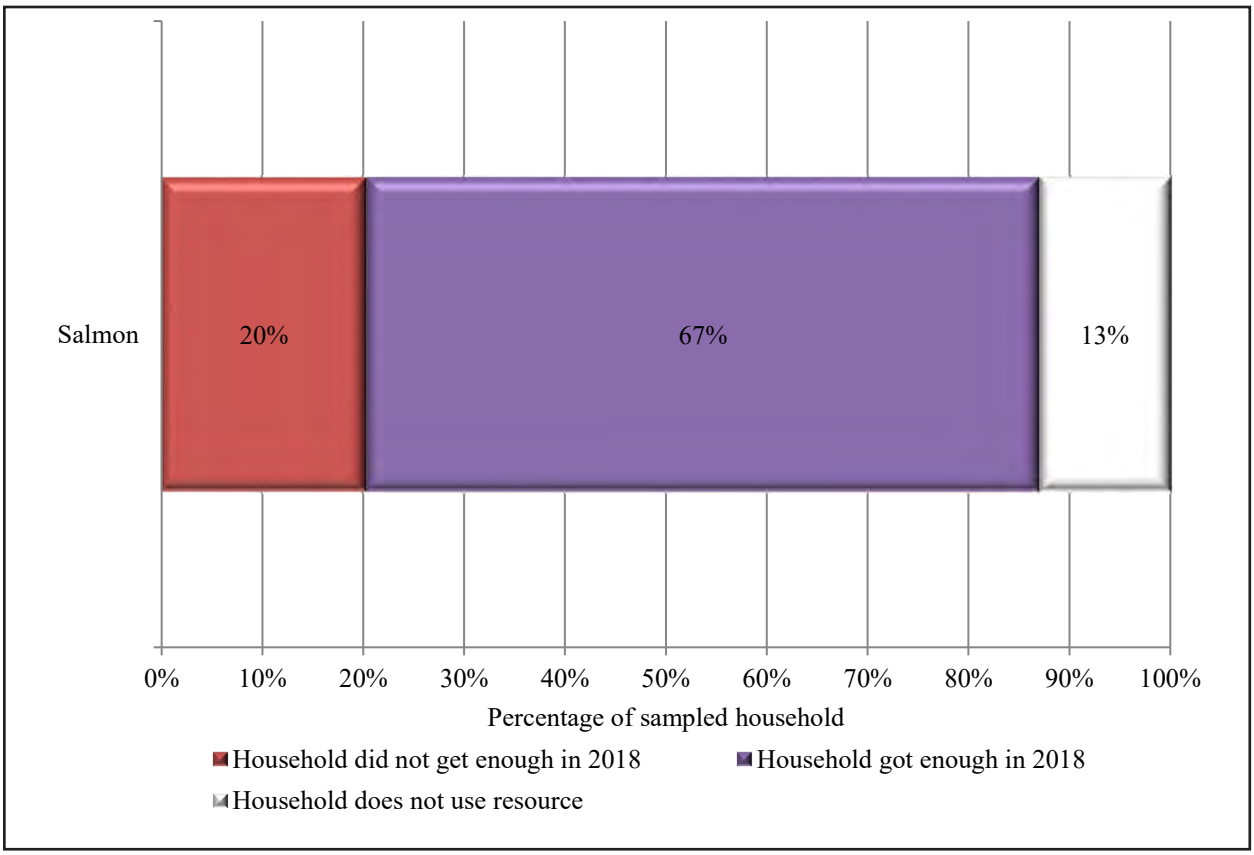

Figure 3-26.–Percentage of sampled households reporting whether they had enough salmon, King Salmon, 2018.

Table 3-29.–Reported impact to households reporting that they did not get enough salmon, King Salmon, 2018.

Sampled households	Households not getting enough salmon				Impact to those not getting enough salmon									
	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
54	47	87.0%	11	23.4%	5	45.5%	1	9.1%	3	27.3%	1	9.1%	1	9.1%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 3-30.–Things households reported doing differently as the result of not getting salmon, King Salmon, 2018.

Valid responses[a]	Bought/bartered		Used more commercial foods		Replaced with other subsistence foods		Asked others for help		Increased effort	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
6	1	16.7%	3	50.0%	0	0.0%	1	16.7%	0	0.0%

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Table 3-30.–Continued.

Valid responses[a]	Made do without		Obtained food from other sources		Got public assistance		Less sharing		Other reasons	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
6	0	0.0%	0	0.0%	0	0.0%	2	33.3%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 3-31.–Amount of salmon needed by households that did not have enough, King Salmon, 2018.

Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
11	2,070	188

Source ADF&G Division of Subsistence household surveys, 2019.

Table 3-32.–Reasons that households worked harder to get more salmon, King Salmon, 2018.

Sampled households	Valid responses	Households reporting… not working harder than usual	working harder than usual	Family/personal Number	Family/personal Percentage	Resource availability Number	Resource availability Percentage	Unsuccessful Number	Unsuccessful Percentage	More time Number	More time Percentage
54	33	31	2	1	50.0%	0	0.0%	0	0.0%	1	50.0%

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Table 3-32.–Continued.

Sampled households	Valid responses	Households reporting… not working harder than usual	working harder than usual	Small or diseased resources Number	Small or diseased resources Percentage	No equipment Number	No equipment Percentage	Other reasons Number	Other reasons Percentage	No response Number	No response Percentage
54	33	31	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

Table 3-33.–Households reporting that they traveled farther or to different locations, King Salmon, 2018.

Sampled households	Valid responses	Households reporting that they... traveled further	traveled to different locations
54	33	1	1

Source ADF&G Division of Subsistence household surveys, 2019.

Table 3-34.–Usual household harvest methods, King Salmon, 2017.

Households providing valid response to question about usual salmon harvest method	Remove from commercial catch		Seine		Set gillnet		Rod and reel		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
41	2	4.9%	0	0.0%	30	73.2%	35	85.4%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Assessments of Salmon Harvest Methods

2017

Out of 41 households that answered questions about usual harvest methods, 35 (85% of households) indicated at least one usual salmon harvest method was rod and reel, 30 (73%) indicated at least one usual harvest method was subsistence set gillnet, and two (5%) indicated usually retaining commercial harvests (Table 3-34). Of those 35 households that responded rod and reel is a usual salmon harvest method, reasons provided for why included: fun (29 households), selectivity (five households), other reasons (four households), tradition (three households), ease (two households), and conservation (two households) (Table 3-35).

2018

Of the 39 households that answered the questions, 27 (69% of households) indicated at least one of their usual harvest methods for salmon was subsistence set gillnet, 23 (59%) indicated at least one usual salmon harvest method was rod and reel, five (13%) indicated usually retaining commercial harvests, one (3%) indicated seine net, and one (3%) indicated other methods (Table 3-36). Of those 23 households that responded rod and reel is a usual salmon harvest method, reasons provided for why included: fun (16 households), ease (six households), other reasons (six households), selectivity (three households), and tradition (one household) (Table 3-37).

Table 3-35.–Reasons for using a rod and reel to harvest salmon, King Salmon, 2017.

Households using rod and reel	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
35	2	5.7%	5	14.3%	0	0.0%	3	8.6%	2	5.7%	29	82.9%	4	11.4%

Source ADF&G Division of Subsistence household surveys, 2018.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-36.–Usual household harvest methods, King Salmon, 2018.

Households providing valid response to question about usual salmon harvest method	Remove from commercial catch		Seine		Set gillnet		Rod and reel		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
39	5	12.8%	1	2.6%	27	69.2%	23	59.0%	1	2.6%

Source ADF&G Division of Subsistence household surveys, 2019.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-37.–Reasons for using a rod and reel to harvest salmon, King Salmon, 2018.

Households using rod and reel	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
23	0	0.0%	3	13.0%	0	0.0%	1	4.3%	6	26.1%	16	69.6%	6	26.1%

Source ADF&G Division of Subsistence household surveys, 2019.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Comparing Harvests in 2017 and 2018 with Estimated Harvests from Previous Study Years and Returned Subsistence Salmon Permits

Changes in the harvest of salmon by King Salmon residents can also be discerned through comparisons with findings from other study years and data from the subsistence permit database; the permit data collected by ADF&G begins in 1983. Comprehensive subsistence harvest surveys were conducted in King Salmon for the study years 1983 and 2007 (Holen et al. 2011; Morris 1985).

As discussed above, for 2017 and 2018, Division of Subsistence staff members opportunistically collected unreturned permits from households in King Salmon; the data from previously unreturned permits were then included in the subsistence permit database. Three goals of the 2017 and 2018 household salmon surveys included collecting unreturned subsistence permits from King Salmon households, gathering harvest data from households that did not obtain a subsistence permit but did subsistence fish, and collecting information about the amount of salmon retained from commercial catches for home use or harvested using rod and reel. This additional information collected through the administration of household surveys provides a more accurate representation of a King Salmon fishing season and total harvests for home use than data from returned subsistence salmon permits alone. As mentioned above, a total of nine and 14 additional permits were collected as a result of the survey efforts for 2017 and 2018, respectively; this resulted in a higher percentage of returned household permits both years (tables 3-14, 3-16, and 3-38). In King Salmon, the permit return rate prior to survey administration was 81% in 2017 and 71% in 2018, but the return rates improved to 93% and 87%, respectively, after surveys were conducted (Table 3-14; Table 3-16).

According to the subsistence permit system, King Salmon subsistence salmon harvests have fluctuated since 1983 (Figure 3-27–Total Salmon). Based on subsistence permit data spanning 1983 through 1990, subsistence salmon harvests were relatively steady—ranging between approximately 4,300–6,700 fish. In the early 1990s, the harvest amounts increased significantly, with the highest harvest occurring in 1993 when 10,279 salmon were harvested; however, in the early 2000s, the harvest amounts decreased and remained below 8,000 salmon for the ensuing 18 years (Table 3-38). The historical average harvest of all salmon species based on permit data from 1983–2018 was 6,706 fish, the 10-year (2009–2018) average was 6,030 salmon, and the five-year (2014–2018) average was 6,245 fish. Like the harvest amounts, the number of permits issued each year has also fluctuated since 1983; however, the number of issued permits corresponds with the harvest patterns identified above. For example, spanning 1983–1990, the number of issued permits ranged 65–99. But spanning 1992–2000, more than 100 permits were issued annually when salmon harvests were higher (ranging 6,800–10,300 fish); then, for the ensuing 18 years, the number of issued permits did not ever exceed 100, and on average there were 82 permits issued in that timeframe.

Based on the post-season harvest survey data, the total community subsistence harvest estimates have increased over time (Figure 3-28). For example, 3,067 salmon were harvested in 1983, the 2007 subsistence salmon harvest was 3,926 fish, 3,141 salmon were harvested in 2017, and 5,777 fish (including spawning salmon) were harvested in 2018 (Figure 3-28; Table 3-39). However, it should be noted that no salmon harvest surveys occurred in the early 1990s—the timeframe when harvests increased significantly based on the subsistence permit data (Table 3-38). Interestingly, though the harvest survey data indicate an increase of harvests over time, the population of King Salmon has decreased since the 1983 harvest survey. According to Division of Subsistence population estimates, the 1983 population of King Salmon was 369 individuals, in 2007 the population was 246, and this study found a population of 244 individuals in 2017 and 242 individuals in 2018 (Figure 3-2).

According to both the salmon harvest survey data and the subsistence permits, sockeye salmon has been the most harvested salmon species for subsistence by residents of King Salmon since 1983 (Figure 3-27). Because sockeye salmon harvests compose such a large proportion of the total subsistence salmon harvest each year, the subsistence harvests of sockeye salmon over time reflect the trends identified above for all salmon species combined. According to subsistence permit data, the historical average harvest of sockeye salmon from 1983–2018 was 6,052 fish, the 10-year (2009–2018) average was 5,634 fish, and the five-year (2014–2018) average was 5,766 fish (Table 3-38). According to the post-season harvest survey estimates, the sockeye salmon subsistence harvest estimates increased over time: in 1983 the sockeye salmon harvest

Table 3-38.–Historical estimated subsistence salmon harvests, based on Bristol Bay permit returns, King Salmon, 1983–2018.

	Permits		Percentage of returned permits	Estimated salmon harvest					
Year	Issued	Returned		Chinook	Sockeye	Coho	Chum	Pink	**Total**
1983	68	54	79.4%	213	4,480	55	123	77	**4,948**
1984	65	62	95.4%	184	5,040	70	226	175	**5,695**
1985	70	60	85.7%	142	5,993	66	51	0	**6,252**
1986	71	52	73.2%	182	5,838	125	71	68	**6,285**
1987	73	63	86.3%	338	3,797	202	264	32	**4,633**
1988	91	80	87.9%	312	4,662	178	129	243	**5,523**
1989	76	69	90.8%	207	3,783	283	73	2	**4,348**
1990	99	92	92.9%	305	5,789	154	245	247	**6,741**
1991	91	84	92.3%	240	9,303	214	391	40	**10,188**
1992	116	103	88.8%	300	9,186	284	230	264	**10,263**
1993	111	101	91.0%	409	9,232	410	185	43	**10,279**
1994	107	86	80.4%	476	7,579	303	225	146	**8,730**
1995	101	87	86.1%	324	7,810	210	217	15	**8,576**
1996	100	87	87.0%	434	8,836	371	117	140	**9,898**
1997	107	96	89.7%	709	6,814	568	106	24	**8,221**
1998	106	97	91.5%	362	5,619	559	169	154	**6,864**
1999	103	91	88.3%	225	7,398	381	179	38	**8,222**
2000	116	109	94.0%	228	7,122	332	170	274	**8,125**
2001	96	91	94.8%	177	6,813	189	39	24	**7,242**
2002	89	82	92.1%	165	4,486	199	106	97	**5,052**
2003	98	84	85.7%	252	5,877	85	40	22	**6,276**
2004	87	67	77.0%	197	4,588	135	78	126	**5,124**
2005	86	76	88.4%	189	6,141	246	58	46	**6,680**
2006	79	67	84.8%	176	4,904	233	153	177	**5,643**
2007	93	81	87.1%	131	5,182	270	91	42	**5,715**
2008	76	68	89.5%	124	5,251	118	55	51	**5,599**
2009	74	68	91.9%	65	5,966	139	20	12	**6,202**
2010	79	69	87.3%	96	6,235	159	35	212	**6,738**
2011	71	68	95.8%	107	5,396	117	53	24	**5,697**
2012	81	74	91.4%	173	5,329	49	17	100	**5,667**
2013	76	68	89.5%	87	4,585	65	29	0	**4,776**
2014	77	75	97.4%	124	6,062	188	25	50	**6,450**
2015	86	80	93.0%	148	7,397	97	78	20	**7,741**
2016	75	69	92.0%	227	4,021	195	38	20	**4,500**
2017	75	70	93.3%	130	5,130	203	28	30	**5,520**
2018	78	68	87.2%	187	6,219	539	33	34	**7,012**
5-year avg (2014–2018)	78	72	92.6%	163	5,766	244	40	31	**6,245**
10-year avg (2009–2018)	77	71	91.8%	134	5,634	175	36	50	**6,030**
Historical avg (1983–2018)	87	78	88.9%	232	6,052	222	115	85	**6,706**

Source ADF&G Division of Subsistence, ASFDB 2018 (ADF&G May 2019).

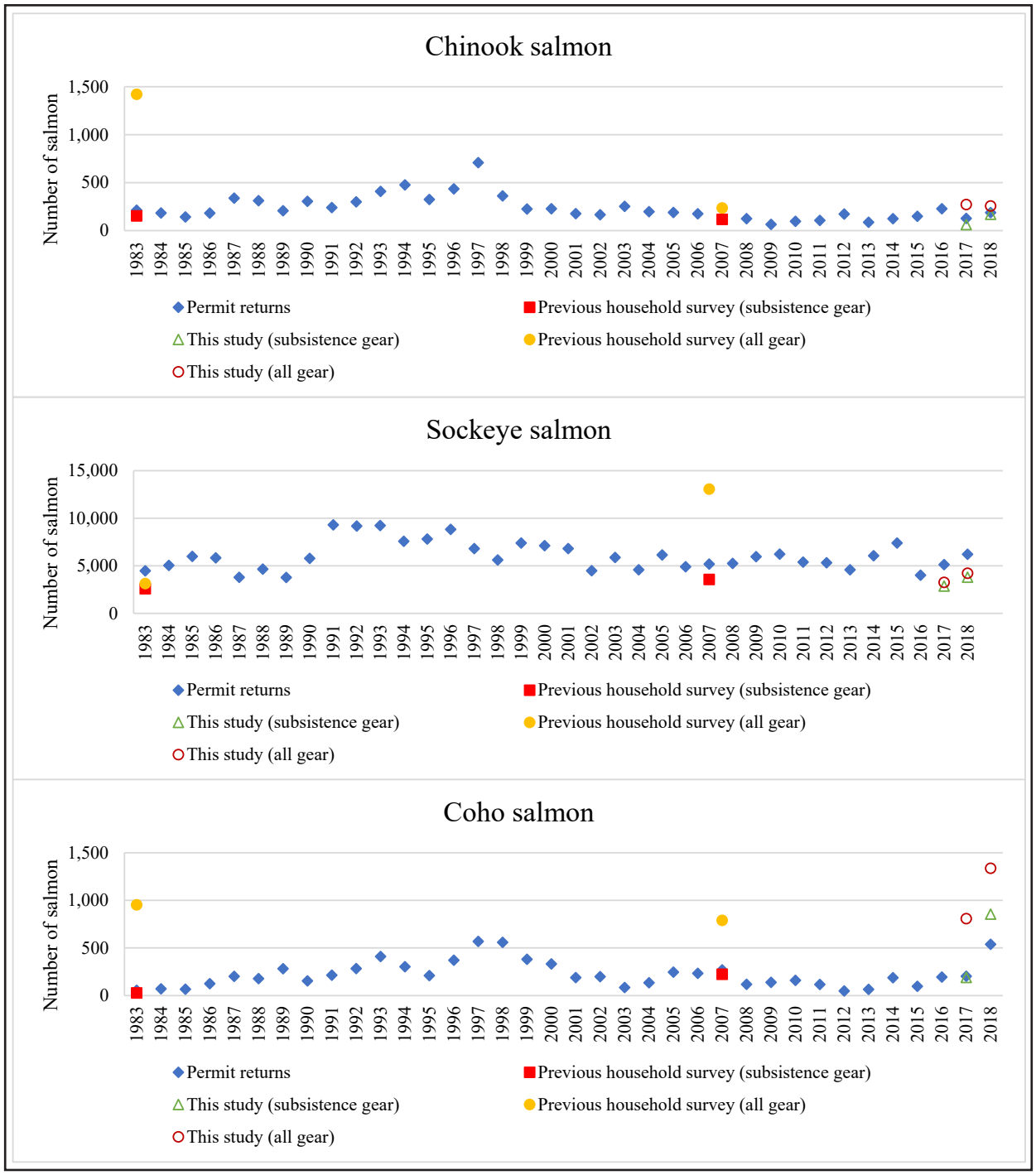
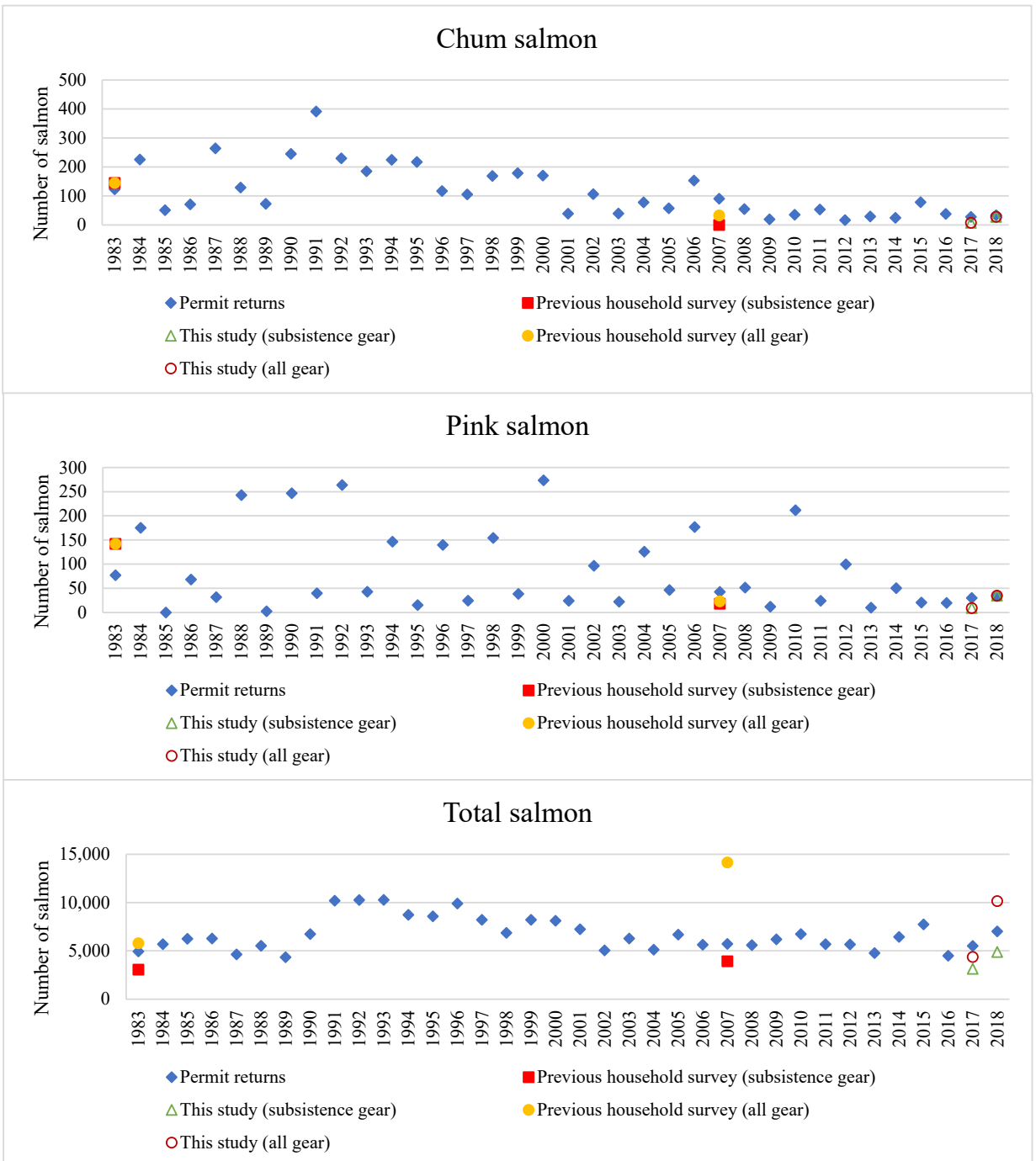


Figure 3-27.–Comparison of historical estimated salmon harvests, based on Bristol Bay permit returns, 1983–2018, and based on household surveys, King Salmon, 1983, 2007, 2017, and 2018.

Figure 3-27.–Page 2 of 2.



Note For comparability to harvest estimates based on permit returns, the remaining harvest estimates based on household surveys (i.e., previous household survey and this study) exclude spawning salmon harvests.

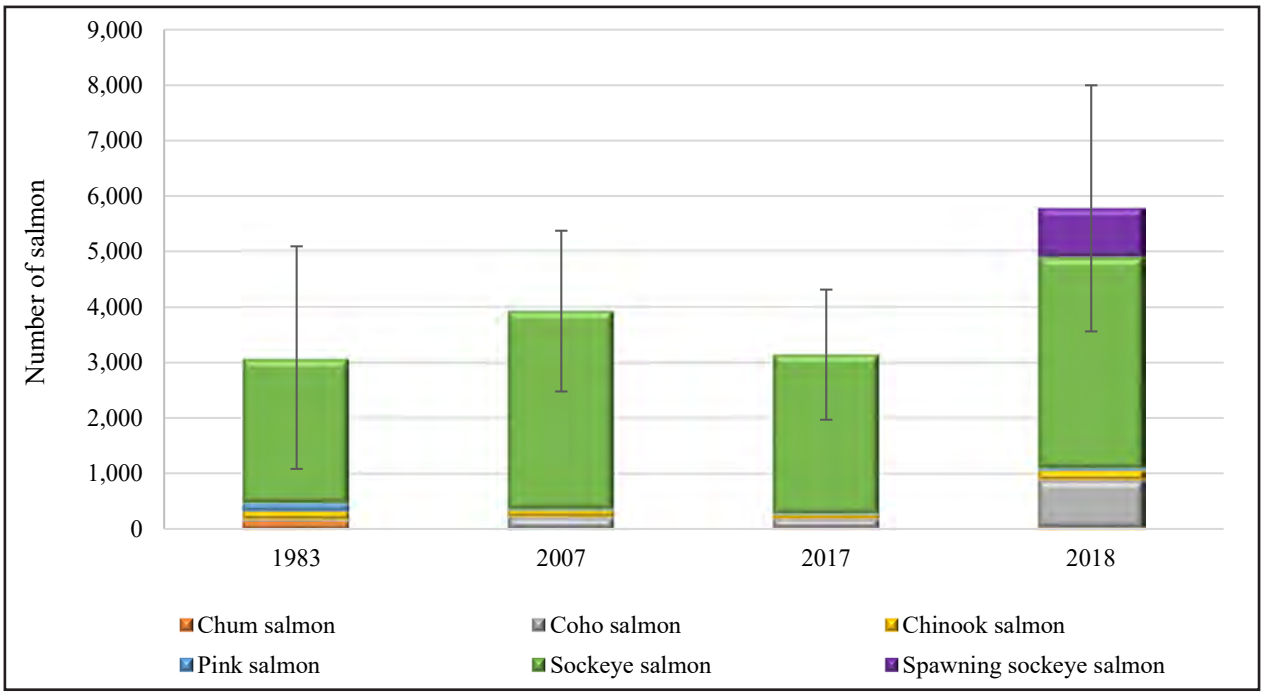


Figure 3-28.–Composition of historical estimated subsistence salmon harvests, by individual fish and based on household surveys, King Salmon, 1983, 2007, 2017, and 2018.

was 2,599 fish, in 2007 the harvest was 3,567 fish, in 2017 a total of 2,871 sockeye salmon were harvested, and in 2018 a total of 3,801 sockeye salmon (excluding spawnouts) were harvested (Figure 3-27—Sockeye Salmon; Table 3-39).

Since 1983, either Chinook or coho salmon have been the second-most harvested species; although, since 2000, based on both salmon harvest survey and subsistence permit data, coho salmon has more frequently been the second most harvested species (Table 3-38; Table 3-39). According to subsistence permit data, the historical average subsistence harvest of coho salmon from 1983–2018 was 222 fish, the 10-year (2009–2018) average was 175 fish, and the five-year (2014–2018) average was 244 fish (Table 3-38). According to the harvest surveys, the coho salmon subsistence harvest estimates increased over time: in 1983 an estimated 28 coho salmon were harvested, the harvest in 2007 was 225 coho salmon, in 2017 the harvest was 191 fish, and in 2018 a total of 855 coho salmon were harvested (Figure 3-27—Coho Salmon; Table 3-39). During 2017, based on the harvest survey, a large portion (75%) of the coho salmon harvest was caught using rod and reel—a non-subsistence gear type under both state and federal regulations (Figure 3-29); these harvests are not represented in the subsistence permit data or survey data depicted in tables 3-38 and 3-39. In addition, according to survey respondents, participant observations, and key respondent interviews, local participation in rod and reel fishing has remained important over the past 20 years. However, although results for the four survey years do not depict a trend of increasing rod and reel harvests of coho salmon, survey results do still depict the importance of the use of rod and reel to harvest this species over time. Spanning the four survey years, the coho salmon rod and reel harvest estimates were approximately 500–900 fish; the proportion of the total coho salmon harvest that came from rod and reel was 94% in 1983, 62% in 2007, 75% in 2017, and 36% in 2018 (Table 3-40; Figure 3-29).

The historical average subsistence harvest of Chinook salmon based on returned permits from 1983–2018 was 232 fish, the 10-year (2009–2018) average was 134 fish, and the five-year (2014–2018) average was 163 fish (Table 3-38). Note that the historical average harvest of Chinook and coho salmon were similar—232 and 222 fish, respectively. However, as previously mentioned, Chinook salmon have been less frequently harvested by a higher amount than coho salmon in more recent years, and the five-year average differs more

Table 3-39.–Comparison of estimated subsistence salmon harvests, based on household surveys, King Salmon, 1983, 2007, 2017, and 2018.

	Estimated salmon harvest[a]							
	1983				2007			
Resource	Number	Pounds	Per capita (lb)	CIP	Number	Pounds	Per capita (lb)	CIP
Salmon	**3,067.0**	**13,465.0**	**36.5**	**66.0%**	**3,925.9**	**17,794.3**	**72.3**	**37.0%**
Chum salmon	145.0	622.0	1.7	154.0%	0.0	0.0	0.0	3.9%
Coho salmon	28.0	116.0	0.3	160.0%	224.5	1,144.9	4.7	33.7%
Chinook salmon	153.0	2,236.0	6.1	66.0%	116.7	1,294.6	5.3	28.5%
Pink salmon	142.0	355.0	1.0	157.0%	18.0	53.7	0.2	101.9%
Sockeye salmon	2,599.0	10,136.0	27.5	60.0%	3,566.7	15,301.1	62.2	31.0%
Spawning sockeye salmon	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%

-continued-

Table 3-39.–Continued.

	Estimated salmon harvest[a]							
	2017				2018			
Resource	Number	Pounds	Per capita (lb)	CIP	Number	Pounds	Per capita (lb)	CIP
Salmon	**3,140.5**	**12,882.0**	**52.8**	**37.4%**	**5,777.3**	**23,535.1**	**97.3**	**38.4%**
Chum salmon	7.3	34.5	0.1	81.5%	28.3	132.3	0.5	95.7%
Coho salmon	190.7	909.0	3.7	95.9%	855.2	4,171.9	17.3	57.5%
Chinook salmon	62.3	517.1	2.1	48.3%	170.0	1,285.6	5.3	53.1%
Pink salmon	9.2	25.0	0.1	79.8%	34.6	90.3	0.4	93.0%
Sockeye salmon	2,871.0	11,396.4	46.7	38.2%	3,801.4	14,474.6	59.9	48.6%
Spawning sockeye salmon	0.0	0.0	0.0	0.0%	887.8	3,380.4	14.0	97.5%
Unknown salmon	0.0	0.0	0.0	0.0%	0.0	0.0	0.0	0.0%

Sources For 2017 and 2018, ADF&G Division of Subsistence household surveys, 2018 and 2019; for previous study years, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2019.

a. Includes subsistence gear types only.

significantly (244 for coho salmon compared to 163 for Chinook salmon). From the harvest surveys, the estimated Chinook salmon subsistence harvests were 153 fish in 1983, 117 fish in 2007, 62 fish in 2017, and 170 fish in 2018 (Table 3-39). Results for the four survey years demonstrate a decline in the amount of Chinook salmon harvested since the 1983 survey, while also depicting a decrease in the use of rod and reel to harvest this salmon species since 1983 (Figure 3-30). In 1983, 73% of Chinook salmon were harvested using rod and reel; in following study years, the percentage of the Chinook salmon harvest that came from rod and reel was lower (37% in 2007, 45% in 2017, and 15% in 2018) (Figure 3-29).

Pink salmon and chum salmon are typically not the preferred salmon species for residents of King Salmon, and both these species combined have, based on household surveys and the permit data, historically and contemporarily made up less than 9% of the total subsistence salmon harvest composition (Table 3-38; Table 3-39).

The subsistence permits do not ask separately about the harvests of spawning sockeye salmon and non-spawning sockeye salmon; therefore, the only available data for spawning sockeye salmon harvests are from the post-season household surveys. The only year in which King Salmon households reported harvesting spawning sockeye salmon was study year 2018 (Figure 3-30).

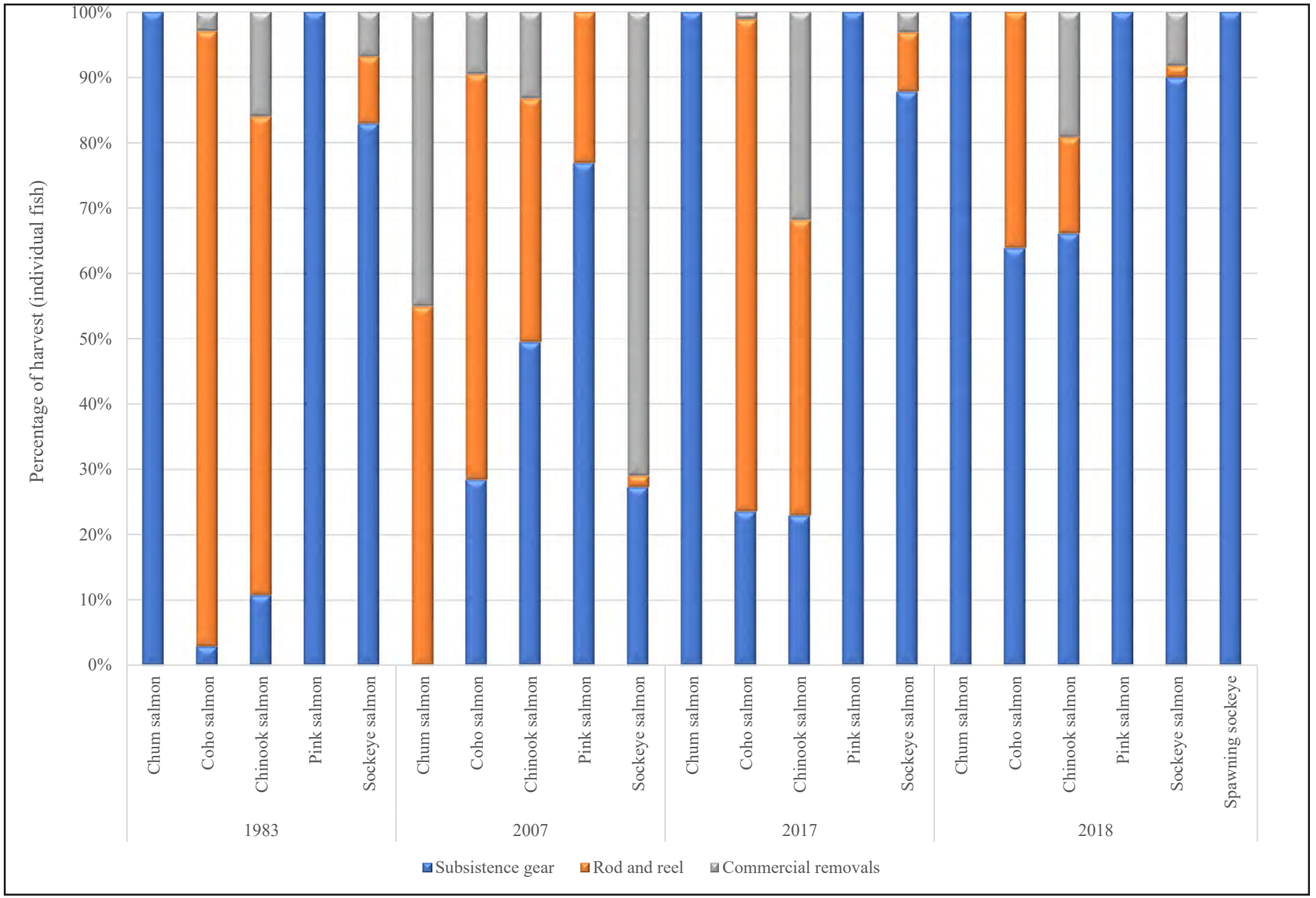


Figure 3-29.–Historical proportion of salmon harvests, by individual fish and by species, harvested by gear type, King Salmon, 1983, 2007, 2017, and 2018.

Table 3-40.–Historical estimated salmon harvests by rod and reel, King Salmon, 1983, 2007, 2017, and 2018

	1983		2007		2017		2018	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**2,258.0**	**20,129.0**	**829.7**	**4,558.6**	**1,026.7**	**5,092.4**	**595.0**	**2,923.0**
Chum salmon	0.0	0.0	18.0	87.6	0.0	0.0	0.0	0.0
Coho salmon	897.0	3,676.0	490.3	2,500.5	608.7	2,901.7	481.7	2,349.6
Chinook salmon	1,041.0	15,202.0	88.0	975.9	122.8	1,019.0	37.8	285.7
Pink salmon	0.0	0.0	5.4	16.1	0.0	0.0	0.0	0.0
Sockeye salmon	321.0	1,251.0	228.1	978.5	295.2	1,171.7	75.6	287.7

Sources For 2017 and 2018, ADF&G Division of Subsistence household surveys, 2018 and 2019; for previous study years, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2020.

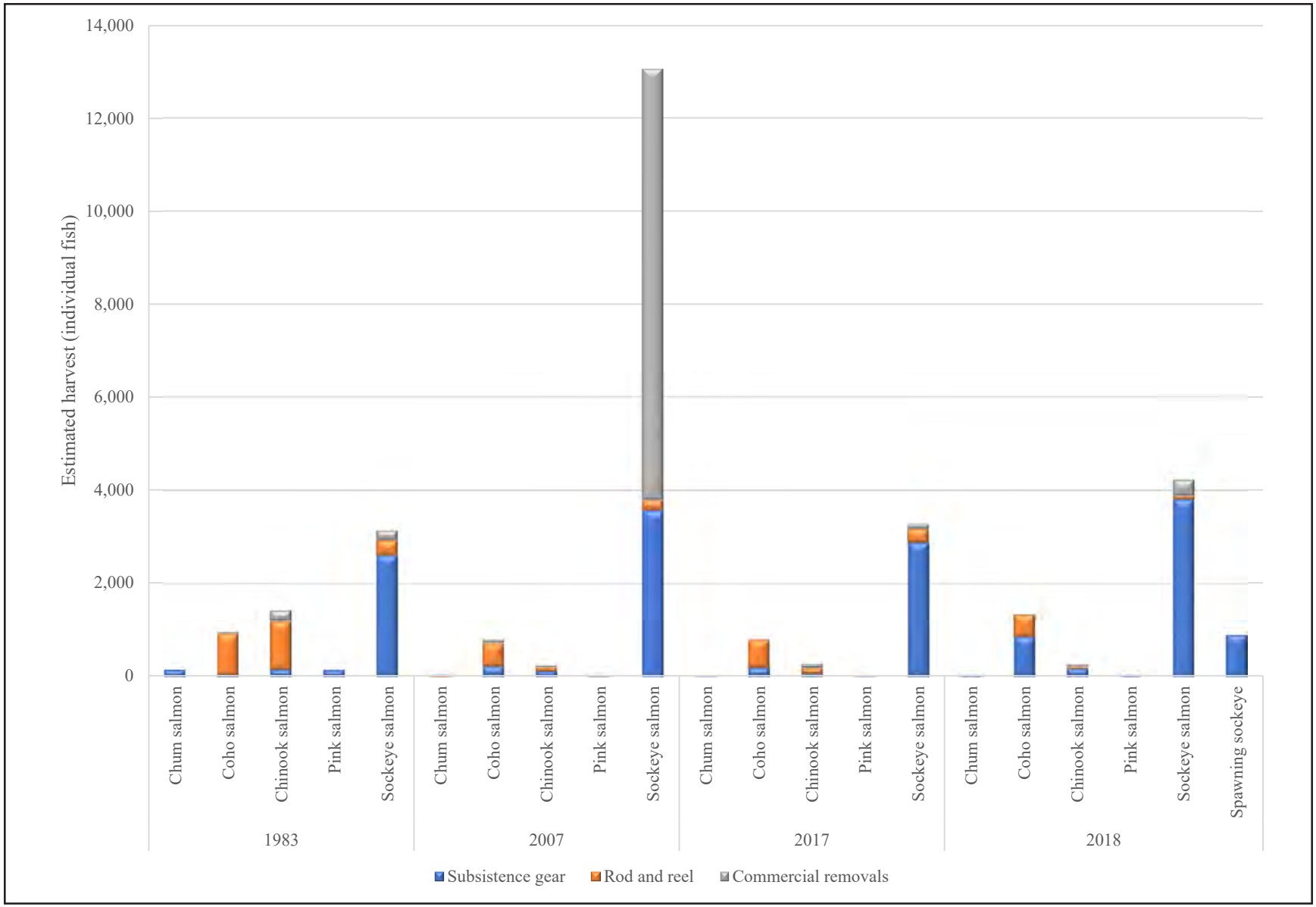


Figure 3-30.–Historical estimated salmon harvests, by individual fish and by species, harvested by gear type, King Salmon, 1983, 2007, 2017, and 2018.

Local Comments and Concerns

Following is a summary of local comments, concerns, and observations related to salmon resource populations and harvest trends that were recorded during the surveys in King Salmon. Some households did not offer any additional information during the survey interviews, so not all households are represented in the summary. In addition, respondents expressed their concerns about salmon during the community review meeting of preliminary data. Comments and concerns collected during household surveys and the community data review meeting are further contextualized with qualitative information obtained from key respondent interviews and participant observation. These concerns have been included in the summary.

Bears

King Salmon residents remarked on the presence of brown bears on the beaches where subsistence fishing occurs. A consensus among respondents suggested that the number of bears had increased over the past 10 years. These King Salmon residents worried about their personal safety while harvesting and processing subsistence salmon.

Chinook Salmon and Coho Salmon Abundance

Several residents of King Salmon expressed concerns about the abundance of Chinook salmon and coho salmon. During surveys and interviews, respondents suggested that local area fishery managers solely focus on sockeye salmon, and as a result these respondents worried that Chinook salmon and coho salmon are not monitored enough by ADF&G. These King Salmon residents mentioned an increased presence of sport fishing in the Naknek River and attributed their concerns for salmon abundance to increased sport fishing activities. Several residents commented that they had witnessed an increase in the number of subsistence fishers from outside of Bristol Bay Borough; respondents believed this increased pressure on Chinook and coho salmon may lead to a reduction in abundance in the future. Finally, the number of Chinook salmon retained from commercial harvests for home use concerned some King Salmon community members. Community members were concerned that large amounts of Chinook salmon were being retained from commercial harvests, but that these numbers were not being recorded.

Commercial Retention for Home Use

According to survey respondents, Chinook salmon are widely kept and distributed by commercial fishermen due to the low price offered by processors for this salmon species. Some King Salmon residents remarked that the rules and regulations surrounding the retention of commercially caught salmon for home use (also known as home pack) were not clear. Several King Salmon residents informed project staff that the tenders and processors did not record home pack when fish were delivered, and these residents were concerned that a large amount of Chinook salmon have been kept and not reported.

Sport Fishing in the Naknek River

Concerns regarding pressure from sport fishing on the Naknek River were mentioned by several survey respondents during both years of household harvest surveys. Feedback from King Salmon respondents included remarks about increased erosion of the riverbanks from increased boat traffic in the Naknek River, and Chinook salmon spawning grounds being disturbed by sport fishing traffic. Others expressed concerns about salmon mortality rates from catch-and-release practices.

4. NAKNEK

Community Setting

The community of Naknek is located on the north bank of the lower Naknek River. The residential and business section of the community is located approximately 1.5 miles east of the outlet of Naknek River into Kvichak Bay. There is a road system that links to the Alaska Peninsula Highway, which runs between Naknek and King Salmon along the north shore of the Naknek River. The eastern boundary for the Naknek area used in this study was Pauls Creek. The western boundary was the shores of Kvichak Bay, nearly 11 miles away.

The natural environment surrounding Naknek is diverse. At the mouth of the Naknek River, large rocky cliffs lead to muddy, tidal-dependent beaches, and north of where the Naknek River commences there are large, grassy bluffs with views of Kvichak Bay. Portions of Naknek's landscape are spotted with tundra and kettle ponds, while there are also fields of grasses and cotton-like sedges along the Alaska Peninsula Highway. Some areas surrounding Naknek are more boreal, composed of black spruce and alder forests.

Naknek is regarded as a major Alaska fishery center, and this community also serves as the administrative center of the Bristol Bay Borough, which encompasses the communities of King Salmon, Naknek, and South Naknek. The borough administration offices are located in Naknek, along with Naknek Elementary School, Bristol Bay Middle/High School and the Bristol Bay Correspondence School (all housed in one borough building), a public library, and recreational facilities. Other facilities and businesses operating in this community during this project included one each of a tribal center, health clinic, small airstrip, grocery store, hardware store, gas station, bakery, and coffee shop; several each of restaurants, bars, and marine sales and services companies; and several large and several small commercial fisheries processing plants.

Population Estimates and Demographic Information: 2017 and 2018

This study found an estimated population for Naknek in 2017 of 413 individuals in 154 households, and in 2018 the population was estimated to be 434 individuals in 153 households (Table 4-1). For both years, the population estimates from this study were lower than the 2010 U.S. federal census of 544 individuals in 261 households, and the American Community Survey (ACS) five-year average estimates for 2013–2017 (509 individuals in 202 households) and 2014–2018 (464 individuals in 180 households) (Figure 4-1; Table 4-1). A reason these estimates differ may relate to different criteria used by the agencies to determine full-time residency. The criteria employed in this study required at least six months of occupancy in the community during the study years (2017 and 2018) and self-identification as a full-time resident.

The population of Naknek has increased since 1950 (Figure 4-2). The community experienced growth from a population of 174 in 1950 to 678 in 2000, followed by a steady decline in population that began in 2001 (660 individuals). A study conducted by the ADF&G Division of Subsistence for 2007 estimated 533 residents in Naknek, which was similar to the population (567 individuals) estimated by the Alaska Department of Labor and Workforce Development. Since the 2007 study, the population of Naknek has continued to decline.

In both study years, an estimated 64% of the Naknek population was Alaska Native (Table 4-1). The 2017 study estimated the average age of Naknek residents to be 36 years old, with the youngest individual being less than one year old and the oldest individual being 86 years old. The 2018 study estimated the average age of Naknek residents to be 37 years old with the youngest individual being 1 year old and the oldest individual being 88 years old.

Table 4-1.–Sample and demographic characteristics, Naknek, 2010, 2017, and 2018.

Characteristics	2017	2018
Sampled households	78	80
Eligible households	154	153
Percentage sampled	50.6%	52.3%
Sampled population	209	227
Estimated community population	412.6	434.1
Range[a]	372 – 453	376 – 492
Household size		
Mean	2.7	2.8
Minimum	1.0	1.0
Maximum	9.0	18.0
Age		
Mean	36.0	37.0
Minimum[b]	0	1
Maximum	86	88
Median	36	36
Alaska Native		
Estimated households[c]		
Number	98.7	99.5
Percentage	64.1%	65.0%
Estimated population		
Number	262.6	277.3
Percentage	63.6%	63.9%
Range[a]	217 – 308	214 – 341
U.S. Census	**2010**	
Households	261	
Population	544	
Alaska Native population	283	
ACS 5-year average	**(2013–2017)**	**(2014–2018)**
Households	202	180
Range[d]	178 – 226	155 – 205
Population	509	464
Range[d]	443 – 575	383 – 545
Alaska Native population	263	238
Range[d]	222 – 304	191 – 285

Sources U.S. Census Bureau (n.d.) for 2010 decennial census data, and for American Community Survey (ACS) five-year estimate for 2107 (2013–2017) and 2018 (2014–2018); and ADF&G Division of Subsistence household surveys, 2018 for 2017 estimate, and 2019 for 2018 estimate.

a. Range for estimates represent a 95% confidence interval.

b. A minimum age of 0 (zero) is used for infants who are less than 1 year of age.

c. The estimated number of households in which at least one head of household is Alaska Native.

d. ACS data range is the reported margin of error.

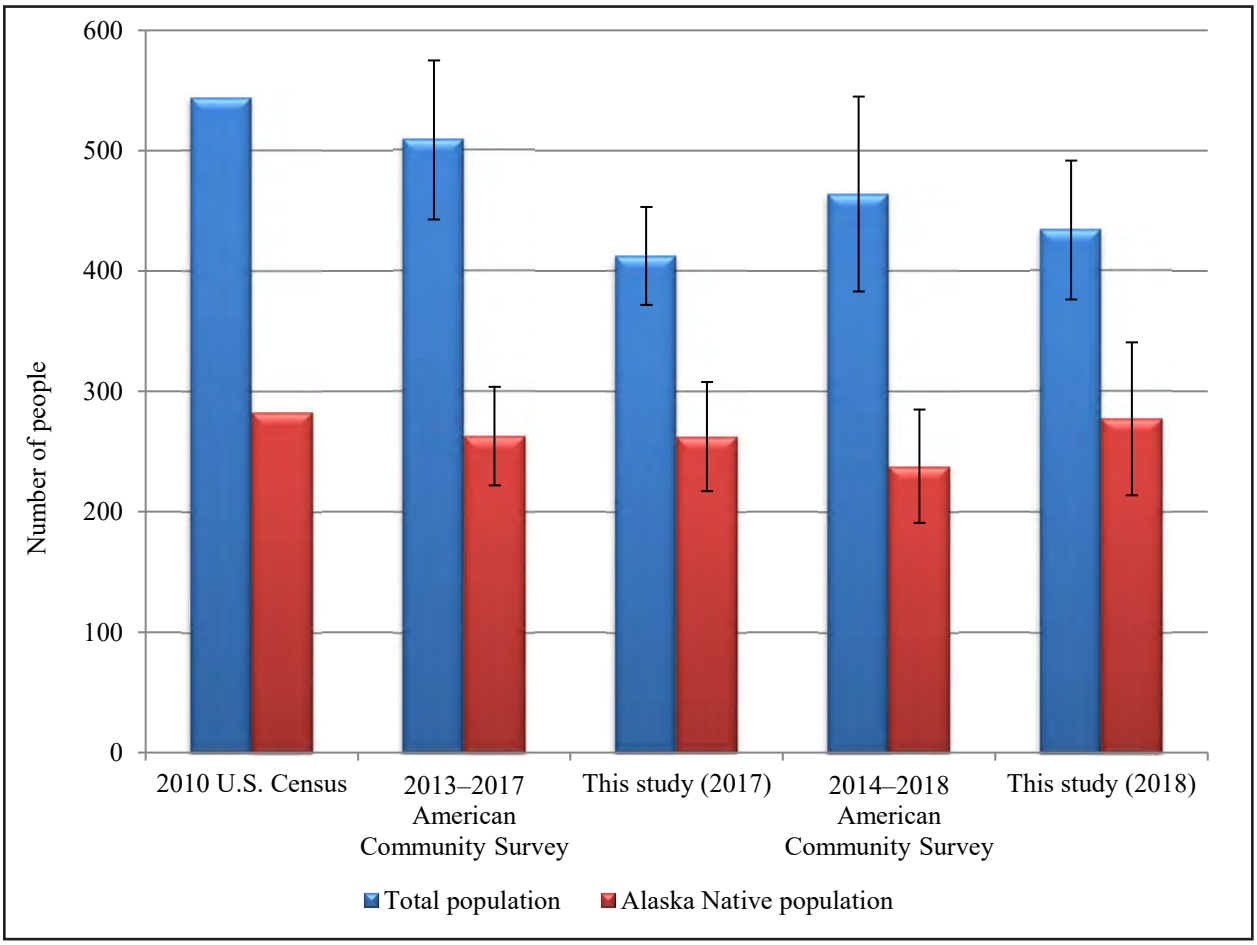


Figure 4-1.–Alaska Native and overall population estimates, Naknek, 2010, 2017, and 2018.

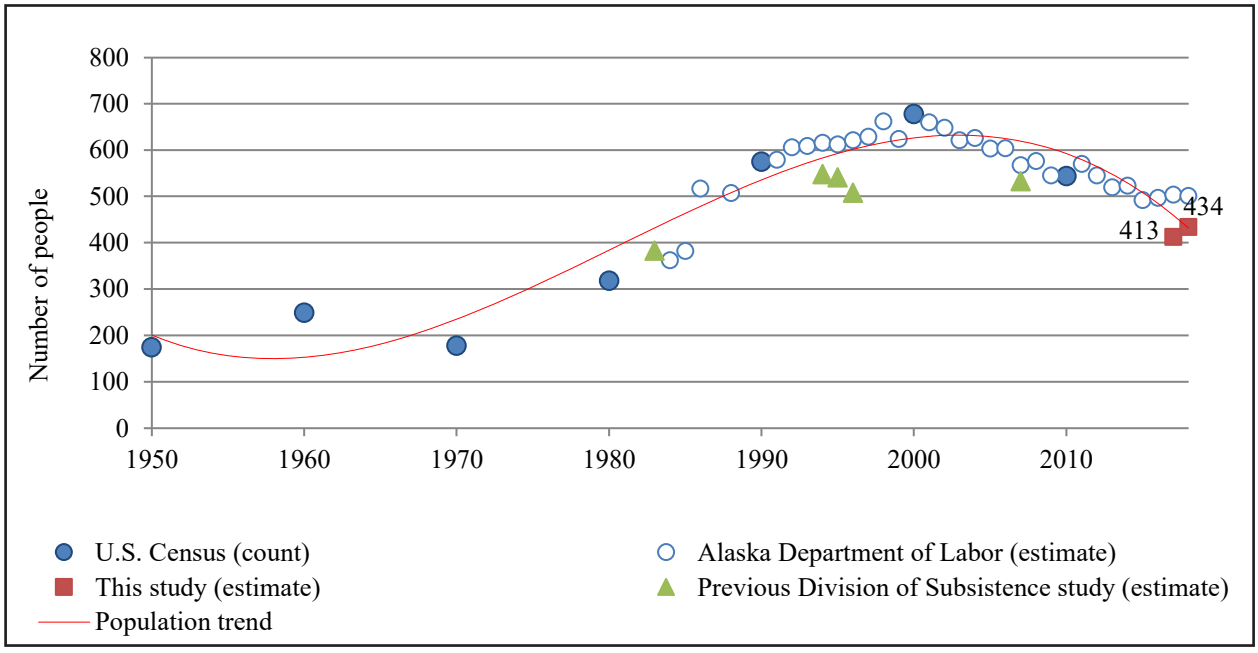


Figure 4-2.–Historical population estimates, Naknek, 1950–2018.

Overall, both the 2017 and 2018 population profiles indicate that the ratio of males versus females was relatively evenly distributed within many age cohorts in Naknek (Figure 4-3; Figure 4-4). Individuals in youth age cohorts made up approximately 30% of the total population in both study years (Table 4-2; Table 4-3). In 2017, the ratio of male-to-female youth between the ages of 0–4 was unevenly distributed (six males and 20 females); however, the remaining youth age cohorts (ages 5–9, 10–14, and 15–19) had a more even distribution between males and females. In 2018, the youth age cohorts were relatively evenly distributed between males and females, with the largest difference occurring for individuals in the 5–9 age cohort (31 males and 17 females). For the 2017 study year, the largest female age cohort was for the ages of 50–54, followed by individuals in the youth age cohorts (ages 0–4, 5–9, 10–14, and 15–19) (Table 4-2; Figure 4-3). The largest male age cohort in 2017 was for the ages of 55–59, followed by the age 30–34 cohort. In 2018, the largest female age cohorts were for the ages of 15–19 and 30–34 (Table 4-3; Figure 4-4). The largest male age cohort in 2018 was for the ages of 5–9, followed by ages 10–14, and 40–44.

For the 2017 survey, an estimated 41% of household heads' parents were living outside of Alaska in other parts of the United States at the time of their birth, while 18% of household heads' parents were living in Naknek at the time of their birth (Table 4-4). In 2017, 27% of Naknek's total population had parents living outside of Alaska in other parts of the country when they were born, but 34% of the overall population had parents living in Naknek at the time of their birth, which indicates a larger proportion of individuals living in Naknek chose to remain in Naknek and establish families in this community between generations (Table 4-5; Table 4-4). For the 2018 study year, the birthplace findings of household heads and the total population were similar to those from 2017, except for slight increases (by less than 10%) in the proportion of each group having parents residing in another U.S. state (Table 4-6; Table 4-7).

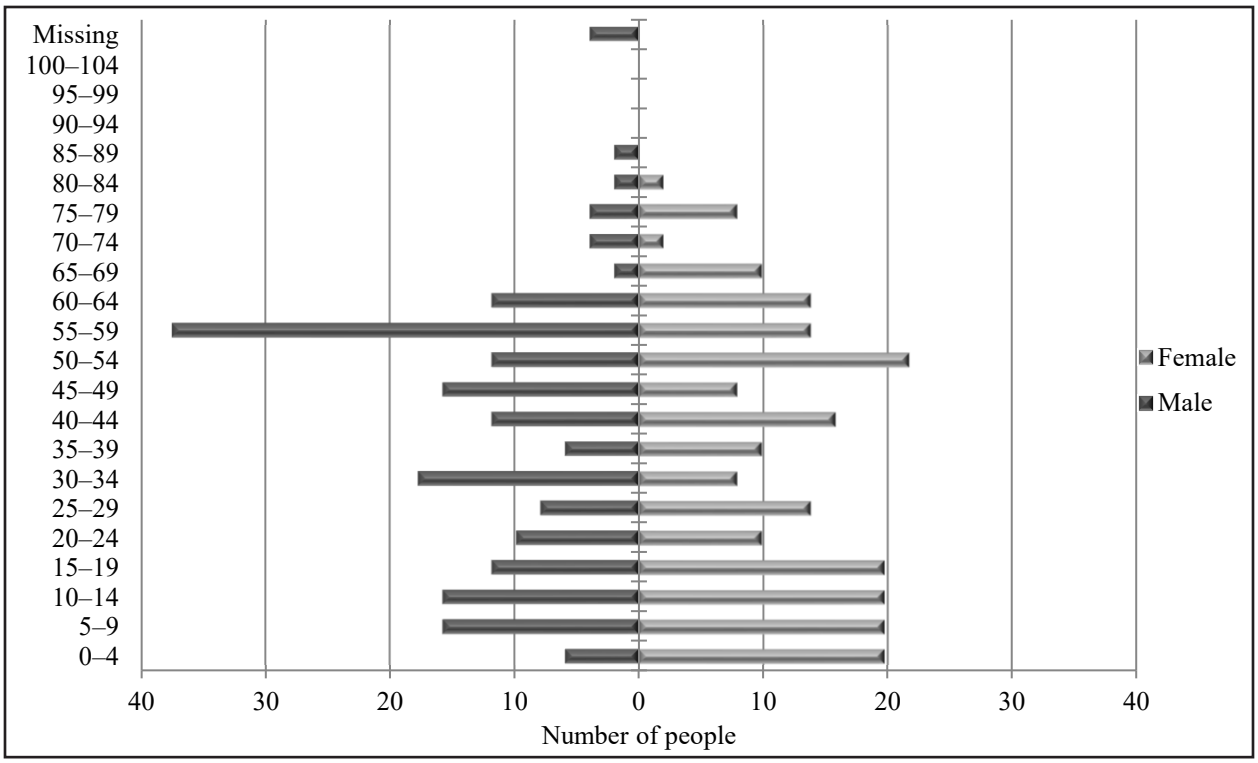


Figure 4-3.–Population profile, Naknek, 2017.

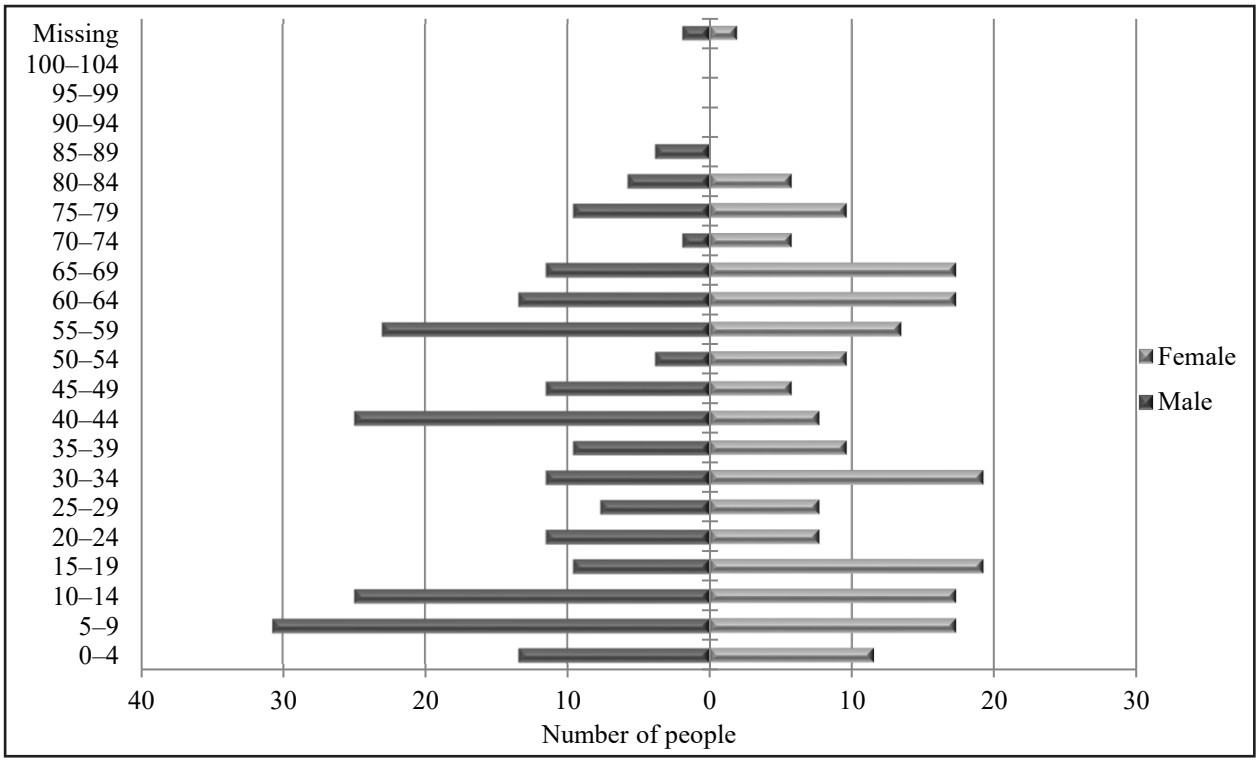


Figure 4-4.–Population profile, Naknek, 2018.

Table 4-2.–Population profile, Naknek, 2017.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	5.9	3.0%	3.0%	19.7	9.2%	9.2%	25.7	6.2%	6.2%
5–9	15.8	8.0%	11.0%	19.7	9.2%	18.3%	35.5	8.6%	14.8%
10–14	15.8	8.0%	19.0%	19.7	9.2%	27.5%	35.5	8.6%	23.4%
15–19	11.8	6.0%	25.0%	19.7	9.2%	36.7%	31.6	7.7%	31.1%
20–24	9.9	5.0%	30.0%	9.9	4.6%	41.3%	19.7	4.8%	35.9%
25–29	7.9	4.0%	34.0%	13.8	6.4%	47.7%	21.7	5.3%	41.1%
30–34	17.8	9.0%	43.0%	7.9	3.7%	51.4%	25.7	6.2%	47.4%
35–39	5.9	3.0%	46.0%	9.9	4.6%	56.0%	15.8	3.8%	51.2%
40–44	11.8	6.0%	52.0%	15.8	7.3%	63.3%	27.6	6.7%	57.9%
45–49	15.8	8.0%	60.0%	7.9	3.7%	67.0%	23.7	5.7%	63.6%
50–54	11.8	6.0%	66.0%	21.7	10.1%	77.1%	33.6	8.1%	71.8%
55–59	37.5	19.0%	85.0%	13.8	6.4%	83.5%	51.3	12.4%	84.2%
60–64	11.8	6.0%	91.0%	13.8	6.4%	89.9%	25.7	6.2%	90.4%
65–69	2.0	1.0%	92.0%	9.9	4.6%	94.5%	11.8	2.9%	93.3%
70–74	3.9	2.0%	94.0%	2.0	0.9%	95.4%	5.9	1.4%	94.7%
75–79	3.9	2.0%	96.0%	7.9	3.7%	99.1%	11.8	2.9%	97.6%
80–84	2.0	1.0%	97.0%	2.0	0.9%	100.0%	3.9	1.0%	98.6%
85–89	2.0	1.0%	98.0%	0.0	0.0%	100.0%	2.0	0.5%	99.0%
90–94	0.0	0.0%	98.0%	0.0	0.0%	100.0%	0.0	0.0%	99.0%
95–99	0.0	0.0%	98.0%	0.0	0.0%	100.0%	0.0	0.0%	99.0%
100–104	0.0	0.0%	98.0%	0.0	0.0%	100.0%	0.0	0.0%	99.0%
Missing	3.9	2.0%	100.0%	0.0	0.0%	100.0%	3.9	1.0%	100.0%
Total	**197.4**	**100.0%**	**100.0%**	**215.2**	**100.0%**	**100.0%**	**412.6**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2018.

Table 4-3.–Population profile, Naknek, 2018.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	13.4	5.8%	5.8%	11.5	5.7%	5.7%	25.0	5.8%	5.8%
5–9	30.7	13.3%	19.2%	17.3	8.5%	14.2%	48.0	11.1%	16.8%
10–14	25.0	10.8%	30.0%	17.3	8.5%	22.6%	42.3	9.7%	26.5%
15–19	9.6	4.2%	34.2%	19.2	9.4%	32.1%	28.8	6.6%	33.2%
20–24	11.5	5.0%	39.2%	7.7	3.8%	35.8%	19.2	4.4%	37.6%
25–29	7.7	3.3%	42.5%	7.7	3.8%	39.6%	15.4	3.5%	41.2%
30–34	11.5	5.0%	47.5%	19.2	9.4%	49.1%	30.7	7.1%	48.2%
35–39	9.6	4.2%	51.7%	9.6	4.7%	53.8%	19.2	4.4%	52.7%
40–44	25.0	10.8%	62.5%	7.7	3.8%	57.5%	32.7	7.5%	60.2%
45–49	11.5	5.0%	67.5%	5.8	2.8%	60.4%	17.3	4.0%	64.2%
50–54	3.8	1.7%	69.2%	9.6	4.7%	65.1%	13.4	3.1%	67.3%
55–59	23.1	10.0%	79.2%	13.4	6.6%	71.7%	36.5	8.4%	75.7%
60–64	13.4	5.8%	85.0%	17.3	8.5%	80.2%	30.7	7.1%	82.7%
65–69	11.5	5.0%	90.0%	17.3	8.5%	88.7%	28.8	6.6%	89.4%
70–74	1.9	0.8%	90.8%	5.8	2.8%	91.5%	7.7	1.8%	91.2%
75–79	9.6	4.2%	95.0%	9.6	4.7%	96.2%	19.2	4.4%	95.6%
80–84	5.8	2.5%	97.5%	5.8	2.8%	99.1%	11.5	2.7%	98.2%
85–89	3.8	1.7%	99.2%	0.0	0.0%	99.1%	3.8	0.9%	99.1%
90–94	0.0	0.0%	99.2%	0.0	0.0%	99.1%	0.0	0.0%	99.1%
95–99	0.0	0.0%	99.2%	0.0	0.0%	99.1%	0.0	0.0%	99.1%
100–104	0.0	0.0%	99.2%	0.0	0.0%	99.1%	0.0	0.0%	99.1%
Missing	1.9	0.8%	100.0%	1.9	0.9%	100.0%	3.8	0.9%	100.0%
Total	**230.5**	**100.0%**	**100.0%**	**203.6**	**100.0%**	**100.0%**	**434.1**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2019.

Table 4-4.–Birthplaces of household heads, Naknek, 2017.

Birthplace	Percentage
Ambler	0.8%
Anchorage	4.7%
Bethel	1.6%
Clarks Point	0.8%
Deadhorse	0.8%
Dillingham	3.9%
Egegik	2.3%
Galena	0.8%
Igiugig	0.8%
Kachemak City	0.8%
Kokhanok	0.8%
Koliganek	0.8%
Levelock	7.8%
Naknek	18.0%
Newhalen	0.8%
Petersburg	0.8%
Pilot Point	1.6%
Point Hope	0.8%
Port Heiden	1.6%
Seward	0.8%
Sitka	0.8%
South Naknek	3.1%
Unalakleet	1.6%
Other U.S.	40.6%
Foreign	2.3%
Missing	0.8%

Source ADF&G Division of Subsistence household surveys, 2018.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 4-5.–Birthplaces of population, Naknek, 2017.

Birthplace	Percentage
Ambler	0.5%
Anchorage	5.7%
Bethel	1.0%
Clarks Point	0.5%
Deadhorse	0.5%
Delta Junction	1.0%
Dillingham	3.3%
Dutch Harbor	0.5%
Egegik	1.4%
Galena	0.5%
Igiugig	0.5%
Kachemak City	0.5%
King Salmon	1.0%
Kokhanok	1.0%
Koliganek	0.5%
Levelock	4.8%
Naknek	33.5%
Newhalen	1.0%
Petersburg	0.5%
Pilot Point	1.0%
Point Hope	0.5%
Port Heiden	1.0%
Seward	0.5%
Sitka	0.5%
South Naknek	3.3%
Unalakleet	1.0%
Wasilla	0.5%
Other U.S.	27.3%
Foreign	1.4%
Missing	5.3%

Source ADF&G Division of Subsistence household surveys, 2018.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 4-6.–Birthplaces of household heads, Naknek, 2018.

Birthplace	Percentage
Anchorage	2.3%
Bethel	0.8%
Clarks Point	0.8%
Dillingham	3.8%
Egegik	3.1%
Galena	0.8%
Ketchikan	0.8%
Kokhanok	0.8%
Levelock	6.9%
Naknek	15.3%
Newhalen	0.8%
Palmer	0.8%
Pilot Point	0.8%
Port Heiden	1.5%
South Naknek	4.6%
Saint Paul	0.8%
Unalakleet	1.5%
Lake Clark	0.8%
Old Iliamna	0.8%
Other U.S.	47.3%
Foreign	3.1%
Missing	2.3%

Source ADF&G Division of Subsistence household surveys, 2019.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 4-7.–Birthplaces of population, Naknek, 2018.

Birthplace	Percentage
Anchorage	3.1%
Bethel	0.4%
Clarks Point	0.9%
Dillingham	3.1%
Egegik	2.6%
Galena	0.4%
Ketchikan	0.9%
King Salmon	0.4%
Kodiak City	0.4%
Kokhanok	0.4%
Levelock	4.4%
Naknek	37.9%
Newhalen	0.4%
Palmer	0.4%
Pilot Point	0.4%
Port Heiden	0.9%
South Naknek	2.6%
Saint Paul	0.9%
Unalakleet	0.9%
Lake Clark	0.4%
Old Iliamna	0.4%
Other U.S.	32.2%
Foreign	2.2%
Missing	3.1%

Source ADF&G Division of Subsistence household surveys, 2019.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Summary of Harvest and Use Patterns

All five species of Pacific salmon found in Alaska enter the Naknek River on the way to freshwater spawning grounds. In this chapter, harvest survey results for Naknek (2017 and 2018) are first presented, which include harvest estimates, identifying the gear types used to harvest salmon, and fishing locations.

Following an overview of survey results is a discussion of subsistence permit participation in Naknek. Next, the results of the salmon use assessment questions from the household surveys are presented. Assessment questions attempt to gauge to what degree salmon harvest and use patterns by the community have changed over time. Finally, the 2017 and 2018 salmon harvest data are compared to harvest survey results from previous study years 2007 and 1983, and also compared to the subsistence salmon harvest permit data for 1983–2018. Results from those previous study years are published by the Division of Subsistence in Holen et al. (2011), Morris (1982; 1985), and also the CSIS; permit-based harvest estimates are published by the Division of Subsistence in an annual report, which was last published by Fall et al. (2020). Following presentation of these data, local community comments and concerns are presented. Information for the final section of this chapter came from the harvest surveys and is contextualized with qualitative information obtained from key respondent interviews and participant observation.

Household Salmon Harvest and Use Characteristics in Naknek: 2017

In 2017, Naknek residents harvested an estimated total of 56,927 lb, or 138 lb per capita, of salmon (Table 4-8). In terms of total pounds harvested and harvest proportions by percentage of harvest weight by salmon resource, the greatest harvest was sockeye salmon (39,233 lb, 95 lb per capita, or 69% of the total salmon harvest), which was followed by Chinook salmon (7,977 lb, 19 lb per capita, or 14%), coho salmon (6,212 lb, 15 lb per capita, or 11%), spawning sockeye salmon (2,720 lb, 7 lb per capita, 5%), and small harvests that each totaled less than 1 lb per capita (less than 1% of harvest) of chum salmon (576 lb) and pink salmon (210 lb) (Table 4-8; Figure 4-5).

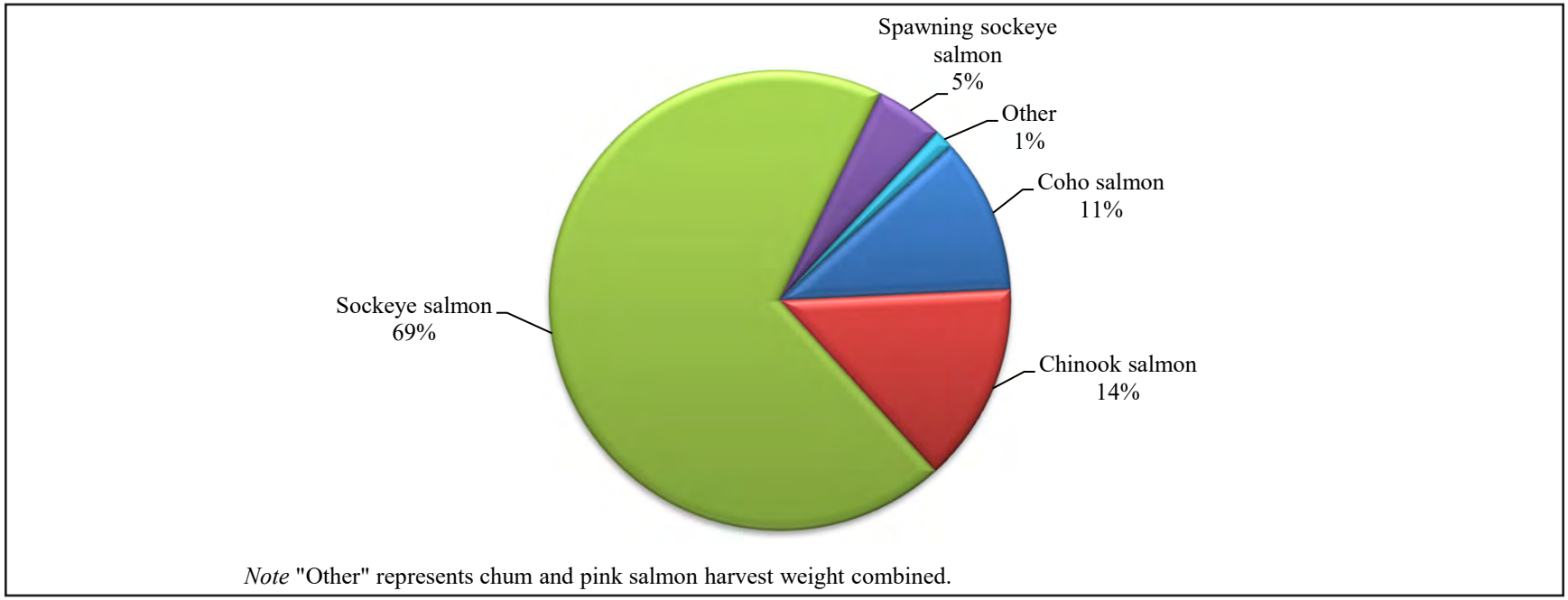
In study year 2017, an estimated 68% of Naknek households owned a gillnet to harvest salmon and 55% of households owned a boat (Table 1-7). Overall, an estimated 39% of households in Naknek owned a boat that was used for commercial fishing. In 2017, there were 68 households that indicated a person either held a commercial fishery permit or a person who participated as a commercial fishing crew member resided at the residence: 35 households had permit holders and 33 households had crew members in residence (Table 1-8). Based on responses from surveyed households that retained salmon from commercial catches in 2017, an estimated 51 households usually retain salmon from commercial fishing for home use, and an overall estimated 43 households that retain salmon from commercial fishing for home use also participate in subsistence salmon fishing (Table 1-9).

Table 4-9 lists in number of fish and pounds each salmon resource harvested by Naknek residents in 2017; Figure 4-6 is a complementary visual representation of the salmon harvest weight caught by gear type. Naknek residents harvested the majority of their salmon by subsistence gillnets (81% of salmon harvest weight); the other methods used to harvest salmon were removals from commercial catches (17%), and rod and reel (2%) (Table 4-10). Most (88%) of the sockeye salmon harvest was caught using subsistence gillnets, approximately 12% was removed from commercial catches, and less than 1% was harvested using rod and reel. Likewise, most spawning sockeye salmon were caught by subsistence gillnets: 626 out of 685 fish, or 91% (Table 4-9; Table 4-10). For Chinook salmon, almost one-half (49%) of the harvest weight came from commercial removals, almost one-half (49%) was caught by subsistence gillnets, and the remaining 2% was harvested using rod and reel. For coho salmon, nearly three-quarters (74%) of the harvested fish were caught by subsistence gillnets; another 15% was removed from commercial harvests, and the remining 12% was caught by rod and reel. All chum salmon harvests were caught using subsistence gillnets. For pink salmon, 87% of the catch weight was harvested using subsistence gillnets, and the other 13% of the pink salmon harvest was caught using rod and reel.

Table 4-8.–Estimated use and harvest of salmon, Naknek, 2017.

	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	**87.2**	**73.1**	**70.5**	**53.8**	**50.0**	**56,927.3**	**369.7**	**138.0**	**13,032.7**	**ind**	**84.6**	**24.5**
Chum salmon	15.4	14.1	12.8	3.8	2.6	575.9	3.7	1.4	122.4	ind	0.8	59.0
Coho salmon	41.0	34.6	34.6	10.3	17.9	6,212.2	40.3	15.1	1,303.1	ind	8.5	39.4
Chinook salmon	71.8	61.5	56.4	30.8	26.9	7,976.5	51.8	19.3	961.5	ind	6.2	23.1
Pink salmon	12.8	11.5	11.5	2.6	0.0	210.4	1.4	0.5	77.0	ind	0.5	58.4
Sockeye salmon	78.2	59.0	56.4	37.2	35.9	39,232.9	254.8	95.1	9,883.6	ind	64.2	27.7
Spawning sockeye salmon	16.7	11.5	11.5	5.1	5.1	2,719.5	17.7	6.6	685.1	ind	4.4	62.5
Unknown salmon	5.1	0.0	0.0	5.1	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2018.



Note "Other" represents chum and pink salmon harvest weight combined.

Figure 4-5.–Composition of salmon harvest in pounds usable weight, Naknek, 2017.

Table 4-9.–Estimated harvest of salmon by gear type and resource, Naknek, 2017.

	Removed from commercial catch		Subsistence methods									
			Gillnet[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**1,816.4**	**9,402.9**	**10,926.1**	**46,170.9**	**0.0**	**0.0**	**10,926.1**	**46,170.9**	**290.2**	**1,353.5**	**13,032.7**	**56,927.3**
Chum salmon	0.0	0.0	122.4	575.9	0.0	0.0	122.4	575.9	0.0	0.0	122.4	575.9
Coho salmon	189.5	903.6	963.5	4,593.3	0.0	0.0	963.5	4,593.3	150.1	715.3	1,303.1	6,212.2
Chinook salmon	471.9	3,914.5	467.9	3,881.8	0.0	0.0	467.9	3,881.8	21.7	180.2	961.5	7,976.5
Pink salmon	0.0	0.0	67.1	183.4	0.0	0.0	67.1	183.4	9.9	27.0	77.0	210.4
Sockeye salmon	1,155.0	4,584.7	8,679.3	34,452.2	0.0	0.0	8,679.3	34,452.2	49.4	195.9	9,883.6	39,232.9
Spawning sockeye salmon	0.0	0.0	625.9	2,484.4	0.0	0.0	625.9	2,484.4	59.2	235.1	685.1	2,719.5
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

Source ADF&G Division of Subsistence household surveys, 2018.
a. Gillnet harvests may include both set and drift gillnet.

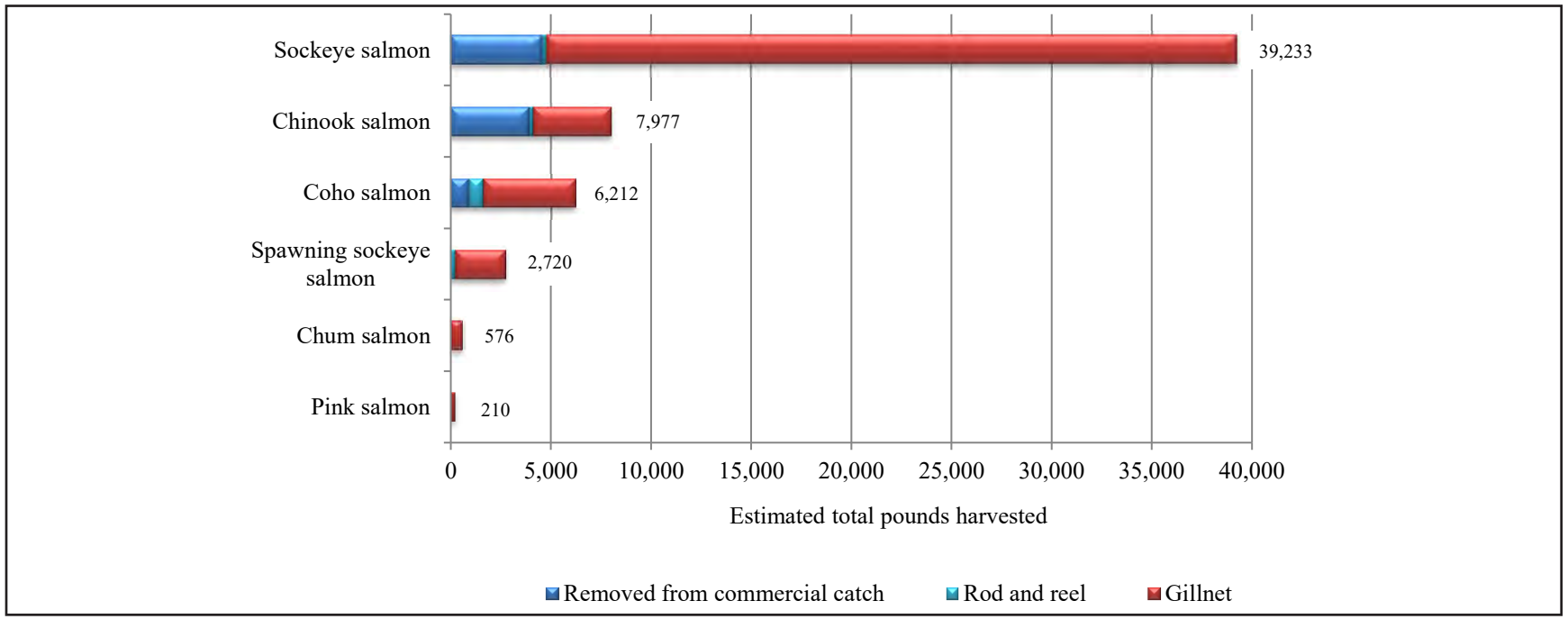


Figure 4-6.–Estimated harvest of salmon in pounds usable weight by gear type and resource, Naknek, 2017.

Table 4-10.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Naknek, 2017.

Resource	Percentage base	Removed from commercial catch		Subsistence methods						Rod and reel		Any method	
				Gillnet[a]		Dip net		Subsistence gear, any method					
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**Gear type**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**13.9%**	**16.5%**	**83.8%**	**81.0%**	**0.0%**	**0.0%**	**83.8%**	**81.1%**	**2.2%**	**2.4%**	**100.0%**	**100.0%**
	Total	**13.9%**	**16.5%**	**83.8%**	**81.0%**	**0.0%**	**0.0%**	**83.8%**	**81.1%**	**2.2%**	**2.4%**	**100.0%**	**100.0%**
Chum salmon	Gear type	0.0%	0.0%	1.1%	1.2%	0.0%	0.0%	1.1%	1.2%	0.0%	0.0%	0.9%	1.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.9%	1.0%	0.0%	0.0%	0.9%	1.0%	0.0%	0.0%	0.9%	1.0%
Coho salmon	Gear type	10.4%	9.6%	8.8%	10.0%	0.0%	0.0%	8.8%	9.9%	51.7%	52.9%	10.0%	10.9%
	Resource	14.5%	14.5%	73.9%	73.9%	0.0%	0.0%	73.9%	73.9%	11.5%	11.5%	100.0%	100.0%
	Total	1.5%	1.6%	7.4%	8.1%	0.0%	0.0%	7.4%	8.1%	1.2%	1.3%	10.0%	10.9%
Chinook salmon	Gear type	26.0%	41.6%	4.2%	8.2%	0.0%	0.0%	4.3%	8.4%	7.5%	13.3%	7.4%	14.0%
	Resource	49.1%	49.1%	47.6%	47.6%	0.0%	0.0%	48.7%	48.7%	2.3%	2.3%	100.0%	100.0%
	Total	3.6%	6.9%	3.5%	6.7%	0.0%	0.0%	3.6%	6.8%	0.2%	0.3%	7.4%	14.0%
Pink salmon	Gear type	0.0%	0.0%	0.6%	0.4%	0.0%	0.0%	0.6%	0.4%	3.4%	2.0%	0.6%	0.4%
	Resource	0.0%	0.0%	87.2%	87.2%	0.0%	0.0%	87.2%	87.2%	12.8%	12.8%	100.0%	100.0%
	Total	0.0%	0.0%	0.5%	0.3%	0.0%	0.0%	0.5%	0.3%	0.1%	0.0%	0.6%	0.4%
Sockeye salmon	Gear type	63.6%	48.8%	79.5%	74.8%	0.0%	0.0%	79.4%	74.6%	17.0%	14.5%	75.8%	68.9%
	Resource	11.7%	11.7%	87.8%	87.8%	0.0%	0.0%	87.8%	87.8%	0.5%	0.5%	100.0%	100.0%
	Total	8.9%	8.1%	66.6%	60.5%	0.0%	0.0%	66.6%	60.5%	0.4%	0.3%	75.8%	68.9%
Spawning sockeye salmon	Gear type	0.0%	0.0%	5.7%	5.4%	0.0%	0.0%	5.7%	5.4%	20.4%	17.4%	5.3%	4.8%
	Resource	0.0%	0.0%	91.4%	91.4%	0.0%	0.0%	91.4%	91.4%	8.6%	8.6%	100.0%	100.0%
	Total	0.0%	0.0%	4.8%	4.4%	0.0%	0.0%	4.8%	4.4%	0.5%	0.4%	5.3%	4.8%
Unknown salmon	Gear type	0.0%	0.0%	0.0%	0.0%	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%	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%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Gillnet harvests may include both set and drift gillnet.

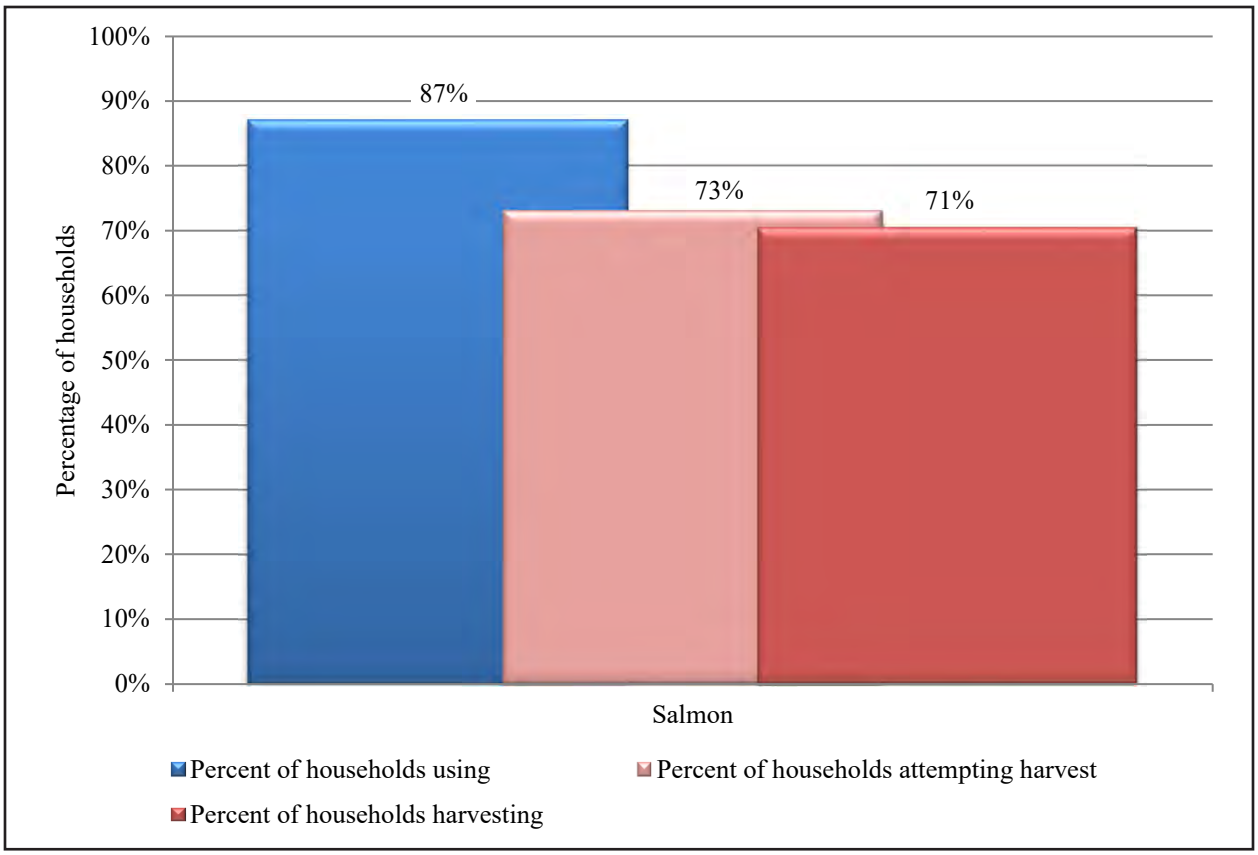


Figure 4-7.–Percentages of household using, attempting to harvest, or harvesting salmon, Naknek, 2017.

Figure 4-7 shows the percentages of households that used, attempted to harvest, and harvested salmon. During 2017, 87% of Naknek households used salmon, 73% attempted to harvest salmon, and 71% of community households were successful in their salmon harvest pursuits. At least one-half of the Naknek households shared salmon in 2017: 50% of households gave salmon away, and 54% of households received salmon during the study year (Table 4-8). Sockeye salmon was the most used salmon species in 2017. The majority (78%) of Naknek households used sockeye salmon during the study year, 59% of households attempted to harvest sockeye salmon, 56% successfully harvested this salmon species, 36% gave away this salmon species, and 37% of households received sockeye salmon. For Chinook salmon, household participation rates were very similar to those for sockeye salmon: 72% of Naknek households used Chinook salmon during the study year, 56% of households harvested this species, 27% gave away this salmon species, and 31% of households received Chinook salmon. In 2017, a little less than one-half (41%) of Naknek households used coho salmon, 35% harvested this salmon species, 18% gave away coho salmon, and 10% of households received this salmon species. A smaller percentage of households in Naknek used and harvested spawning sockeye salmon (17% used and 12% harvested), chum salmon (15% used and 13% harvested), and pink salmon (13% used and 12% harvested) during the study year.

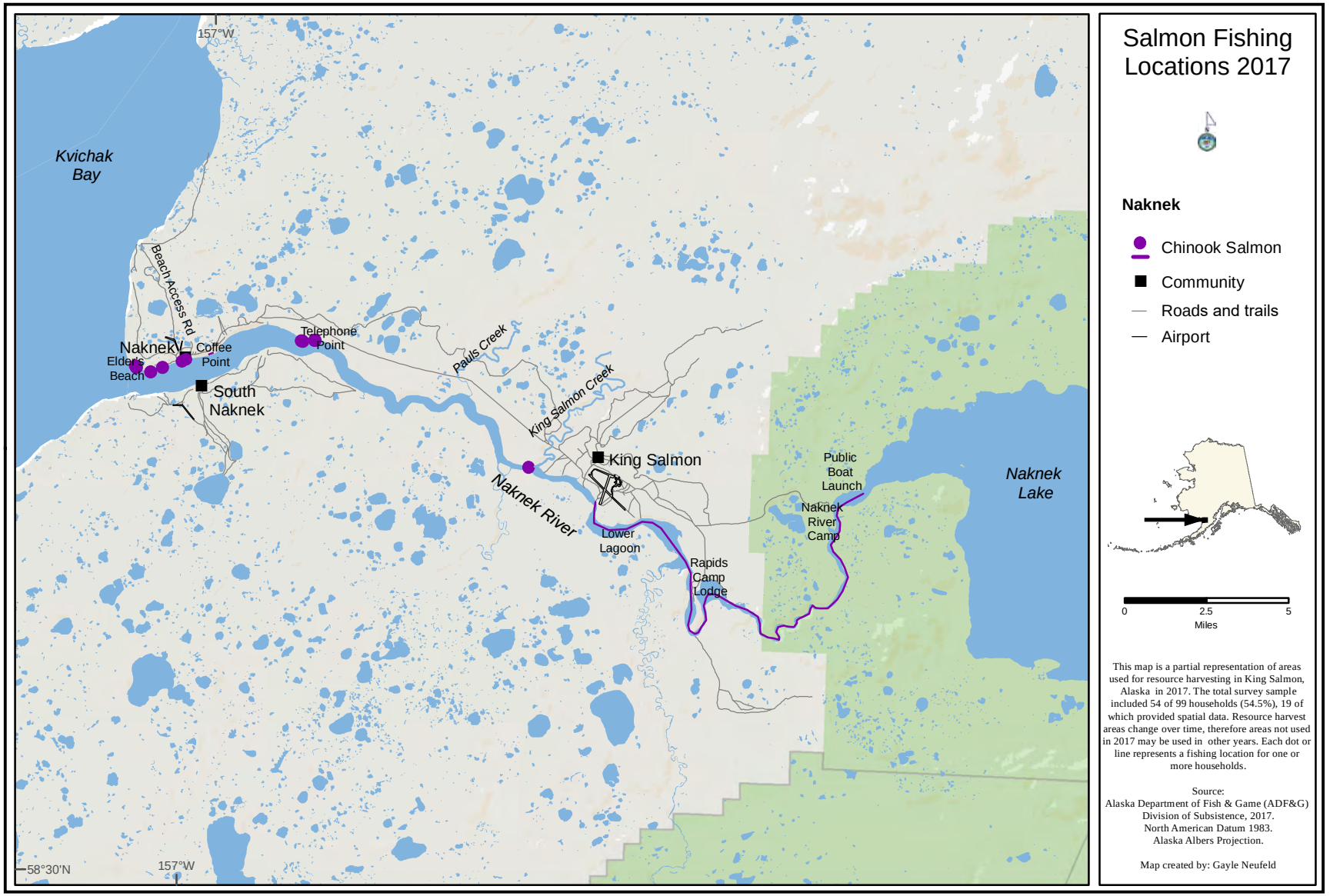


Figure 4-8.–Fishing and harvest locations of Chinook salmon, Naknek, 2017.

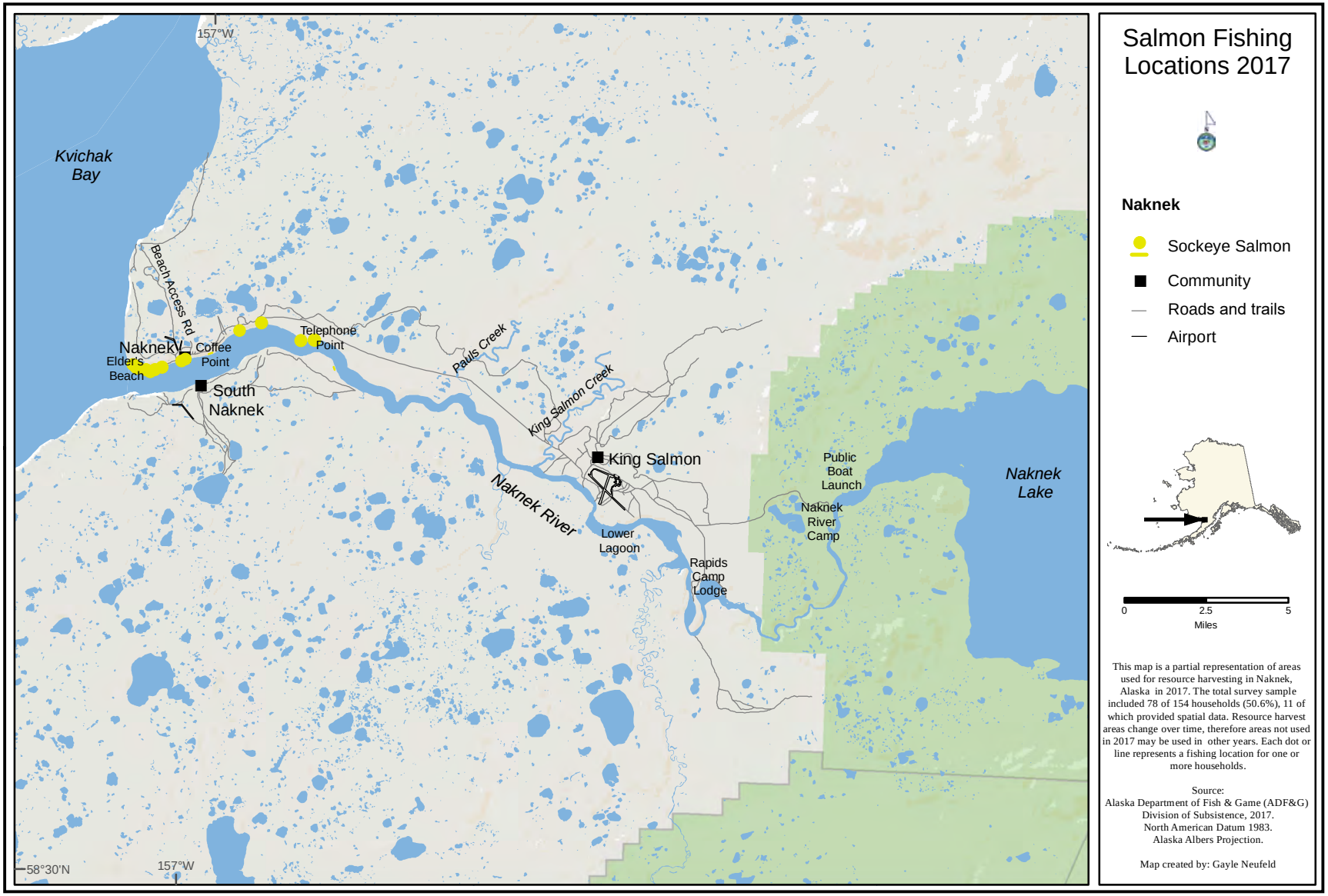


Figure 4-9.–Fishing and harvest locations of sockeye salmon, Naknek, 2017.

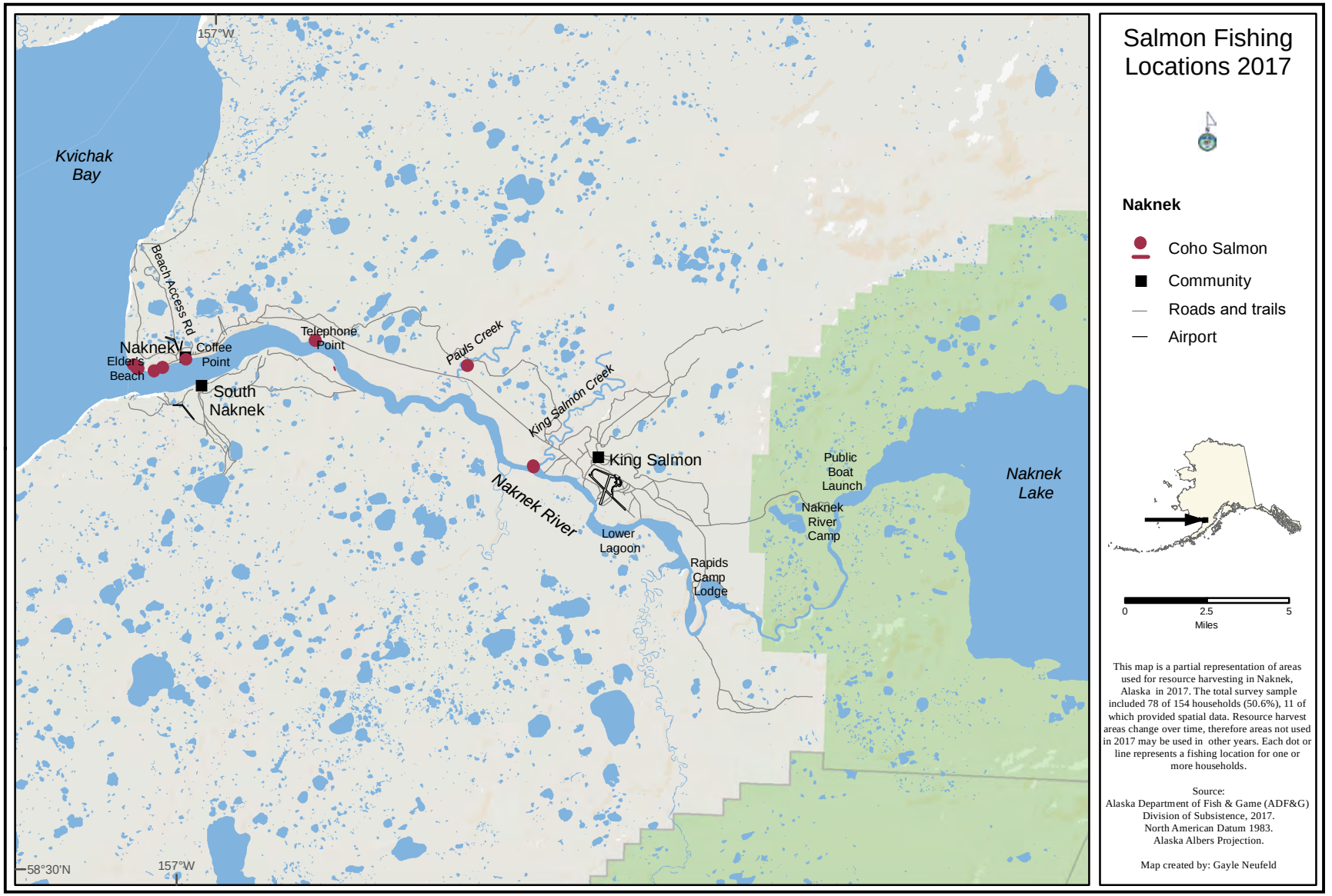


Figure 4-10.–Fishing and harvest locations of coho salmon, Naknek, 2017.

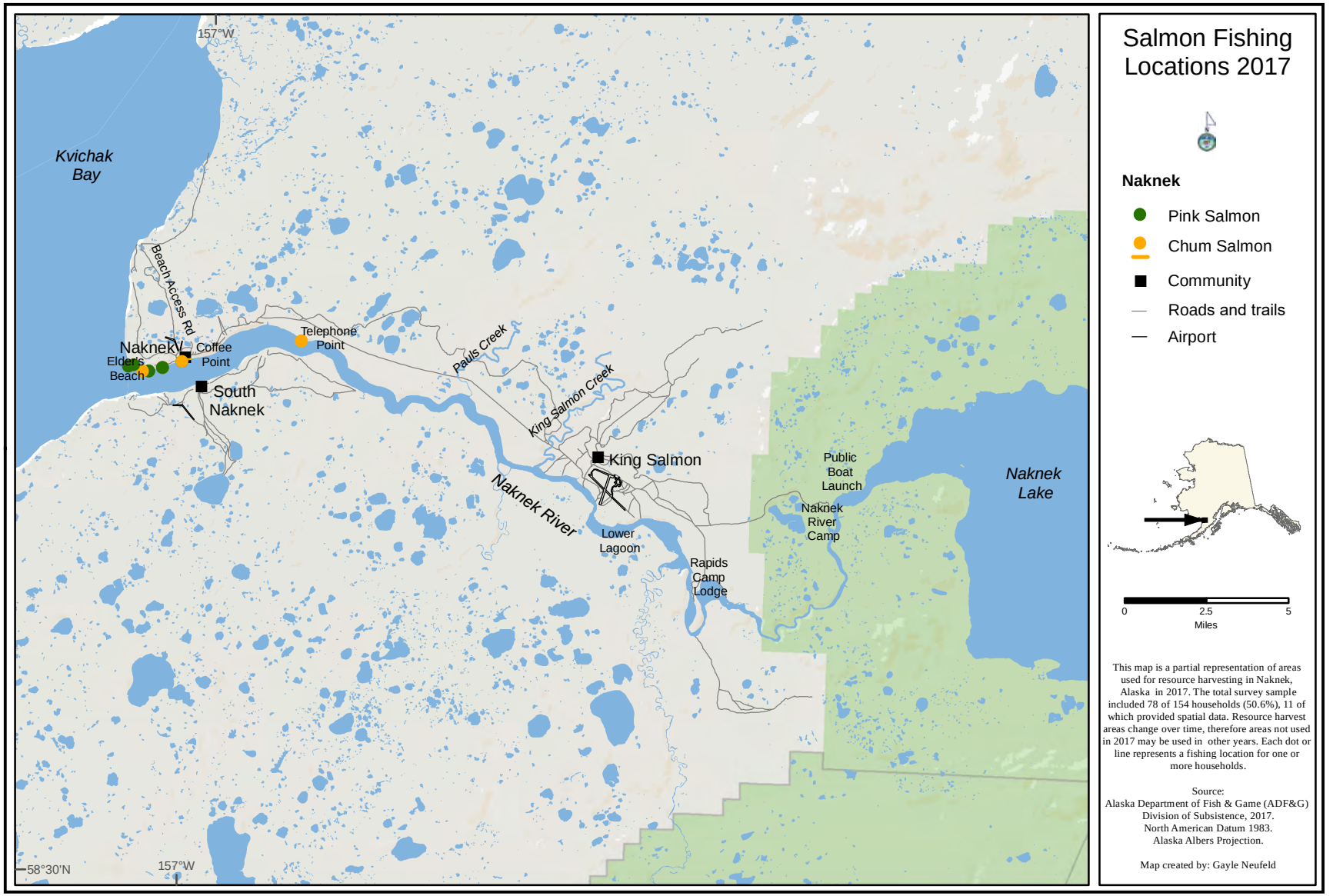


Figure 4-11.–Fishing and harvest locations of pink and chum salmon, Naknek, 2017.

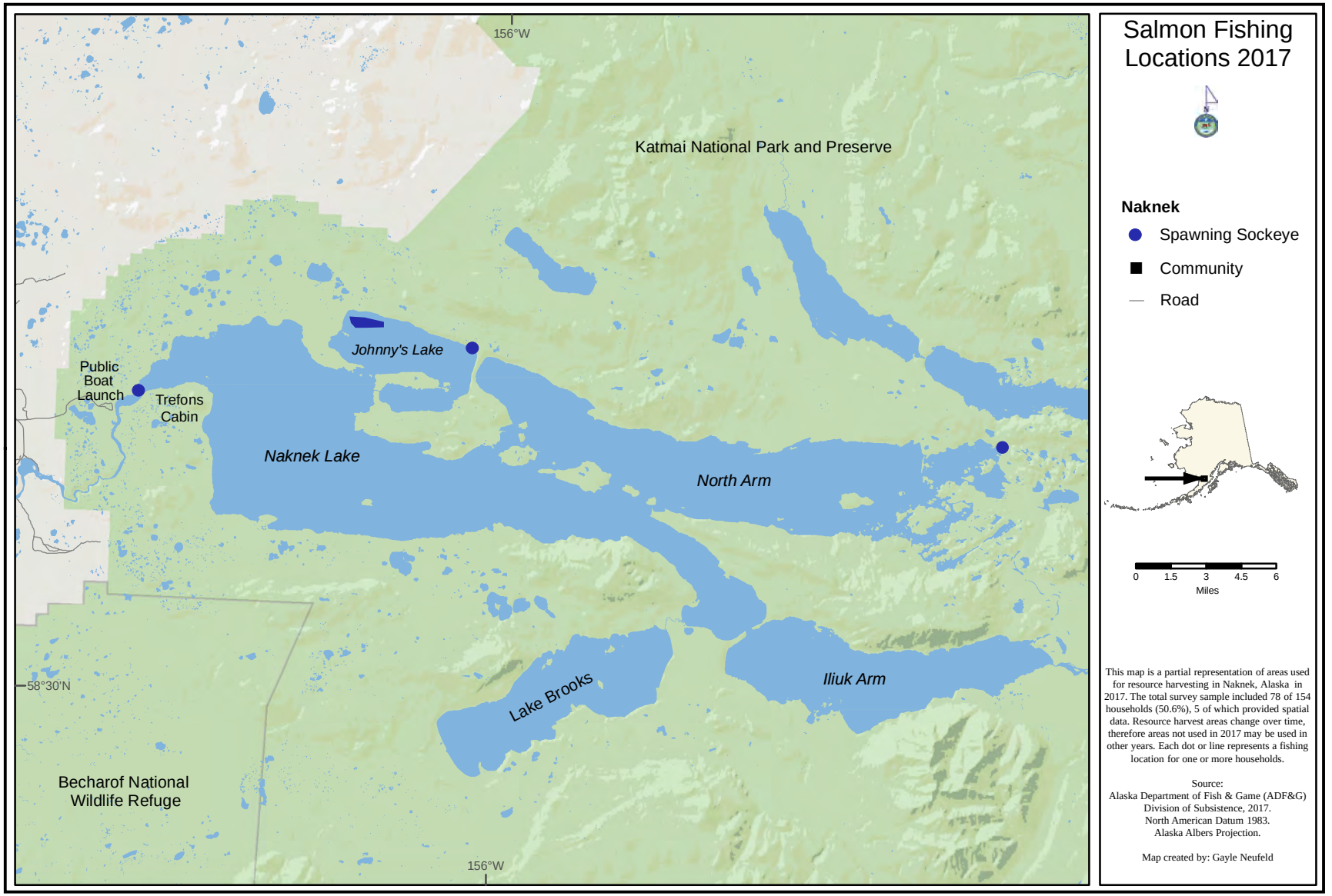


Figure 4-12.–Fishing and harvest locations of spawning sockeye salmon, Naknek, 2017.

In 2017, starting from the west and moving toward the east, Naknek respondents reported harvesting Chinook salmon near the mouth of the Naknek River at Elder's Beach, Coffee Point, and Telephone Point (Figure 4-8). Naknek community members also reported harvesting Chinook salmon near the mouth of King Salmon Creek and within the Naknek River from where the King Salmon airport is located upriver to the mouth of Naknek Lake. During the first study year, sockeye salmon were harvested near the mouth of the Naknek River at Elder's Beach, Coffee Point, and Telephone Point (Figure 4-9). In 2017, coho salmon were harvested near Elder's Beach, Coffee Point, and Telephone Point (Figure 4-10). Coho salmon were also harvested in Paul's Creek and the mouth of King Salmon Creek. The other salmon species (chum and pink salmon) were harvested at Elder's Beach, and at Telephone Point only chum salmon were harvested (Figure 4-11). In 2017, spawning sockeye salmon were harvested in Naknek Lake near the public boat launch, in Johnny's Lake, and in the northeastern corner of North Arm Naknek Lake (Figure 4-12).

Household Salmon Harvest and Use Characteristics in Naknek: 2018

In 2018, Naknek residents harvested an estimated total of 47,062 lb, or 108 lb per capita, of salmon (Table 4-11). In terms of total pounds harvested and harvest proportion by percentage of harvest weight by salmon resource, the greatest harvest was sockeye salmon (37,082 lb, 85 lb per capita, or 79% of the total salmon harvest), which was followed by Chinook salmon (5,163 lb, 12 lb per capita, or 11%), coho salmon (3,340 lb, 8 lb per capita, or 7%), spawning sockeye salmon (1,049 lb, 2 lb per capita, or 2%), and chum salmon (304 lb) and pink salmon (125 lb) each composed less than 1% of the total harvest and contributed less than 1 lb per capita (Table 4-11; Figure 4-13).

In 2018, an estimated 48% of Naknek households owned a gillnet to harvest salmon and 53% of households owned a boat (Table 1-7). Overall, an estimated 31% of households in Naknek owned a boat that was used for commercial fishing. For 2018, there were 72 households that indicated a person from the residence either held a commercial fishery permit or participated as a commercial fishing crew member: 25 households had permit holders residing at the household and 47 households had crew members in residence (Table 1-8). Based on responses from surveyed households that retained salmon from commercial catches in 2018, an estimated 50 households usually retain salmon from commercial fishing for home use, and an overall estimated 36 households that retain salmon from commercial fishing for home use also participate in subsistence salmon fishing (Table 1-9).

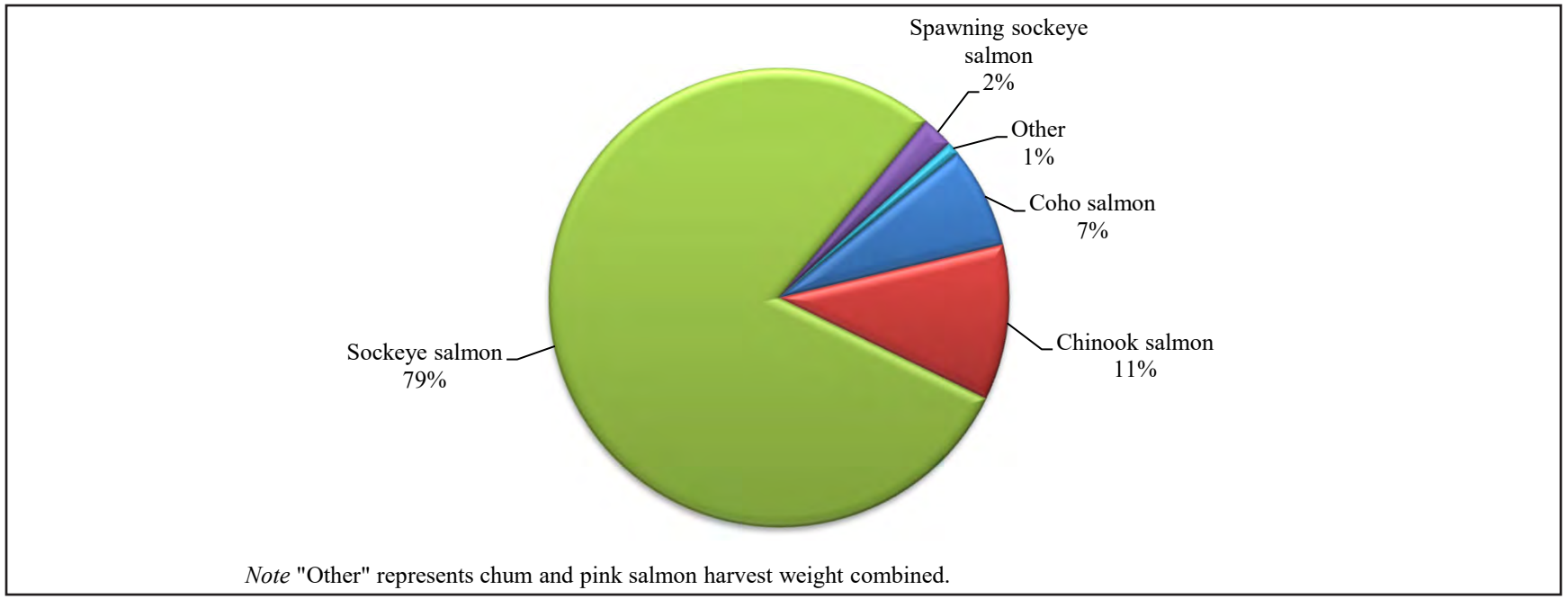
Table 4-12 lists in number of fish and pounds each salmon resource harvested by Naknek residents in 2018; Figure 4-14 is a complementary visual representation of the salmon harvest weight caught by gear type. Naknek residents harvested the majority of their salmon by subsistence nets (85% of salmon harvest weight); the other methods used to harvest salmon were removals from commercial catches (14%), and rod and reel (2%) (Table 4-13). Almost all (94%) of the sockeye salmon harvest was caught using subsistence nets and the remaining 6% was removed from commercial catches. For Chinook salmon, 62% of the harvest weight was removed from commercial catches, 36% was caught using subsistence nets, and 2% was harvested using rod and reel. Slightly less than one-half (48%) of the coho salmon harvest weight was caught using subsistence nets, 35% was removed from commercial catches, and 17% caught using rod and reel. Coho salmon composed 84% of the total number of salmon caught by rod and reel: 117 out of 140 fish (Table 4-13; Table 4-12). All chum salmon and pink salmon were caught using subsistence nets.

Figure 4-15 shows the percentages of households that used salmon, attempted to harvest, and harvested salmon. During 2018, an estimated 90% of Naknek households used salmon, and 60% attempted to harvest salmon and all were successful in their salmon harvest pursuits. Less than one-half (45%) of the Naknek households shared salmon in 2018, but 56% of households received salmon during the study year (Table 4-11). Sockeye salmon was the most used and shared salmon species in 2018. The majority (83%) of Naknek households used sockeye salmon during the study year, 53% of households harvested this salmon species, 40% shared this salmon species, and 48% of households received sockeye salmon. For Chinook salmon, a little more than one-half (55%) of Naknek households used this salmon species during the 2018 study year, 41% of households harvested Chinook salmon, 20% shared this salmon species, and 24% received Chinook salmon. For coho salmon, 28% of Naknek households used, 23% harvested, 10% shared, and 8% received this species. A smaller percentage of households in Naknek used and harvested spawning sockeye

Table 4-11.–Estimated use and harvest of salmon, Naknek, 2018.

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Salmon	**90.0**	**60.0**	**60.0**	**56.3**	**45.0**	**47,062.3**	**307.6**	**108.4**	**11,494.4**	**ind**	**75.1**	**25.3**
Chum salmon	8.8	8.8	8.8	1.3	1.3	303.5	2.0	0.7	65.0	ind	0.4	88.0
Coho salmon	27.5	23.8	22.5	7.5	10.0	3,339.9	21.8	7.7	684.7	ind	4.5	49.0
Chinook salmon	55.0	41.3	41.3	23.8	20.0	5,163.4	33.7	11.9	682.8	ind	4.5	43.9
Pink salmon	6.3	6.3	6.3	1.3	1.3	124.6	0.8	0.3	47.8	ind	0.3	89.1
Sockeye salmon	82.5	52.5	52.5	47.5	40.0	37,082.2	242.4	85.4	9,738.7	ind	63.7	26.7
Spawning sockeye salmon	10.0	6.3	6.3	5.0	2.5	1,048.6	6.9	2.4	275.4	ind	1.8	85.3
Unknown salmon	1.3	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2019.



Note "Other" represents chum and pink salmon harvest weight combined.

Figure 4-13.–Composition of salmon harvest in pounds usable weight, Naknek, 2018.

Table 4-12.–Estimated harvest of salmon by gear type and resource, Naknek, 2018.

	Removed from commercial catch		Subsistence methods									
			Subsistence net[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**1,233.8**	**6,540.9**	**10,121.0**	**39,821.8**	**0.0**	**0.0**	**10,121.0**	**39,821.8**	**139.6**	**699.6**	**11,494.4**	**47,062.3**
Chum salmon	0.0	0.0	65.0	303.5	0.0	0.0	65.0	303.5	0.0	0.0	65.0	303.5
Coho salmon	239.1	1,166.2	329.0	1,604.7	0.0	0.0	329.0	1,604.7	116.7	569.1	684.7	3,339.9
Chinook salmon	422.7	3,196.4	248.6	1,880.2	0.0	0.0	248.6	1,880.2	11.5	86.8	682.8	5,163.4
Pink salmon	0.0	0.0	47.8	124.6	0.0	0.0	47.8	124.6	0.0	0.0	47.8	124.6
Sockeye salmon	572.1	2,178.4	9,166.6	34,903.9	0.0	0.0	9,166.6	34,903.9	0.0	0.0	9,738.7	37,082.2
Spawning sockeye salmon	0.0	0.0	263.9	1,005.0	0.0	0.0	263.9	1,005.0	11.5	43.7	275.4	1,048.6
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

Source ADF&G Division of Subsistence household surveys, 2019.

a. Subsistence net harvests may include set gillnet, drift gillnet, and seine.

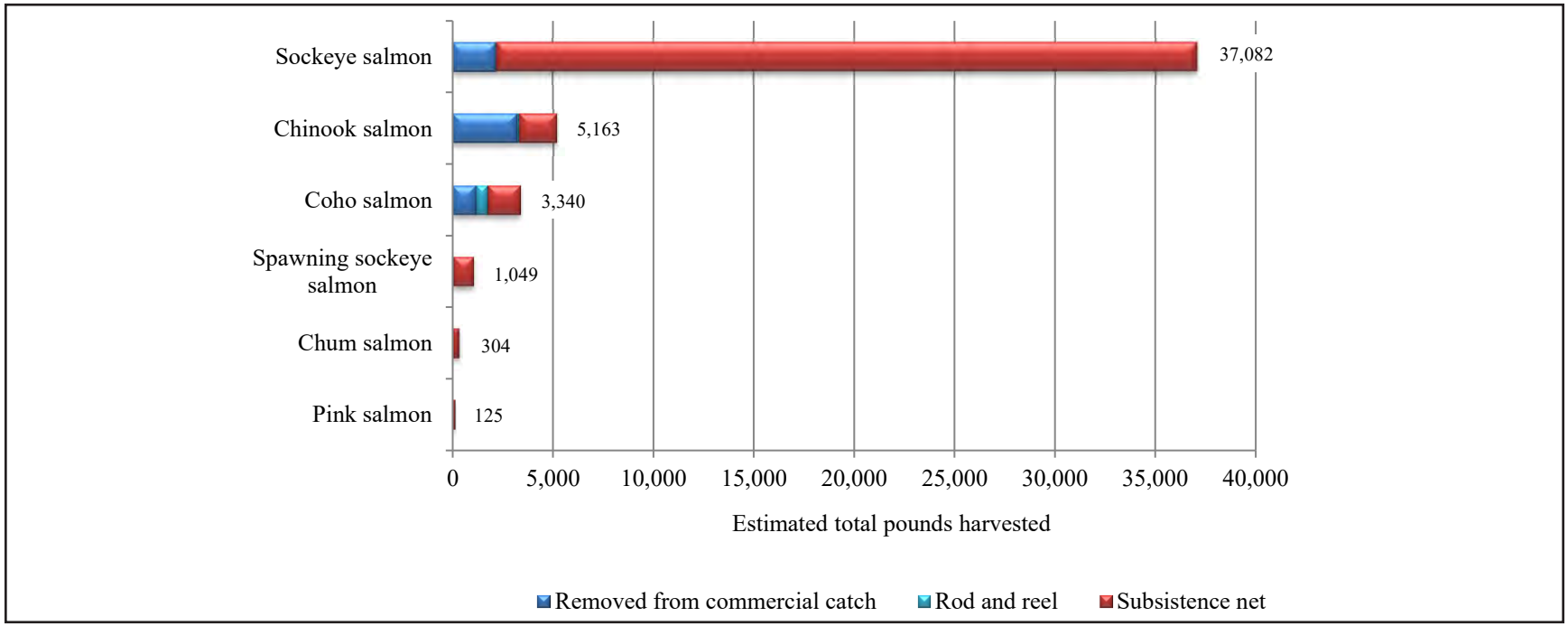


Figure 4-14.–Estimated harvest of salmon in pounds usable weight by gear type and resource, Naknek, 2018.

Table 4-13.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Naknek, 2018.

				Subsistence methods									
		Removed from commercial catch		Subsistence net[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
Resource	Percentage base	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**Gear type**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**10.7%**	**13.9%**	**88.1%**	**84.6%**	**0.0%**	**0.0%**	**88.1%**	**84.6%**	**1.2%**	**1.5%**	**100.0%**	**100.0%**
	Total	**10.7%**	**13.9%**	**88.1%**	**84.6%**	**0.0%**	**0.0%**	**88.1%**	**84.6%**	**1.2%**	**1.5%**	**100.0%**	**100.0%**
Chum salmon	Gear type	0.0%	0.0%	0.6%	0.8%	0.0%	0.0%	0.6%	0.8%	0.0%	0.0%	0.6%	0.6%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.6%	0.6%	0.0%	0.0%	0.6%	0.6%	0.0%	0.0%	0.6%	0.6%
Coho salmon	Gear type	19.4%	17.8%	3.3%	4.0%	0.0%	0.0%	3.3%	4.0%	83.6%	81.3%	6.0%	7.1%
	Resource	34.9%	34.9%	48.0%	48.0%	0.0%	0.0%	48.0%	48.0%	17.0%	17.0%	100.0%	100.0%
	Total	2.1%	2.5%	2.9%	3.4%	0.0%	0.0%	2.9%	3.4%	1.0%	1.2%	6.0%	7.1%
Chinook salmon	Gear type	34.3%	48.9%	2.5%	4.7%	0.0%	0.0%	2.5%	4.7%	8.2%	12.4%	5.9%	11.0%
	Resource	61.9%	61.9%	36.4%	36.4%	0.0%	0.0%	36.4%	36.4%	1.7%	1.7%	100.0%	100.0%
	Total	3.7%	6.8%	2.2%	4.0%	0.0%	0.0%	2.2%	4.0%	0.1%	0.2%	5.9%	11.0%
Pink salmon	Gear type	0.0%	0.0%	0.5%	0.3%	0.0%	0.0%	0.5%	0.3%	0.0%	0.0%	0.4%	0.3%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.4%	0.3%	0.0%	0.0%	0.4%	0.3%	0.0%	0.0%	0.4%	0.3%
Sockeye salmon	Gear type	46.4%	33.3%	90.6%	87.7%	0.0%	0.0%	90.6%	87.7%	0.0%	0.0%	84.7%	78.8%
	Resource	5.9%	5.9%	94.1%	94.1%	0.0%	0.0%	94.1%	94.1%	0.0%	0.0%	100.0%	100.0%
	Total	5.0%	4.6%	79.7%	74.2%	0.0%	0.0%	79.7%	74.2%	0.0%	0.0%	84.7%	78.8%
Spawning sockeye salmon	Gear type	0.0%	0.0%	2.6%	2.5%	0.0%	0.0%	2.6%	2.5%	8.2%	6.2%	2.4%	2.2%
	Resource	0.0%	0.0%	95.8%	95.8%	0.0%	0.0%	95.8%	95.8%	4.2%	4.2%	100.0%	100.0%
	Total	0.0%	0.0%	2.3%	2.1%	0.0%	0.0%	2.3%	2.1%	0.1%	0.1%	2.4%	2.2%
Unknown salmon	Gear type	0.0%	0.0%	0.0%	0.0%	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%	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%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Subsistence net harvests may include set gillnet, drift gillnet, and seine.

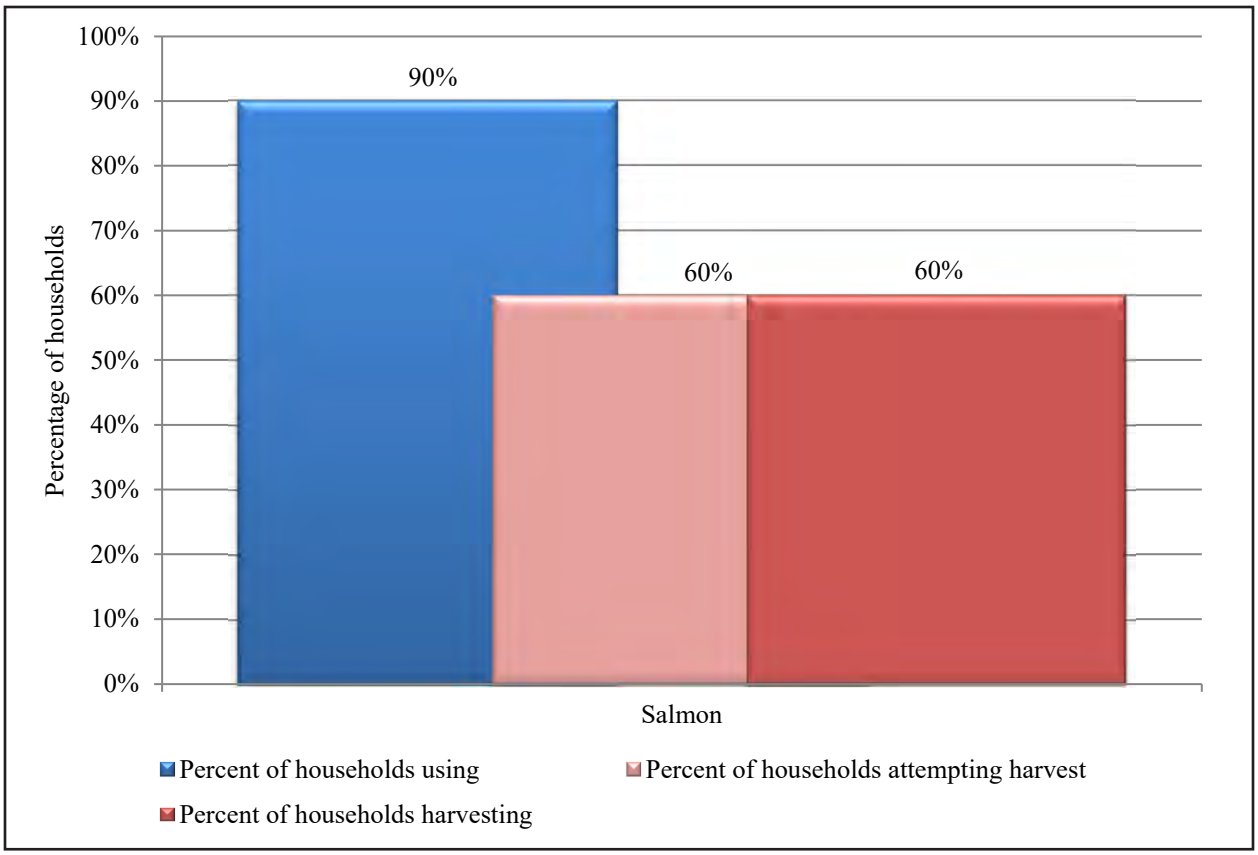


Figure 4-15.–Percentage of households using, attempting to harvest, and harvesting salmon, Naknek, 2018.

salmon (10% used and 6% harvested), chum salmon (9% used and harvested), and pink salmon (6% used and harvested) during the 2018 study year.

In 2018, starting from the west and moving toward the east, Naknek respondents reported harvesting Chinook salmon on the beach northwest of Naknek (where Beach Access Road ends), near the mouth of the Naknek River at Elder's Beach, and at Coffee Point (Figure 4-16). Additionally, Chinook salmon were harvested at Lower Lagoon in Naknek River in 2018. Compared to 2017, Naknek households reported fewer fishing locations in the Naknek River overall and did not go as far upriver to fish for Chinook salmon in 2018 (Figure 4-8; Figure 4-16). During the second study year, sockeye salmon were harvested on the beach northwest of Naknek (where Beach Access Road ends), near the mouth of the Naknek River at Elder's Beach, at Coffee Point, and at Telephone Point (Figure 4-17). In 2018, coho salmon were harvested on the beach northwest of Naknek (where Beach Access Road ends), at Elder's Beach, and on the beach between Coffee Point and Telephone Point (Figure 4-18). Additionally, coho salmon were harvested in Lower Lagoon of the Naknek River and in the Naknek River near Rapids Camp Lodge in 2018; these fishing locations in 2018 were further upriver than any from 2017 (Figure 4-10; Figure 4-18). Chum salmon were harvested on the beach northwest of Naknek (where Beach Access Road ends), at Elder's Beach, and near Coffee Point and Telephone points in 2018 (Figure 4-19). Pink salmon were only harvested near Elder's Beach in 2018. In 2018, spawning sockeye salmon were harvested in Naknek Lake near Trefons Cabin, north of the public boat launch, and along the eastern shore of Johnny's Lake (Figure 4-20).

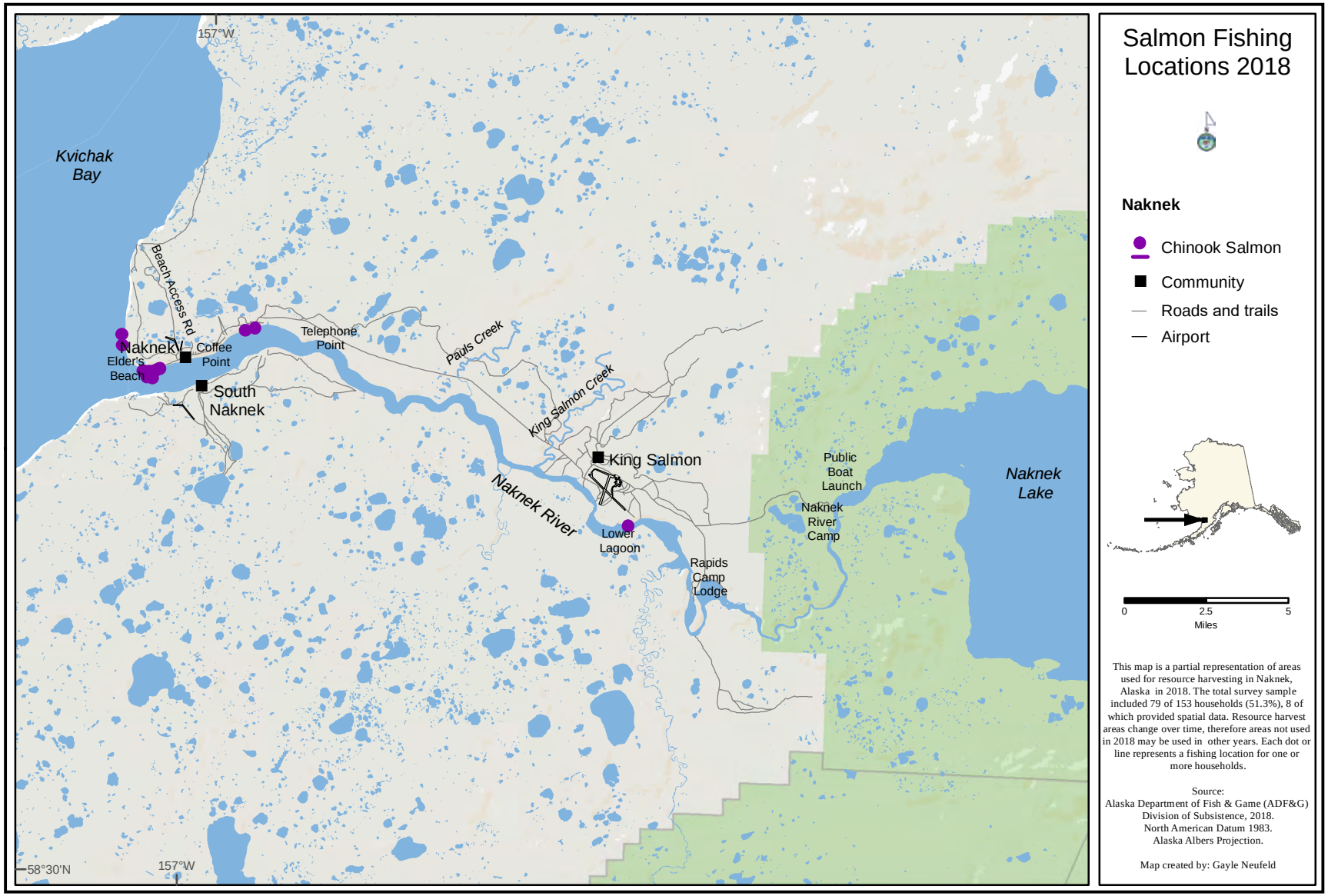


Figure 4-16.–Fishing and harvest locations of Chinook salmon, Naknek, 2018.

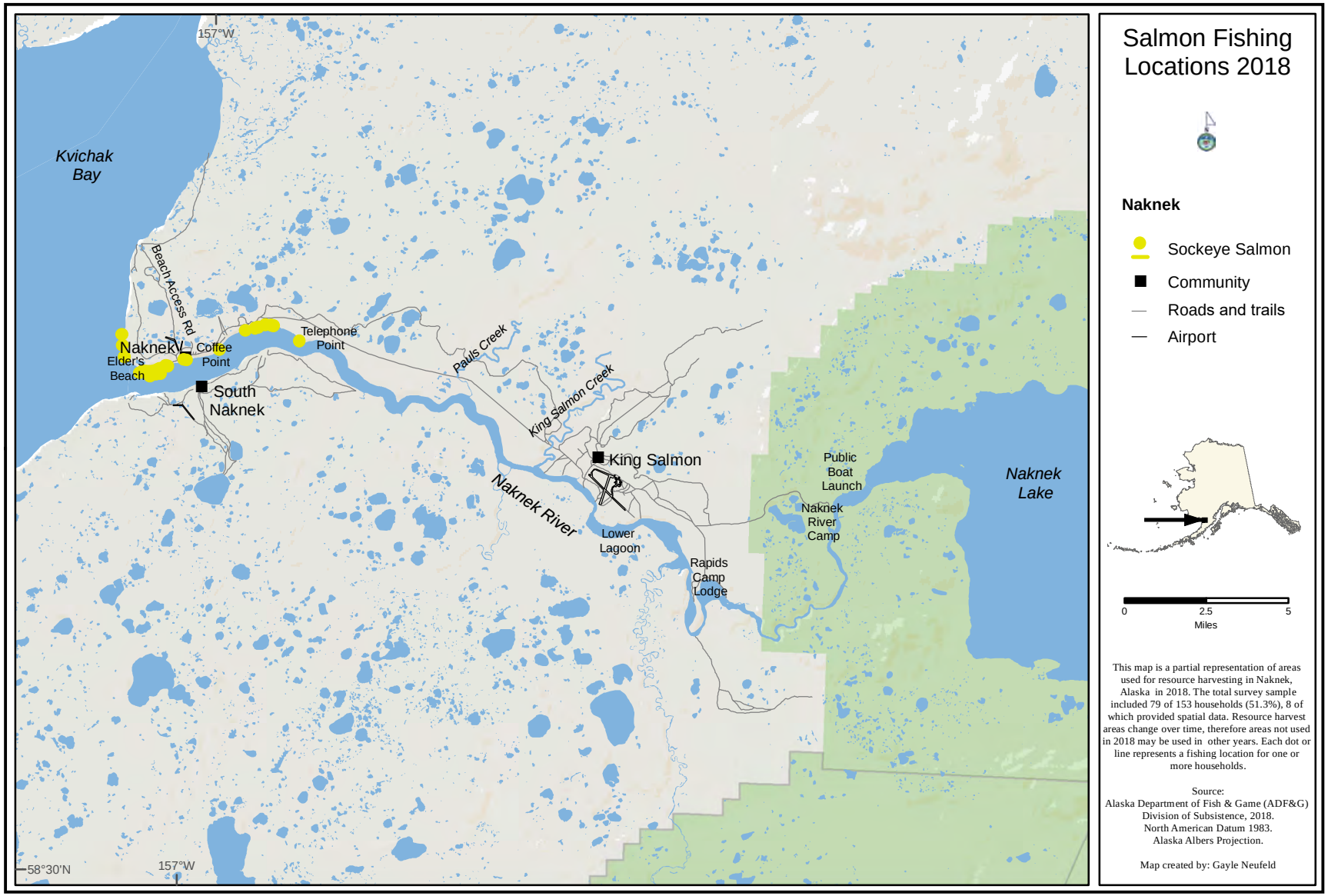


Figure 4-17.–Fishing and harvest locations of sockeye salmon, Naknek, 2018.

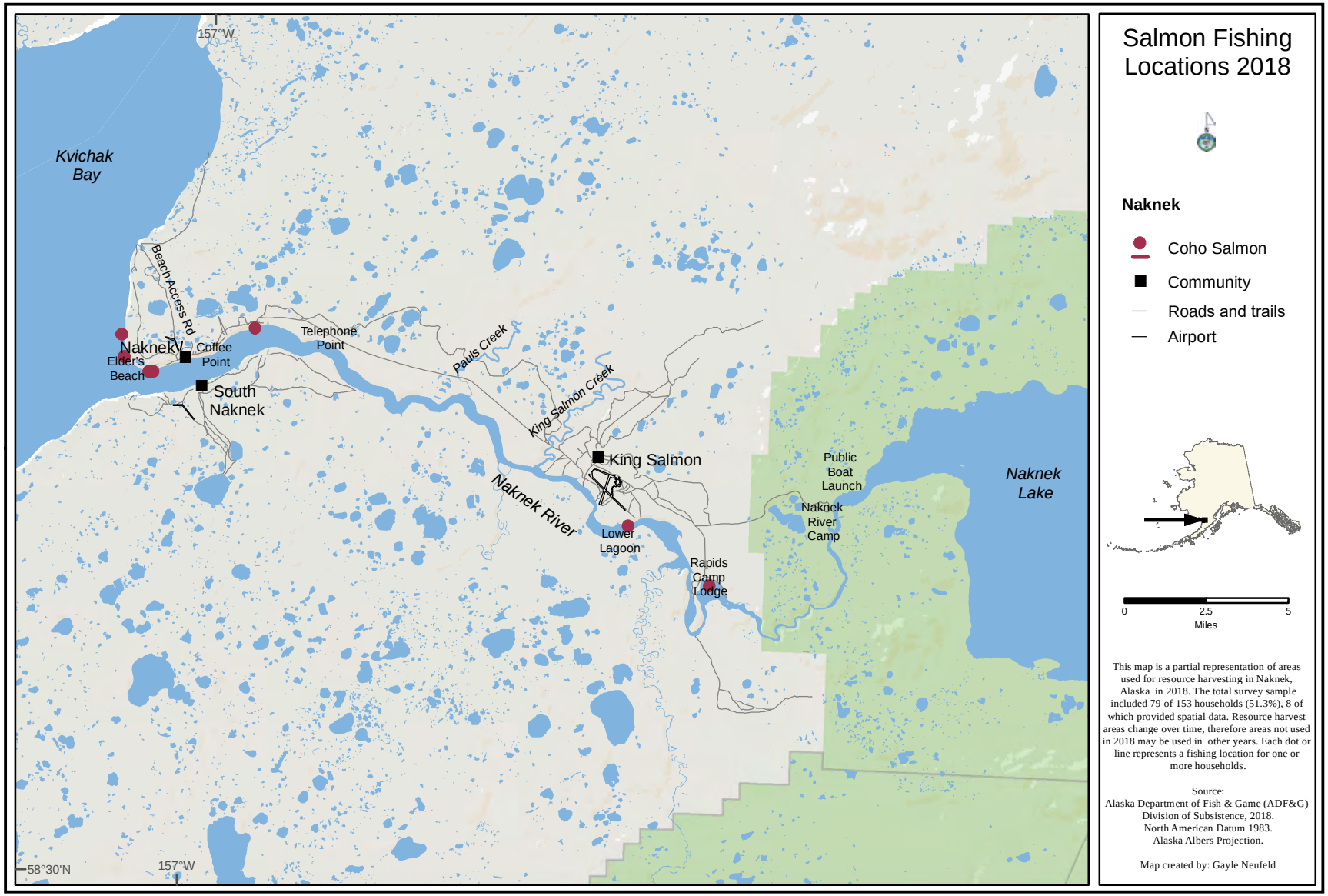


Figure 4-18.–Fishing and harvest locations of coho salmon, Naknek, 2018.

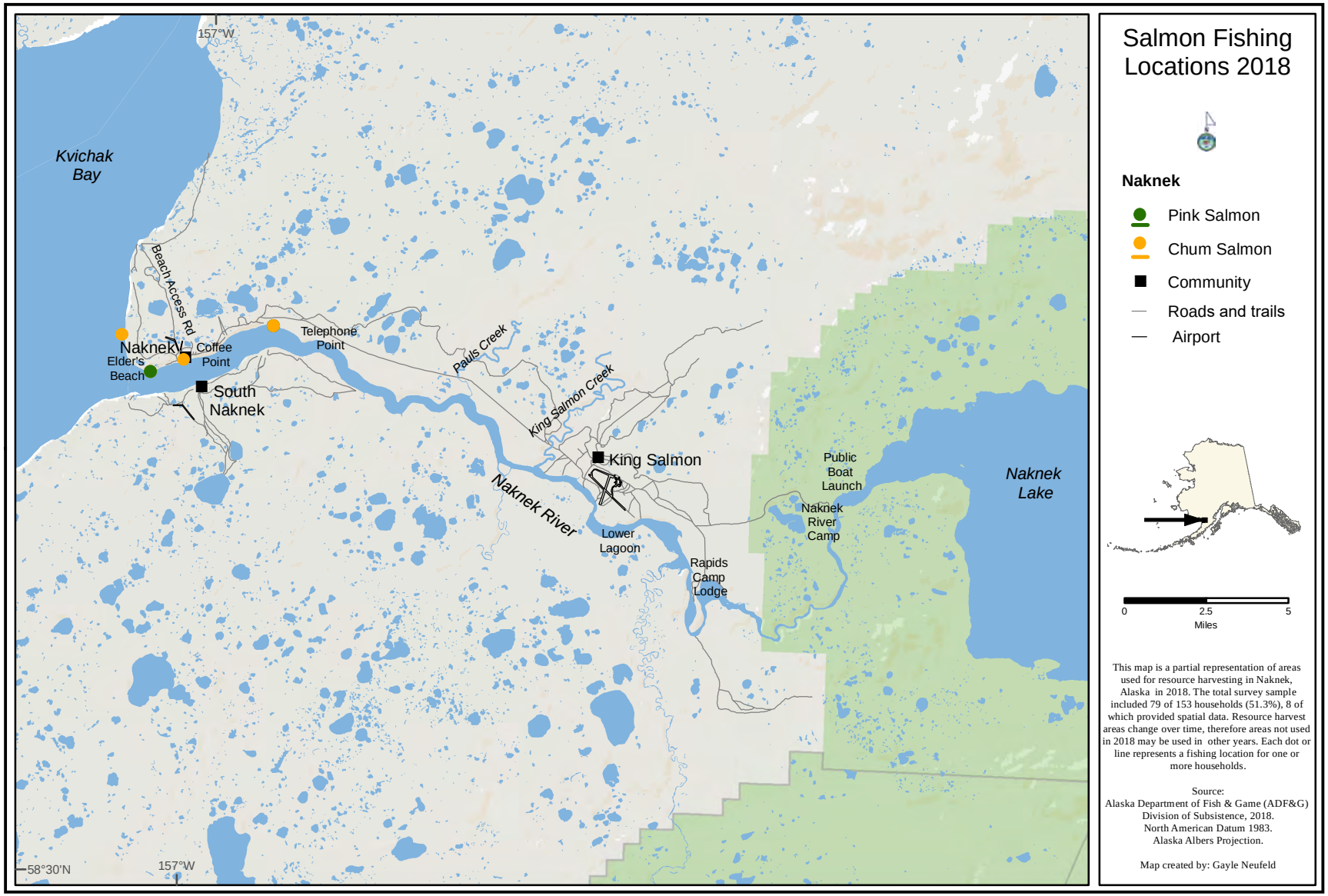


Figure 4-19.–Fishing and harvest locations of pink and chum salmon, Naknek, 2018.

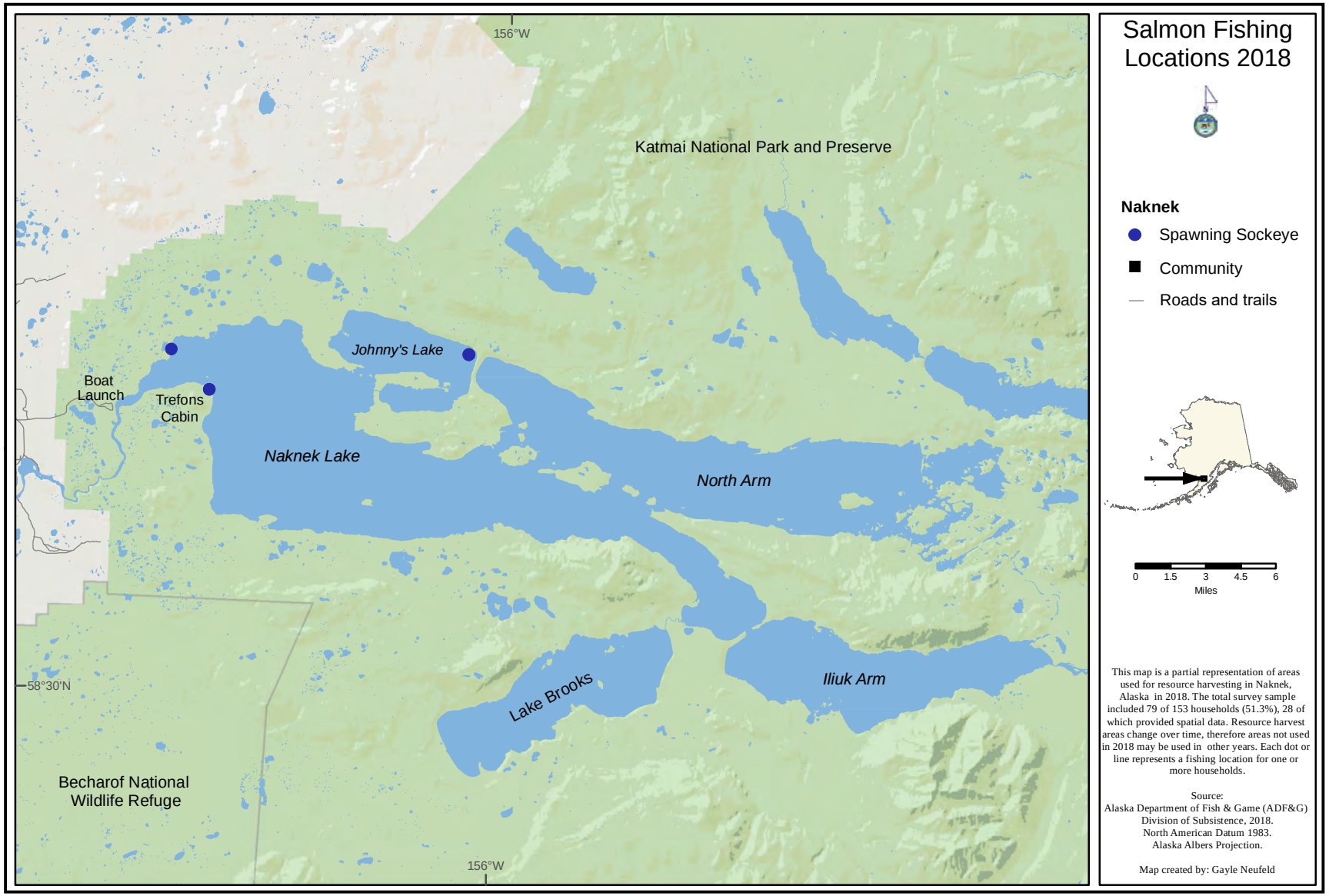


Figure 4-20.–Fishing and harvest locations of spawning sockeye salmon, Naknek, 2018.

Comparing 2017 and 2018 Harvest and Use Characteristics

The overall salmon harvest weight decreased by 9,865 lb from 2017 to 2018, or by 30 lb per capita (Table 4-8; Table 4-11). The harvest weight of every salmon resource declined in 2018 compared to 2017, but the species that contributed the greatest harvest weight decrease, in pounds usable weight, from 2017 to 2018 was coho salmon. The harvest weight for coho salmon in 2017 was 6,212 lb, and in 2018 the harvest weight was 3,340 lb. The harvest of coho salmon decreased by 2,872 lb, or by 46%. Following closely behind coho salmon as the species having the most reduced harvest weight was Chinook salmon, the harvest of which decreased by 2,813 lb. For sockeye salmon the harvest weight decreased by 2,151 lb between the two study years, and for spawning sockeye salmon the harvest weight decreased by 1,671 lb from 2017 to 2018. The harvest weight for chum salmon decreased by 272 lb, and for pink salmon the harvest weight decreased by 86 lb from 2017 to 2018. Since the same number of households was surveyed in Naknek for study years 2017 and 2018, changes to the households selected to be surveyed by the random sample may account for the changes in the harvest weight and composition between 2016 and 2017 (see tables 1-4, 4-8, and 4-11).

Overall, salmon fishing participation by Naknek households declined between the study years: 73% and 71% of households fished for and harvested salmon in 2017, respectively, but 60% of households fished for and harvested salmon in 2018 (Figure 4-7; Figure 4-15). Interestingly, even though the overall harvest weight of salmon decreased between 2017 to 2018, the percentage of Naknek households using and receiving salmon as a resource category increased by a difference of 3% (using) and 2% (receiving) (Table 4-8; Table 4-11). Regarding individual species, the percentage of Naknek households using and receiving sockeye salmon increased from 2017 to 2018. In 2017, 78% of households used sockeye salmon and 83% used this species in 2018; additionally, 37% of households received sockeye salmon in 2017 and 48% received this salmon species in 2018. These data suggest that Naknek households received sockeye salmon from households outside of the community of Naknek.

Overall, Naknek residents harvested salmon in similar areas during the two study years, with some exceptions (Figure 4-21; Figure 4-22). An exception includes the harvest areas of spawning sockeye salmon in Naknek Lake. In 2017, spawning sockeye salmon were harvested on the west and east sides of Johnny's Lake, and in 2018 spawning sockeye salmon were only harvested on the east side of Johnny's Lake. Additionally, regarding harvest areas for spawning sockeye salmon, in 2017 Naknek residents harvested this resource in the most eastern portion of Naknek Lake, but this location was not reported during the 2018 study year. Also, coho salmon were harvested in Paul's Creek and the mouth of King Salmon Creek in 2017, but harvests in those tributaries of the Naknek River were not reported during the 2018 study year.

Figure 4-21.–Fishing and harvest locations of all salmon species, Naknek, 2017.

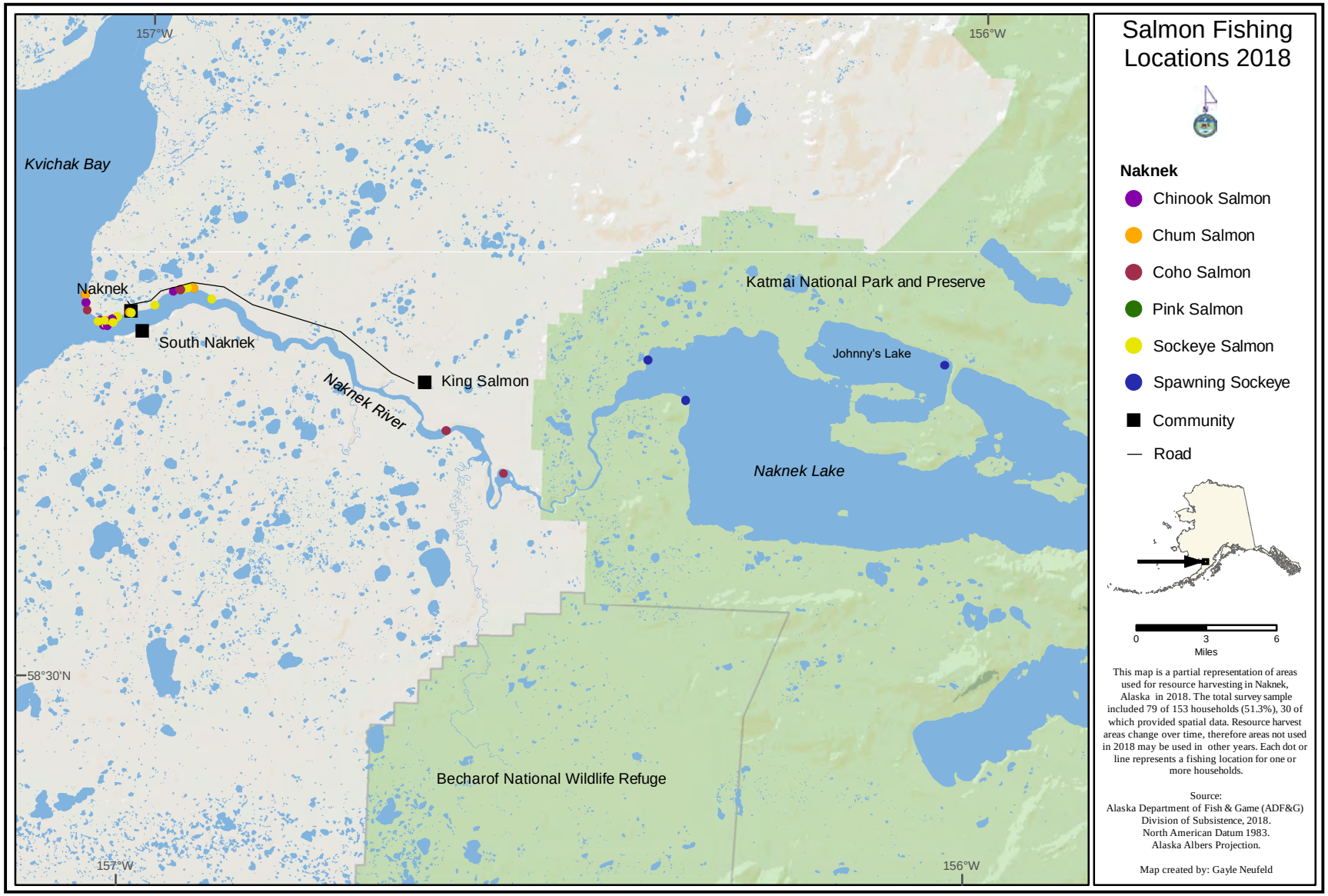


Figure 4-22.–Fishing and harvest locations of all salmon species, Naknek, 2018.

The Subsistence Salmon Permit System

Evaluating Subsistence Salmon Permit System Harvest Estimates from Before and After Post-Season Household Surveys

Each year, subsistence salmon household permits are issued and collected for the Naknek District to estimate harvests by each community. Harvest estimates are recorded in the ADF&G Alaska Subsistence Fisheries Database (ASFDB) and published in an annual report by the Division of Subsistence; the latest annual report was published by Fall et al. (2020) and presented subsistence salmon harvest estimates for 2017. The post-season salmon harvest surveys administered for this project in Naknek for 2017 and 2018 complement the permit system and increase the accuracy of documented subsistence salmon harvest levels. As noted in Chapter 1: "Introduction," during survey administration, permit data were provided and reviewed with households that had previously returned permits, or households returned a permit during the survey, to verify harvest information and to assist with recall. This section reviews the changes to the reported and estimated salmon harvests as the result of reconciling post-season survey data with returned permits, which helps to illustrate how well the permit system generally performs as a tool for documenting harvests. There is a set of tables (two for each year) that compares: 1) subsistence salmon permit participation based on surveys and returned permits (Table 4-14; Table 4-16), and 2) harvest estimates from before and after the time that post-season surveys occurred (Table 4-15; Table 4-17). The following paragraph explains how the total number of households was developed and how participation values of both permits and surveys were used for estimating harvests.

The estimated number of households included in the assessment of subsistence salmon harvests in Naknek is based on the total number of year-round households plus an estimate of seasonal Alaska residents using a Naknek address on their permit. This estimate was derived by computing the proportion of surveyed households obtaining a permit and applying that to unsurveyed households to estimate the number of year-round resident permit holders. The remaining permit holders were assumed to be seasonal and added to the total year-round households. The total estimated harvest from both permits and surveys was computed by first estimating harvests based on total permits and returns. Then, an additional correction was added based on the estimated number of unsurveyed households in the community fishing without a permit. The correction factor is the number of estimated unsurveyed households fishing without a permit multiplied by the average harvests by surveyed households holding permits.

Harvest Survey and Subsistence Permit Participation in Naknek: 2017

In 2017, there were 98 permits issued to households with Naknek addresses for the subsistence salmon fishery, and 82 of those permits were returned prior to the post-season salmon harvest survey (84% return rate) (Table 4-14). During the 2017 survey, five permits were collected by research staff or LRAs from community households that had not already returned their permit. Also, five households were identified that fished without a permit; these households were issued a permit. The ten additional returned permits increased the number of returned permits to 92 of 103, or an 89% return rate. Overall, there were 188 households that were eligible for the household survey or cited Naknek as the permit holder's place of residence but were likely seasonal residents. This includes 154 year-round households and an estimated 34 seasonal resident households that had subsistence permits and gave Naknek as their place of residence. Of these 188 households, including 35 permit holders that were surveyed, 135 (72%) were contacted through either the permit system (92 returned permits) or post-season household surveys (43 surveyed households that did not subsistence fish and had no permit) (Table 1-4; Table 4-14).

Table 4-14.–Subsistence salmon permit participation estimates based on returned permits and surveys, Naknek, 2017.

	Naknek
Permits	
Before surveys	
Number of permits issued	98
Number of permits returned	82
Initial return rate	83.7%
After surveys	
Number of previously issued permits returned during survey	5
Surveyed households that fished without a permit[a]	5
Estimated total number of households that fished without a permit	10
Number of permits issued[b]	103
Revised number of permits returned	92
Final return rate	89.3%
Participation	
Total number of households[c]	188
Total contacts	135
Proportion of contacted households	71.8%

Source ADF&G Division of Subsistence household surveys, 2018, and inseason catch permits, 2017.

a. According to both permit and survey returns combined.

b. Permits issued ex post facto were provided only to those households that were interviewed during post-season surveys.

c. Note that 35 permits were issued to households that were surveyed and 68 household permits were issued to people with Naknek addresses who were not surveyed, and their status as permanent (year-round) or seasonal residents of the community could not be directly determined. Based upon the percentage of surveyed households that had permits (35 of 78, or 45%), an estimated 69 of the 154 year-round Naknek households had subsistence permits. Therefore, 34 permits (103 permits minus 69 permits) were held by seasonal households.

Harvest by Species in Naknek: 2017

Prior to the 2017 household surveys, the reported subsistence Chinook salmon harvest from the 82 returned Naknek permits was 321 fish, which was expanded to an initial estimated harvest of 384 Chinook salmon (Table 4-14; Table 4-15). An additional 36 Chinook salmon harvests were reported during the household surveys (29 added to previously returned permits, six recorded on permits returned during surveys, and one from a household that did not have a permit while fishing) (Table 4-15). The initial harvested 321 Chinook salmon reported from the permits and the additional 36 fish recorded during the household surveys increased the reported Chinook salmon harvest to 357 fish, which was expanded to a community harvest estimate of 425 Chinook salmon in 2017. Only the harvests reported by five surveyed households that fished without a permit (and were issued a permit after being surveyed) were added to the ASFDB, and not the estimated harvest for the estimated five additional households in Naknek that fished without a permit and were not surveyed. Also, the updated permit return rate changed the expansion factor and average household harvest for estimating community harvests; therefore, the estimated post-season Chinook salmon harvest by Naknek residents for the Naknek District for 2017 recorded in the ASFDB was 400 fish.

For sockeye salmon, prior to the 2017 household surveys, the reported subsistence harvest from the 82 returned Naknek permits was 8,171 fish, which was expanded to an initial estimated harvest of 9,765 sockeye salmon (Table 4-14; Table 4-15). An additional 555 sockeye salmon harvests were reported during the household surveys (268 added to previously returned permits, 67 recorded on permits returned during surveys, and 220 from households that did not have a permit while fishing) (Table 4-15). The initial 8,171 sockeye salmon reported from the permits and the additional 555 salmon recorded during the household surveys increased the reported sockeye salmon harvest to 8,726 fish, which was expanded to a community harvest estimate of 10,455 sockeye salmon in 2017. For the same reasons noted above for Chinook salmon, the subsistence sockeye salmon estimate in the permit database was 9,769 fish.

Prior to the 2017 household surveys, the reported subsistence coho salmon harvest from the 82 returned Naknek permits was 551 fish, which was expanded to an initial estimated harvest of 659 coho salmon (Table 4-14; Table 4-15). An additional 147 coho salmon harvests were reported during the household surveys (52 added from previously returned permits, 25 recorded on permits returned during surveys, and 70 from households that did not have a permit while fishing) (Table 4-15). The initial harvested 551 coho salmon reported from the permits and the additional 147 fish recorded during the household surveys increased the reported coho salmon harvest to 698 fish, which was expanded to a community harvest estimate of 849 coho salmon in 2017. For the same reasons noted above for Chinook salmon, the subsistence coho salmon estimate recorded in the permit database was 781 fish.

For chum salmon, prior to the 2017 household surveys, the reported subsistence harvest from the 82 returned Naknek permits was 113 fish, which was expanded to an initial estimated harvest of 135 chum salmon (Table 4-14; Table 4-15). An additional 14 chum salmon harvests were reported during the household surveys (10 added to previously returned permits, two recorded on permits returned during surveys, and two from households that did not have a permit while fishing) (Table 4-15). The initial harvested 113 chum salmon reported from the permits and the additional 14 harvests recorded during the household surveys increased the reported chum salmon harvest to 127 fish, which was expanded to a community harvest estimate of 151 chum salmon in 2017. For the same reasons noted above for Chinook salmon, the subsistence chum salmon estimate in the permit database was 142 fish.

Prior to the 2017 household surveys the reported subsistence harvest of pink salmon from the 82 returned Naknek permits was 27 fish, which was expanded to an initial estimated harvest of 32 pink salmon (Table 4-14; Table 4-15). An additional 15 pink salmon harvests were reported during the household surveys (10 added to previously returned permits, three recorded on permits returned during surveys, and two from households that did not have a permit while fishing) (Table 4-15). The initial harvested 27 pink salmon reported from the permits and the additional 15 fish recorded during the household surveys increased the reported pink salmon harvest to 42 fish, which was expanded to a community harvest estimate of 52 pink salmon in 2017. For the same reasons noted above for Chinook salmon, the subsistence pink salmon estimate in the permit database was 47 fish.

Table 4-15.–Subsistence salmon harvest estimates based on returned permits and surveys, Naknek, 2017.

Harvest	Chinook	Sockeye	Coho	Chum	Pink
Before surveys					
Initial harvest reported on permits	321	8,171	551	113	27
Initial estimated harvest, all permit holders	384	9,765	659	135	32
After surveys					
Additional harvest added to previously returned permits	29	268	52	10	10
Harvest recorded on permits returned during the survey	6	67	25	2	3
Harvest by households that did not have permits	1	220	70	2	2
Reported harvest from both permits and surveys	357	8,726	698	127	42
Total estimated harvest, from both permits and surveys	425	10,455	849	151	52
Estimated harvest, from Alaska Subsistence Fisheries Database[a]	400	9,769	781	142	47

Source ADF&G Division of Subsistence household surveys, 2018, and inseason catch permits, 2017.

a. Based only on known fishers.

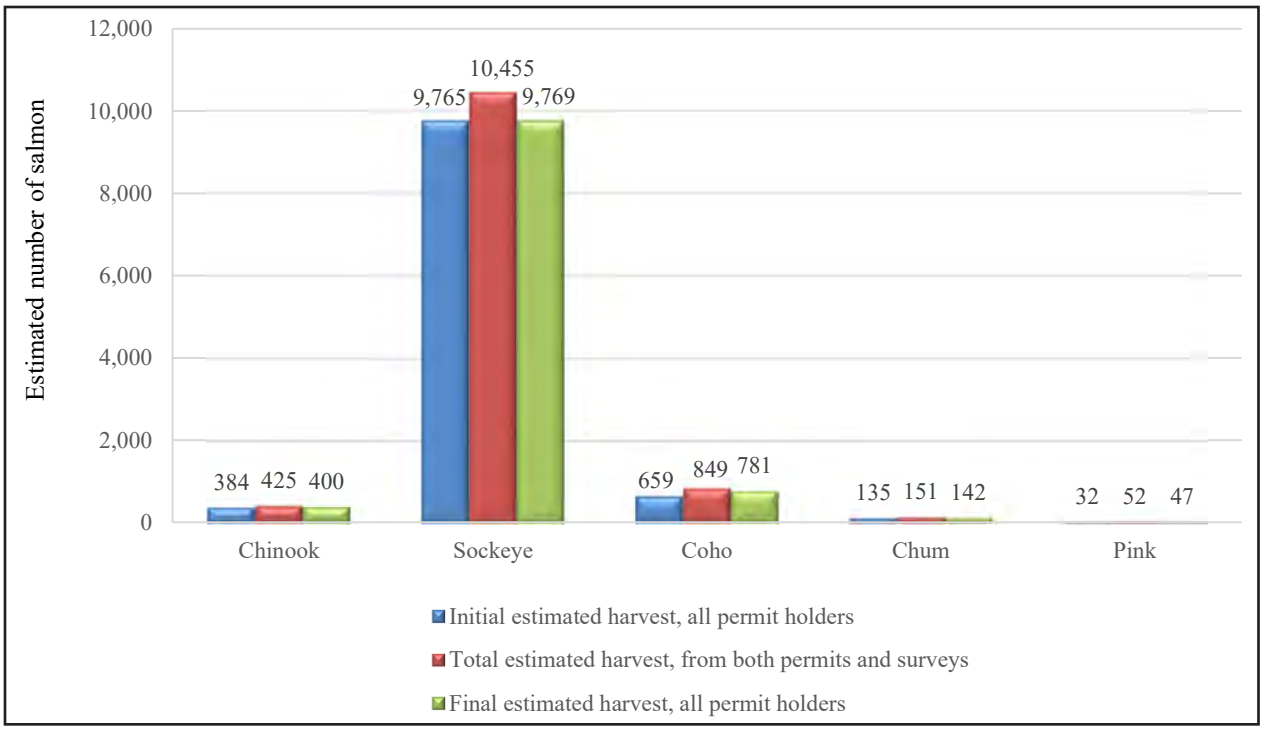


Figure 4-23.–Initial estimated salmon harvest based on returned permits compared to final estimated salmon harvest based on returned permits and surveyed households, Naknek, 2017.

In comparing the initial estimated harvest for permit holders against the revised, post-survey community subsistence harvest for 188 households, the pink salmon harvest exhibited the most significant change: an increase of 63%; however, the pink salmon pre- and post-season harvest estimate difference when compared to other species—such as sockeye, coho, and Chinook salmon—was low (a difference of 20 fish) (Table 4-14; Figure 4-23). For coho salmon, the post-season harvest estimate increased by 29%, or by 190 fish, when compared to the initial estimate. For Chinook salmon and chum salmon, there was an 11% increase to each total harvest estimate for 188 households in comparison to the initial estimated harvest for permit holders. The highest harvested species of salmon, sockeye salmon, exhibited the least significant change: an increase of 7%, but the pre- and post-season estimates differed by the most for this species: 690 fish.

Harvest Survey and Subsistence Permit Participation in Naknek: 2018

In 2018, there were 85 permits issued to households with Naknek addresses for the subsistence salmon fishery, and 59 of those permits were returned prior to the post-season salmon harvest survey (69% return rate) (Table 4-16). During the 2018 survey, 15 permits were collected by research staff or LRAs from community households that had not already returned their permit, and four households were identified that fished without a permit and were issued a permit during survey administration. The 19 additional returned permits increased the number of returned permits to 78 of 89, or an 88% return rate. Overall, there were 171 households that were eligible for the household survey or cited Naknek as the permit holder's place of residence but were likely seasonal residents. This includes 153 year-round households and an estimated 18 seasonal resident households that had subsistence permits and gave Naknek as their place of residence. Of these 171 households, including 37 permit holders that were surveyed, 121 (71%) were contacted through either the permit system (78 returned permits) or post-season household surveys (43 surveyed households that did not subsistence fish and had no permit) (Table 1-4; Table 4-16).

Table 4-16.–Subsistence salmon permit participation estimates based on returned permits and surveys, Naknek, 2018.

	Naknek
Permits	
Before surveys	
Number of permits issued	85
Number of permits returned	59
Initial return rate	69.4%
After surveys	
Number of previously issued permits returned during survey	15
Surveyed households that fished without a permit[a]	4
Estimated total number of households that fished without a permit	8
Number of permits issued[b]	89
Revised number of permits returned	78
Final return rate	87.6%
Participation	
Total number of households[c]	171
Total contacts	121
Proportion of contacted households	70.7%

Source ADF&G Division of Subsistence household surveys, 2019, and inseason catch permits, 2018.

a. According to both permit and survey returns combined.

b. Permits issued ex post facto were provided only to those households that were interviewed during post-season surveys.

c. Note that 37 permits were issued to households that were surveyed and 52 household permits were issued to people with Naknek addresses who were not surveyed, and their status as permanent (year-round) or seasonal residents of the community could not be directly determined. Based upon the percentage of surveyed households that had permits (37 of 80, or 46%), an estimated 71 of the 153 year-round Naknek households had subsistence permits. Therefore, 18 permits (89 permits minus 71 permits) were held by seasonal households.

Harvest by Species in Naknek: 2018

Prior to the 2018 household surveys, the reported subsistence Chinook salmon harvest from the 59 returned Naknek permits was 287 fish, which was expanded to an initial estimated harvest of 413 Chinook salmon (Table 4-16; Table 4-17). An additional 69 Chinook salmon harvests were reported during the household surveys (15 added to previously returned permits, 30 recorded on permits returned during surveys, and 24 from households that did not have a permit while fishing) (Table 4-17). The initial harvested 287 Chinook salmon reported from the permits and the additional 69 fish recorded during the household surveys increased the reported Chinook salmon harvest to 356 fish, which was expanded to a community harvest estimate of 422 Chinook salmon in 2018. Only the harvests reported by four surveyed households that fished without a permit (and were issued a permit after being surveyed) were added to the ASFDB, and not the estimated harvest for the estimated four additional households in Naknek that fished without a permit and were not surveyed. Also, the updated permit return and average household harvest changed the expansion factor for estimating community harvests; therefore, the estimated post-season Chinook salmon harvest by Naknek residents for the Naknek District for 2018 recorded in the ASFDB was 406 fish, which was lower than the initial permit-based estimate for the ASFDB.

For sockeye salmon, prior to the 2018 household surveys, the reported subsistence harvest from the 59 returned Naknek permits was 6,829 fish, which was expanded to an initial estimated harvest of 9,838 sockeye salmon (Table 4-16; Table 4-17). An additional 1,604 sockeye salmon harvests were reported during the household surveys (179 added to previously returned permits, 1,158 recorded on permits returned during surveys, and 267 from households that did not have a permit while fishing) (Table 4-17). The initial 6,829 sockeye salmon reported from the permits and the additional 1,604 salmon harvests recorded during the household surveys increased the reported sockeye salmon harvest to 8,433 fish, which was expanded to a community harvest estimate of 10,153 sockeye salmon in 2018. For the same reasons noted above for Chinook salmon, the subsistence sockeye salmon post-season estimate in the permit database was lower than the initial permit-based estimate, at 9,622 fish.

Prior to the 2018 household surveys, the reported subsistence coho salmon harvest from the 59 returned Naknek permits was 263 fish, which was expanded to an initial estimated harvest of 379 coho salmon (Table 4-16; Table 4-17). An additional 75 coho salmon harvests were reported during the household surveys (65 recorded on permits returned during surveys, and 10 from households that did not have a permit while fishing) (Table 4-17). The initial harvested 263 coho salmon reported from the permits and the additional 75 fish harvests recorded during the household surveys increased the reported coho salmon harvest to 338 fish, which was expanded to a community harvest estimate of 405 coho salmon in 2018. For the same reasons noted above for Chinook salmon, the subsistence coho salmon estimate in the permit database was 386 fish.

For chum salmon, prior to the 2018 household surveys, the reported subsistence harvest from the 59 returned Naknek permits was 70 fish, which was expanded to an initial estimated harvest of 101 chum salmon (Table 4-16; Table 4-17). An additional eight chum salmon harvests were reported during the household surveys on permits returned during surveys (Table 4-17). The initial harvested 70 chum salmon reported from the permits and the additional eight harvests recorded during the household surveys increased the reported chum salmon harvest to 78 fish, which was expanded to a community harvest estimate of 93 chum salmon in 2018. For the same reasons noted above for Chinook salmon, the subsistence chum salmon post-season estimate in the permit database was lower than the initial permit-based estimate, at 89 fish.

Prior to the 2018 household surveys the reported subsistence harvest of pink salmon from the 59 returned Naknek permits was 53 fish, which was expanded to an initial estimated harvest of 76 pink salmon (Table 4-16; Table 4-17). An additional nine pink salmon harvests were reported during the household surveys on permits returned during surveys (Table 4-17). The initial harvested 53 pink salmon reported from the permits and the additional nine fish recorded during the household surveys increased the reported pink salmon harvest to 62 fish, which was expanded to a community harvest estimate of 73 pink salmon in 2018. For the same reasons noted above for Chinook salmon, the subsistence pink salmon post-season estimate in the permit database was lower than the initial permit-based estimate, at 71 fish.

Table 4-17.–Subsistence salmon harvest estimates based on returned permits and surveys, Naknek, 2018.

Harvest	Chinook	Sockeye	Coho	Chum	Pink
Before surveys					
Initial harvest reported on permits	287	6,829	263	70	53
Initial estimated harvest, all permit holders	413	9,838	379	101	76
After surveys					
Additional harvest added to previously returned permits	15	179	0	0	0
Harvest recorded on permits returned during the survey	30	1,158	65	8	9
Harvest by households that did not have permits	24	267	10	0	0
Reported harvest from both permits and surveys	356	8,433	338	78	62
Total estimated harvest, from both permits and surveys	422	10,153	405	93	73
Estimated harvest, from Alaska Subsistence Fisheries Database[a]	406	9,622	386	89	71

Source ADF&G Division of Subsistence household surveys, 2019, and inseason catch permits, 2018.

a. Based only on known fishers.

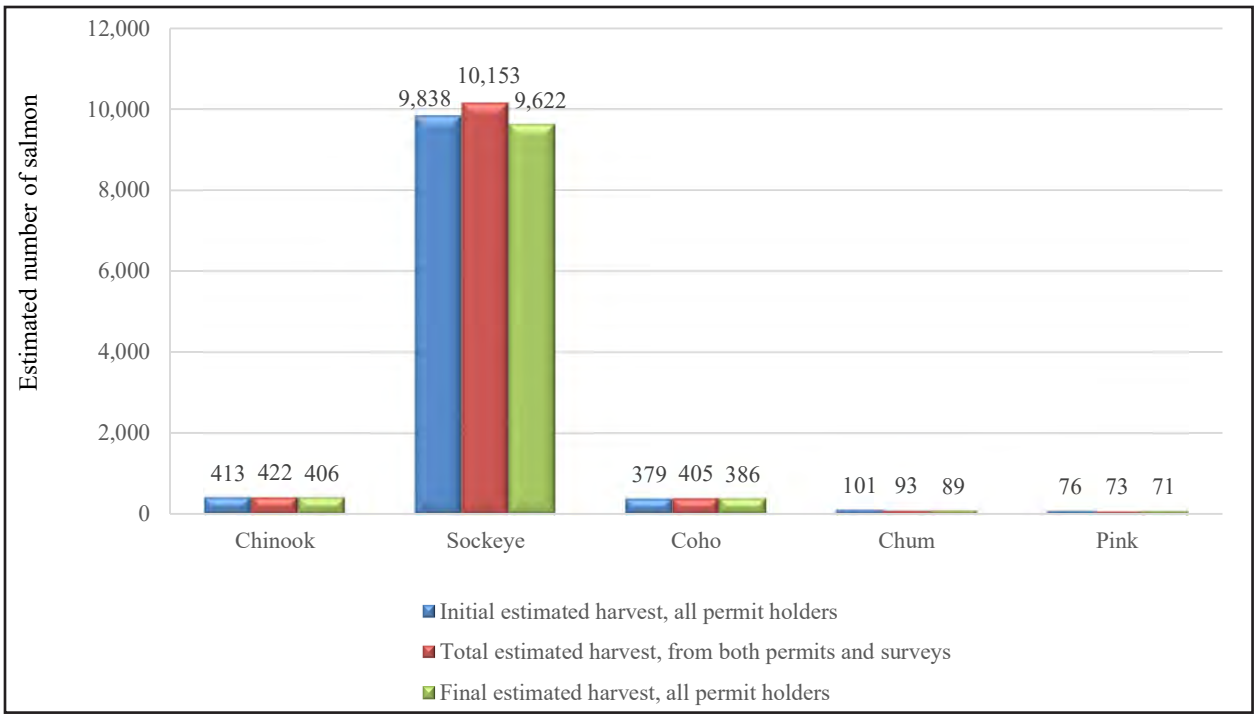


Figure 4-24.–Initial estimated salmon harvest based on returned permits compared to final estimated salmon harvest based on returned permits and surveyed households, Naknek, 2018.

In comparing the initial estimated harvest for permit holders against the revised, post-season community subsistence harvest estimate for 171 households, the chum and pink salmon harvest estimates exhibited a decrease: the harvest estimates decreased by 8% and 4%, respectively (Table 4-16; Figure 4-23). However, the harvest estimate difference for chum and pink salmon was small: decreased by only eight fish and six fish, respectively. The coho salmon harvest estimate increased by 7%, or by 26 fish. The harvest estimate increased by 2% for Chinook salmon (a difference of nine fish) and 3% for sockeye salmon (a difference of 315 fish).

Comparing Uses and Harvests in 2017and 2018 with Previous Years

Assessments of Use

Researchers asked respondents to assess their salmon use in two ways: whether they used more, less, or about the same amount of salmon in each study year as in the past five years, and whether they "got enough" salmon. Households also were asked to provide reasons if their use was different or if they were unable to get enough salmon. Also, if they did not get enough, respondents were asked to evaluate the severity of the impact to their household as a result of not getting enough. They were further asked how much salmon did the household need annually and whether they did anything differently (such as supplement with store-bought food or switch to a different subsistence resource) because they did not get enough. Households were also asked to assess whether their salmon fishing efforts or locations changed during the study years compared to usual activities. Because not every household uses salmon resources, some households did not respond to the assessment questions. Additionally, some households that do typically use salmon resources simply did not answer questions. For each type of assessment, households could give more than one reason for changes to resource use, not having enough salmon, or increased effort or travel to get salmon. This section discusses responses to those questions.

2017

In 2017, out of 74 responding households, 68 Naknek households reported usually using salmon, 44 (60%) stated that they used about the same amount of salmon as they used in previous years, 20% (15 households) reported less use, and 12% (9 households) reported more use of salmon (Table 4-18; Figure 4-25). When asked for reasons why salmon use was less, 31% of respondents indicated it was due to working/no time, 31% cited did not need as much salmon, 23% cited less sharing, and 23% cited lack of effort (Table 4-19). Additionally, 8% of responding households indicated less use of salmon due to family/personal reasons and 8% cited lack of equipment. Of the eight households that provided a reason for increased salmon use, 25% of respondents stated more use was due to having received more salmon, increased effort, and more success (Table 4-20). Additionally, 13% of households indicated more use of salmon was due to increased availability of resources, had more time, and got/fixed equipment. When asked if the household got enough salmon in 2017, 71% of sampled households indicated that they did, while 18% indicated that they did not (Figure 4-26). Of the 14 responding households that did not get enough salmon in 2017, 43% of these households reported the impact as minor, 14% reported the impact as not noticeable, 7% of these households reported the impact as major, and 7% reported the impact as severe (Table 4-21). When asked what households that did not get enough salmon did as the result of not getting enough, 33% (two households) indicated that they used more commercial foods, 33% obtained food from other sources, 17% bought/bartered, 17% replaced salmon with other subsistence foods, and 17% made do without (Table 4-22). The 14 households that did not have enough salmon were asked how many are needed annually, and responses indicated an average of 99 salmon (Table 4-23). In 2017, three Naknek households reported having to work harder than usual to obtain enough salmon. Of those households that provided a response, the specific reason why obtaining enough salmon in 2017 required more work was due to resource availability (one household); also, two households cited other or unspecified reasons (Table 4-24). In 2017, two households reported that they had to travel farther, and two households reported traveling to different locations than normal to obtain enough salmon for their household needs (Table 4-25).

2018

In 2018, 73 Naknek households reported usually using salmon, 37 households (46%) stated that they used the same amount of salmon as they used in previous years, 26 (33%) reported less use, and 10 households (13%) reported more use of salmon (Table 4-26; Figure 4-27). When asked to provide the reasons why salmon use was less, 42% of 26 respondents cited did not need as much salmon, 39% cited working/no time, and 15% of households indicated family/personal reasons; also, both lack of equipment and had no help were cited by 4% of respondents (Table 4-27). All households that used more salmon provided a reason for why, and the majority (60%) cited having needed more salmon in 2018 (Table 4-28). Other specific reasons cited for increased salmon use included: received more (20%), increased effort (10%), more success (10%), and had more time (10%). When asked if the household got enough salmon in 2018, 79% of sampled households indicated that they did, while 13% did not (Figure 4-28). Of the 10 responding households that did not get enough salmon in 2018, six households provided an assessment of the impact of not getting enough: three households reported the impact as not noticeable, two households reported a minor impact, and one household experienced a major effect (Table 4-29). There were seven household that did not get enough salmon that also reported what the household did as the result of not getting enough salmon: 43% used more commercial foods, 29% replaced salmon with other subsistence foods, 29% indicated less sharing, 14% asked others for help, and 14% obtained food from other sources (Table 4-30). The 10 households that did not have enough salmon were asked how many are needed annually, and responses indicated an average of 209 salmon (Table 4-31). In 2018, two Naknek households reported having to work harder than usual to obtain enough salmon and one household indicated resource availability as the reason for why; the other household did not respond to the follow-up question (Table 4-32). In 2018, one household reported that they had to travel farther, and two households reported traveling to different locations than normal to obtain enough salmon for their household needs (Table 4-33).

Table 4-18.–Changes in household uses of salmon compared to recent years, Naknek, 2017.

Sampled households	Valid responses[a]	Households reporting use								Households not using	
		Total households		Less		Same		More			
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
78	74	68	91.9%	15	20.3%	44	59.5%	9	12.2%	6	8.1%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households that did not provide any response.

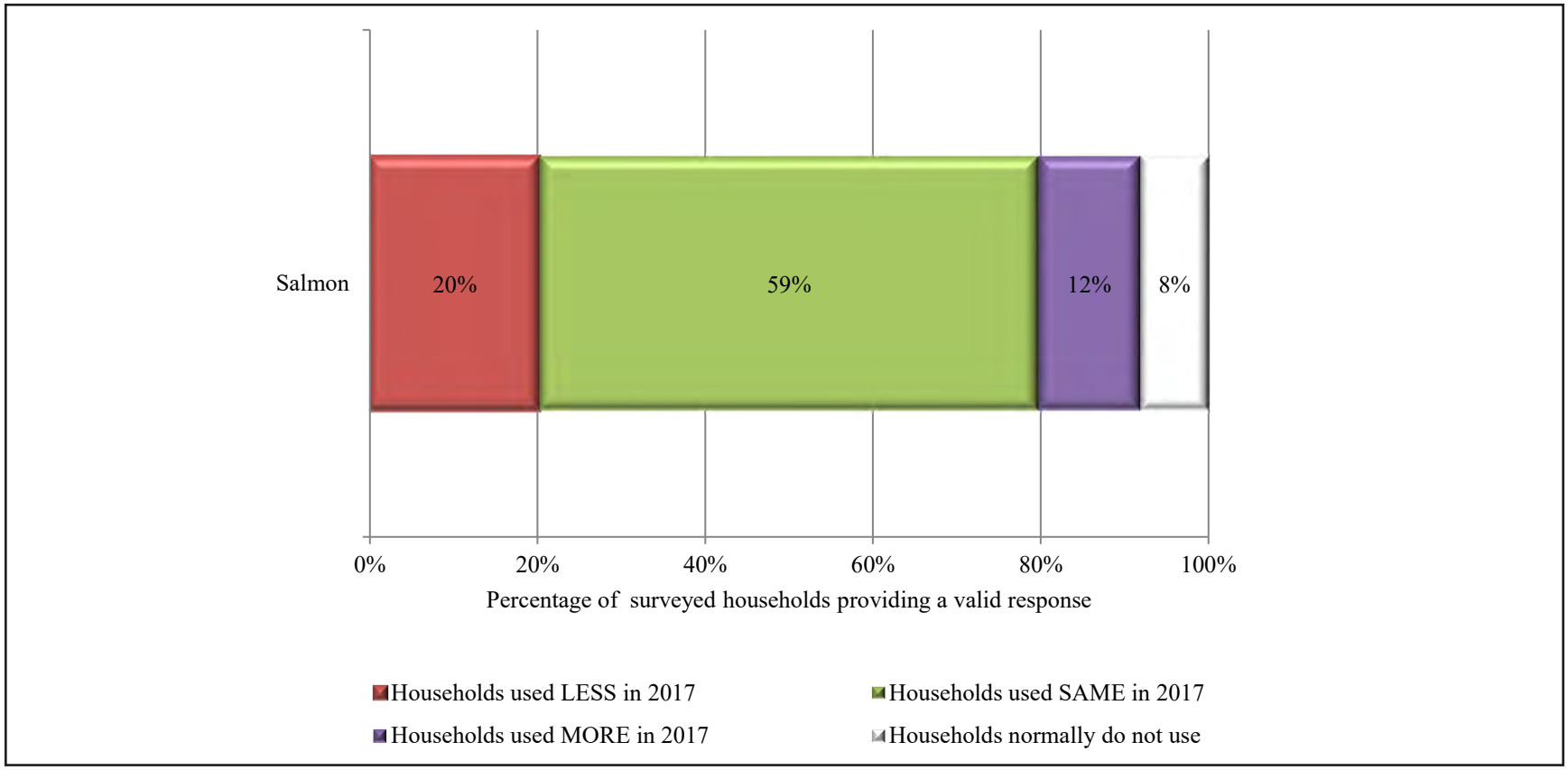


Figure 4-25.–Changes in household uses of salmon compared to recent years, Naknek, 2017.

Table 4-19.–Reasons for less household uses of salmon compared to recent years, Naknek, 2017.

Valid responses[a]	Households reporting reasons for less use	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
74	13	1	7.7%	0	0.0%	0	0.0%	1	7.7%	3	23.1%	3	23.1%	0	0.0%	0	0.0%

-continued-

Table 4-19.–Continued.

Valid responses[a]	Households reporting reasons for less use	Working/ no time		Regulations		Did not need		Gas/equipment too expensive		Used other resources		Competition		Had no help		Other reasons	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
74	13	4	30.8%	0	0.0%	4	30.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

Table 4-20.–Reasons for more household uses of salmon compared to recent years, Naknek, 2017.

Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Favorable weather		Received more		Needed more		Increased effort	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
74	8	1	12.5%	0	0.0%	0	0.0%	2	25.0%	2	25.0%	2	25.0%

-continued-

Table 4-20.–Continued.

Valid responses[a]	Households reporting reasons for more use	More success		Had more time		Got/fixed equipment		Substitute for unavaialable resource(s)		Had more help		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
74	8	2	25.0%	1	12.5%	1	12.5%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

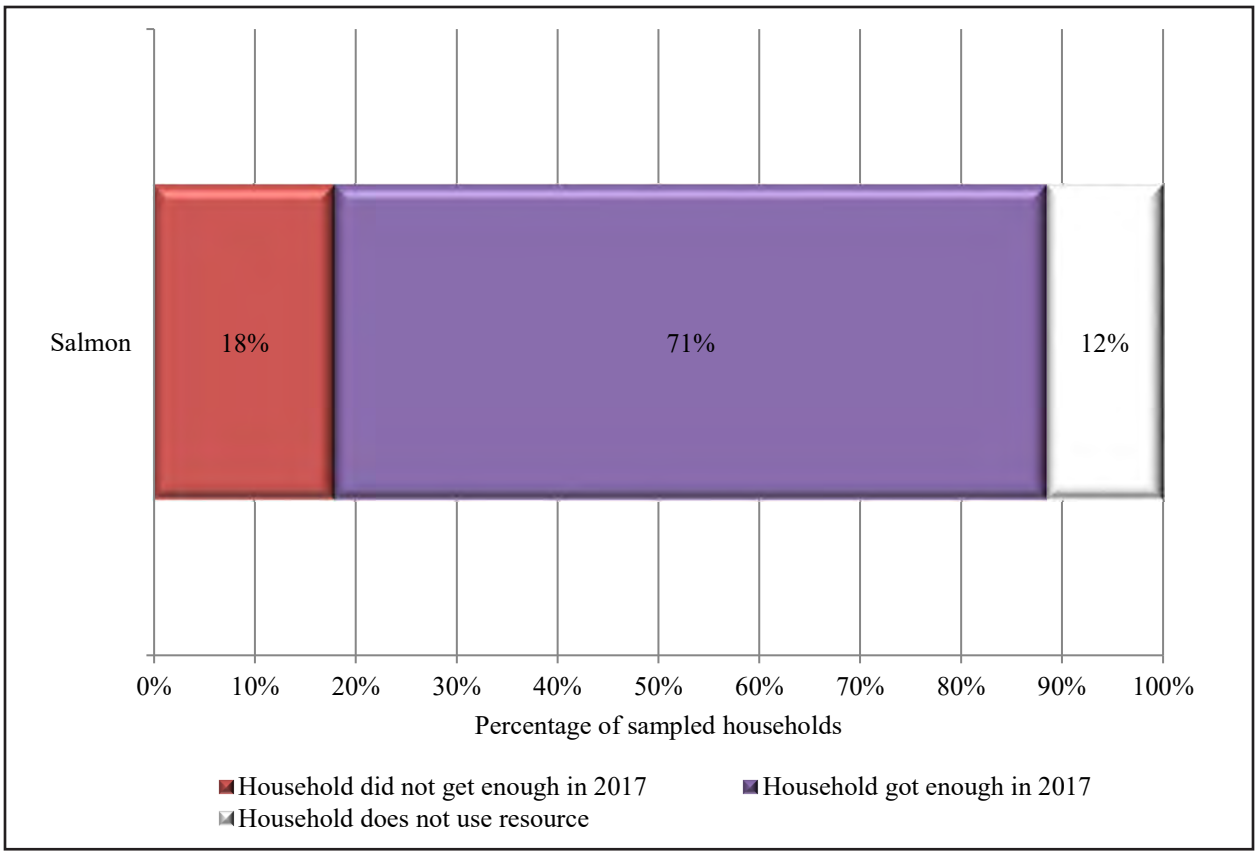


Figure 4-26.–Percentage of sampled households reporting whether they had enough salmon, Naknek, 2017.

Table 4-21.–Reported impact to households reporting that they did not get enough salmon, Naknek, 2017.

Sampled households	Households not getting enough salmon				Impact to those not getting enough salmon									
	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
78	69	88.5%	14	20.3%	4	28.6%	2	14.3%	6	42.9%	1	7.1%	1	7.1%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 4-22.–Things households reported doing differently as the result of not getting salmon, Naknek, 2017.

Valid responses[a]	Bought/bartered		Used more commercial foods		Replaced with other subsistence foods		Asked others for help		Increased effort	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
6	1	16.7%	2	33.3%	1	16.7%	0	0.0%	0	0.0%

-continued-

Table 4-22.–Continued.

Valid responses[a]	Made do without		Obtained food from other sources		Got public assistance		Less sharing		Other reasons	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
6	1	16.7%	2	33.3%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 4-23.–Amount of salmon needed by households that did not have enough, Naknek, 2017.

Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
14	1,382	99

Source ADF&G Division of Subsistence household surveys, 2018.

Table 4-24.–Reasons that households worked harder to get more salmon, Naknek, 2017.

Sampled households	Valid responses	Households reporting… not working harder than usual	working harder than usual	Family/personal Number	Family/personal Percentage	Resource availability Number	Resource availability Percentage	Unsuccessful Number	Unsuccessful Percentage	More time Number	More time Percentage
78	57	54	3	0	0.0%	1	33.3%	0	0.0%	0	0.0%

-continued-

Table 4-24.–Continued.

Sampled households	Valid responses	Households reporting… not working harder than usual	working harder than usual	Small or diseased resources Number	Small or diseased resources Percentage	No equipment Number	No equipment Percentage	Other reasons Number	Other reasons Percentage	No response Number	No response Percentage
78	57	54	3	0	0.0%	0	0.0%	2	66.7%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

Table 4-25.–Households reporting that they traveled farther or to different locations, Naknek, 2017.

Sampled households	Valid responses	Households reporting that they... traveled further	traveled to different locations
78	57	2	2

Source ADF&G Division of Subsistence household surveys, 2018.

Table 4-26.–Changes in household uses of salmon compared to recent years, Naknek, 2018.

Sampled households	Valid responses[a]	Households reporting use								Households not using	
		Total households		Less		Same		More			
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
80	80	73	91.3%	26	32.5%	37	46.3%	10	12.5%	7	8.8%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households that did not provide any response.

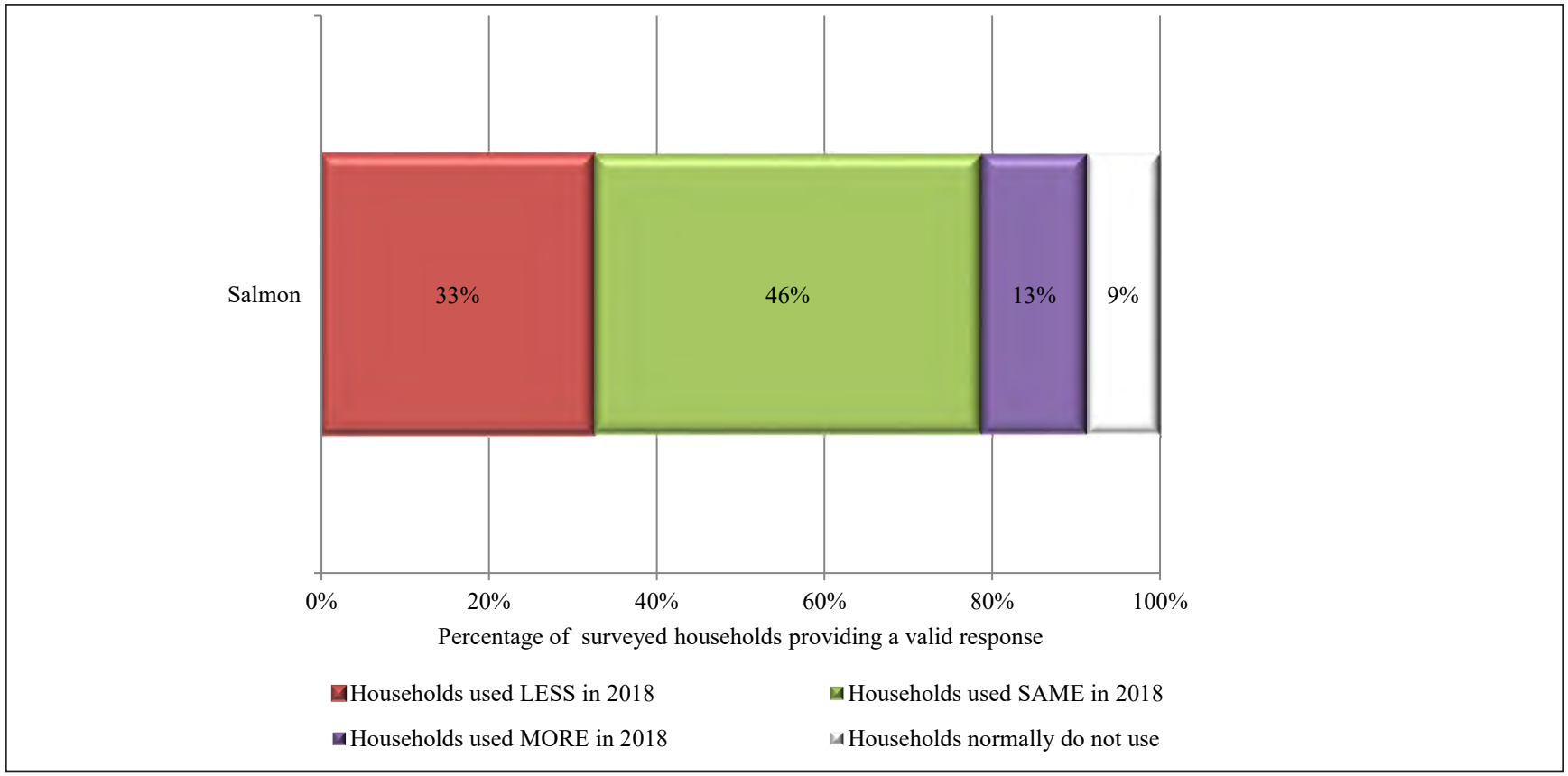


Figure 4-27.–Changes in household uses of salmon compared to recent years, Naknek, 2018.

Table 4-27.–Reasons for less household uses of salmon compared to recent years, Naknek, 2018.

Valid responses[a]	Households reporting reasons for less use	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
80	26	4	15.4%	0	0.0	0	0.0%	1	3.8%	0	0.0%	2	7.7%	0	0.0%	0	0.0%

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Table 4-27.–Continued.

Valid responses[a]	Households reporting reasons for less use	Working/ no time		Regulations		Did not need		Gas/equipment too expensive		Used other resources		Competition		Had no help		Other reasons	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
80	26	10	38.5%	0	0.0%	11	42.3%	0	0.0%	0	0.0%	0	0.0%	1	3.8%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

Table 4-28.–Reasons for more household uses of salmon compared to recent years, Naknek, 2018.

Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Favorable weather		Received more		Needed more		Increased effort	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
80	10	0	0.0%	0	0.0%	0	0.0%	2	20.0%	6	60.0%	1	10.0%

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Table 4-28.–Continued.

Valid responses[a]	Households reporting reasons for more use	More success		Had more time		Got/fixed equipment		Substitute for unavaialable resource(s)		Had more help		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
80	10	1	10.0%	1	10.0%	0	0.0%	0	0.0%	0	0.0%	1	10.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

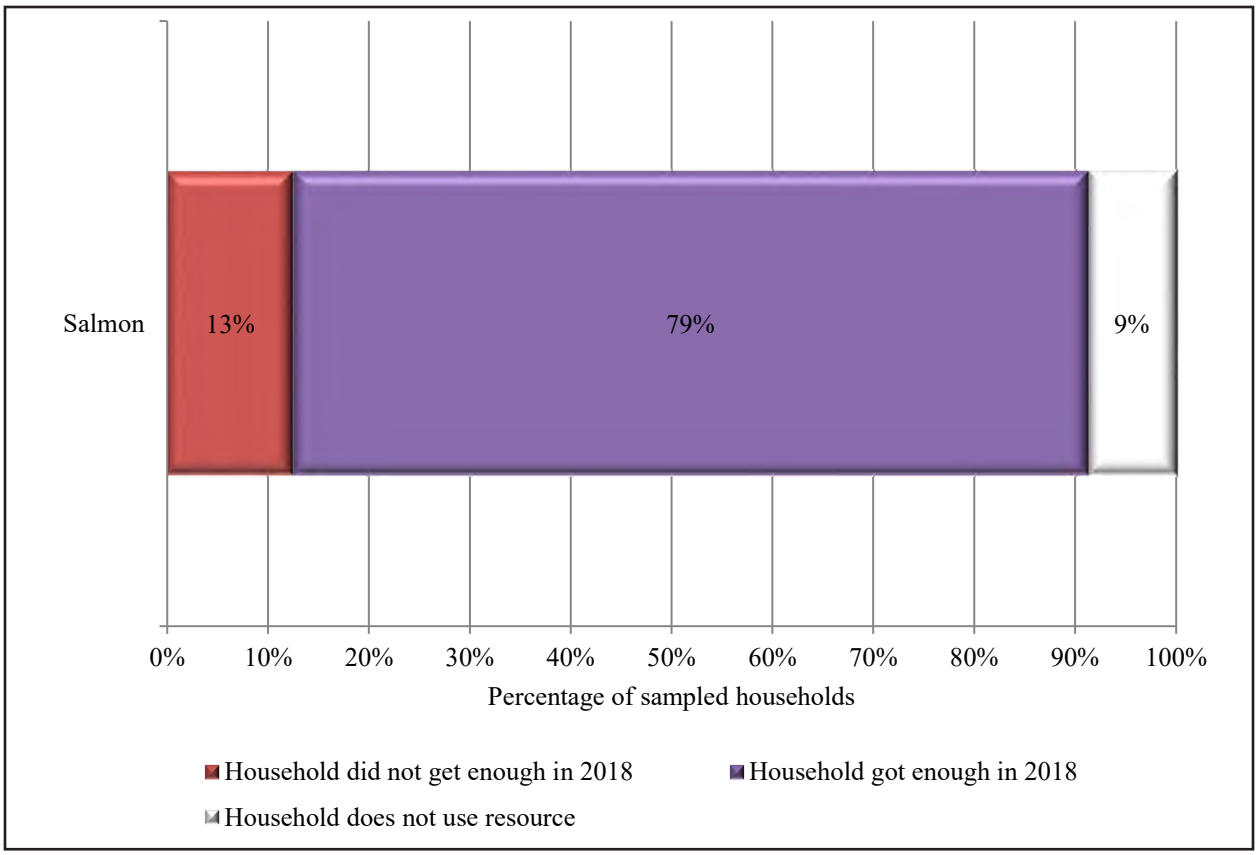


Figure 4-28.–Percentage of sampled households reporting whether they had enough salmon, Naknek, 2018.

Table 4-29.–Reported impact to households reporting that they did not get enough salmon, Naknek, 2018.

Sampled households	Households not getting enough salmon				Impact to those not getting enough salmon									
	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
80	73	91.3%	10	13.7%	4	40.0%	3	30.0%	2	20.0%	1	10.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 4-30.–Things households reported doing differently as the result of not getting salmon, Naknek, 2018.

Valid responses[a]	Bought/bartered		Used more commercial foods		Replaced with other subsistence foods		Asked others for help		Increased effort	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
7	0	0.0%	3	42.9%	2	28.6%	1	14.3%	0	0.0%

-continued-

Table 4-30.–Continued.

Valid responses[a]	Made do without		Obtained food from other sources		Got public assistance		Less sharing		Other reasons	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
7	0	0.0%	1	14.3%	0	0.0%	2	28.6%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 4-31.–Amount of salmon needed by households that did not have enough, Naknek, 2018.

Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
10	2,085	209

Source ADF&G Division of Subsistence household surveys, 2019.

Table 4-32.–Reasons that households worked harder to get more salmon, Naknek, 2018.

Sampled households	Valid responses	Households reporting… not working harder than usual	Households reporting… working harder than usual	Family/personal Number	Family/personal Percentage	Resource availability Number	Resource availability Percentage	Unsuccessful Number	Unsuccessful Percentage	More time Number	More time Percentage
80	44	42	2	0	0.0%	1	50.0%	0	0.0%	0	0.0%

-continued-

Table 4-32.–Continued.

Sampled households	Valid responses	Households reporting… not working harder than usual	Households reporting… working harder than usual	Small or diseased resources Number	Small or diseased resources Percentage	No equipment Number	No equipment Percentage	Other reasons Number	Other reasons Percentage	No response Number	No response Percentage
80	44	42	2	0	0.0%	0	0.0%	0	0.0%	1	50.0%

Source ADF&G Division of Subsistence household surveys, 2019.

Table 4-33.–Households reporting that they traveled farther or to different locations, Naknek, 2018.

Sampled households	Valid responses	Households reporting that they... traveled further	Households reporting that they... traveled to different locations
80	44	1	2

Source ADF&G Division of Subsistence household surveys, 2019.

Table 4-34.–Usual household harvest methods, Naknek, 2017.

Households providing valid response to question about usual salmon harvest method	Remove from commercial catch		Seine		Set gillnet		Rod and reel		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
51	14	27.5%	0	0.0%	43	84.3%	22	43.1%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Assessments of Salmon Harvest Methods

2017

Out of 51 Naknek households that answered questions about usual harvest methods, 43 (84% of households) indicated at least one usual salmon harvest method was subsistence set gillnet, 22 (43%) indicated at least one usual harvest method for salmon was rod and reel, and 14 (28%) indicated usually retaining commercial harvests for home use (Table 4-34). Of those 22 households that responded rod and reel is a usual salmon harvest method, reasons provided for why included: fun (19 households), tradition (five households), selectivity (two households), ease (two households), and other reasons (one household) (Table 4-35).

2018

Of the 49 households that answered the questions, 37 (76% of households) indicated at least one of their usual harvest methods for salmon was subsistence set gillnet, 22 (45%) indicated usually retaining commercial harvests, 13 (27%) indicated at least one usual salmon harvest method was rod and reel, and one (2%) indicated seine as a usual method (Table 4-36). Of those 13 households that responded rod and reel is a usual salmon harvest method, reasons provided for why included: fun (10 households), ease (three households), conservation (two households), and selectivity (one household) (Table 4-37).

Comparing Harvests in 2017 and 2018 with Estimated Harvests from Previous Study Years and Returned Subsistence Salmon Permits

Changes in the harvest of salmon by Naknek residents can also be discerned through comparisons with findings from other study years and data from the subsistence permit database; the permit data collected by ADF&G begins in 1983. Comprehensive subsistence harvest surveys were conducted in Naknek for the study years 1983 and 2007 (Holen et al. 2011; Morris 1985).

As discussed above, for 2017 and 2018, Division of Subsistence staff members opportunistically collected unreturned permits from households in Naknek; the data from previously unreturned permits were then included in the subsistence permit database. Three goals of the 2017 and 2018 household salmon surveys included collecting unreturned subsistence permits from Naknek households, gathering harvest data from households that did not obtain a subsistence permit but did subsistence fish, and collecting information about the amount of salmon retained from commercial catches for home use or harvested using rod and reel. This additional information collected through the administration of household surveys provides a more accurate representation of a Naknek fishing season and total harvests for home use than data from returned subsistence salmon permits alone. As mentioned above, a total of 10 and 19 additional permits were collected as a result of the survey efforts for 2017 and 2018, respectively; this resulted in a higher percentage of returned household permits—89% and 88%—than historically average (85%), as well as improved permit return rates both years (tables 4-14, 4-16, and 4-38). In Naknek, the permit return rate prior to survey administration was 84% in 2017 and 69% in 2018, but the return rates improved to 89% and 88%, respectively, after surveys were conducted (Table 4-14; Table 4-16).

According to both the salmon harvest survey data and the subsistence permit system, Naknek subsistence salmon harvests have increased overall since 1983; however, much year-to-year fluctuation in harvest

Table 4-35.–Reasons for using a rod and reel to harvest salmon, Naknek, 2017.

Households using rod and reel	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
22	0	0.0%	2	9.1%	0	0.0%	5	22.7%	2	9.1%	19	86.4%	1	4.5%

Source ADF&G Division of Subsistence household surveys, 2018.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 4-36.–Usual household harvest methods, Naknek, 2018.

Households providing valid response to question about usual salmon harvest method	Remove from commercial catch		Seine		Set gillnet		Rod and reel		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
49	22	44.9%	1	2.0%	37	75.5%	13	26.5%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 4-37.–Reasons for using a rod and reel to harvest salmon, Naknek, 2018.

Households using rod and reel	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
13	2	15.4%	1	7.7%	0	0.0%	0	0.0%	3	23.1%	10	76.9%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

numbers has occurred over the 35 years (Figure 4-29—Total Salmon). Based on subsistence permit data spanning 1983 through 1986, subsistence salmon harvests increased from approximately 7,000 salmon to approximately 12,500 salmon (Table 4-38). The harvest amounts dropped to as low as 8,000 salmon during the ensuing four years. However, beginning in 1991 the harvest amounts began to rise again, peaking at an estimated 18,594 salmon in 1997, and then declining and remaining relatively steady between the range of 12,500–9,000 salmon harvested for the remaining years. The historical average subsistence harvest of all salmon species based on permit data from 1983–2018 was 11,570 fish, the 10-year (2009–2018) average was 11,260 salmon, and the five-year (2014–2018) average was 11,605 fish. Surprisingly, the number of permits issued each year has decreased slightly over time since 1983. For example, the historical average from 1983–2018 was 110 issued permits, the 10-year (2009–2018) average was 97 issued permits, and the five-year (2014–2018) average was 94 issued permits.

Based on the post-season harvest survey data, the total community subsistence harvest estimates increased from 1983 to 2007, but remained relatively steady from 2007 to 2018 (Figure 4-30). The difference between the highest and lowest harvests in the latter three study years was 1,835 fish (Table 4-39). For example, 5,161 salmon were harvested for subsistence in 1983, the 2007 salmon harvest was 11,956 fish, 10,926 salmon were harvested in 2017, and 10,121 fish were harvested in 2018 (Figure 4-29–Total Salmon; Table 4-39). However, it should be noted no salmon harvest surveys occurred in the late 1990s—the timeframe when harvests increased based on the subsistence permit data. Mirroring the pattern identified for the survey-based harvest estimates, the population of Naknek increased from 383 individuals in 1983 to 533 individuals in 2007 (Figure 4-2).

According to both the salmon harvest survey data and the subsistence permits, the subsistence harvest of sockeye salmon has increased slightly since the 1980s but has remained relatively steady over time (Table 4-38; Figure 4-29—Sockeye Salmon; Table 4-39). Because sockeye salmon harvests compose such a large proportion of the total salmon harvest each year for Naknek, the subsistence harvests of sockeye salmon over time reflect the fluctuations identified above for all salmon species combined. According to subsistence permit data, the historical average harvest of sockeye salmon from 1983–2018 was 10,209 fish, the 10-year (2009–2018) average was 10,420 fish, and the five-year (2014–2018) average was 10,595 fish (Table 4-38). According to the post-season harvest survey data, the sockeye salmon subsistence harvest estimates (excluding spawnouts) increased over time (Figure 4-29—Sockeye Salmon). In 1983 the sockeye salmon harvest was 4,414 fish, in 2007 the harvest was 10,256 fish, in 2017 a total of 8,679 sockeye salmon were harvested, and in 2018 a total of 9,167 sockeye salmon were harvested (Figure 4-29–Sockeye Salmon; Table 4-39). Sockeye salmon harvests from subsistence nets has been the method used to obtain the largest proportion of this salmon species over time (Figure 4-31). The percentage of sockeye salmon harvested by subsistence nets has ranged between 68%–94% of the total sockeye salmon harvest in a given year: 79% in 1983, 68% in 2007, 88% in 2017, and 94% in 2018. With the expectation of 2007, sockeye salmon harvests retained from commercial catches have remained relatively steady over time. The percentage of sockeye salmon harvested through commercial removals has ranged 6%–30% of the total sockeye salmon harvest in a given year: 18% in 1983, 30% in 2007, 12% in 2017, and 6% in 2018. According to Holen et al. (2011:91), during the 2007 study year commercially harvested salmon were paid a lower price, leading to an increase in Naknek residents keeping more of their commercial catches for home use.

For coho salmon, according to both the salmon harvest survey data and the subsistence permits, harvest estimates have fluctuated over time. Based on data from the subsistence permits, the historical average harvest from 1983–2018 was 451 fish, the 10-year (2009–2018) average was 360 fish, and the five-year (2014–2018) average was 416 fish (Table 4-38). According to post-season harvest surveys used to estimate subsistence harvests, in 1983 an estimated 170 coho salmon were harvested, the harvest estimate in 2007 was 830 coho salmon, in 2017 the harvest was 964 fish, and in 2018 an estimated 329 coho salmon were harvested (Figure 4-29—Coho Salmon; Table 4-39). Like the fluctuation apparent in harvest estimates over time, the gear used to harvest coho salmon has also varied during study years (Figure 4-32). In 1983, 65% of the overall coho salmon harvest came from harvests by rod and reel, and the remaining 18% and 17% of the harvest came from commercial catches and harvests by subsistence nets, respectively (Figure 4-31). The next study year, the lowest proportion of the harvest of coho salmon came from harvests by rod

Table 4-38.–Historical estimated subsistence salmon harvests, based on Bristol Bay permit returns, Naknek, 1983–2018.

	Permits		Percentage of returned	Estimated salmon harvest					
Year	Issued	Returned	permits	Chinook	Sockeye	Coho	Chum	Pink	**Total**
1983	105	88	83.8%	449	6,004	472	211	48	**7,185**
1984	111	101	91.0%	363	7,950	309	185	538	**9,345**
1985	119	93	78.2%	573	9,454	574	313	113	**11,027**
1986	124	90	72.6%	434	9,864	390	249	1,545	**12,482**
1987	134	115	85.8%	649	9,282	700	337	126	**11,095**
1988	110	99	90.0%	547	6,391	317	215	565	**8,035**
1989	127	107	84.3%	512	8,620	458	249	29	**9,867**
1990	130	111	85.4%	405	7,948	273	227	337	**9,190**
1991	133	116	87.2%	516	11,585	467	301	44	**12,913**
1992	128	97	75.8%	592	9,555	471	329	655	**11,602**
1993	114	91	79.8%	702	10,321	750	272	73	**12,118**
1994	115	96	83.5%	629	9,660	601	162	236	**11,288**
1995	117	91	77.8%	671	11,431	547	233	56	**12,938**
1996	119	89	74.8%	778	11,654	854	350	398	**14,034**
1997	145	122	84.1%	1,623	15,525	1,006	280	161	**18,594**
1998	118	105	89.0%	588	14,618	738	334	581	**16,859**
1999	110	95	86.4%	418	13,435	381	189	41	**14,463**
2000	108	96	88.9%	311	10,873	314	177	177	**11,851**
2001	107	94	87.9%	357	11,320	357	205	163	**12,403**
2002	104	86	82.7%	266	9,647	299	253	445	**10,909**
2003	113	97	85.8%	513	9,542	463	54	6	**10,577**
2004	108	86	79.6%	359	8,877	206	349	885	**10,677**
2005	104	92	88.5%	383	10,165	271	137	19	**10,975**
2006	108	91	84.3%	433	9,769	236	158	514	**11,109**
2007	94	86	91.5%	249	10,682	408	114	82	**11,535**
2008	100	91	91.0%	335	9,141	769	184	417	**10,846**
2009	101	88	87.1%	209	10,097	407	45	18	**10,776**
2010	100	82	82.0%	226	11,133	330	133	78	**11,900**
2011	98	91	92.9%	234	10,814	379	112	24	**11,563**
2012	106	84	79.2%	273	10,318	227	49	207	**11,074**
2013	95	84	88.4%	119	8,862	174	88	0	**9,267**
2014	99	90	90.9%	243	11,808	188	199	272	**12,709**
2015	94	87	92.6%	269	11,905	357	69	29	**12,628**
2016	85	74	87.1%	385	9,873	368	134	214	**10,973**
2017	103	92	89.3%	400	9,769	781	142	47	**11,140**
2018	89	78	87.6%	406	9,622	386	89	71	**10,574**
5-year avg (2014–2018)	94	84	89.6%	341	10,595	416	127	126	**11,605**
10-year avg (2009–2018)	97	85	87.6%	276	10,420	360	106	96	**11,260**
Historical avg (1983–2018)	110	94	84.9%	456	10,209	451	198	256	**11,570**

Source ADF&G Division of Subsistence, ASFDB 2018 (ADF&G May 2019).

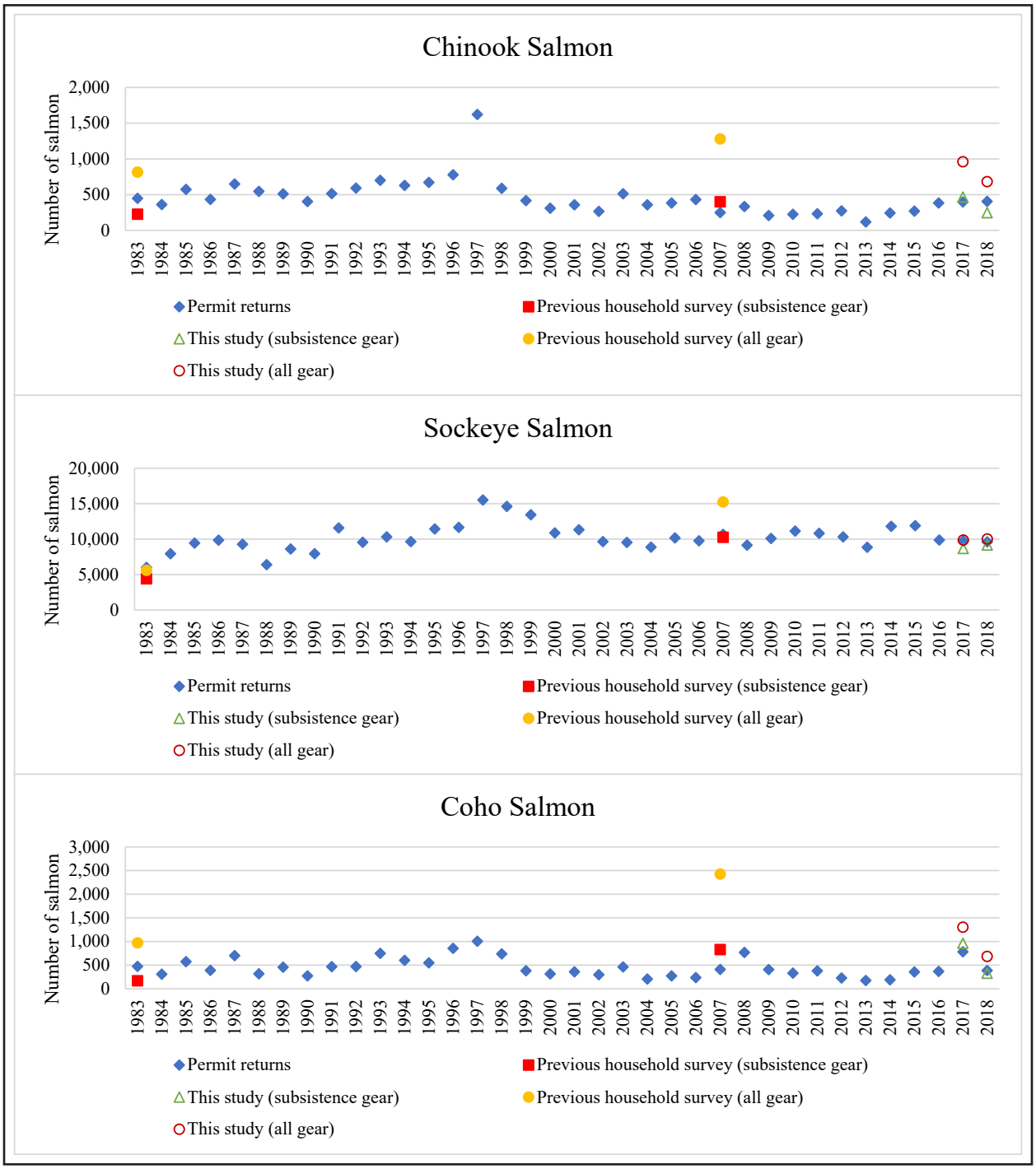
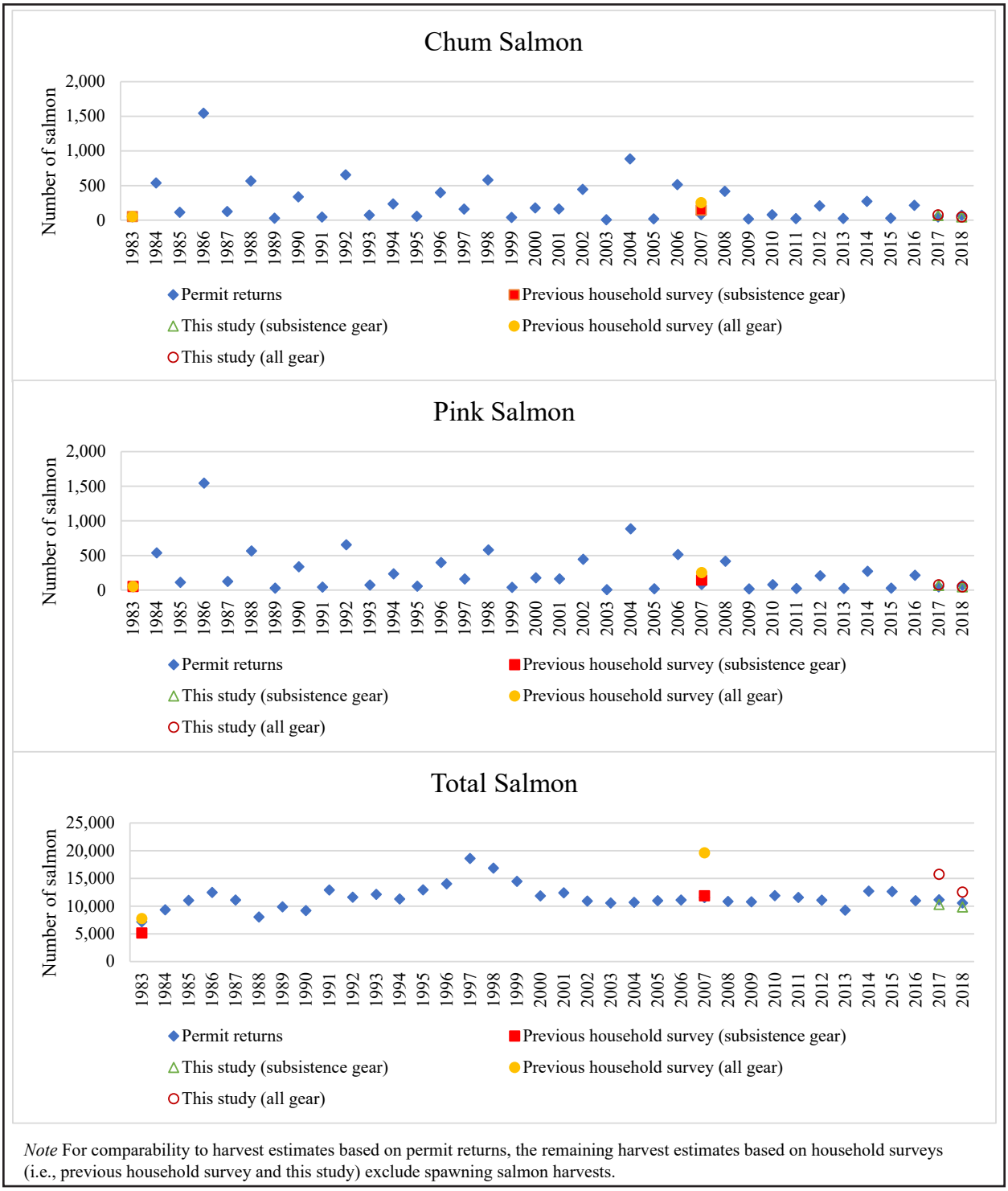


Figure 4-29.–Comparison of historical estimated salmon harvests, based on Bristol Bay permit returns, 1983–2018, and based on household surveys, Naknek, 1983, 2007, 2017, and 2018.

Figure 3-27.–Page 2 of 2.



Note For comparability to harvest estimates based on permit returns, the remaining harvest estimates based on household surveys (i.e., previous household survey and this study) exclude spawning salmon harvests.

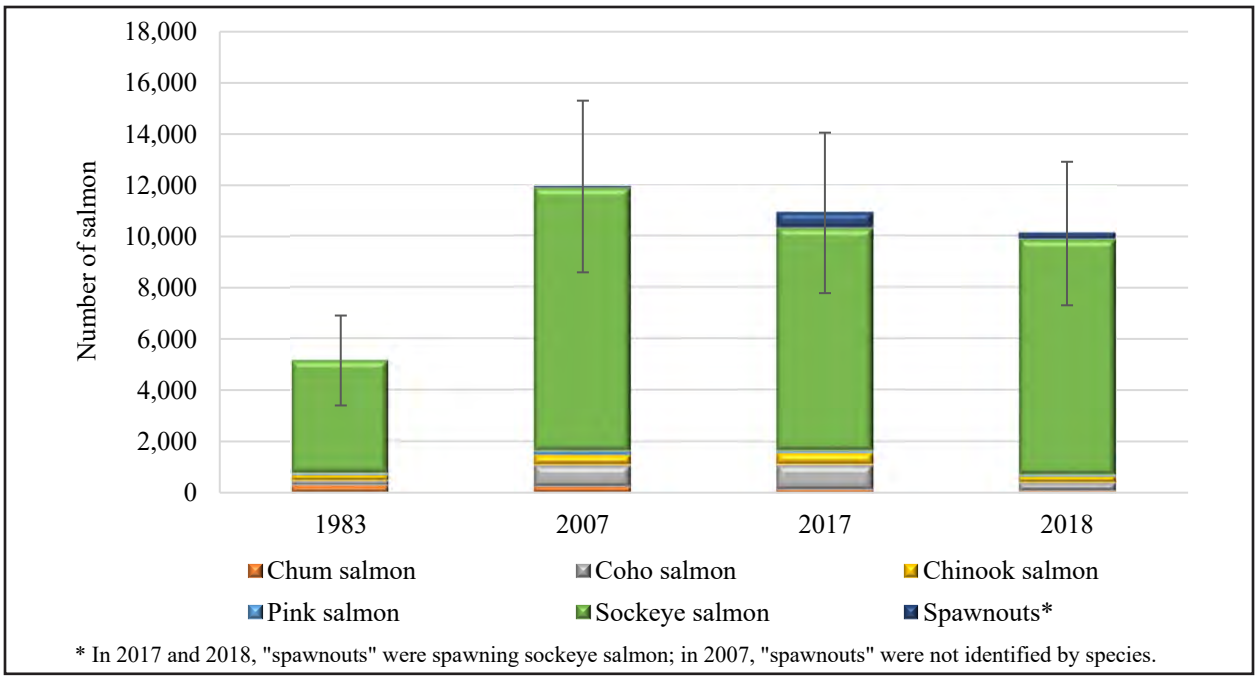


Figure 4-30.–Composition of historical estimated subsistence salmon harvests, by individual fish and based on household surveys, Naknek, 1983, 2007, 2017, and 2018.

and reel (31%), while 34% of the harvest came from subsistence nets and 35% of the harvest came from commercial catches in 2007. During 2017, 15% and 12% of the overall coho salmon harvest came from commercial catches and harvests by rod and reel, respectively, and the remaining 74% of the harvest came from subsistence nets. The next study year, a higher proportion of the harvest of coho salmon overall came from gear other than subsistence nets: 35% of coho salmon were removed from commercial harvests and 17% were caught by rod and reel. Subsequently, in comparison to 2017, a much smaller proportion of the coho salmon harvest—48%—was caught by subsistence nets in 2018.

Post-season household survey results and the permit data demonstrate that Chinook salmon harvests have not contributed a large portion of the total salmon harvest in any given year. Based on the permit data, the highest estimated Chinook salmon subsistence harvest was 1,623 fish in 1997, and, according to the survey data, the highest estimated Chinook salmon harvest occurred in 2017 when 468 fish were harvested (Figure 4-29—Chinook Salmon). The historical average harvest of Chinook salmon from 1983–2018 was 456 fish, the 10-year (2009–2018) average was 276 fish, and the five-year (2014–2018) average was 341 fish (Table 4-38). From the harvest surveys, the total Chinook salmon subsistence harvest estimates were 227 fish in 1983, 401 fish in 2007, 468 fish in 2017, and 249 fish in 2018 (Table 4-39). Chinook salmon harvests retained from commercial catches and harvests from subsistence nets have remained relatively steady over time (Figure 4-32). The percentage of Chinook salmon harvested through commercial removals has ranged 44%–62% of the total Chinook salmon harvest in a given year: 44% in 1983, 62% in 2007, 49% in 2017, and 62% in 2018 (Figure 4-31). The percentage of Chinook salmon harvested by subsistence nets has ranged 28%–49% of the total Chinook salmon harvest in a given year: 28% in 1983, 31% in 2007, 49% in 2017, and 36% in 2018. However, a decrease in the percentage of Chinook salmon harvested by rod and reel over time has occurred: in 1983 approximately 28% of the total Chinook salmon harvest was caught using rod and reel, which lowered to 7% in 2007, and 2% in 2017 and 2018. Pink salmon and chum salmon are typically not the preferred salmon species of Naknek residents, and according to post-season household harvest surveys and the subsistence permit data, historically and contemporarily these species combined have predominantly made up less than 6% of the total subsistence salmon harvest composition (Table 4-39; Table 4-38).

Table 4-39.–Historical estimated subsistence salmon harvests, based on household surveys, Naknek, 1983, 2007, 2017, and 2018.

	Estimated salmon harvest[a]							
	1983				2007			
Resource	Number	Pounds	Per capita (lb)	CIP	Number	Pounds	Per capita (lb)	CIP
Salmon	**5,161.0**	**22,639.0**	**59.1**	**34.0%**	**11,956.2**	**54,455.7**	**102.2**	**28.0%**
Chum salmon	298.0	1,282.0	3.4	118.0%	241.7	1,179.5	2.2	86.3%
Coho salmon	170.0	699.0	1.8	91.0%	829.5	4,230.4	7.9	23.2%
Chinook salmon	227.0	3,315.0	8.7	39.0%	401.0	4,447.2	8.3	27.2%
Pink salmon	52.0	130.0	0.3	142.0%	145.6	435.3	0.8	86.4%
Sockeye salmon	4,414.0	17,214.0	44.9	37.0%	10,256.1	43,998.5	82.6	26.4%
Spawnouts[b]	0.0	0.0	0.0	0.0%	82.4	164.8	0.3	100%
Unknown salmon	0.0	0.0	0.0	0.0%	0.0	0.0	0.0	0%

-continued-

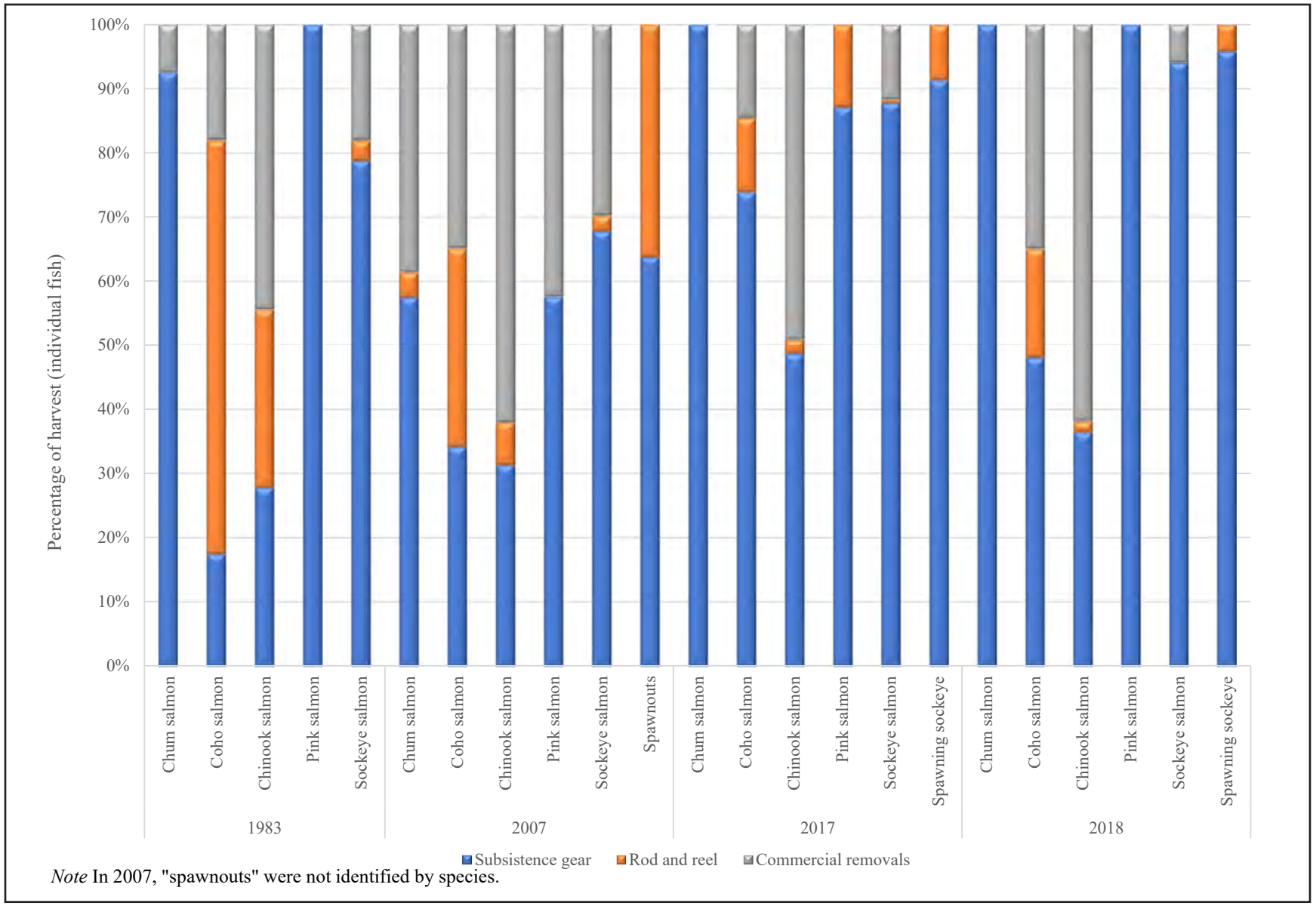
Table 4-39.–Continued.

	Estimated salmon harvest[a]							
	2017				2018			
Resource	Number	Pounds	Per capita (lb)	CIP	Number	Pounds	Per capita (lb)	CIP
Salmon	**10,926.1**	**46,170.9**	**111.9**	**28.7%**	**10,120.9**	**39,821.8**	**91.7**	**27.7%**
Chum salmon	122.4	575.9	1.4	59.0%	65.0	303.5	0.7	88.0%
Coho salmon	963.5	4,593.3	11.1	46.9%	329.0	1,604.7	3.7	51.0%
Chinook salmon	467.9	3,881.8	9.4	33.6%	248.6	1,880.2	4.3	34.8%
Pink salmon	67.1	183.4	0.4	64.3%	47.8	124.6	0.3	89.1%
Sockeye salmon	8,679.3	34,452.2	83.5	31.6%	9,166.6	34,903.9	80.4	28.3%
Spawnouts[b]	625.9	2,484.4	6.0	67.6%	263.9	1,005.0	2.3	88.9%
Unknown salmon	0.0	0.0	0.0	0.0%	0.0	0.0	0.0	0.0%

Sources For 2017 and 2018, ADF&G Division of Subsistence household surveys, 2018, 2019; for previous study years, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2019.

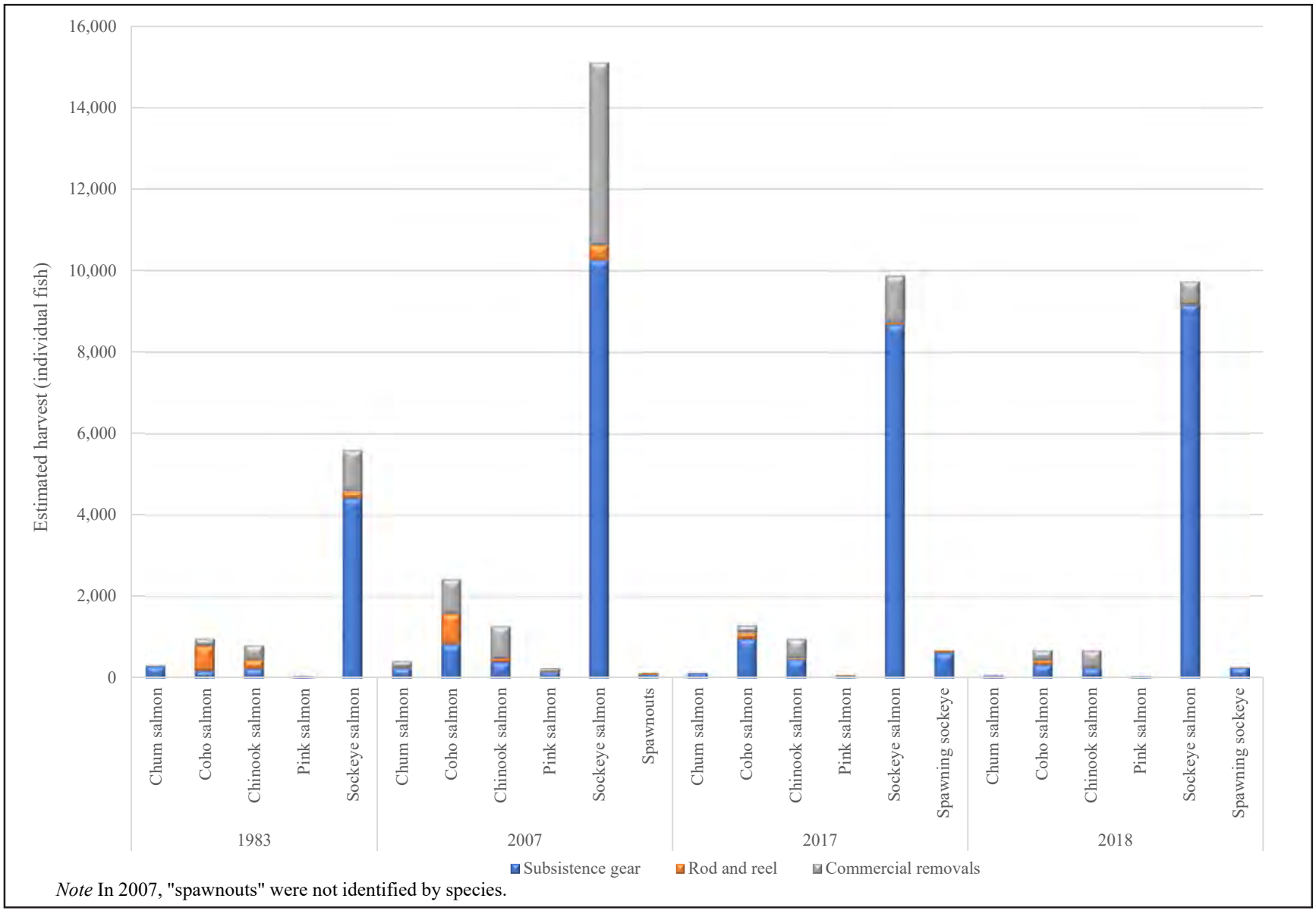
a. Includes subsistence gear types only.

b. In 2017 and 2018, "spawnouts" were spawning sockeye salmon; in 2007, "spawnouts" were not identified by species.



Note In 2007, "spawnouts" were not identified by species.

Figure 4-31.–Historical proportion of salmon harvests, by individual fish and by species, harvested by gear type, Naknek, 1983, 2007, 2017, and 2018.



Note In 2007, "spawnouts" were not identified by species.

Figure 4-32.–Historical estimated salmon harvests, by individual fish and by species, harvested by gear type, Naknek, 1983, 2007, 2017, and 2018.

The subsistence permits do not ask separately about the harvests of spawning sockeye salmon and non-spawning sockeye salmon; therefore, the only available data for spawning sockeye salmon harvests are from the post-season household surveys. In 1983, spawning sockeye salmon were not reported separately from sockeye salmon; therefore, no harvests were reported in that study year. In 2007, an estimated 82 spawning salmon were harvested by Naknek households. This study found an increased estimated spawning salmon harvest amount when compared with the 2007 data. In 2017, Naknek residents harvested an estimated 626 spawning sockeye salmon, and in 2018 an estimated 264 spawning sockeye salmon were harvested (Table 4-39).

Local Comments and Concerns

Following is a summary of local comments, concerns, and observations related to salmon resource populations and harvest trends that were recorded during the surveys in Naknek. Some households did not offer any additional information during the survey interviews, so not all households are represented in the summary. In addition, respondents expressed their concerns about salmon during the community review meeting of preliminary data. Comments and concerns collected during household surveys and the community data review meeting are further contextualized with qualitative information obtained from key respondent interviews and participant observation. These concerns have been included in the summary.

Bears

Naknek residents remarked on the number of brown bears in the Naknek area in 2017 and 2018. Respondents cited seeing bears while subsistence fishing on popular beaches, and several community members remarked on bears breaking into smokehouses in their yards. Several people perceived the increase in bears was a result of some subsistence users leaving salmon in nets as the tide recedes. Others cited a lack of action to mitigate aggressive bears by ADF&G.

Pebble Mine

Concerns regarding Pebble Mine, an open-pit copper/gold/molybdenum mine proposed at Bristol Bay's headwaters, were mentioned during both years of household harvest surveys. Feedback from Naknek respondents included remarks about the potential threats to fish populations, subsistence and commercial fisheries, and other natural resources if the Pebble Mine were developed. The risk of pollution and contamination from the mine site worried Naknek survey respondents. Not a single comment from any survey or interview data supported Pebble Mine. All perspectives focused on the mine's potential negative effects on the region's salmon fisheries and the health of Bristol Bay's ecosystem and economy.

Naknek River Special Harvest Area

Naknek residents remarked on the challenges they experienced while subsistence fishing during the Naknek River Special Harvest Area opening in 2018. Several people explained that they had to stop subsistence fishing because of gear conflicts with commercial stakeholders. One respondent said commercial boats drove over subsistence nets, and another respondent described large waves from commercial boat traffic disturbing subsistence setnet running lines. Several Naknek community members stopped subsistence fishing during the Naknek River Special Harvest Area opening because of these conflicts. Some Naknek residents commented about the need for a special area for subsistence users to go to when commercial fishing is allowed in the Naknek River.

Sport Fishing in the Naknek River

The number of nonlocal sport fishing participants traveling to fish in the Naknek River and Naknek Lake was a concern for several Naknek households in 2017 and 2018. Feedback from Naknek respondents included remarks about high salmon mortality rates from catch-and-release practices, and disturbances to the local river system from increased sport fishing traffic. Several Naknek residents explained that the guided sport fishing season was operating later than it used to; these community members explained that the extended season is creating conflicts for local residents attempting to moose hunt along the Naknek River.

Subsistence Fishing in Katmai National Park

Some Naknek respondents mentioned an apprehension toward harvesting spawning sockeye salmon in Katmai National Park. These respondents cited being questioned by National Park Service enforcement officers, and often stated feeling like they are committing a crime when subsistence fishing in the national park. Other respondents interviewed for this project did not know the rules for fishing in the national park and some did not know if they qualified to subsistence fish in the national park. One respondent explained that the national park's superintendent has a list of families that are eligible, and it was unclear to this respondent if they were on this list. Other respondents explained they have family connections in Iliamna Lake, and, rather than fishing in Naknek Lake, some explained that they prefer to travel to Iliamna Lake to harvest spawning sockeye salmon, and others cited trading subsistence goods with these Iliamna Lake family members for spawning sockeye salmon.

Subsistence Participation Levels

Throughout this project, some Naknek residents remarked on the number of local families who no longer subsistence fish. Some respondents suggested more Naknek households are buying fish from commercial processors rather than harvesting and processing subsistence fish. Others described households harvesting their own salmon with subsistence gear, but instead of processing it themselves, paying small commercial processors to process their subsistence salmon. These small local commercial processors offer services including fileting, flash freezing, vacuum sealing, and smoking. Some Naknek residents viewed these services as a positive resource for community members, while others were worried buying salmon or using commercial processors may lead to a decrease in subsistence interest by the next generation.

Subsistence Permits

During the surveys and interviews, some Naknek residents remarked that no longer having harvest limits listed on subsistence permits is a positive change. These residents explained that in the past they were concerned they may accidently surpass the harvest limits during a single set while the salmon run was strong. Regarding spawning sockeye salmon harvests, during the surveys several households reported not recording these harvests on their subsistence permits because they already returned the permit to ADF&G. One survey respondent suggested ADF&G add a separate column to the permit for spawning sockeye salmon as a reminder to record these salmon.

5. SOUTH NAKNEK

Community Setting

South Naknek is located on the southern shore of the Naknek River, directly across from the community of Naknek. This community is not connected by road to Naknek and King Salmon, and it is 300 airmiles from Anchorage. South Naknek is accessible only by boat, airplane, or a winter road that crosses the frozen river and connects communities on the north and south sides of Naknek River.

Much of the community is situated along a bluff overlooking the Naknek River. The western portion of South Naknek begins where the Naknek River flows into the Kvichak Bay; however, the community center is located approximately 2.5 miles east of the confluence. The tidally dependent shoreline at the base of the bluff bordering the community is composed of sandy patches with large expanses of mud flats. The lands surrounding the houses, canneries, and community buildings are composed of overgrown fields of grass, and, more recently, alders. Beyond the small community is open country that is spotted with tundra and kettle ponds and stands of black spruce and thick alders.

Once a thriving fishing community, contemporary South Naknek has few services located in the community. A public library and post office are open year-round. The South Naknek school closed over a decade ago, and the few remaining students who reside in the community are flown daily to a school in Naknek. None of the commercial salmon canneries are currently in operation, and a local bar/restaurant that was open seasonally in the community relocated to Naknek in 2018.

Population Estimates and Demographic Information: 2017 and 2018

This study found an estimated population for South Naknek in 2017 of 46 individuals in 28 households, and in 2018 the population was estimated to be 38 individuals in 26 households (Table 5-1). For both years, the population estimates from this study were lower than the 2010 U.S. federal census of 79 individuals in 35 households, but similar to the American Community Survey (ACS) five-year average estimates for 2013–2017 (47 individuals in 27 households) and 2014–2018 (41 individuals in 18 households) (Figure 5-1; Table 5-1). A reason these estimates differ may relate to different criteria used by the agencies to determine full-time residency. The criteria employed in this study required at least six months of occupancy in the community during the study years (2017 and 2018) and self-identification as a full-time resident.

The population of South Naknek has decreased since the mid-1980s (Figure 5-2). According to the Alaska Department of Labor population estimates, the community began to experience population decline in 1986 when the population declined by 18 residents from the previous year (population of 195 residents in 1985, and population of 177 in 1986). In 1995, the Division of Subsistence and the Alaska Department of Labor estimated the population of South Naknek to be 144 and 148, respectively. Evident of further population decline, in 2010 the U.S. federal census identified 79 individuals residing in South Naknek. Since 2010, the population of South Naknek has remained less than 100.

The majority of the households in South Naknek had an Alaska Native head of household: 74%–79% of households in 2017 and 2018, respectively (Table 5-1). The 2017 study estimated the average age of South Naknek residents to be 44 years old, with the youngest individual being less than 1 year old and the oldest individual being 87 years old. The 2018 study estimated the average age of South Naknek residents to be 54 years old with the youngest individual being 15 years old and the oldest individual being 88 years old.

Table 5-1.–Sample and demographic characteristics, South Naknek, 2010, 2017, and 2018.

Characteristics	2017	2018
Sampled households	23	19
Eligible households	28	26
Percentage sampled	82.1%	73.1%
Sampled population	38	28
Estimated community population	46.3	38.3
Range[a]	42 – 51	34 – 43
Household size		
Mean	1.7	1.5
Minimum	1.0	1.0
Maximum	4.0	3.0
Age		
Mean	43.8	53.6
Minimum[b]	0	15
Maximum	87	88
Median	51	59
Alaska Native		
Estimated households[c]		
Number	20.7	20.5
Percentage	73.9%	78.9%
Estimated population		
Number	32.9	31.5
Percentage	71.1%	82.1%
Range[a]	27 – 39	27 – 36

U.S. Census	**2010**
Households	35
Population	79
Alaska Native population	66

ACS 5-year average	**(2013–2017)**	**(2014–2018)**
Households	27	18
Range[d]	18 – 36	9 – 27
Population	47	41
Range[d]	31 – 63	21 – 61
Alaska Native population	37	36
Range[d]	21 – 53	17 – 55

Sources U.S. Census Bureau (n.d.) for 2010 decennial census data, and for American Community Survey (ACS) five-year estimate for 2107 (2013–2017) and 2018 (2014–2018); and ADF&G Division of Subsistence household surveys, 2018 for 2017 estimate, and 2019 for 2018 estimate.

a. Range for estimates represent a 95% confidence interval.

b. A minimum age of 0 (zero) is used for infants who are less than 1 year of age.

c. The estimated number of households in which at least one head of household is Alaska Native.

d. ACS data range is the reported margin of error.

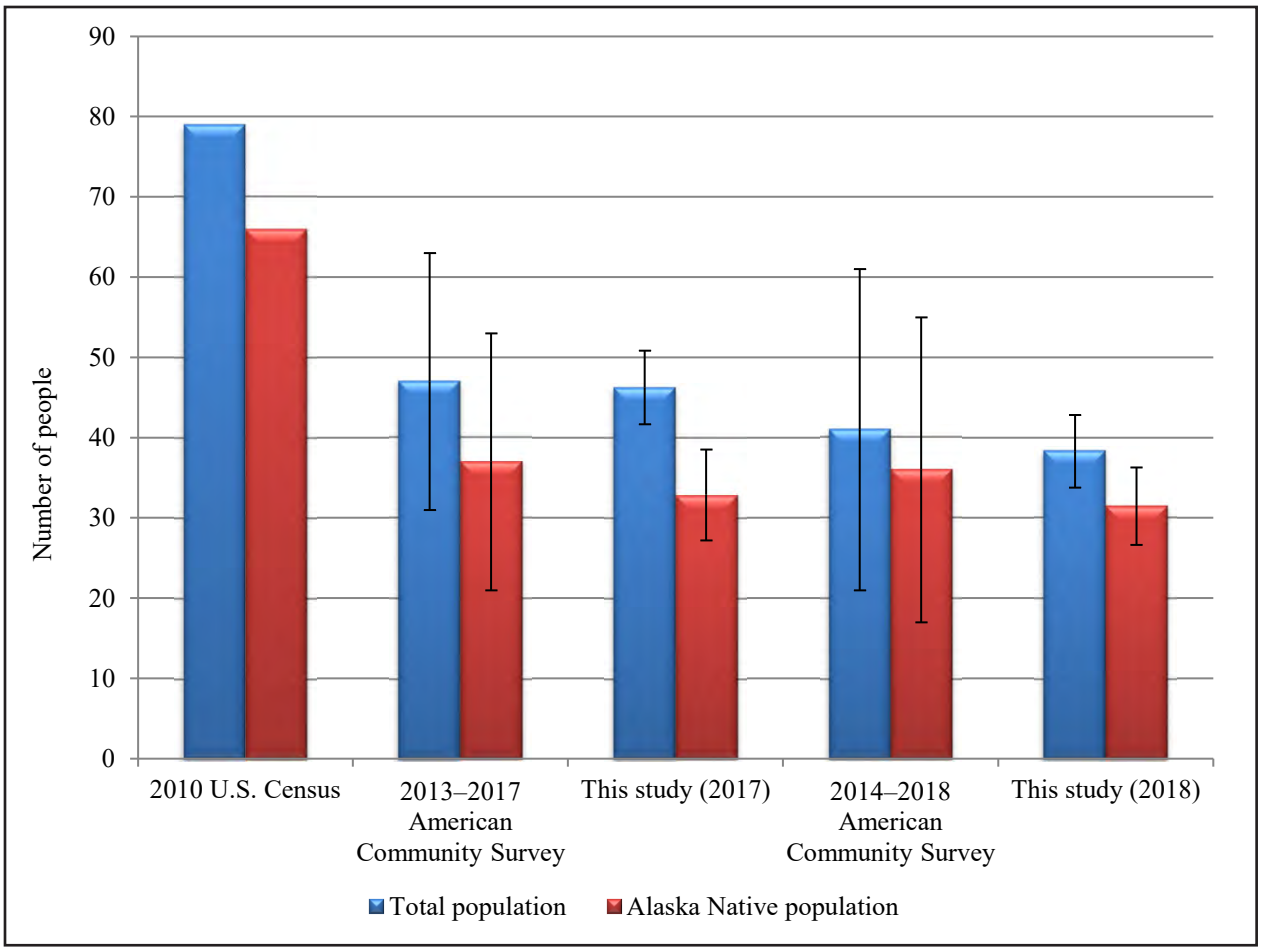


Figure 5-1.–Alaska Native and overall population estimates, South Naknek, 2010, 2017, and 2018.

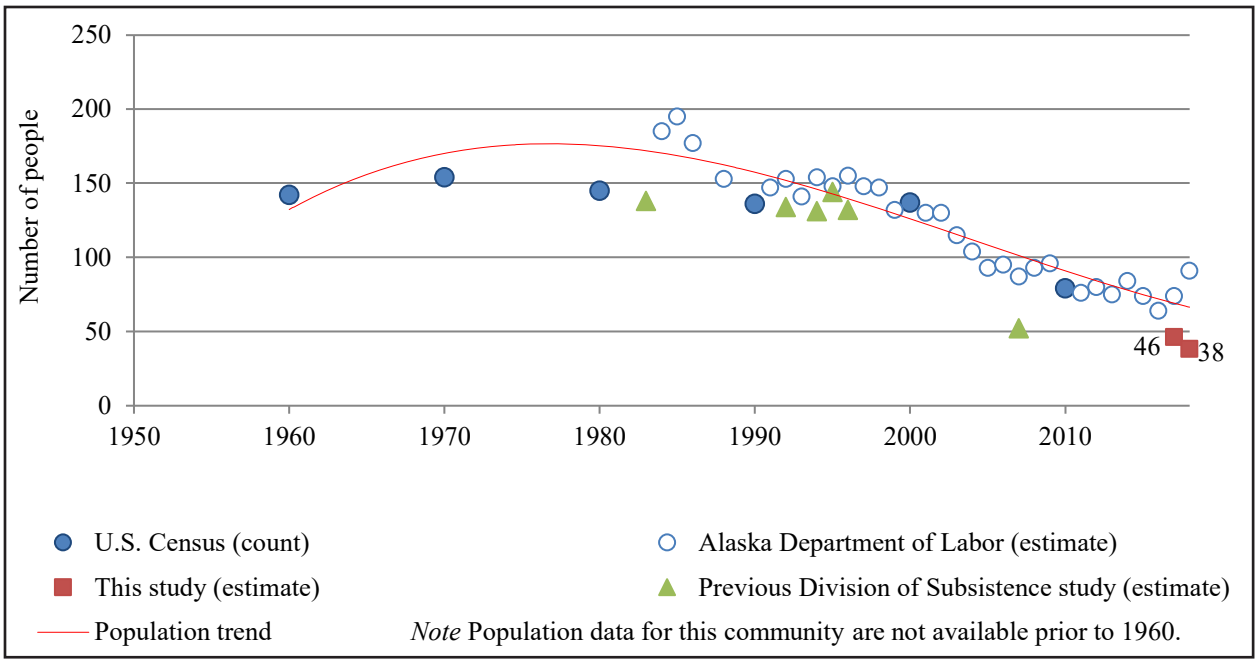


Figure 5-2.–Historical population estimates, South Naknek, 1950–2018.

The South Naknek population did not have a large representation of youth in the community during the two study years as evidenced by the infrequency of individuals younger than the age of 20 living in the community (Figure 5-3; Figure 5-4). Individuals in youth age cohorts made up 11% of the total population in 2017, and 4% in 2018 (Table 5-2; Table 5-3). Additionally, the male-to-female youth ratio was uneven during both study years: no male youth in 2017 and no female youth in 2018. Overall, both the 2017 and 2018 population profiles indicate that the ratio of males versus females was unevenly distributed within many age cohorts in South Naknek (Figure 5-3; Figure 5-4). For the 2017 study year, the largest female age cohorts were for the ages of 0–4, 20–24, and 55–59 (approximately four individuals in each cohort), followed by ages 60–64 and 85–89 (approximately two individuals in each cohort) (Table 5-2). The largest male age cohort in 2017 was for the ages of 50–54 (approximately five individuals), followed by ages 30–34 and 60–64 (approximately four individuals in each cohort). In 2018, the largest female age cohorts were for the ages of 55–59, 65–69, and 85–89 (approximately three individuals in each cohort) (Table 5-3). The largest male age cohorts in 2018 were for the ages of 50–54 and 60–64 (approximately seven individuals in each cohort), followed by ages of 55–59 (approximately four individuals).

The 2017 survey estimated 48% of household heads' parents were living in South Naknek at the time of their birth, while 29% of household heads' parents were living outside of Alaska in other parts of the United States at the time of their birth (Table 5-4). In 2017, the majority, or 53%, of South Naknek's total population had parents living in South Naknek when they were born, while 24% of the general population had parents who were living outside of Alaska in other parts of the United States at the time of their birth (Table 5-5). The 2018 survey estimated 50% of household heads' parents were living in South Naknek at the time of their birth, while 21% of household heads' parents were living outside of Alaska in other parts of the country at the time of their birth (Table 5-6). In 2018, 46% of South Naknek's total population had parents living in South Naknek when they were born, while 18% of the total population parents who were living outside of Alaska in other parts of the United States at the time of their birth (Table 5-7).

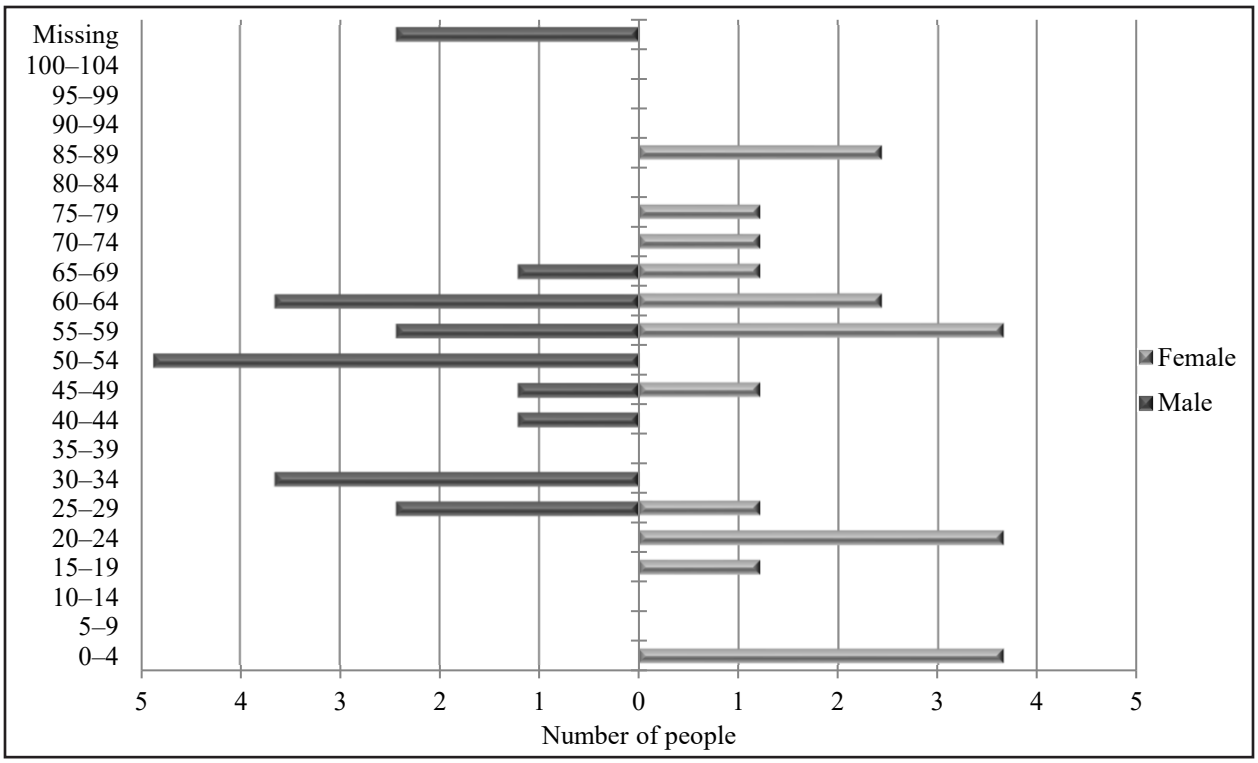


Figure 5-3.–Population profile, South Naknek, 2017.

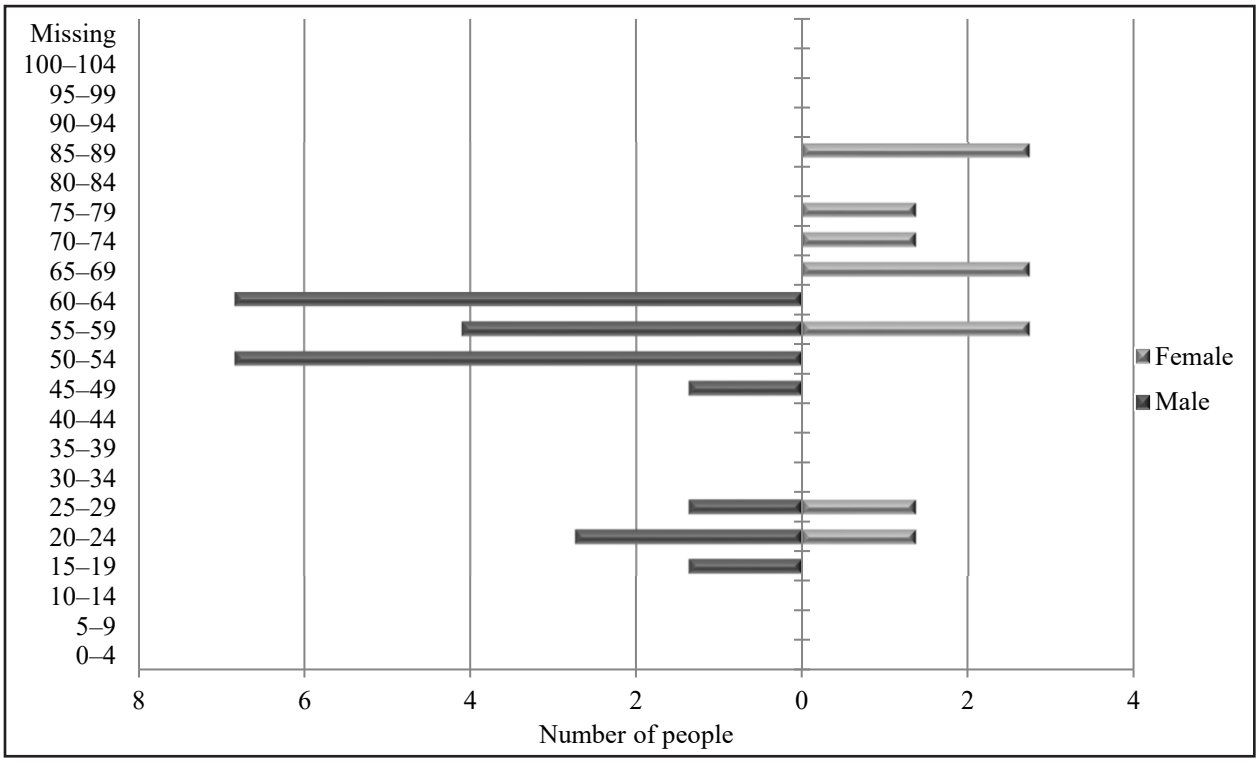


Figure 5-4.–Population profile, South Naknek, 2018.

Table 5-2.–Population profile, South Naknek, 2017.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	0.0	0.0%	0.0%	3.7	15.8%	15.8%	3.7	7.9%	7.9%
5–9	0.0	0.0%	0.0%	0.0	0.0%	15.8%	0.0	0.0%	7.9%
10–14	0.0	0.0%	0.0%	0.0	0.0%	15.8%	0.0	0.0%	7.9%
15–19	0.0	0.0%	0.0%	1.2	5.3%	21.1%	1.2	2.6%	10.5%
20–24	0.0	0.0%	0.0%	3.7	15.8%	36.8%	3.7	7.9%	18.4%
25–29	2.4	10.5%	10.5%	1.2	5.3%	42.1%	3.7	7.9%	26.3%
30–34	3.7	15.8%	26.3%	0.0	0.0%	42.1%	3.7	7.9%	34.2%
35–39	0.0	0.0%	26.3%	0.0	0.0%	42.1%	0.0	0.0%	34.2%
40–44	1.2	5.3%	31.6%	0.0	0.0%	42.1%	1.2	2.6%	36.8%
45–49	1.2	5.3%	36.8%	1.2	5.3%	47.4%	2.4	5.3%	42.1%
50–54	4.9	21.1%	57.9%	0.0	0.0%	47.4%	4.9	10.5%	52.6%
55–59	2.4	10.5%	68.4%	3.7	15.8%	63.2%	6.1	13.2%	65.8%
60–64	3.7	15.8%	84.2%	2.4	10.5%	73.7%	6.1	13.2%	78.9%
65–69	1.2	5.3%	89.5%	1.2	5.3%	78.9%	2.4	5.3%	84.2%
70–74	0.0	0.0%	89.5%	1.2	5.3%	84.2%	1.2	2.6%	86.8%
75–79	0.0	0.0%	89.5%	1.2	5.3%	89.5%	1.2	2.6%	89.5%
80–84	0.0	0.0%	89.5%	0.0	0.0%	89.5%	0.0	0.0%	89.5%
85–89	0.0	0.0%	89.5%	2.4	10.5%	100.0%	2.4	5.3%	94.7%
90–94	0.0	0.0%	89.5%	0.0	0.0%	100.0%	0.0	0.0%	94.7%
95–99	0.0	0.0%	89.5%	0.0	0.0%	100.0%	0.0	0.0%	94.7%
100–104	0.0	0.0%	89.5%	0.0	0.0%	100.0%	0.0	0.0%	94.7%
Missing	2.4	10.5%	100.0%	0.0	0.0%	100.0%	2.4	5.3%	100.0%
Total	**23.1**	**100.0%**	**100.0%**	**23.1**	**100.0%**	**100.0%**	**46.3**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2018.

Table 5-3.–Population profile, South Naknek, 2018.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	0.0	0.0%	0.0%	0.0	0.0%	0.0%	0.0	0.0%	0.0%
5–9	0.0	0.0%	0.0%	0.0	0.0%	0.0%	0.0	0.0%	0.0%
10–14	0.0	0.0%	0.0%	0.0	0.0%	0.0%	0.0	0.0%	0.0%
15–19	1.4	5.6%	5.6%	0.0	0.0%	0.0%	1.4	3.6%	3.6%
20–24	2.7	11.1%	16.7%	1.4	10.0%	10.0%	4.1	10.7%	14.3%
25–29	1.4	5.6%	22.2%	1.4	10.0%	20.0%	2.7	7.1%	21.4%
30–34	0.0	0.0%	22.2%	0.0	0.0%	20.0%	0.0	0.0%	21.4%
35–39	0.0	0.0%	22.2%	0.0	0.0%	20.0%	0.0	0.0%	21.4%
40–44	0.0	0.0%	22.2%	0.0	0.0%	20.0%	0.0	0.0%	21.4%
45–49	1.4	5.6%	27.8%	0.0	0.0%	20.0%	1.4	3.6%	25.0%
50–54	6.8	27.8%	55.6%	0.0	0.0%	20.0%	6.8	17.9%	42.9%
55–59	4.1	16.7%	72.2%	2.7	20.0%	40.0%	6.8	17.9%	60.7%
60–64	6.8	27.8%	100.0%	0.0	0.0%	40.0%	6.8	17.9%	78.6%
65–69	0.0	0.0%	100.0%	2.7	20.0%	60.0%	2.7	7.1%	85.7%
70–74	0.0	0.0%	100.0%	1.4	10.0%	70.0%	1.4	3.6%	89.3%
75–79	0.0	0.0%	100.0%	1.4	10.0%	80.0%	1.4	3.6%	92.9%
80–84	0.0	0.0%	100.0%	0.0	0.0%	80.0%	0.0	0.0%	92.9%
85–89	0.0	0.0%	100.0%	2.7	20.0%	100.0%	2.7	7.1%	100.0%
90–94	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
95–99	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
100–104	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
Missing	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
Total	**24.6**	**100.0%**	**100.0%**	**13.7**	**100.0%**	**100.0%**	**38.3**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2019.

Table 5-4.–Birthplaces of household heads, South Naknek, 2017.

Birthplace	Percentage
Mountain Village	3.2%
Nondalton	3.2%
Pilot Point	3.2%
Portage	3.2%
South Naknek	48.4%
Togiak	3.2%
Ugashik	3.2%
Other U.S.	29.0%
Missing	3.2%

Source ADF&G Division of Subsistence household surveys, 2018.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 5-5.–Birthplaces of population, South Naknek, 2017.

Birthplace	Percentage
Mountain Village	2.6%
Nondalton	2.6%
Pilot Point	2.6%
Portage	2.6%
South Naknek	52.6%
Togiak	2.6%
Ugashik	2.6%
Other U.S.	23.7%
Outside Alaska	2.6%
Missing	5.3%

Source ADF&G Division of Subsistence household surveys, 2018.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 5-6.–Birthplaces of household heads, South Naknek, 2018.

Birthplace	Percentage
Dillingham	4.2%
Egegik	8.3%
Naknek	4.2%
Nondalton	4.2%
Portage	4.2%
South Naknek	50.0%
Kodiak Is. (General)	4.2%
Other U.S.	20.8%

Source ADF&G Division of Subsistence household surveys, 2019.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 5-7.–Birthplaces of population, South Naknek, 2018.

Birthplace	Percentage
Anchorage	10.7%
Dillingham	3.6%
Egegik	7.1%
Naknek	3.6%
Nondalton	3.6%
Portage	3.6%
South Naknek	46.4%
Kodiak Is. (General)	3.6%
Other U.S.	17.9%

Source ADF&G Division of Subsistence household surveys, 2019.
Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Summary of Harvest and Use Patterns

All five species of Pacific salmon found in Alaska enter the Naknek River on the way to freshwater spawning grounds. In this chapter, harvest survey results for South Naknek (2017 and 2018) are first presented, which include harvest estimates, identifying the gear types used to harvest salmon, and fishing locations.

Following an overview of survey results is a discussion of subsistence permit participation in South Naknek. Next, the results of the salmon use assessment questions from the household surveys are presented. Assessment questions attempt to gauge to what degree salmon harvest and use patterns by the community have changed over time. Finally, the 2017 and 2018 salmon harvest data are compared to harvest survey results from previous study years 2007, 1992, and 1983, and also compared to the subsistence salmon harvest permit data for 1983–2018. Results from those previous study years are published by the Division of Subsistence in Holen et al. (2011), Morris (1985), and also the CSIS; permit-based harvest estimates are published by the Division of Subsistence in an annual report, which was last published by Fall et al. (2020). Following presentation of these data, local community comments and concerns are presented. Information for the final section of this chapter came from the harvest surveys and is contextualized with qualitative information obtained from key respondent interviews and participant observation.

Household Salmon Harvest and Use Characteristics in South Naknek: 2017

In 2017, South Naknek residents harvested an estimated total of 8,955 lb, or 194 lb per capita, of salmon (Table 5-8). In terms of total pounds harvested and harvest proportion by percentage of harvest weight by salmon species, the greatest harvest was sockeye salmon (6,886 lb, 149 lb per capita, or 77% of the total salmon harvest), which was followed by coho salmon (952 lb, 21 lb per capita, or 10%), Chinook salmon (788 lb, 17 lb per capita, or 9%), chum salmon (246 lb, 5 lb per capita, or 3%), and pink salmon (83 lb, 2 lb per capita, or 1%) (Table 5-8; Figure 5-5).

In study year 2017, an estimated 87% of South Naknek households owned a gillnet to harvest salmon and 52% of households owned a boat (Table 1-7). Overall, an estimated 44% of households in South Naknek owned a boat that was used for commercial fishing. In 2017, there were 17 households that indicated a person who either held a commercial fishery permit or participated as a commercial fishing crew member resided at the residence: 13 households had permit holders and four households had crew members in residence (Table 1-8). Based on responses from surveyed households that retained salmon from commercial catches in 2017, an estimated 11 South Naknek households usually retain salmon from commercial fishing for home use, and an overall estimated seven households that retain salmon from commercial fishing for home use also participate in subsistence salmon fishing (Table 1-9).

Table 5-9 lists in number of fish and pounds each salmon species harvested by South Naknek residents in 2017; Figure 5-6 is a complementary visual representation of the salmon harvest weight caught by gear type. South Naknek residents harvested the majority of their salmon by subsistence gillnets (84% of total salmon harvest weight); the only other method used to harvest salmon was removals from commercial catches (16% of harvest weight) (Table 5-10). Most (71%) of the individual salmon harvested were sockeye salmon caught by subsistence gillnets, or an estimated 1,489 out of 2,112 fish (Table 5-10; Table 5-9). More than 80% of the harvest weight of each species, except Chinook salmon, was caught by subsistence gillnets; only 65% of the Chinook salmon harvest weight was caught by subsistence gillnets and the remaining 35% was removed from commercial catches (Table 5-10). Some fish were obtained by removals from commercial catches for each species except chum salmon; chum salmon were harvested only by subsistence gillnets.

Table 5-8.–Estimated use and harvest of salmon, South Naknek, 2017.

	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	**91.3**	**78.3**	**78.3**	**39.1**	**47.8**	**8,955.2**	**319.8**	**193.6**	**2,112.2**	**ind**	**75.4**	**17.1**
Chum salmon	30.4	30.4	30.4	4.3	4.3	246.3	8.8	5.3	52.3	ind	1.9	32.6
Coho salmon	43.5	43.5	43.5	4.3	17.4	951.8	34.0	20.6	199.7	ind	7.1	28.2
Chinook salmon	65.2	60.9	56.5	21.7	30.4	787.7	28.1	17.0	95.0	ind	3.4	23.7
Pink salmon	21.7	21.7	21.7	0.0	8.7	83.1	3.0	1.8	30.4	ind	1.1	45.9
Sockeye salmon	87.0	78.3	78.3	26.1	39.1	6,886.2	245.9	148.9	1,734.8	ind	62.0	17.3
Spawning sockeye salmon	4.3	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown salmon	4.3	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2018.

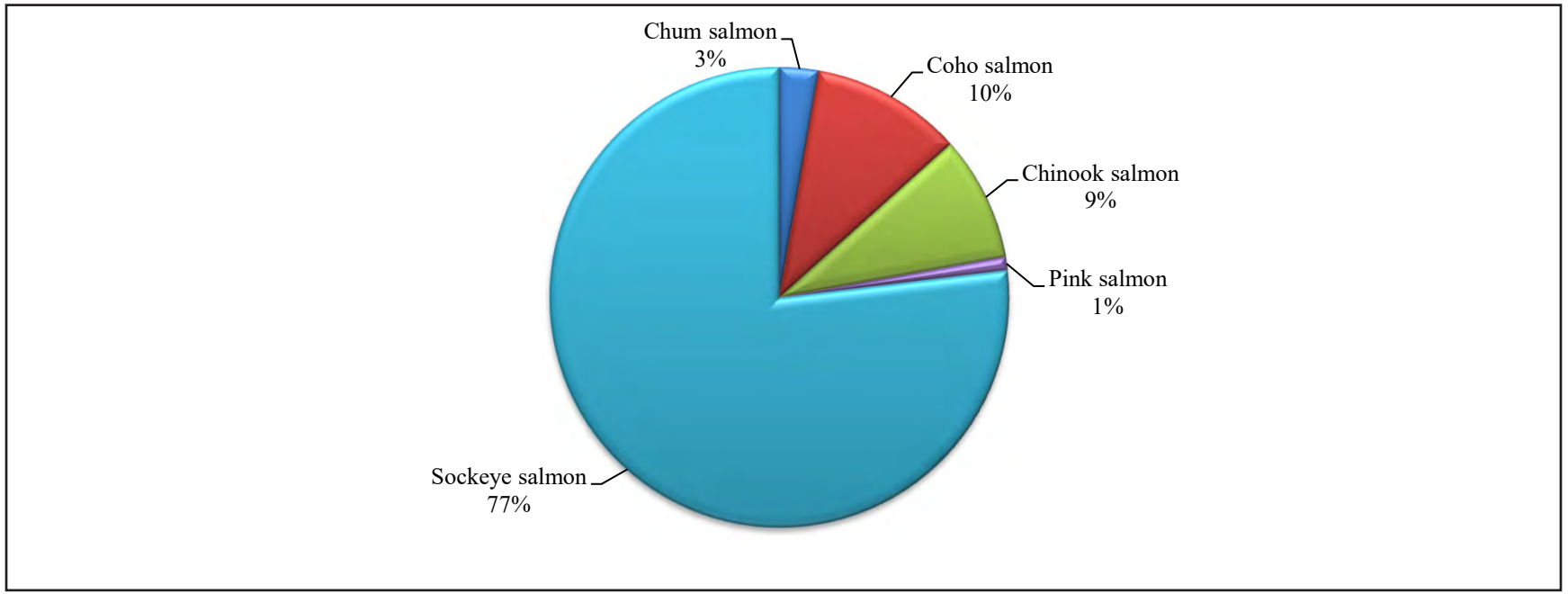


Figure 5-5.–Composition of salmon harvest in pounds usable weight, South Naknek, 2017.

Table 5-9.–Estimated harvest of salmon by gear type and resource, South Naknek, 2017.

	Removed from commercial catch		Subsistence methods									
			Gillnet[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**315.3**	**1,420.5**	**1,796.9**	**7,534.7**	**0.0**	**0.0**	**1,796.9**	**7,534.7**	**0.0**	**0.0**	**2,112.2**	**8,955.2**
Chum salmon	0.0	0.0	52.3	246.3	0.0	0.0	52.3	246.3	0.0	0.0	52.3	246.3
Coho salmon	35.3	168.3	164.3	783.5	0.0	0.0	164.3	783.5	0.0	0.0	199.7	951.8
Chinook salmon	32.9	272.7	62.1	515.1	0.0	0.0	62.1	515.1	0.0	0.0	95.0	787.7
Pink salmon	1.2	3.3	29.2	79.8	0.0	0.0	29.2	79.8	0.0	0.0	30.4	83.1
Sockeye salmon	245.9	976.1	1,488.9	5,910.0	0.0	0.0	1,488.9	5,910.0	0.0	0.0	1,734.8	6,886.2
Spawning sockeye 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
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

Source ADF&G Division of Subsistence household surveys, 2018.
a. Gillnet harvests may include both set and drift gillnet.

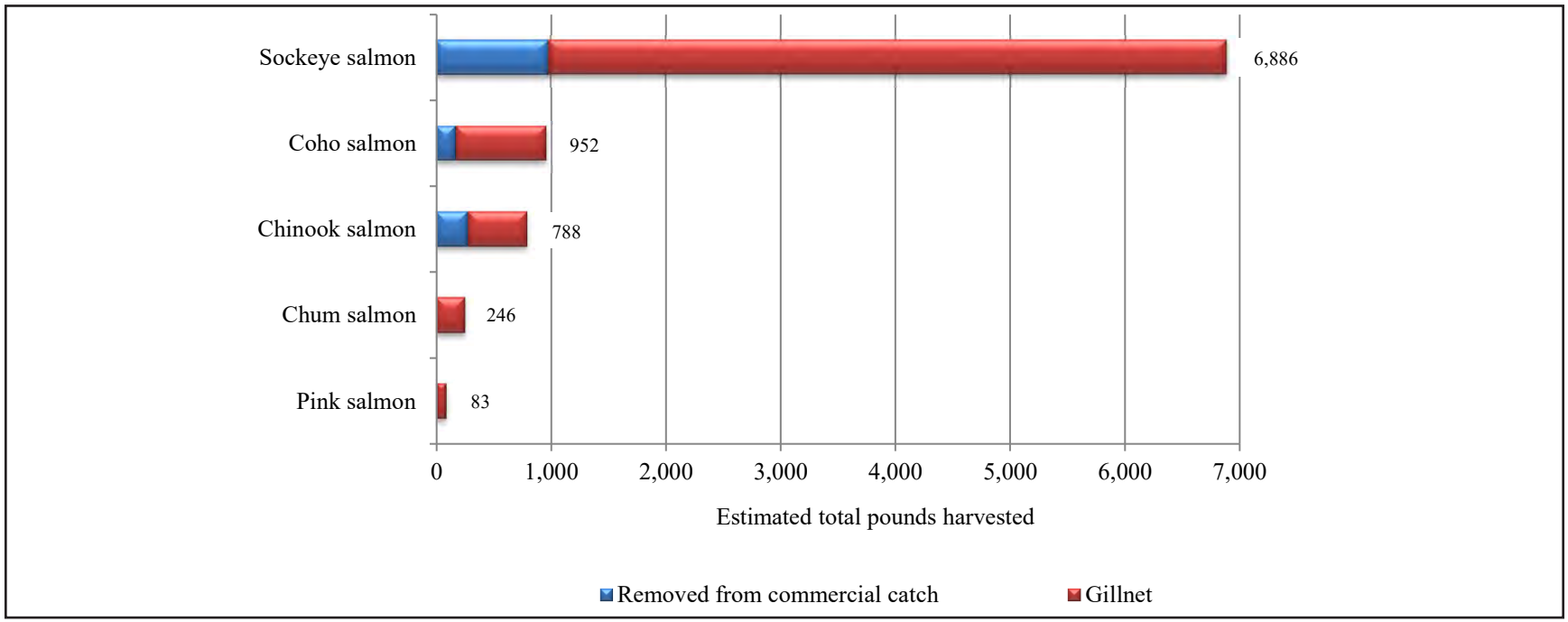


Figure 5-6.–Estimated harvest of salmon in pounds usable weight by gear type and resource, South Naknek, 2017.

Table 5-10.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, South Naknek, 2017.

Resource	Percentage base	Removed from commercial catch		Subsistence methods									
				Gillnet[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**Gear type**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**
	Resource	**14.9%**	**15.9%**	**85.1%**	**84.1%**	**0.0%**	**0.0%**	**85.1%**	**84.1%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**
	Total	**14.9%**	**15.9%**	**85.1%**	**84.1%**	**0.0%**	**0.0%**	**85.1%**	**84.1%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**
Chum salmon	Gear type	0.0%	0.0%	2.9%	3.3%	0.0%	0.0%	2.9%	3.3%	0.0%	0.0%	2.5%	2.8%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	2.5%	2.8%	0.0%	0.0%	2.5%	2.8%	0.0%	0.0%	2.5%	2.8%
Coho salmon	Gear type	11.2%	11.8%	9.1%	10.4%	0.0%	0.0%	9.1%	10.4%	0.0%	0.0%	9.5%	10.6%
	Resource	17.7%	17.7%	82.3%	82.3%	0.0%	0.0%	82.3%	82.3%	0.0%	0.0%	100.0%	100.0%
	Total	1.7%	1.9%	7.8%	8.7%	0.0%	0.0%	7.8%	8.7%	0.0%	0.0%	9.5%	10.6%
Chinook salmon	Gear type	10.4%	19.2%	3.5%	6.8%	0.0%	0.0%	3.5%	6.8%	0.0%	0.0%	4.5%	8.8%
	Resource	34.6%	34.6%	65.4%	65.4%	0.0%	0.0%	65.4%	65.4%	0.0%	0.0%	100.0%	100.0%
	Total	1.6%	3.0%	2.9%	5.8%	0.0%	0.0%	2.9%	5.8%	0.0%	0.0%	4.5%	8.8%
Pink salmon	Gear type	0.4%	0.2%	1.6%	1.1%	0.0%	0.0%	1.6%	1.1%	0.0%	0.0%	1.4%	0.9%
	Resource	4.0%	4.0%	96.0%	96.0%	0.0%	0.0%	96.0%	96.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.1%	0.0%	1.4%	0.9%	0.0%	0.0%	1.4%	0.9%	0.0%	0.0%	1.4%	0.9%
Sockeye salmon	Gear type	78.0%	68.7%	82.9%	78.4%	0.0%	0.0%	82.9%	78.4%	0.0%	0.0%	82.1%	76.9%
	Resource	14.2%	14.2%	85.8%	85.8%	0.0%	0.0%	85.8%	85.8%	0.0%	0.0%	100.0%	100.0%
	Total	11.6%	10.9%	70.5%	66.0%	0.0%	0.0%	70.5%	66.0%	0.0%	0.0%	82.1%	76.9%
Spawning sockeye salmon	Gear type	0.0%	0.0%	0.0%	0.0%	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%	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%	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%	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%	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%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Gillnet harvests may include both set and drift gillnet.

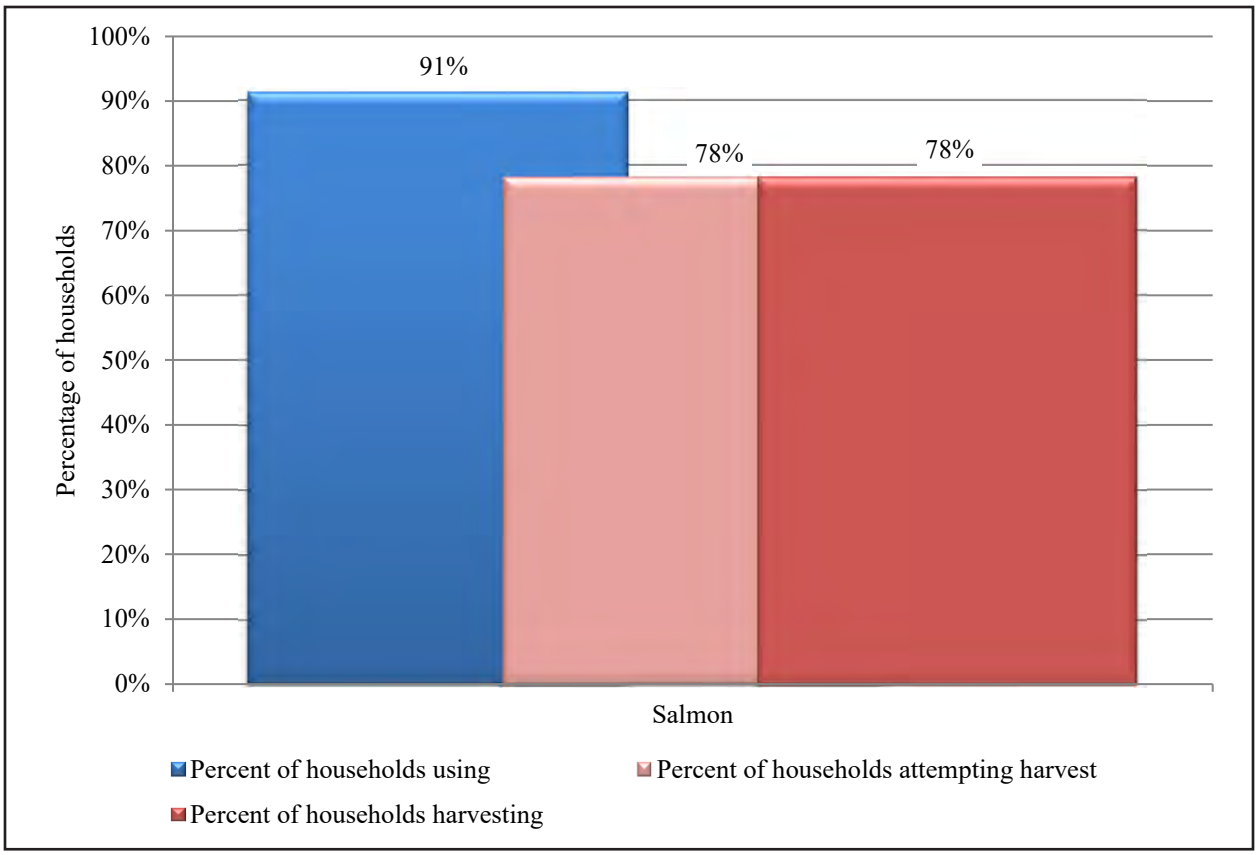


Figure 5-7.–Percentages of household using, attempting to harvest, or harvesting salmon, South Naknek, 2017.

Figure 5-7 shows the percentages of households that used, attempted to harvest, and harvested salmon. During 2017, 91% of South Naknek households used salmon, 78% attempted to harvest salmon, and 78% of community households were successful in their salmon harvest pursuits. Less than one-half of the South Naknek households shared salmon in 2017: 48% of households gave salmon away and 39% of households received salmon during the study year (Table 5-8). Sockeye salmon was the most used salmon resource in 2017. The majority (87%) of South Naknek households used sockeye salmon during the study year, 78% of households attempted to harvest sockeye salmon, 78% community households successfully harvested this salmon species, 39% gave away this salmon species, and 26% of households received sockeye salmon. For Chinook salmon, 65% of South Naknek households used this salmon species salmon during the study year, 61% of households attempted to harvest Chinook salmon, 57% successfully harvested this species of salmon, 30% gave away Chinook salmon, and 22% received Chinook salmon. In 2017, slightly less than one-half (44%) of South Naknek households used coho salmon, 44% attempted to harvest and successfully harvested this salmon species, 17% gave away coho salmon, and 4% of households received this salmon species. A smaller percentage (30%) of households in South Naknek used and harvested chum salmon in 2017, and 4% of households gave away and received this salmon species. Pink salmon was used and harvested by 22% of South Naknek households, 9% of households gave away this resource, and no households received pink salmon in 2017. Note that for only two salmon species did more households use the resource than harvested it: a difference of 9% more households used Chinook salmon and 9% more used sockeye salmon than harvested either resource. Those species were shared (both giving away and receiving) more than any other species. No surveyed South Naknek households reported harvesting spawning sockeye salmon; however, 4% of households did receive and use spawning sockeye salmon during the study year, as well as unknown salmon resources.

In 2017, starting from the west and moving toward the east, South Naknek respondents reported harvesting Chinook salmon on the southern shore of Naknek River near the mouth of the Naknek River at Dimond M Cannery, near Diamond O Cannery, along the beach between Diamond O Cannery and Bumble Bee Cannery, and along the beach from Diamond NN Cannery and Brough Dock Road (Figure 5-8). Additionally, Chinook salmon were harvested on the north side of Naknek River between Coffee and Telephone points. During the first study year, like Chinook salmon, sockeye salmon were harvested near the mouth of the Naknek River at Dimond M Cannery, near Diamond O Cannery, along the beach between Diamond O Cannery and Bumble Bee Cannery, and along the beach from Diamond NN Cannery and Borough Dock Road in slightly greater concentration compared to findings for Chinook salmon (Figure 5-9). Additionally, sockeye salmon were harvested on the north side of Naknek River between Coffee and Telephone points. In 2017, coho salmon were harvested near Dimond M Cannery, Diamond O Cannery, along the beach between Diamond O Cannery and Bumble Bee Cannery, and along the beach from Diamond NN Cannery and Brough Dock Road (Figure 5-10). The other salmon species (pink salmon and chum salmon) were harvested near the mouth of the Naknek River at Dimond M Cannery, near Bumble Bee Cannery, and along the beach from Diamond NN Cannery and Brough Dock Road (Figure 5-11).

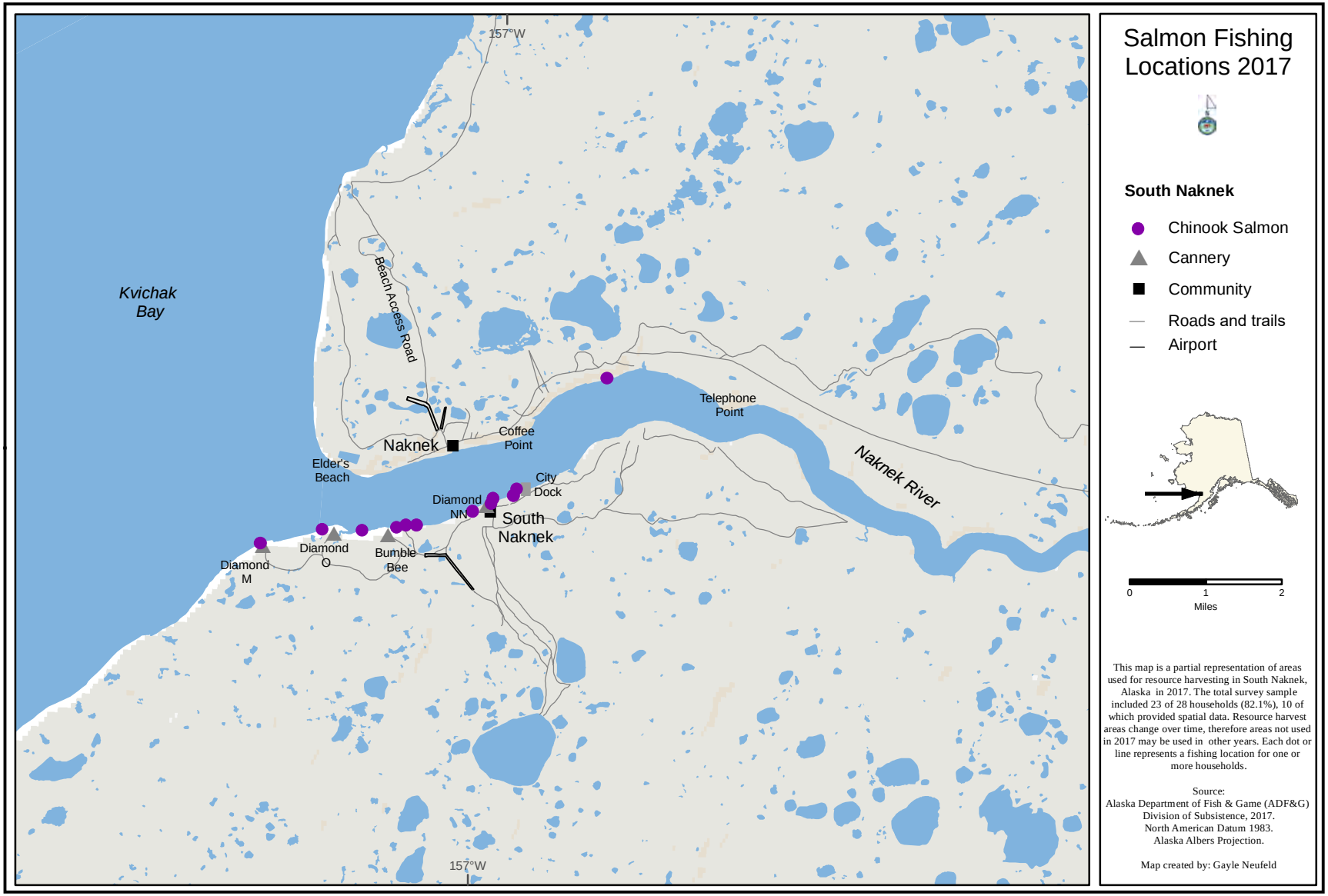


Figure 5-8.–Fishing and harvest locations of Chinook salmon, South Naknek, 2017.

Figure 5-9.–Fishing and harvest locations of sockeye salmon, South Naknek, 2017.

Figure 5-10.–Fishing and harvest locations of coho salmon, South Naknek, 2017.

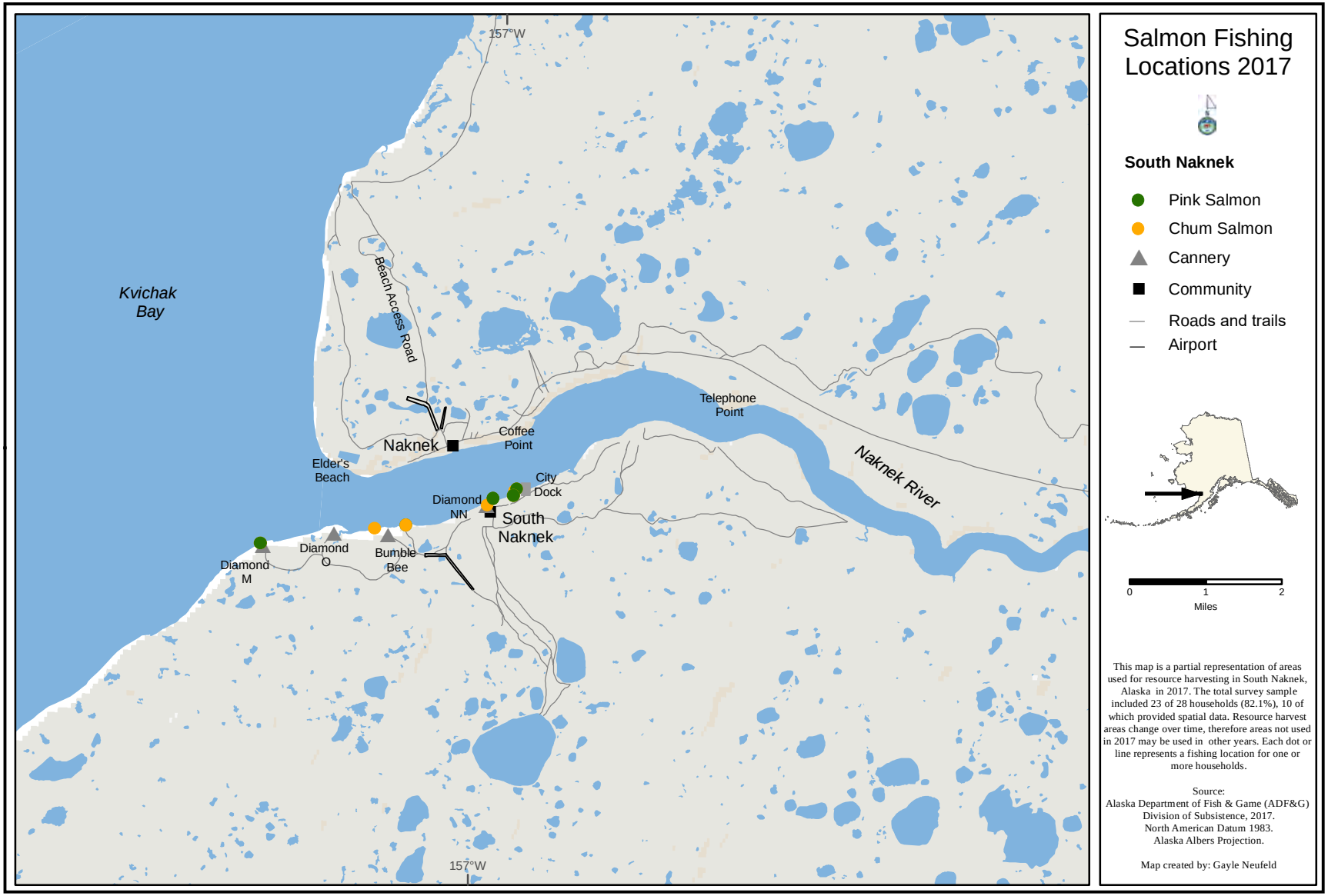


Figure 5-11.–Fishing and harvest locations of pink and chum salmon, South Naknek, 2017.

Household Salmon Harvest and Use Characteristics in South Naknek: 2018

In 2018, South Naknek residents harvested an estimated total of 4,436 lb, or 116 lb per capita, of salmon (Table 5-11). In terms of total pounds harvested and harvest proportion by percentage of harvest weight by salmon species, the greatest harvest was sockeye salmon (3,324 lb, 128 lb per capita, or 75% of the total salmon harvest), which was followed by Chinook salmon (590 lb, 23 lb per capita, or 13%), coho salmon (354 lb, 14lb per capita, or 8%), chum salmon (121 lb, 5 lb per capita, or 3%), and pink salmon (46 lb, 2 lb per capita, or 1%) (Table 5-11; Figure 5-12).

In 2018, an estimated 84% of South Naknek households owned a gillnet to harvest salmon and 63% of households owned a boat (Table 1-7). Overall, an estimated 47% of households in South Naknek owned a boat that was used for commercial fishing. In 2018, there were 11 households that indicated a person either holding a commercial fishery permit or a person who participated as a commercial fishing crew member resided at the residence: eight households had permit holders and three households had crew members (Table 1-8). Based on responses from surveyed households that retained salmon from commercial catches in 2018, an estimated seven households in South Naknek usually retain salmon from commercial fishing for home use, and an overall estimated four households that retain salmon from commercial fishing for home use also participate in subsistence salmon fishing (Table 1-9).

Table 5-12 lists in number of fish and pounds each salmon species harvested by South Naknek residents in 2018; Figure 5-13 is a complementary visual representation of the salmon harvest weight caught by gear type. South Naknek residents harvested the majority of their salmon by subsistence nets (79% of salmon harvest weight); the only other method used to harvest salmon was removals from commercial catches (21% of harvest weight) (Table 5-13). The majority (80%) of the sockeye salmon harvest weight was caught using subsistence nets and the remaining 20% was removed from commercial catches. Sockeye salmon harvested by subsistence nets accounted for 65% of the total number of harvested salmon: 697 out of 1,067 total fish (Table 5-12; Table 5-13). More than one-half (60%) of the Chinook salmon harvest weight was obtained using subsistence nets, and 40% was removed from commercial catches. All coho salmon and pink salmon were caught using subsistence nets (Figure 5-13). The majority (74%) of the chum salmon harvest was caught using subsistence nets and the remaining 26% was removed from commercial catches (Table 5-13).

Table 5-11.–Estimated use and harvest of salmon, South Naknek, 2018.

	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	**89.5**	**73.7**	**57.9**	**68.4**	**42.1**	**4,435.7**	**170.6**	**115.8**	**1,067.4**	**ind**	**41.1**	**33.7**
Chum salmon	26.3	26.3	21.1	10.5	15.8	121.4	4.7	3.2	26.0	ind	1.0	85.8
Coho salmon	31.6	26.3	21.1	15.8	10.5	353.8	13.6	9.2	72.5	ind	2.8	52.7
Chinook salmon	57.9	47.4	36.8	36.8	31.6	589.9	22.7	15.4	78.0	ind	3.0	38.0
Pink salmon	31.6	26.3	21.1	21.1	15.8	46.4	1.8	1.2	17.8	ind	0.7	55.9
Sockeye salmon	89.5	73.7	52.6	68.4	42.1	3,324.3	127.9	86.8	873.1	ind	33.6	34.4
Spawning sockeye 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	5.3	0.0	0.0	5.3	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2019.

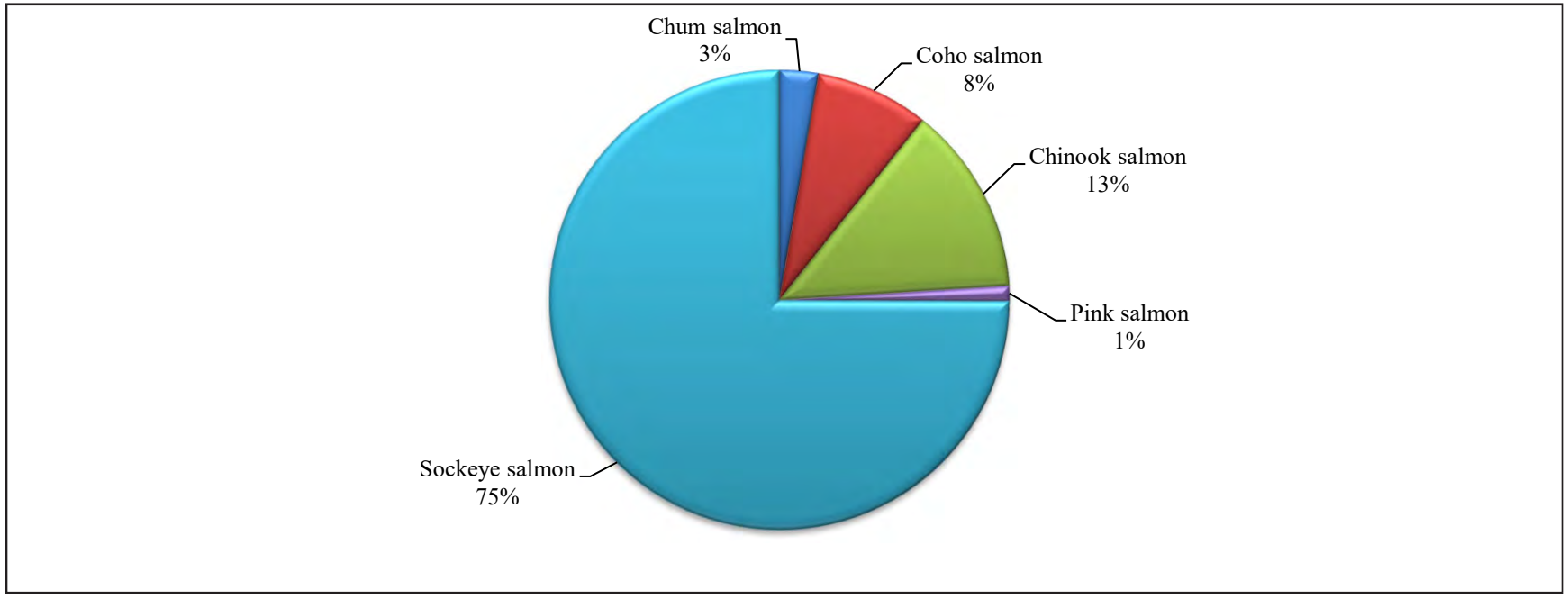


Figure 5-12.–Composition of salmon harvest in pounds usable weight, South Naknek, 2018.

Table 5-12.–Estimated harvest of salmon by gear type and resource, South Naknek, 2018.

	Removed from commercial catch		Subsistence methods									
			Subsistence net[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**214.8**	**942.1**	**852.5**	**3,493.6**	**0.0**	**0.0**	**852.5**	**3,493.6**	**0.0**	**0.0**	**1,067.4**	**4,435.7**
Chum salmon	6.8	31.9	19.2	89.4	0.0	0.0	19.2	89.4	0.0	0.0	26.0	121.4
Coho salmon	0.0	0.0	72.5	353.8	0.0	0.0	72.5	353.8	0.0	0.0	72.5	353.8
Chinook salmon	31.5	238.0	46.5	351.9	0.0	0.0	46.5	351.9	0.0	0.0	78.0	589.9
Pink salmon	0.0	0.0	17.8	46.4	0.0	0.0	17.8	46.4	0.0	0.0	17.8	46.4
Sockeye salmon	176.5	672.2	696.5	2,652.2	0.0	0.0	696.5	2,652.2	0.0	0.0	873.1	3,324.3
Spawning sockeye 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
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

Source ADF&G Division of Subsistence household surveys, 2019.

a. Subsistence net harvests may include set gillnet, drift gillnet, and seine.

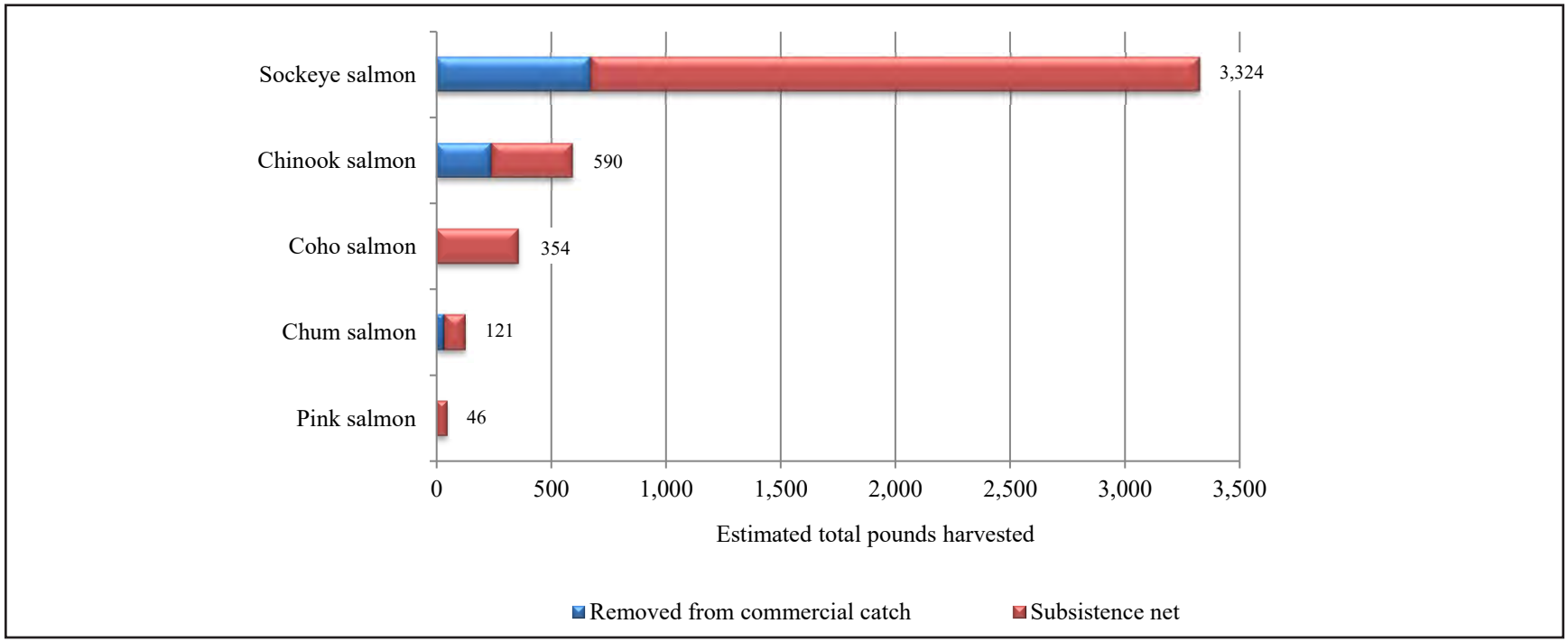


Figure 5-13.–Estimated harvest of salmon in pounds usable weight by gear type and resource, South Naknek, 2018.

Table 5-13.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, South Naknek, 2018.

Resource	Percentage base	Removed from commercial catch		Subsistence methods									
				Subsistence net[a]		Dip net		Subsistence gear, any method		Rod and reel		Any method	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**Gear type**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**
	Resource	**20.1%**	**21.2%**	**79.9%**	**78.8%**	**0.0%**	**0.0%**	**79.9%**	**78.8%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**
	Total	**20.1%**	**21.2%**	**79.9%**	**78.8%**	**0.0%**	**0.0%**	**79.9%**	**78.8%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**
Chum salmon	Gear type	3.2%	3.4%	2.2%	2.6%	0.0%	0.0%	2.2%	2.6%	0.0%	0.0%	2.4%	2.7%
	Resource	26.3%	26.3%	73.7%	73.7%	0.0%	0.0%	73.7%	73.7%	0.0%	0.0%	100.0%	100.0%
	Total	0.6%	0.7%	1.8%	2.0%	0.0%	0.0%	1.8%	2.0%	0.0%	0.0%	2.4%	2.7%
Coho salmon	Gear type	0.0%	0.0%	8.5%	10.1%	0.0%	0.0%	8.5%	10.1%	0.0%	0.0%	6.8%	8.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	6.8%	8.0%	0.0%	0.0%	6.8%	8.0%	0.0%	0.0%	6.8%	8.0%
Chinook salmon	Gear type	14.6%	25.3%	5.5%	10.1%	0.0%	0.0%	5.5%	10.1%	0.0%	0.0%	7.3%	13.3%
	Resource	40.4%	40.4%	59.6%	59.6%	0.0%	0.0%	59.6%	59.6%	0.0%	0.0%	100.0%	100.0%
	Total	2.9%	5.4%	4.4%	7.9%	0.0%	0.0%	4.4%	7.9%	0.0%	0.0%	7.3%	13.3%
Pink salmon	Gear type	0.0%	0.0%	2.1%	1.3%	0.0%	0.0%	2.1%	1.3%	0.0%	0.0%	1.7%	1.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	1.7%	1.0%	0.0%	0.0%	1.7%	1.0%	0.0%	0.0%	1.7%	1.0%
Sockeye salmon	Gear type	82.2%	71.3%	81.7%	75.9%	0.0%	0.0%	81.7%	75.9%	0.0%	0.0%	81.8%	74.9%
	Resource	20.2%	20.2%	79.8%	79.8%	0.0%	0.0%	79.8%	79.8%	0.0%	0.0%	100.0%	100.0%
	Total	16.5%	15.2%	65.3%	59.8%	0.0%	0.0%	65.3%	59.8%	0.0%	0.0%	81.8%	74.9%
Spawning sockeye salmon	Gear type	0.0%	0.0%	0.0%	0.0%	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%	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%	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%	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%	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%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Subsistence net harvests may include set gillnet, drift gillnet, and seine.

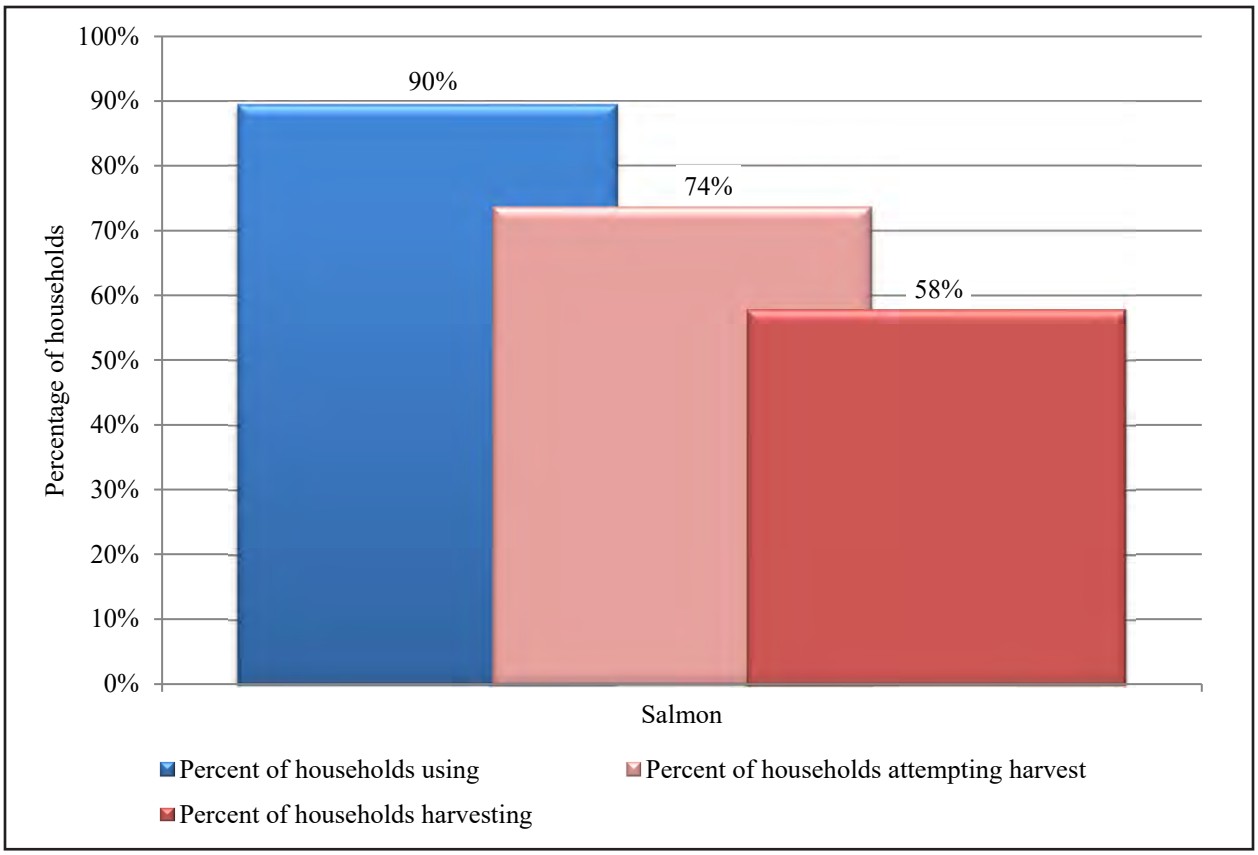


Figure 5-14.–Percentage of households using, attempting to harvest, and harvesting salmon, South Naknek, 2018.

Figure 5-14 shows the percentages of households that used, attempted to harvest, and harvested salmon. During 2018, 90% of South Naknek households used salmon, and 74% attempted to harvest salmon, but, overall, 58% of community households were successful in their salmon harvest pursuits. In regard to sharing salmon in 2018, 42% of South Naknek households gave salmon away and 68% of households received salmon during the study year (Table 5-11).

Sockeye salmon was the most used salmon species in 2018. Almost all (90%) South Naknek households used sockeye salmon during the study year, 42% gave away this salmon species, and 68% of households received sockeye salmon (Table 5-11). Only two species were used by the majority of South Naknek households: sockeye and Chinook salmon were used by 90% and 58% of households, respectively. The remaining three harvested salmon species were each used by about one-quarter to one-third of community households (26%–32%). In 2018, more than one-half (58%) of South Naknek households used Chinook salmon, 32% gave away Chinook salmon, and 37% of households received this salmon species. For coho salmon, less than one-half (32%) of South Naknek households used this type of salmon during the study year, 11% gave away this salmon species, and 16% received coho salmon. An estimated 26% of South Naknek households used chum salmon in 2018, 16% of households gave away chum salmon, and 11% received this species during the study year. Though the harvest weight was less than chum salmon, a greater percentage (32%) of households in South Naknek used pink salmon in 2018, 16% gave away this salmon species, and 21% received pink salmon during the study year. For every resource, a proportion of fishing households were not successful, but the greatest difference between the percentage of households attempting to harvest and harvesting a resource was for sockeye and Chinook salmon. An estimated 74% of households fished for sockeye salmon but only 53% were able to harvest this species in 2018, and 47% fished for Chinook salmon but only 37% successfully harvested this species. According to several survey respondents during

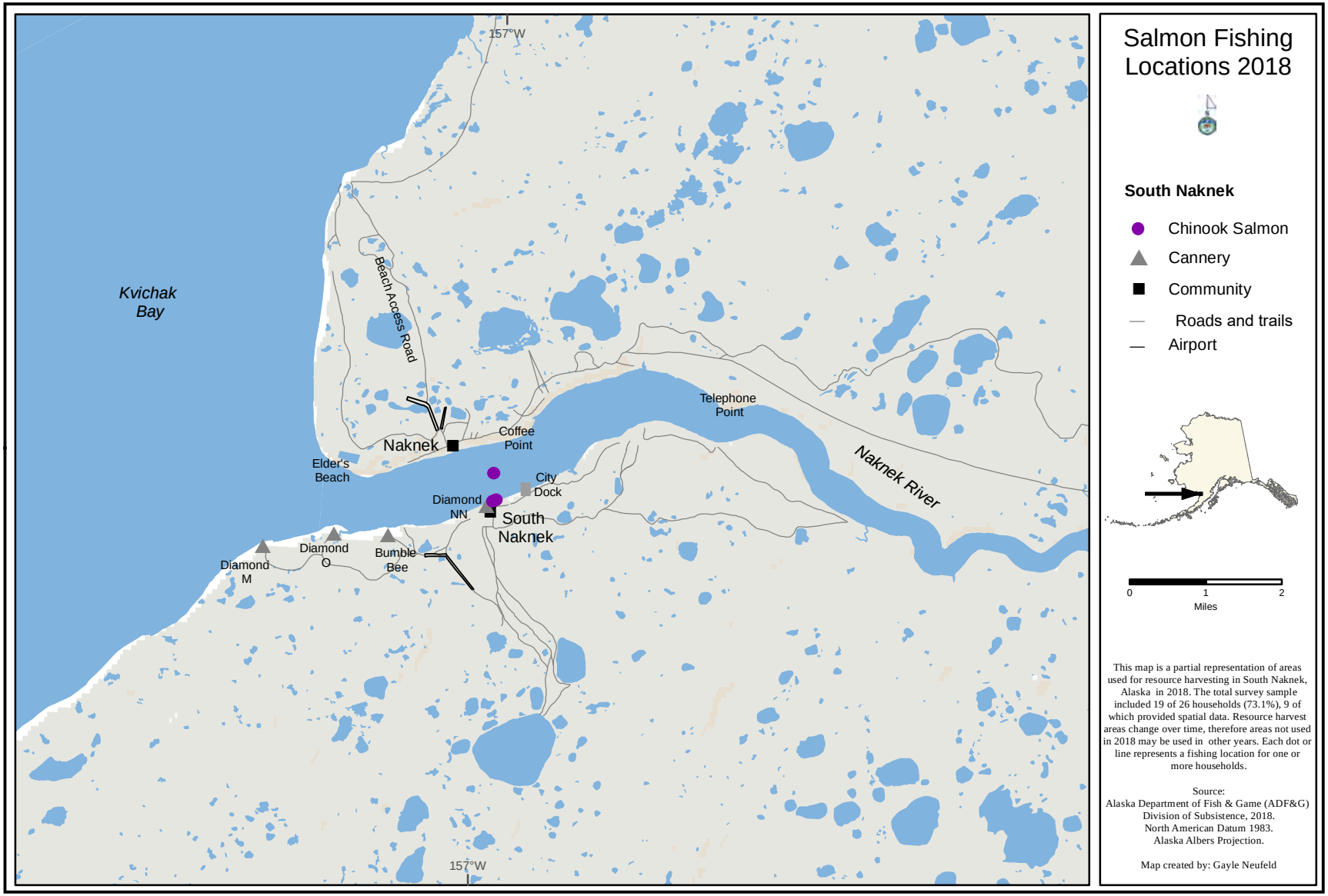


Figure 5-15.–Fishing and harvest locations of Chinook salmon, South Naknek, 2018.

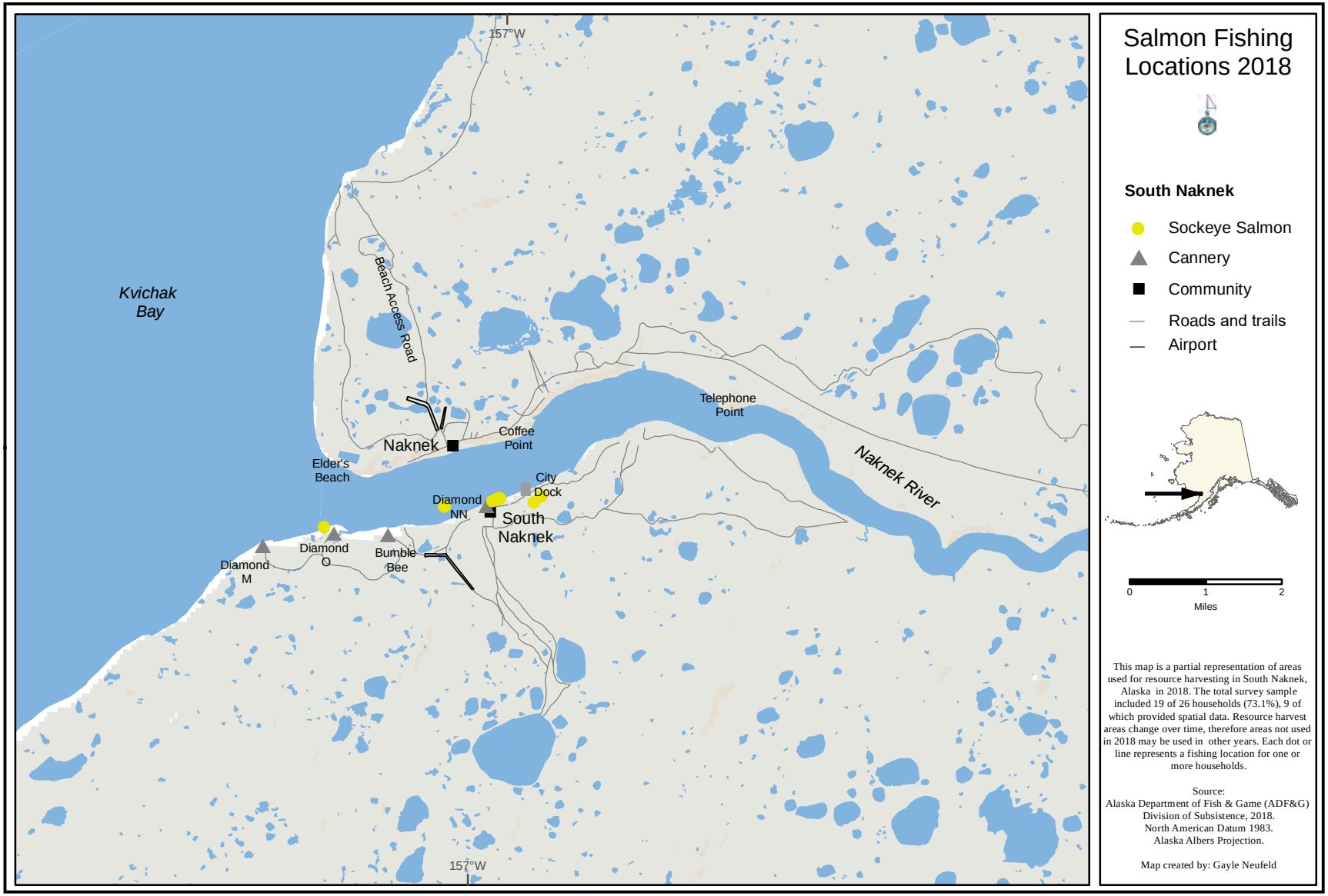


Figure 5-16.–Fishing and harvest locations of sockeye salmon, South Naknek, 2018.

Figure 5-17.–Fishing and harvest locations of coho salmon, South Naknek, 2018.

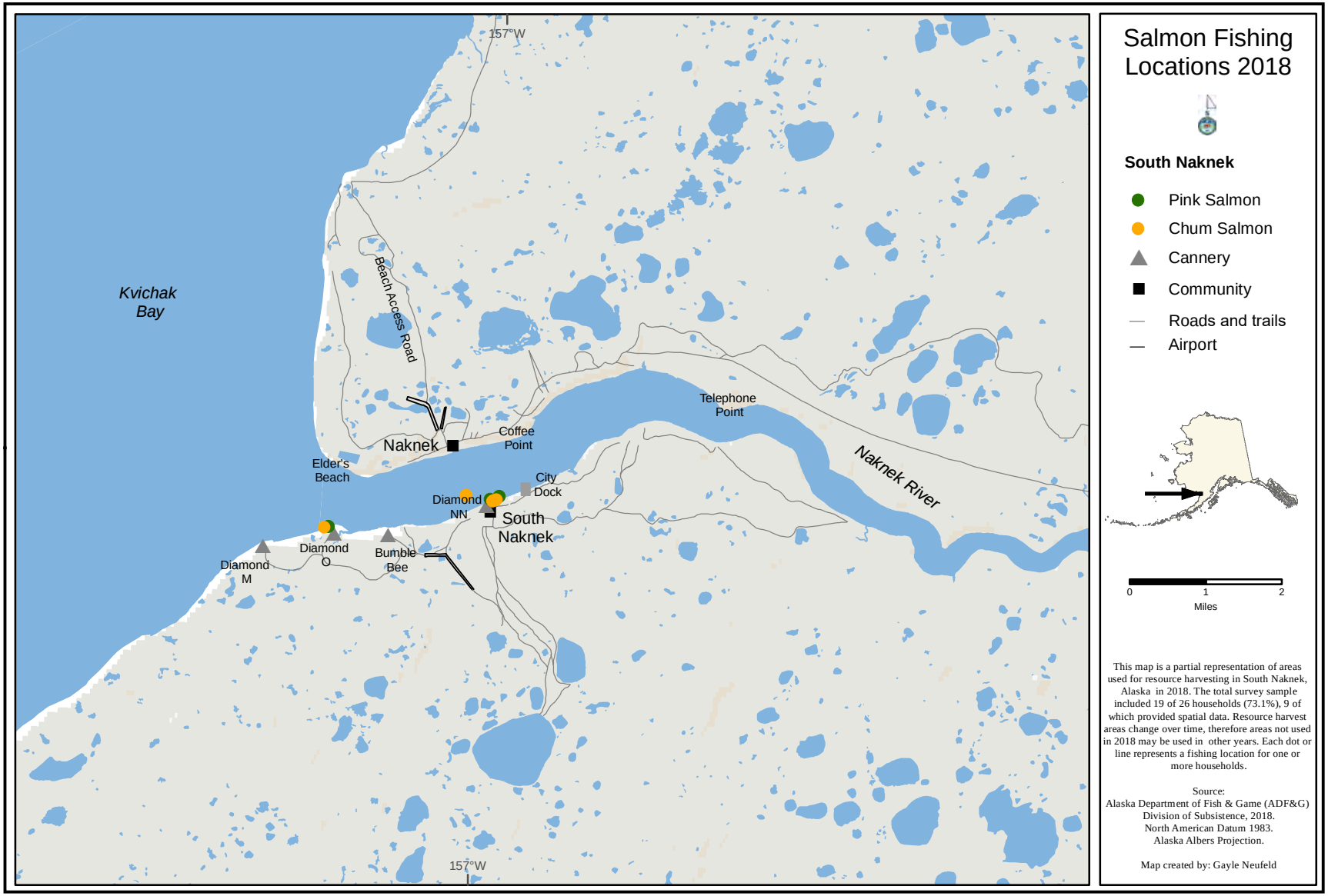


Figure 5-18.–Fishing and harvest locations of pink and chum salmon, South Naknek, 2018.

the 2018 fishing season, salmon runs were later than usual and some households did not have time to fish later in the season. For coho, chum, and pink salmon, 26% of households attempted to harvest each resource and a smaller proportion, 21%, harvested each species. Note that despite not all households successfully harvesting each desired species, all harvested species were given away. Also, for sockeye, Chinook, coho, and pink salmon, more households received than gave away those species; this may be an indication that some received salmon came from households in another community.

In 2018 Chinook salmon were harvested on the southern shore of Naknek River near the Diamond NN Cannery (Figure 5-15). During the second study year, sockeye salmon were harvested near the mouth of the Naknek River close to the Diamond O Cannery and along the beaches near the Diamond NN Cannery to Brough Dock Road (Figure 5-16). In 2018, coho salmon were harvested near Diamond O Cannery, along the beach nearby Diamond NN Cannery, and at the end of Brough Dock Road (Figure 5-17). The other salmon species (chum salmon and pink salmon) were harvested near the mouth of the Naknek River at Dimond O Cannery, and along the beach nearby Diamond NN Cannery (Figure 5-18).

Comparing 2017 and 2018 Harvest and Use Characteristics

The overall salmon harvest weight decreased by approximately one-half (4,520 lb) from 2017 to 2018, or by 78 lb per capita (Table 5-8; Table 5-11). The species that contributed the greatest harvest weight decrease from 2017 to 2018 was sockeye salmon with a harvest weight difference of 3,562 lb. For coho salmon, the harvest weight decreased by 598 lb from year one to year two. For Chinook salmon, the harvest weight was 198 lb less in 2018 than it was in 2017. The harvest weight for chum salmon also decreased by approximately one-half the harvest weight between study years (125 lb less), and a similar difference in harvest weight occurred for pink salmon—the harvest weight of this species decreased by almost one-half (37 lb less) between the two study years.

Indicative of decreased harvest weight from 2017 to 2018, the percentage of South Naknek households using, attempting to harvest, and harvesting any species of salmon also decreased between the study years by a difference of 1% (using), 4% (fishing), and 20% (harvesting), respectively (Figure 5-7; Figure 5-14). However, the amount of households receiving any species of salmon increased from 39% in 2017 to 68% in 2018, but the amount of households giving away any species of salmon did not increase between 2017 to 2018, suggesting households were receiving salmon from residents of other communities (Table 5-8; Table 5-11). Regarding individual salmon species, with the exception of pink salmon, overall there was a decrease from 2017 to 2018 in the percentage of South Naknek households attempting to harvest and harvesting individual salmon species. Sockeye salmon use characteristics had a decrease from 2017 to 2018 in both the percentage of South Naknek households attempting to harvest (decreased by 4%) and harvesting (decreased by 25%) this species. For coho salmon, the decreases from 2017 to 2018 were by a difference of 18% (attempting to harvest) and 23% (harvesting). The percentage of South Naknek households attempting to harvest and harvesting Chinook salmon decreased from 2017 to 2018 by a difference of 14% (attempting to harvest) and 20% (harvesting). Chum salmon use characteristics had a decrease in both the percentage of South Naknek households attempting to harvest (decreased by 4%) and harvesting (decreased by 9%) this species. Pink salmon is the only salmon species that had an increase in the percentage of South Naknek households attempting to harvest (increased by 4%) and harvesting (increased by less than 1%) the resource.

According to key respondents and survey respondents, South Naknek residents generally use the same location to set subsistence gillnets each season. The areas used to harvest salmon by South Naknek residents were similar in 2017 and 2018 (Figure 5-19; Figure 5-20). One notable difference in harvest locations between study years was that a harvest location was reported on north side of the Naknek River 2017, while all salmon harvest locations were located on the south side of the Naknek River in 2018.

Figure 5-19.–Fishing and harvest locations of all salmon species, South Naknek, 2017.

Figure 5-20.–Fishing and harvest locations of all salmon species, South Naknek, 2018.

The Subsistence Salmon Permit System

Evaluating Subsistence Salmon Permit System Harvest Estimates from Before and After Post-Season Household Surveys

Each year, subsistence salmon household permits are issued and collected for the Naknek District to estimate harvests by each community. Harvest estimates are recorded in the ADF&G Alaska Subsistence Fisheries Database (ASFDB) and published in an annual report by the Division of Subsistence; the latest annual report was published by Fall et al. (2020) and presented subsistence salmon harvest estimates for 2017. The post-season salmon harvest surveys administered for this project in South Naknek for 2017 and 2018 complement the permit system and increase the accuracy of documented subsistence salmon harvest levels. As noted in Chapter 1: "Introduction," during survey administration, permit data were provided and reviewed with households that had previously returned permits, or households returned a permit during the survey, to verify harvest information and to assist with recall. This section reviews the changes to the reported and estimated salmon harvests as the result of reconciling post-season survey data with returned permits, which helps to illustrate how well the permit system generally performs as a tool for documenting harvests. There is a set of tables (two for each year) that compares: 1) subsistence salmon permit participation based on surveys and returned permits (Table 5-14; Table 5-16), and 2) harvest estimates from before and after the time that post-season surveys occurred (Table 5-15; Table 5-17). The following paragraph explains how the total number of households was developed and how participation values of both permits and surveys were used for estimating harvests.

The estimated number of households included in the assessment of subsistence salmon harvests in South Naknek is based on the total number of year-round households plus an estimate of seasonal Alaska residents using a South Naknek address on their permit. This estimate was derived by computing the proportion of surveyed households obtaining a permit and applying that to unsurveyed households to estimate the number of year-round resident permit holders. The remaining permit holders were assumed to be seasonal and added to the total year-round households. The total estimated harvest from both permits and surveys was computed by first estimating harvests based on total permits and returns. Then, an additional correction was added based on the estimated number of unsurveyed households in the community fishing without a permit. The correction factor is the number of estimated unsurveyed households fishing without a permit multiplied by the average harvests by surveyed households holding permits.

Harvest Survey and Subsistence Permit Participation in South Naknek: 2017

In 2017, there were 16 permits issued to households with South Naknek addresses for the subsistence salmon fishery, and nine of those permits were returned prior to the post-season salmon harvest survey (56% return rate) (Table 5-14). During the 2017 survey, four permits were collected by research staff or LRAs from community households that had not already returned their permit. One household that did not obtain a permit but did fish with subsistence gear was issued a permit that was completed based on respondents' recall of harvests during the survey and the data were incorporated into the permit database (i.e., ASFDB) after the surveys were finished. The additional one permit issued increased the total 2017 subsistence permits for South Naknek from 16 to 17. The combination of the one new permit and four additional returned permits increased the number of returned permits to 14, or an 82% return rate. Overall, there were 28 households that were eligible for the household survey or cited South Naknek as the permit holder's place of residence. Of those households, 82% were contacted through either the permit system (14 returned permits) or post-season household surveys (14 surveyed households that did not subsistence fish and had no permit) (Table 1-4; Table 5-14).

Harvest by Species in South Naknek: 2017

Prior to the 2017 household surveys, the reported subsistence Chinook salmon harvest from the nine returned South Naknek permits was 34 fish, which was expanded to an initial estimated harvest of 60 Chinook salmon (Table 5-14; Table 5-15). An additional six Chinook salmon harvests were reported during the household surveys (two recorded on permits returned during surveys, and four from households that did not have a permit while fishing) (Table 5-15). The initial harvested 34 Chinook salmon reported from the

Table 5-14.–Subsistence salmon permit participation estimates based on returned permits and surveys, South Naknek, 2017.

	South Naknek
Permits	
Before surveys	
Number of permits issued	16
Number of permits returned	9
Initial return rate	56.3%
After surveys	
Number of previously issued permits returned during survey	4
Surveyed households that fished without a permit[a]	1
Estimated total number of households that fished without a permit	1
Number of permits issued[b]	17
Revised number of permits returned	14
Final return rate	82.4%
Participation	
Total number of households[c]	28
Total contacts	23
Proportion of contacted households	82.1%

Source ADF&G Division of Subsistence household surveys, 2018, and inseason catch permits, 2017.

Note During the household survey, it was found that two permits had been issued to individiuals who later formed a single household for the purposes of the household survey effort; the result is a discrepancy of one household between the lists.

a. According to both permit and survey returns combined.

b. Permits issued ex post facto were provided only to those households that were interviewed during post-season surveys. We estimate that there were no unsurveyed South Naknek households that fished without a permit in 2017.

c. All households were year-round resident households of South Naknek. No seasonal residents held subsistence permits.

permits and the additional six fish recorded during the household surveys increased the reported Chinook salmon harvest to 40 fish, which was expanded to a community harvest estimate of 49 Chinook salmon in 2017. Only the harvests reported by the one surveyed household that fished without a permit (and was issued a permit after being surveyed) were added to the ASFDB. Because of the ratio of surveyed households in South Naknek and the size of this study community, no additional households were estimated to have fished without a permit that were not surveyed. Because five more permits were returned during surveys, the expansion factor and average household harvest used for estimating the community harvest changed (initial estimate was 60 fish) and the final estimated harvest of Chinook salmon recorded in the ASFDB permit database was lower (49 fish) than the estimate from prior to surveys being completed.

For sockeye salmon, prior to the 2017 household surveys, the reported subsistence harvest from the nine returned South Naknek permits was 653 fish, which was expanded to an initial estimated harvest of 1,161 sockeye salmon (Table 5-14; Table 5-15). An additional 396 sockeye salmon harvests were reported during the household surveys (276 recorded on permits returned during surveys, and 120 from households that did not have a permit while fishing) (Table 5-15). The initial 653 sockeye salmon reported from the permits and the additional 396 salmon recorded during the household surveys increased the reported sockeye salmon harvest to 1,049 fish, which was expanded to a community harvest estimate of 1,274 sockeye salmon in 2017. For the same reasons noted above for Chinook salmon, the subsistence sockeye salmon estimate recorded in the permit database was also 1,274 fish.

Prior to the 2017 household surveys, the reported subsistence coho salmon harvest from the nine returned South Naknek permits was 67 fish, which was expanded to an initial estimated harvest of 119 coho salmon (Table 5-14; Table 5-15). An additional 62 coho salmon harvests were reported during the household surveys (five added from previously returned permits, and 57 recorded on permits returned during surveys) (Table 5-15). The initial harvested 67 coho salmon reported from the permits and the additional 62 fish recorded during the household surveys increased the reported coho salmon harvest to 129 fish, which was expanded to a community harvest estimate of 157 coho salmon in 2017. For the same reasons noted above for Chinook salmon, the subsistence coho salmon estimate recorded in the permit database was also 157 fish.

For chum salmon, prior to the 2017 household surveys, the reported subsistence harvest from the nine returned South Naknek permits was nine fish, which was expanded to an initial estimated harvest of 16 chum salmon (Table 5-14; Table 5-15). An additional 32 chum salmon harvests were reported during the household surveys (five added to previously returned permits, 17 recorded on permits returned during surveys, and 10 from households that did not have a permit while fishing) (Table 5-15). The initial harvested nine chum salmon reported from the permits and the additional 32 harvests recorded during the household surveys increased the reported chum salmon harvest to 41 fish, which was expanded to a community harvest estimate of 50 chum salmon in 2017. For the same reasons noted above for Chinook salmon, the subsistence chum salmon estimate in the permit database was also 50 fish.

Prior to the 2017 household surveys the reported subsistence harvest of pink salmon from the nine returned South Naknek permits was six fish, which was expanded to an initial estimated harvest of 11 pink salmon (Table 5-14; Table 5-15). An additional 15 pink salmon harvests were reported during the household surveys (five added to previously returned permits, and 10 from households that did not have a permit while fishing) (Table 5-15). The initial harvested six pink salmon reported from the permits and the additional 15 fish recorded during the household surveys increased the reported pink salmon harvest to 21 fish, which was expanded to a community harvest estimate of 26 pink salmon in 2017. For the same reasons noted above for Chinook salmon, the subsistence pink salmon estimate in the permit database was also 26 fish.

In comparing the initial estimated harvest for permit holders against the revised, post-season community subsistence harvest estimate for 28 total households, and focusing on the top three most harvested salmon species (Chinook, coho, and sockeye salmon), the coho salmon harvest estimate exhibited the most significant change: an increase of 32% (a difference of 38 fish) (Table 5-14; Figure 5-21). The harvest estimate decreased by 18% for Chinook salmon (a difference of 11 fish) but increased by 10% for sockeye salmon (a difference of 113 fish). The harvest estimate difference was largest for sockeye salmon: the

Table 5-15.–Subsistence salmon harvest estimates based on returned permits and surveys, South Naknek, 2017.

Harvest	Chinook	Sockeye	Coho	Chum	Pink
Before surveys					
Initial harvest reported on permits	34	653	67	9	6
Initial estimated harvest, all permit holders	60	1,161	119	16	11
After surveys					
Additional harvest added to previously returned permits	0	0	5	5	5
Harvest recorded on permits returned during the survey	2	276	57	17	0
Harvest by households that did not have permits	4	120	0	10	10
Reported harvest from both permits and surveys	40	1,049	129	41	21
Total estimated harvest, from both permits and surveys	49	1,274	157	50	26
Estimated harvest, from Alaska Subsistence Fisheries Database[a]	49	1,274	157	50	26

Source ADF&G Division of Subsistence household surveys, 2018, and inseason catch permits, 2017.

a. Based only on known fishers.

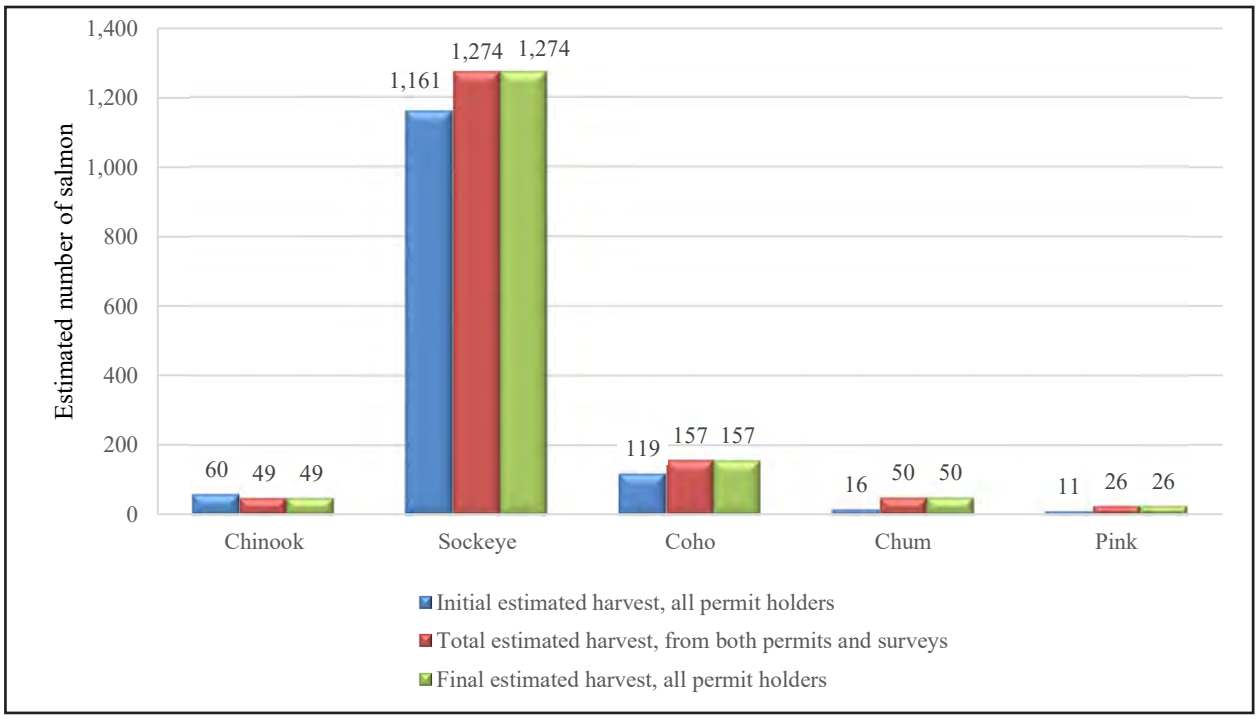


Figure 5-21.–Initial estimated salmon harvest based on returned permits compared to final estimated salmon harvest based on returned permits and surveyed households, South Naknek, 2017.

estimate increased by 113 fish. In comparing the initial estimated harvest for permit holders against the revised, post-survey community subsistence harvest estimate for 28 total households for the two least harvested salmon species, the chum and pink salmon estimates exhibited an increase. The harvest estimate for chum salmon increased by 213% (a difference of 34 fish) and for pink salmon increased by 136% (a difference of 15 fish).

Harvest Survey and Subsistence Permit Participation in South Naknek: 2018

In 2018, there were 15 permits issued to households with South Naknek addresses for the subsistence salmon fishery, and 10 of those permits were returned prior to the post-season salmon harvest survey (67% return rate) (Table 5-16). During the 2018 survey, three permits were collected by research staff or LRAs from community households that had not already returned their permit. Other households (three) that did not obtain a permit but did fish with subsistence gear were issued a permit that was completed based on respondents' recall of harvests during the survey and the recall data were incorporated into the permit database (i.e., ASFDB) after the surveys were finished. The additional three permits issued increased the total 2018 subsistence permits for South Naknek from 15 to 18. The combination of the three new permits and three additional returned permits increased the number of returned permits to 16, or an 89% return rate. Overall, there were 30 households that were eligible for the household survey or cited South Naknek as the permit holder's place of residence. This includes 26 year-round households and an estimated four seasonal resident households that had subsistence permits and gave South Naknek as their place of residence. Of these 30 households, including 10 permit holders that were surveyed, 25 (83%) were contacted through either the permit system (16 returned permits) or post-season household surveys (nine surveyed households that did not subsistence fish and had no permit) (Table 1-4; Table 5-16) .

Table 5-16.–Subsistence salmon permit participation estimates based on returned permits and surveys, South Naknek, 2018.

	South Naknek
Permits	
Before surveys	
Number of permits issued	15
Number of permits returned	10
Initial return rate	66.7%
After surveys	
Number of previously issued permits returned during survey	3
Surveyed households that fished without a permit[a]	3
Estimated total number of households that fished without a permit	4
Number of permits issued[b]	18
Revised number of permits returned	16
Final return rate	88.9%
Participation	
Total number of households[c]	30
Total contacts	25
Proportion of contacted households	83.3%

Source ADF&G Division of Subsistence household surveys, 2019, and inseason catch permits, 2018.

a. According to both permit and survey returns combined.

b. Permits issued ex post facto were provided only to those households that were interviewed during post-season surveys.

c. Note that 10 permits were issued to households that were surveyed and eight household permits were issued to people with South Naknek addresses who were not surveyed, and their status as permanent (year-round) or seasonal residents of the community could not be directly determined. Based upon the percentage of surveyed households that had permits (10 of 19, or 53%), an estimated 14 of the 26 year-round Naknek households had subsistence permits. Therefore, four permits (18 permits minus four permits) were held by seasonal households.

Harvest by Species in South Naknek: 2018

Prior to the 2018 household surveys, the reported subsistence Chinook salmon harvest from the 10 returned South Naknek permits was 55 fish, which was expanded to an initial estimated harvest of 83 Chinook salmon (Table 5-16; Table 5-17). An additional eight Chinook salmon harvests were reported during the household surveys from households that did not have a permit while fishing (Table 5-17). The initial harvested 55 Chinook salmon reported from the permits and the additional eight harvests recorded during the household surveys increased the reported Chinook salmon harvest to 63 fish, which was expanded to a community harvest estimate of 74 Chinook salmon in 2018. Only the harvests reported by three surveyed households that fished without a permit (and were issued a permit after being surveyed) were added to the ASFDB, and not the estimated harvest for the estimated one additional household in South Naknek that fished without a permit and was not surveyed. Also, the updated permit return and average household harvest changed the expansion factor for estimating community harvests; therefore, the estimated post-season Chinook salmon harvest by South Naknek residents for the Naknek District for 2018 recorded in the ASFDB was 71 fish, which was lower than the initial permit-based estimate for the ASFDB.

For sockeye salmon, prior to the 2018 household surveys, the reported subsistence harvest from the 10 returned South Naknek permits was 683 fish, which was expanded to an initial estimated harvest of 1,025 sockeye salmon (Table 5-16; Table 5-17). An additional 283 sockeye salmon harvests were reported during the household surveys (three added to previously returned permits, 120 recorded on permits returned during surveys, and 160 from households that did not have a permit while fishing) (Table 5-17). The initial 683 sockeye salmon reported from the permits and the additional 283 salmon recorded during the household surveys increased the reported sockeye salmon harvest to 966 fish, which was expanded to a community harvest estimate of 1,139 sockeye salmon in 2018. For the same reasons noted above for Chinook salmon, the subsistence sockeye salmon estimate in the permit database was 1,087 fish.

Prior to the 2018 household surveys, the reported subsistence coho salmon harvest from the 10 returned South Naknek permits was 39 fish, which was expanded to an initial estimated harvest of 59 coho salmon (Table 5-16; Table 5-17). An additional 40 coho salmon harvests were reported during the household surveys (20 recorded on permits returned during surveys, and 20 from households that did not have a permit while fishing) (Table 5-17). The initial harvested 39 coho salmon reported from the permits and the additional 40 fish recorded during the household surveys increased the reported coho salmon harvest to 79 fish, which was expanded to a community harvest estimate of 95 coho salmon in 2018. For the same reasons noted above for Chinook salmon, the subsistence coho salmon estimate in the permit database was 89 fish.

For chum salmon, prior to the 2018 household surveys, the reported subsistence harvest from the 10 returned South Naknek permits was four fish, which was expanded to an initial estimated harvest of six chum salmon (Table 5-16; Table 5-17). An additional 12 chum salmon harvests were reported during the household surveys from households that did not have a permit while fishing (Table 5-17). The initial harvested four chum salmon reported from the permits and the additional 12 harvests recorded during the household surveys increased the reported chum salmon harvest to 16 fish, which was expanded to a community harvest estimate of 19 chum salmon in 2018. For the same reasons noted above for Chinook salmon, the subsistence chum salmon estimate in the permit database was 18 fish.

Prior to the 2018 household surveys, the reported subsistence harvest of pink salmon from the 10 returned South Naknek permits was nine fish, which was expanded to an initial estimated harvest of 14 pink salmon (Table 5-16; Table 5-17). An additional eight pink salmon harvests were reported during the household surveys from households that did not have a permit while fishing (Table 5-17). The initial harvested nine pink salmon reported from the permits and the additional eight fish recorded during the household surveys increased the reported pink salmon harvest to 14 fish, which was expanded to a community harvest estimate of 17 pink salmon in 2018. For the same reasons noted above for Chinook salmon, the subsistence pink salmon estimate in the permit database was 16 fish.

Table 5-17.–Subsistence salmon harvest estimates based on returned permits and surveys, South Naknek, 2018.

Harvest	Chinook	Sockeye	Coho	Chum	Pink
Before surveys					
Initial harvest reported on permits	55	683	39	4	9
Initial estimated harvest, all permit holders	83	1,025	59	6	14
After surveys					
Additional harvest added to previously returned permits	0	3	0	0	0
Harvest recorded on permits returned during the survey	0	120	20	0	0
Harvest by households that did not have permits	8	160	20	12	8
Reported harvest from both permits and surveys	63	966	79	16	14
Total estimated harvest, from both permits and surveys	74	1,139	95	19	17
Estimated harvest, from Alaska Subsistence Fisheries Database[a]	71	1,087	89	18	16

Source ADF&G Division of Subsistence household surveys, 2019, and inseason catch permits, 2018.

a. Based only on known fishers.

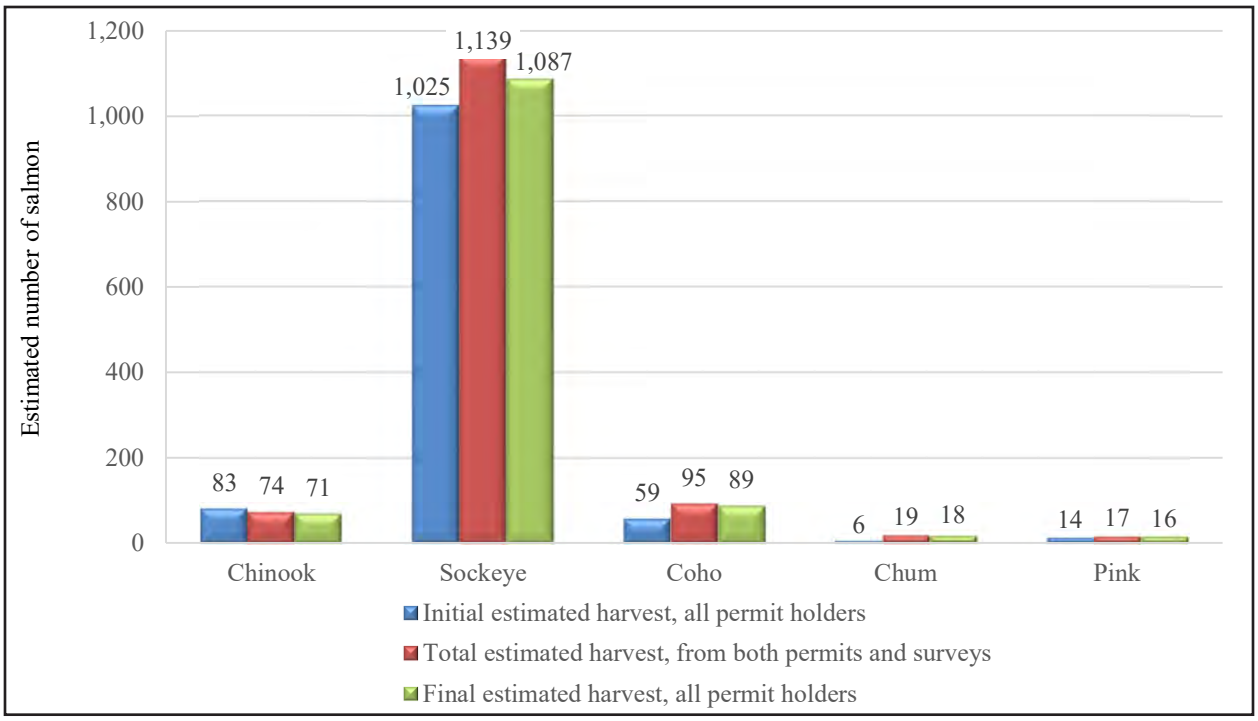


Figure 5-22.–Initial estimated salmon harvest based on returned permits compared to final estimated salmon harvest based on returned permits and surveyed households, South Naknek, 2018.

In comparing the initial estimated harvest for permit holders against the revised, post-season community subsistence harvest for 30 total households, and focusing on the top three most harvested salmon species (Chinook, coho, and sockeye salmon), the coho salmon harvest estimate exhibited the most significant change: an increase of 61% (a difference of 36 fish) (Table 5-16; Figure 5-22). The harvest estimate decreased by 11% for Chinook salmon (from 83 fish to 74 fish) but increased by 11% for sockeye salmon, which also represented the largest difference (114 fish) between the initial permit holder and post-season total community harvest estimates. In comparing the initial estimated harvest for permit holders against the revised, post-survey community subsistence harvest estimate for 30 total households for the two least harvested salmon species (chum and pink salmon), the harvest estimate for chum salmon increased by 217% (from 6 fish to 19 fish), and increased by 21% for pink salmon (from 14 fish to 17 fish).

Comparing Uses and Harvests in 2017and 2018 with Previous Years

Assessments of Use

Researchers asked respondents to assess their salmon use in two ways: whether they used more, less, or about the same amount of salmon in each study year as in the past five years, and whether they "got enough" salmon. Households also were asked to provide reasons if their use was different or if they were unable to get enough salmon. Also, if they did not get enough, respondents were asked to evaluate the severity of the impact to their household as a result of not getting enough. They were further asked how much salmon did the household need annually and whether they did anything differently (such as supplement with store-bought food or switch to a different subsistence resource) because they did not get enough. Households were also asked to assess whether their salmon fishing efforts or locations changed during the study years compared to usual activities. Because not every household uses salmon resources, some households did not respond to the assessment questions. Additionally, some households that do typically use salmon resources simply did not answer questions. For each type of assessment, households could give more than one reason

for changes to resource use, not having enough salmon, or increased effort or travel to get salmon. This section discusses responses to those questions.

2017

For the 2017 study year, 21 South Naknek households reported usually using salmon (Table 5-18). Out of 23 households, nine (39%) stated that they used the less salmon as they used in previous years, eight households (35%) reported the same amount of use, and four households (17%) reported more use of salmon (Table 5-18; Figure 5-23). When asked the reasons why salmon use decreased, one-half (50%) of the eight respondents who responded to the follow-up question cited that they did not need as much salmon, 38% cited working/no time, and 25% cited a lack of effort (Table 5-19). All four households that increased salmon use provided a reason why: 50% of respondents credited increased resource availability, 25% of households stated they needed more, 25% cited increased effort, and 25% had more time to get salmon (Table 5-20). When asked if the household got enough salmon in 2017, 83% of sampled households indicated that they did, while 9% indicated that they did not (Figure 5-24). Of the two responding households that did not get enough salmon in 2017, one household reported the impact as major, and one reported the impact as not noticeable (Table 5-21). The only household to answer the question asking what a household did as the result of not having enough salmon used more commercial foods (Table 5-22). The two households that did not have enough salmon were asked how many are needed annually, and responses indicated an average of 75 salmon (Table 5-23). In 2017, two South Naknek households reported having to work harder than usual to obtain enough salmon, and cited reasons for why were lack of resource availability (one household) and equipment to harvest (one household) (Table 5-24). During the 2017 study year, no households reported that they had to travel further, or travel to different locations than normal, to obtain enough salmon for their household needs (Table 5-25).

2018

In 2018, all 19 sampled South Naknek households reported usually using salmon (Table 5-26). The majority of households (10, or 53%) stated that they used the same amount of salmon as used in previous years, eight households (42%) reported less use, and one household (5%) used more salmon (Table 5-26; Figure 5-25). Especially in comparison to the results for 2017, a variety of reasons were provided to describe why fewer salmon were used in 2018 compared to the past five years: 25% of respondents indicated it was due to family/personal reasons, and 25% cited working/no time (Table 5-27). Additionally, each of the following reasons was cited by 13% of households: lack of equipment, less sharing, lack of effort, unsuccessful harvest efforts, used other resources, had no help, and another (or unspecified) reason. The one household that increased salmon use in 2018 cited increased effort as the reason why (Table 5-28). When asked if the household got enough salmon in 2018, 68% indicated that they did, while 32% (six households) indicated that they did not (Figure 5-26; Table 5-29). Of the six households that did not have enough salmon, two households responded to the follow-up question asking about the impact of not getting enough salmon in 2018: one household reported the impact was minor, and one household reported a major impact. When asked what households that did not get enough salmon did as the result of not getting enough, three households replied: 67% used more commercial foods, and 33% made do without (Table 5-30). There were seven households that assessed how many salmon are needed annually, and responses indicated an average of 62 salmon (Table 5-31). During the 2018 study year, no households reported that they had to work harder, travel further, or travel to different locations than normal to obtain enough salmon for their household needs (Table 5-32; Table 5-33).

Table 5-18.–Changes in household uses of salmon compared to recent years, South Naknek, 2017.

Sampled households	Valid responses[a]	Households reporting use								Households not using	
		Total households		Less		Same		More			
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
23	23	21	91.3%	9	39.1%	8	34.8%	4	17.4%	2	8.7%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households that did not provide any response.

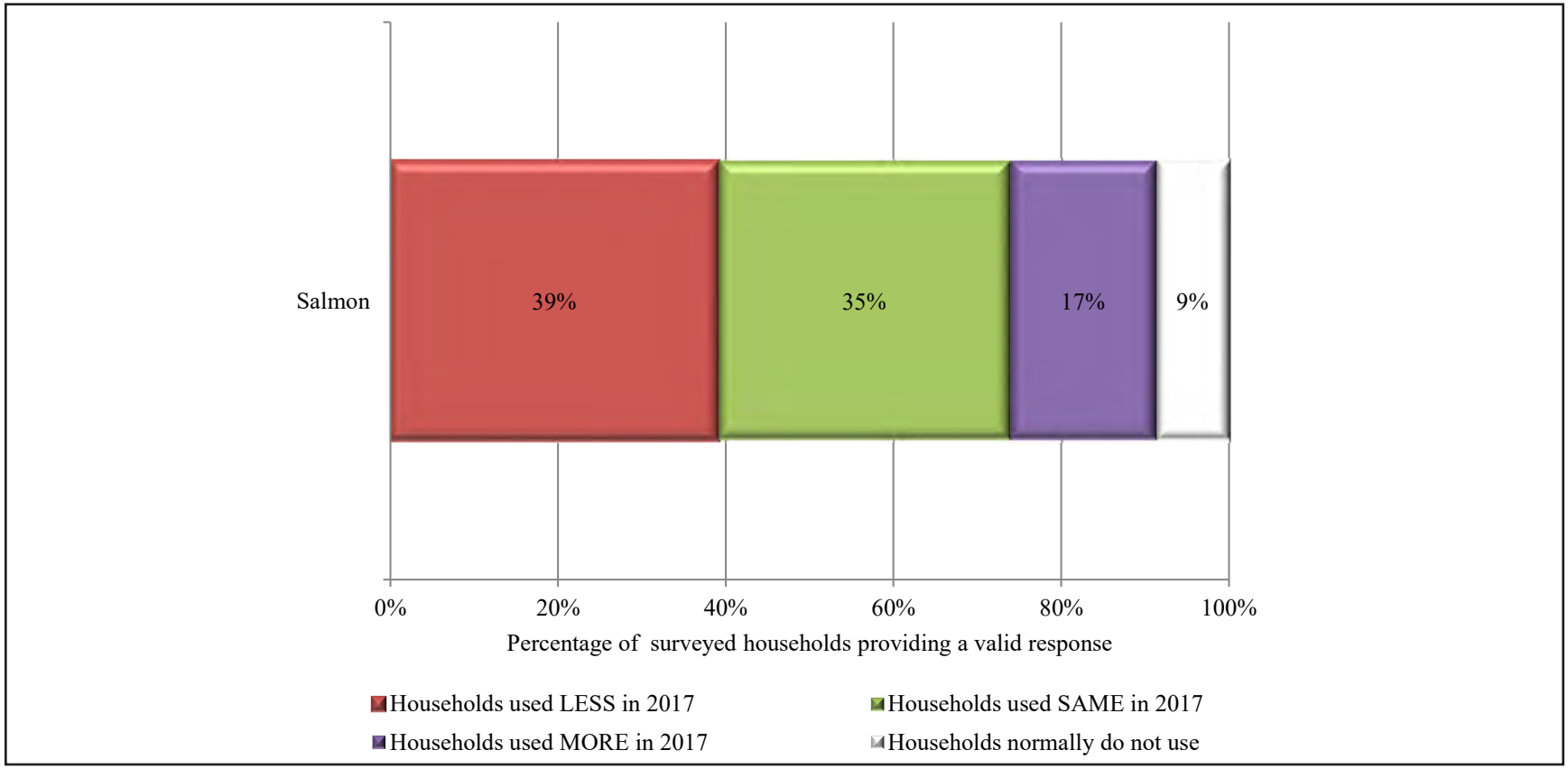


Figure 5-23.–Changes in household uses of salmon compared to recent years, South Naknek, 2017.

Table 5-19.–Reasons for less household uses of salmon compared to recent years, South Naknek, 2017.

Valid responses[a]	Households reporting reasons for less use	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
23	8	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	25.0%	0	0.0%	0	0.0%

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Table 5-19.–Continued.

Valid responses[a]	Households reporting reasons for less use	Working/ no time		Regulations		Did not need		Gas/equipment too expensive		Used other resources		Competition		Had no help		Other reasons	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
23	8	3	37.5%	0	0.0%	4	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	12.5%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

Table 5-20.–Reasons for more household uses of salmon compared to recent years, South Naknek, 2017.

Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Favorable weather		Received more		Needed more		Increased effort	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
23	4	2	50.0%	0	0.0%	0	0.0%	0	0.0%	1	25.0%	1	25.0%

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Table 5-20.–Continued.

Valid responses[a]	Households reporting reasons for more use	More success		Had more time		Got/fixed equipment		Substitute for unavaialable resource(s)		Had more help		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
23	4	0	0.0%	1	25.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

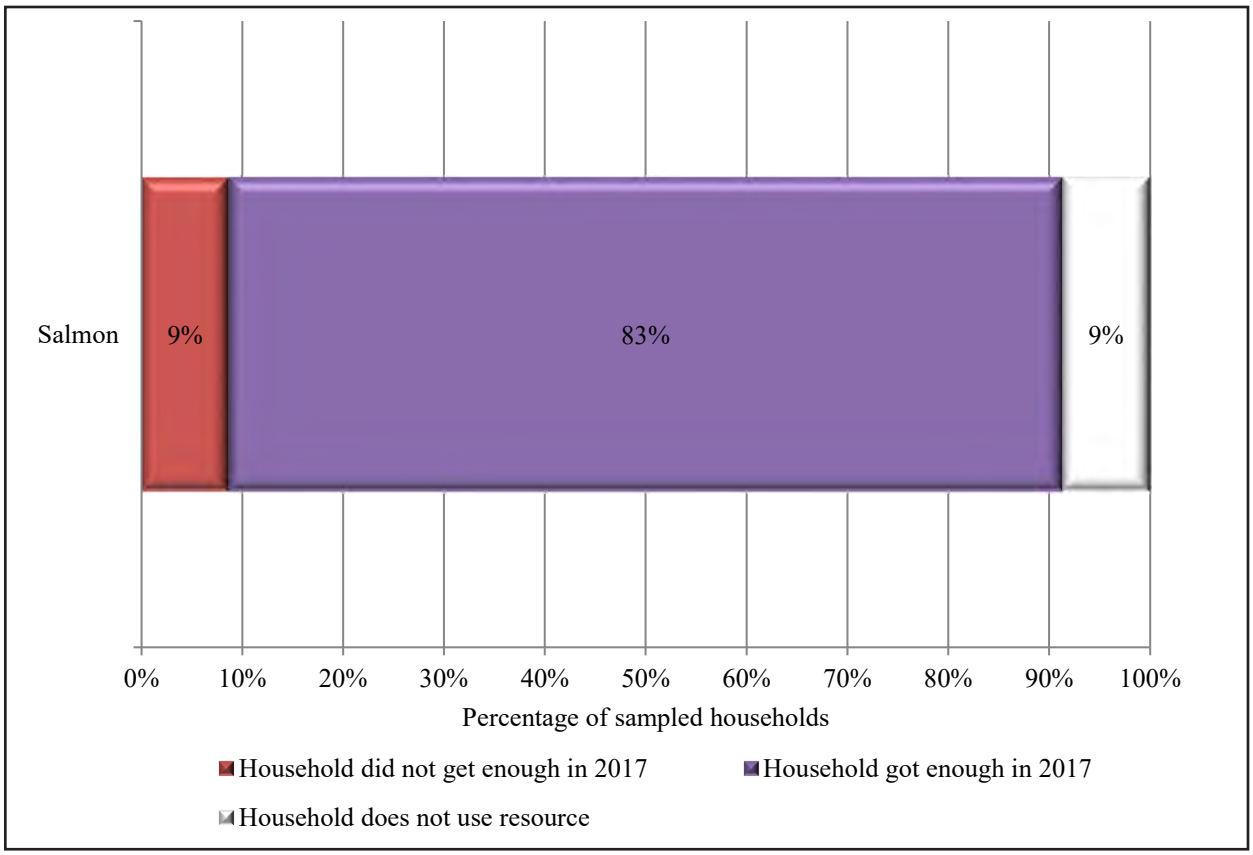

Figure 5-24.–Percentage of sampled households reporting whether they had enough salmon, South Naknek, 2017.

Table 5-21.–Reported impact to households reporting that they did not get enough salmon, South Naknek, 2017.

Sampled households	Households not getting enough salmon				Impact to those not getting enough salmon									
	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
23	21	91.3%	2	9.5%	0	0.0%	1	50.0%	0	0.0%	1	50.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 5-22.–Things households reported doing differently as the result of not getting salmon, South Naknek, 2017.

Valid responses[a]	Bought/bartered		Used more commercial foods		Replaced with other subsistence foods		Asked others for help		Increased effort	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%

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Table 5-22.–Continued.

Valid responses[a]	Made do without		Obtained food from other sources		Got public assistance		Less sharing		Other reasons	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 5-23.–Amount of salmon needed by households that did not have enough, South Naknek, 2017.

Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
2	150	75

Source ADF&G Division of Subsistence household surveys, 2018.

Table 5-24.–Reasons that households worked harder to get more salmon, South Naknek, 2017.

Sampled households	Valid responses	Households reporting… not working harder than usual	working harder than usual	Family/personal Number	Family/personal Percentage	Resource availability Number	Resource availability Percentage	Unsuccessful Number	Unsuccessful Percentage	More time Number	More time Percentage
23	16	14	2	0	0.0%	1	50.0%	0	0.0%	0	0.0%

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Table 5-24.–Continued.

Sampled households	Valid responses	Households reporting… not working harder than usual	working harder than usual	Small or diseased resources Number	Small or diseased resources Percentage	No equipment Number	No equipment Percentage	Other reasons Number	Other reasons Percentage	No response Number	No response Percentage
23	16	14	2	0	0.0%	1	50.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.

Table 5-25.–Households reporting that they traveled farther or to different locations, South Naknek, 2017.

Sampled households	Valid responses	Households reporting that they... traveled further	traveled to different locations
23	16	0	0

Source ADF&G Division of Subsistence household surveys, 2018.

Table 5-26.–Changes in household uses of salmon compared to recent years, South Naknek, 2018.

Sampled households	Valid responses[a]	Households reporting use								Households not using	
		Total households		Less		Same		More			
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
19	19	19	100.0%	8	42.1%	10	52.6%	1	5.3%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households that did not provide any response.

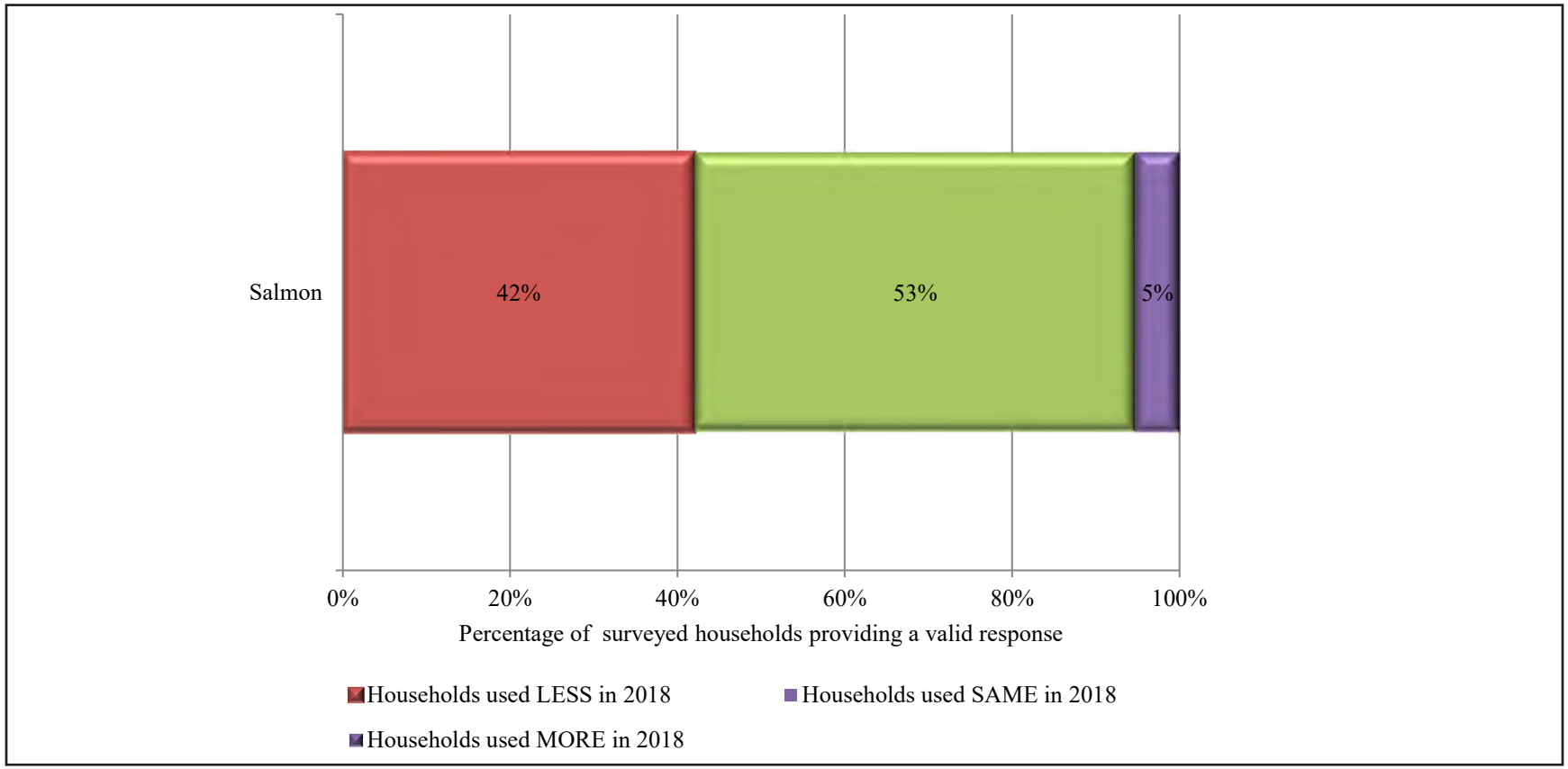

Figure 5-25.–Changes in household uses of salmon compared to recent years, South Naknek, 2018.

Table 5-27.–Reasons for less household uses of salmon compared to recent years, South Naknek, 2018.

Valid responses[a]	Households reporting reasons for less use	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
19	8	2	25.0%	0	0.0%	0	0.0%	1	12.5%	1	12.5%	1	12.5%	1	12.5%	0	0.0%

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Table 5-27.–Continued.

Valid responses[a]	Households reporting reasons for less use	Working/ no time		Regulations		Did not need		Gas/equipment too expensive		Used other resources		Competition		Had no help		Other reasons	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
19	8	2	25.0%	0	0.0%	0	0.0%	0	0.0%	1	12.5%	0	0.0%	1	12.5%	1	12.5%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

Table 5-28.–Reasons for more household uses of salmon compared to recent years, South Naknek, 2018.

Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Favorable weather		Received more		Needed more		Increased effort	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
19	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%

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Table 5-28.–Continued.

Valid responses[a]	Households reporting reasons for more use	More success		Had more time		Got/fixed equipment		Substitute for unavaialable resource(s)		Had more help		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
19	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households that did not provide any response and households reporting never using the resource.

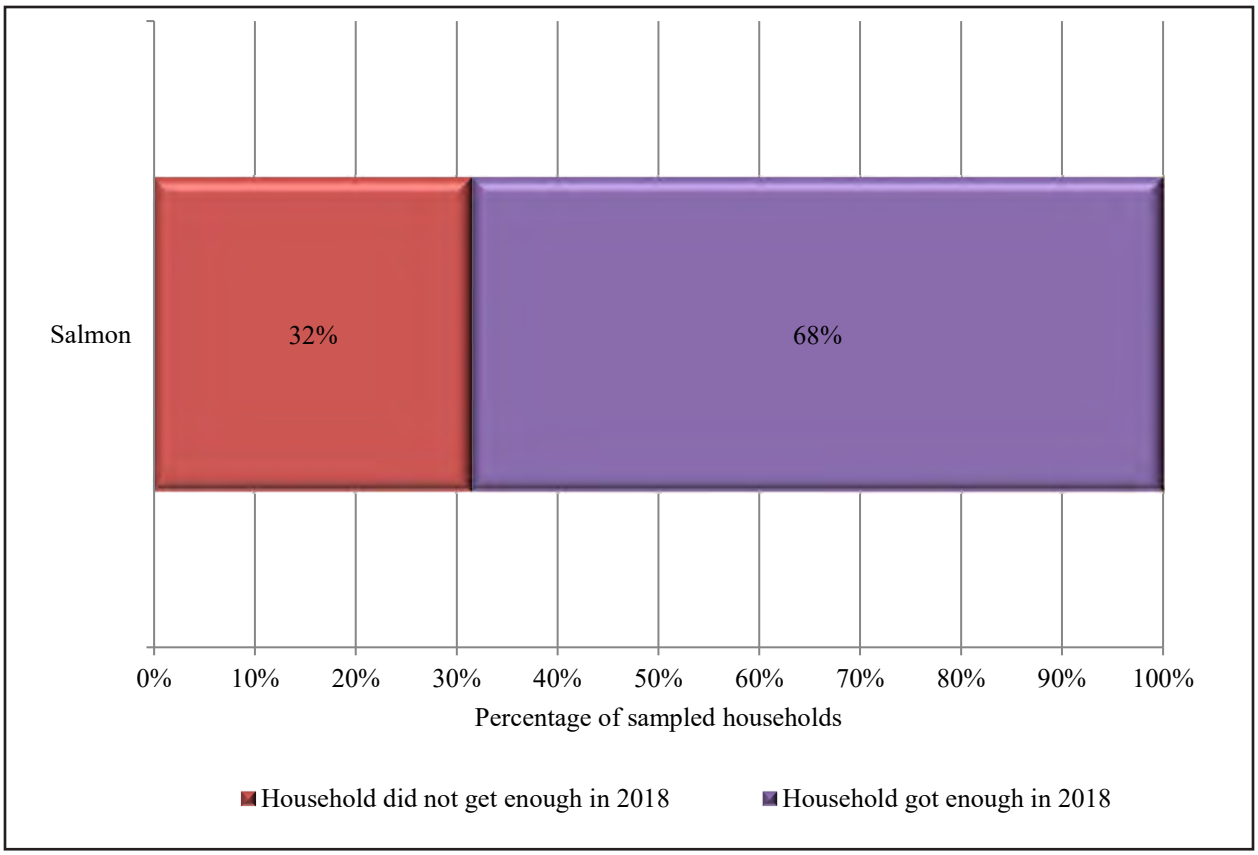

Figure 5-26.–Percentage of sampled households reporting whether they had enough salmon, South Naknek, 2018.

Table 5-29.–Reported impact to households reporting that they did not get enough salmon, South Naknek, 2018.

Sampled households	Households not getting enough salmon				Impact to those not getting enough salmon									
	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
19	19	100.0%	6	31.6%	4	66.7%	0	0.0%	1	16.7%	1	16.7%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 5-30.–Things households reported doing differently as the result of not getting salmon, South Naknek, 2018.

Valid responses[a]	Bought/bartered		Used more commercial foods		Replaced with other subsistence foods		Asked others for help		Increased effort	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
3	0	0.0%	2	66.7%	0	0.0%	0	0.0%	0	0.0%

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Table 5-30.–Continued.

Valid responses[a]	Made do without		Obtained food from other sources		Got public assistance		Less sharing		Other reasons	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

a. Valid responses do not include households failing to respond to the question and those households that never used the resource.

Table 5-31.–Amount of salmon needed by households that did not have enough, South Naknek, 2018.

Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
7	435	62

Source ADF&G Division of Subsistence household surveys, 2019.

Table 5-32.–Reasons that households worked harder to get more salmon, South Naknek, 2018.

Sampled households	Valid responses	Households reporting… not working harder than usual	Households reporting… working harder than usual	Family/personal Number	Family/personal Percentage	Resource availability Number	Resource availability Percentage	Unsuccessful Number	Unsuccessful Percentage	More time Number	More time Percentage
19	11	11	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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Table 5-32.–Continued.

Sampled households	Valid responses	Households reporting… not working harder than usual	Households reporting… working harder than usual	Small or diseased resources Number	Small or diseased resources Percentage	No equipment Number	No equipment Percentage	Other reasons Number	Other reasons Percentage	No response Number	No response Percentage
19	11	11	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.

Table 5-33.–Households reporting that they traveled farther or to different locations, South Naknek, 2018.

Sampled households	Valid responses	Households reporting that they... traveled further	Households reporting that they... traveled to different locations
19	11	0	0

Source ADF&G Division of Subsistence household surveys, 2019.

Table 5-34.–Usual household harvest methods, South Naknek, 2017.

Households providing valid response to question about usual salmon harvest method	Remove from commercial catch		Seine		Set gillnet		Rod and reel		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
18	2	11.1%	0	0.0%	18	100.0%	5	27.8%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2018.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Assessments of Salmon Harvest Methods

2017

All 18 households (100%) that answered questions about usual salmon harvest methods indicated use of subsistence set gillnet; also, five households (28%) indicated at least one usual salmon harvest method was rod and reel, and two households (11%) indicated usually retaining commercial harvests for home use (Table 5-34). The five households that responded rod and reel is a usual salmon harvest method provided the following reasons for why: fun (four households), tradition (two households), selectivity (one household), and other (or unspecified) reason (one household) (Table 5-35).

2018

Of the 16 households that answered the questions, 15 (94%) indicated at least one of their usual harvest methods for salmon was subsistence set gillnet, six households (38%) indicated usually retaining commercial harvests, and two households (13%) indicated rod and reel was a usual harvest method (Table 5-36). Of those two households that responded rod and reel is a usual salmon harvest method, reasons provided for why included: fun (two households), tradition (one household), and ease (one household) (Table 5-37).

Comparing Harvests in 2017 and 2018 with Estimated Harvests from Previous Study Years and Returned Subsistence Salmon Permits

Changes in the harvest of salmon by South Naknek residents can also be discerned through comparisons with findings from other study years and data from the subsistence permit database; the permit data collected by ADF&G begins in 1983. Comprehensive subsistence harvest surveys were conducted in South Naknek for the study years 1983, 1992, and 2007; the reports by Morris (1985) and Holen et al. (2011) summarize study results for 1983 and 2007, respectively; harvest data from 1992 were published in the ADF&G CSIS database.

As discussed above, for 2017 and 2018, Division of Subsistence staff members opportunistically collected unreturned permits from households in South Naknek; the data from previously unreturned permits were then included in the subsistence permit database. Three goals of the 2017 and 2018 household salmon surveys included collecting unreturned subsistence permits from South Naknek households, gathering harvest data from households that did not obtain a subsistence permit but did subsistence fish, and collecting information about the amount of salmon retained from commercial catches for home use or harvested using rod and reel. This additional information collected through the administration of household surveys provides a more accurate representation of a South Naknek fishing season and total harvests for home use than data from returned subsistence salmon permits alone. As mentioned above, a total of five and six additional permits were collected as a result of the survey efforts for 2017 and 2018, respectively; this resulted in improved permit return rates both years (tables 5-14, 5-16, and 5-38). In South Naknek, the permit return rate prior to survey administration was 56% in 2017 and 67% in 2018, but the return rates improved to 82% and 89%, respectively, after surveys were conducted.

Table 5-35.–Reasons for using a rod and reel to harvest salmon, South Naknek, 2017.

Households using rod and reel	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
5	0	0.0%	1	20.0%	0	0.0%	2	40.0%	0	0.0%	4	80.0%	1	20.0%

Source ADF&G Division of Subsistence household surveys, 2018.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 5-36.–Usual household harvest methods, South Naknek, 2018.

Households providing valid response to question about usual salmon harvest method	Remove from commercial catch		Seine		Set gillnet		Rod and reel		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
16	6	37.5%	0	0.0%	15	93.8%	2	12.5%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 5-37.–Reasons for using a rod and reel to harvest salmon, South Naknek, 2018.

Households using rod and reel	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
2	0	0.0%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	2	100.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2019.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Apart from 2017, the studies conducted by the Division of Subsistence have resulted in lower subsistence salmon harvest estimates than those estimated through the subsistence permit database (Figure 5-27—Total Salmon). The Division of Subsistence estimated 1,062 salmon were harvested for subsistence in 1983 based on post-season surveys, and the subsistence permit database estimate was 1,505 salmon (Table 5-38; Table 5-39). In 1992, the harvest survey estimate was 2,713 salmon (excluding spawnouts), and the permit database estimate was 2,972 salmon (Figure 5-27—Total Salmon). For the 2007 study year, the harvest survey estimate was 1,208 salmon (excluding spawnouts) and the permit database estimate was a harvest of 2,676 salmon. For the 2017 study year, the harvest survey estimate was 1,797 salmon and the permit-based estimated harvest was 1,554 salmon. In 2018, the harvest survey estimate was 853 salmon, and the permit database estimate was 1,280 salmon. Past Division of Subsistence studies have demonstrated harvest survey estimates to be more accurate than permit estimates. This is likely the case for South Naknek, and the higher harvest estimates in the permit system most likely are a result of permit holders that do not reside in the community during the winter months listing a South Naknek address on their permits.

Nevertheless, though there is a difference between the subsistence harvest estimates based on the source, both sets of data show a similar timeline for fluctuations in salmon harvest amounts (Figure 5-27). Based on subsistence permit data, spanning 1983 through 1990 subsistence salmon harvests were relatively steady—ranging between approximately 1,055–2,911 fish (Figure 5-27—Total Salmon; Table 5-38). Beginning in the early 1990s, and lasting until the mid-2000s[1], the estimated salmon harvests increased and ranged between approximately 2,216–3,680 fish. From 2005–2018 the harvest estimates decreased (with exception of 2015 when the harvest was estimated at 3,143 salmon) and remained relatively steady, ranging between a low harvest of approximately 942 salmon to a high harvest estimate of approximately 2,676 fish. The number of permits issued each year corresponds with the harvest patterns identified above. For example, spanning 1983–1990, the number of issued permits ranged 29–36, but spanning 1991–2005[2], the number of issued permits ranged 31–44; then, for the ensuing 13 years (2006–2018), the number of issued permits ranged 17–33.

The post-season total community subsistence harvest estimates exhibit a similar timeline for fluctuations in salmon harvest amounts as the permit system (Figure 5-27; Figure 5-28). Also exhibiting a similar timeline for fluctuations, Division of Subsistence population estimates indicate a relatively steady population from the early 1980s until the mid-2000s when the population began to decrease (Figure 5-2). According to Division of Subsistence population estimates, the 1983 population of South Naknek was 138 individuals, in 1992 the population was 134, in 2007 the population was 52, and this study found a population of 46 individuals in 2017 and 38 individuals in 2018.

According to both the salmon harvest survey data and the subsistence permits, sockeye salmon has been the most harvested salmon species by residents of South Naknek since 1983 (Figure 5-27). Because sockeye harvests compose such a large proportion of the total salmon harvest each year, the subsistence harvest of sockeye salmon over time reflects the fluctuations identified above for all salmon species. According to subsistence permit data, the historical average harvest of sockeye salmon from 1983–2018 was 1,704 fish, the 10-year (2009–2018) average was 1,257 fish, and the five-year (2014–2018) average was 1,556 fish (Table 5-38). According to the post-season harvest survey estimates and excluding spawning salmon, in 1983 the subsistence sockeye salmon harvest was 642 fish, in 1992 the harvest was 1,633 sockeye salmon, in 2007 the harvest was 777 fish, in 2017 the harvest was 1,489 fish, and in 2018 a total of 697 sockeye salmon were harvested (Table 5-39).

1. Note that 1997 is not included in the estimated harvest range due to the low number of permits issued.
2. Note that 1997 is not included in the estimated harvest range due to the low number of permits issued.

Table 5-38.–Historical estimated subsistence salmon harvests, based on Bristol Bay permit returns, South Naknek, 1983–2018.

	Permits		Percentage of returned	Estimated salmon harvest					
Year	Issued	Returned	permits	Chinook	Sockeye	Coho	Chum	Pink	**Total**
1983	34	26	76.5%	239	792	348	102	24	**1,505**
1984	32	26	81.3%	218	904	163	120	363	**1,769**
1985	32	29	90.6%	155	1,749	316	14	0	**2,234**
1986	35	27	77.1%	169	2,299	84	34	325	**2,911**
1987	36	34	94.4%	239	1,438	252	39	18	**1,986**
1988	33	31	93.9%	259	1,078	102	10	95	**1,544**
1989	34	33	97.1%	227	994	214	68	52	**1,555**
1990	29	29	100.0%	84	705	110	74	82	**1,055**
1991	35	28	80.0%	261	2,686	323	187	38	**3,494**
1992	34	27	79.4%	285	2,007	241	178	262	**2,972**
1993	32	30	93.8%	284	2,310	553	185	190	**3,522**
1994	38	30	78.9%	501	2,098	523	59	63	**3,244**
1995	35	30	85.7%	243	1,500	262	102	178	**2,285**
1996	36	33	91.7%	317	2,355	294	128	163	**3,257**
1997	7	6	85.7%	49	251	28	11	4	**343**
1998	34	32	94.1%	270	1,971	183	227	114	**2,766**
1999	44	42	95.5%	166	2,662	332	172	85	**3,416**
2000	42	40	95.2%	118	2,571	231	119	272	**3,311**
2001	39	38	97.4%	176	2,879	159	309	156	**3,678**
2002	40	35	87.5%	207	2,990	190	142	152	**3,680**
2003	39	33	84.6%	219	2,925	167	131	165	**3,607**
2004	34	33	97.1%	337	2,320	210	10	19	**2,896**
2005	31	27	87.1%	219	1,561	352	18	64	**2,216**
2006	33	29	87.9%	208	1,936	249	19	55	**2,467**
2007	26	22	84.6%	171	1,967	287	117	134	**2,676**
2008	26	26	100.0%	139	1,838	423	43	159	**2,602**
2009	27	12	44.4%	32	1,141	41	2	0	**1,215**
2010	21	17	81.0%	54	781	143	9	61	**1,048**
2011	22	20	90.9%	52	928	161	11	2	**1,154**
2012	18	15	83.3%	20	778	79	11	54	**942**
2013	19	15	78.9%	25	1,164	76	6	0	**1,277**
2014	22	18	81.8%	68	1,365	242	4	16	**1,695**
2015	22	17	77.3%	60	2,725	250	54	54	**3,143**
2016	20	16	80.0%	25	1,330	62	33	37	**1,486**
2017	17	14	82.4%	49	1,274	157	50	26	**1,554**
2018	18	16	88.9%	71	1,087	89	18	16	**1,280**
5-year avg (2014–2018)	20	16	81.8%	54	1,556	160	32	30	1,832
10-year avg (2009–2018)	21	16	77.7%	46	1,257	130	20	27	1,479
Historical avg (1983–2018)	30	26	87.0%	173	1,704	219	78	97	2,272

Source ADF&G Division of Subsistence, ASFDB 2018 (ADF&G May 2019).

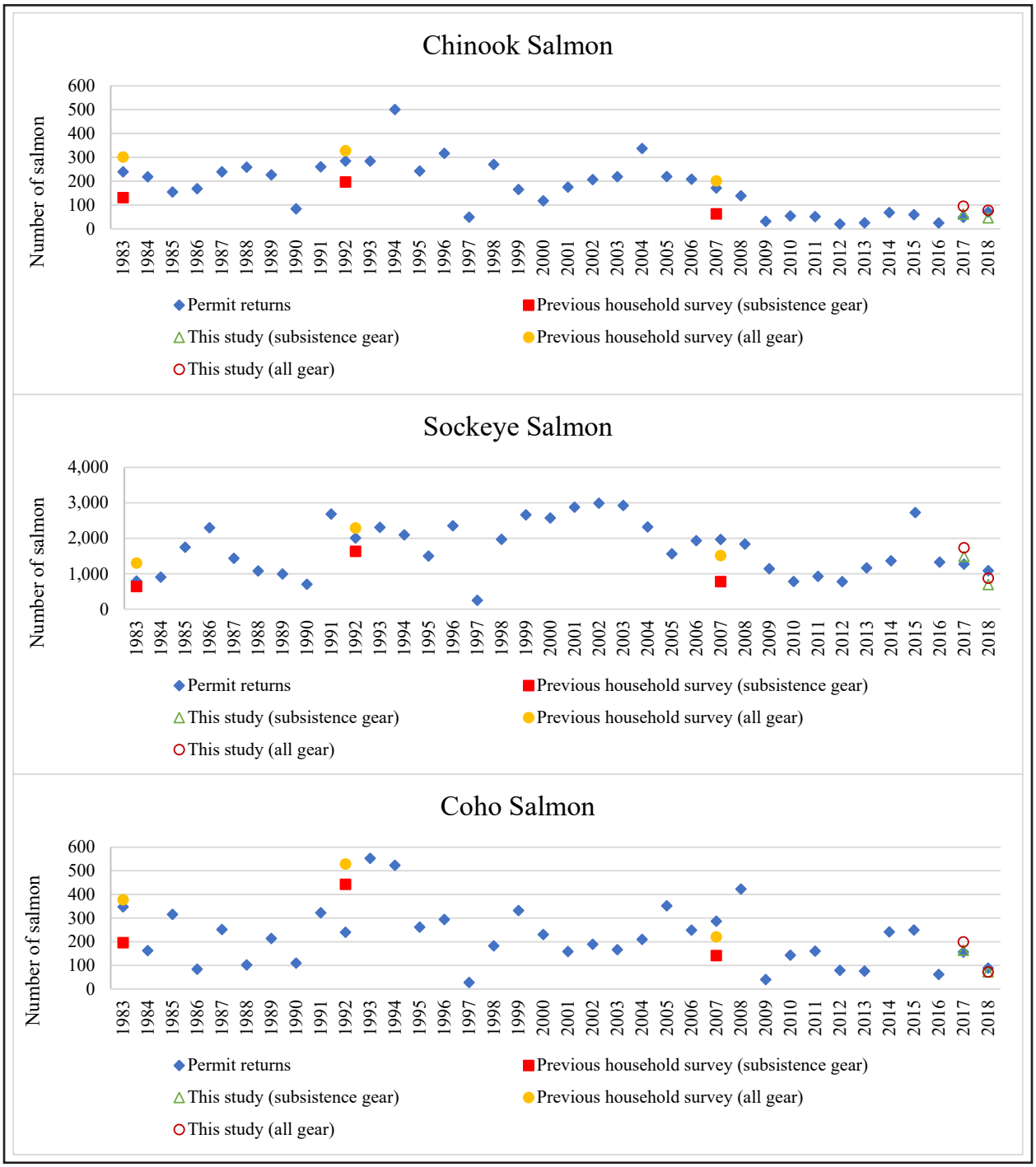
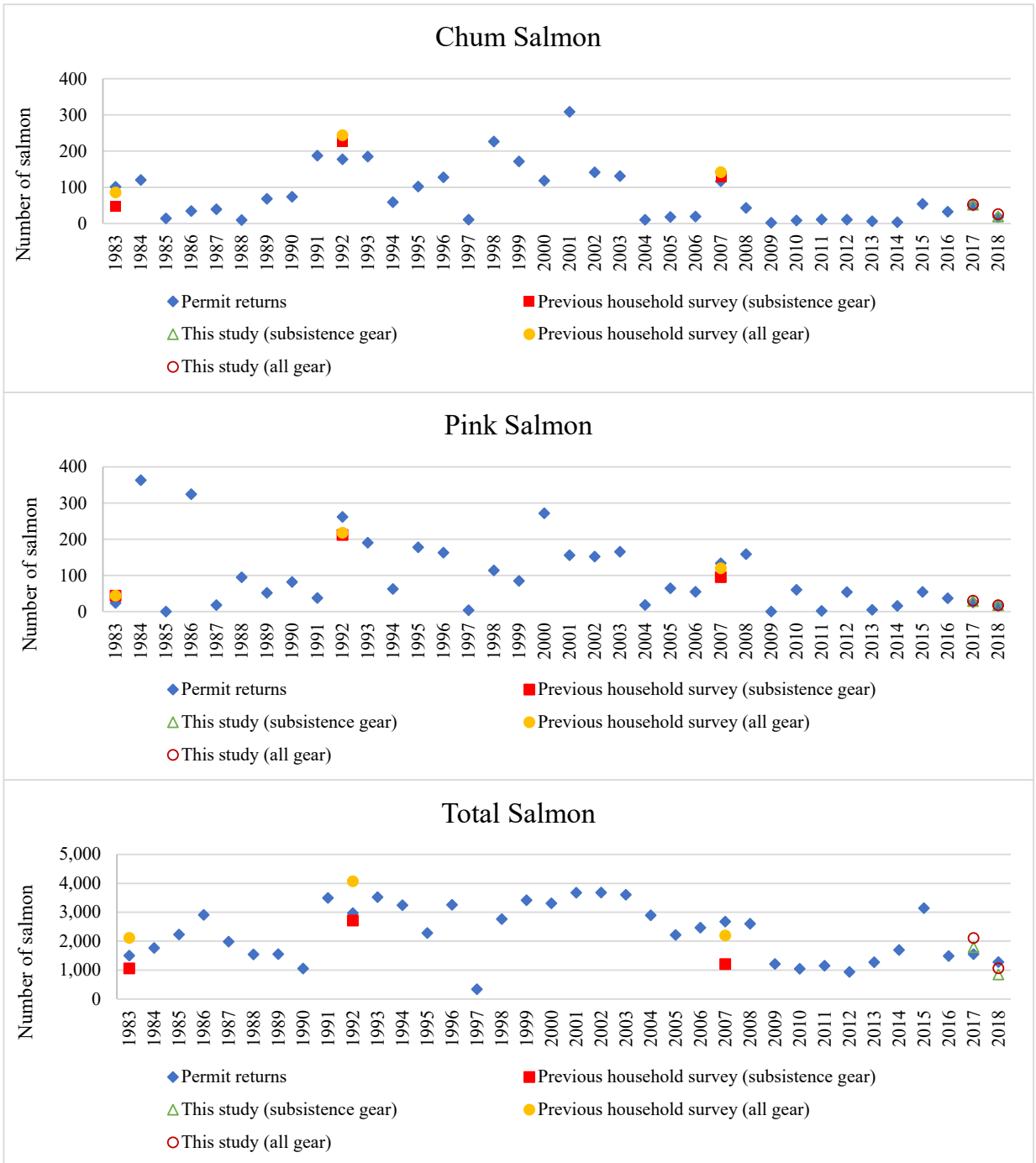


Figure 5-27.–Comparison of historical estimated salmon harvests, based on Bristol Bay permit returns, 1983–2018, and based on household surveys, South Naknek, 1983, 1992, 2007, 2017, and 2018.

Figure 3-27.–Page 2 of 2.



Note For comparability to harvest estimates based on permit returns, the remaining harvest estimates based on household surveys (i.e., previous household survey and this study) exclude spawning salmon harvests.

Table 5-39.–Historical estimated subsistence salmon harvests, based on household surveys, South Naknek, 1983, 1992, 2007, 2017, and 2018

	Estimated salmon harvest[a]							
	1983				1992			
Resource	Number	Pounds	Per capita (lb)	CIP	Number	Pounds	Per capita (lb)	CIP
Salmon	**1,062.0**	**5,536.0**	**40.2**	**75.0%**	**3,173.0**	**14,325.0**	**106.6**	**22.0%**
Chum salmon	49.0	211.0	1.5	148.0%	228.0	1,049.0	7.8	46.0%
Coho salmon	196.0	804.0	5.8	90.0%	443.0	2,196.0	16.3	24.0%
Chinook salmon	131.0	1,908.0	13.9	61.0%	197.0	2,700.0	20.1	22.0%
Pink salmon	44.0	111.0	0.8	150.0%	212.0	486.0	3.6	55.0%
Sockeye salmon	642.0	2,502.0	18.2	99.0%	1,633.0	6,974.0	51.9	23.0%
Spawnouts[b]	0.0	0.0	0.0	0.0%	460.0	919.0	6.8	53.0%
Unknown salmon	0.0	0.0	0.0	0.0%	0.0	0.0	0.0	0.0%

-continued-

Table 5-39.–Continued.

	Estimated salmon harvest[a]							
	2007				2017			
Resource	Number	Pounds	Per capita (lb)	CIP	Number	Pounds	Per capita (lb)	CIP
Salmon	**1,405.9**	**6,074.9**	**116.8**	**27.9%**	**1,796.8**	**7,534.7**	**162.9**	**19.1%**
Chum salmon	130.0	634.4	12.2	64.8%	52.3	246.3	5.3	32.6%
Coho salmon	141.9	723.9	13.9	33.5%	164.3	783.5	16.9	30.5%
Chinook salmon	63.1	700.3	13.5	22.4%	62.1	515.1	11.1	31.4%
Pink salmon	95.3	285.0	5.5	88.6%	29.2	79.8	1.7	48.0%
Sockeye salmon	777.4	3,335.0	64.1	17.9%	1,488.9	5,910.0	127.8	19.3%
Spawnouts[b]	198.1	396.2	7.6	60.7%	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%

-continued-

Table 5-39.–Continued.

	Estimated number of salmon harvested[a]			
	2018			
Resource	Number	Pounds	Per capita (lb)	CIP
Salmon	**852.5**	**3,493.6**	**91.2**	**35.5%**
Chum salmon	19.2	89.4	2.3	78.3%
Coho salmon	72.5	353.8	9.2	52.7%
Chinook salmon	46.5	351.9	9.2	52.0%
Pink salmon	17.8	46.4	1.2	55.9%
Sockeye salmon	696.5	2,652.2	69.2	36.9%
Spawnouts[b]	0.0	0.0	0.0	0.0%
Unknown salmon	0.0	0.0	0.0	0.0%

Sources For 2017 and 2018, ADF&G Division of Subsistence household surveys, 2018, 2019; for previous study years, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2019.

a. Includes subsistence gear types only.

b. In 1992 and 2007, "spawnouts" were spawning sockeye salmon.

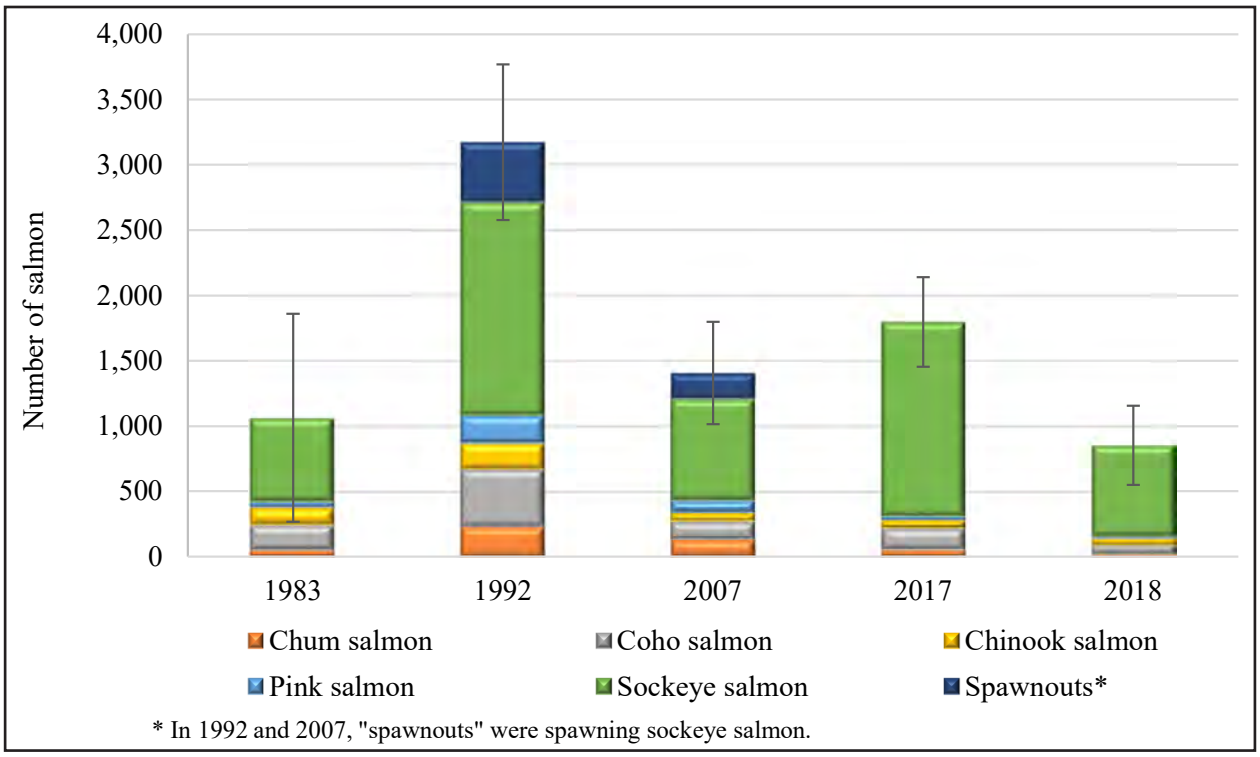
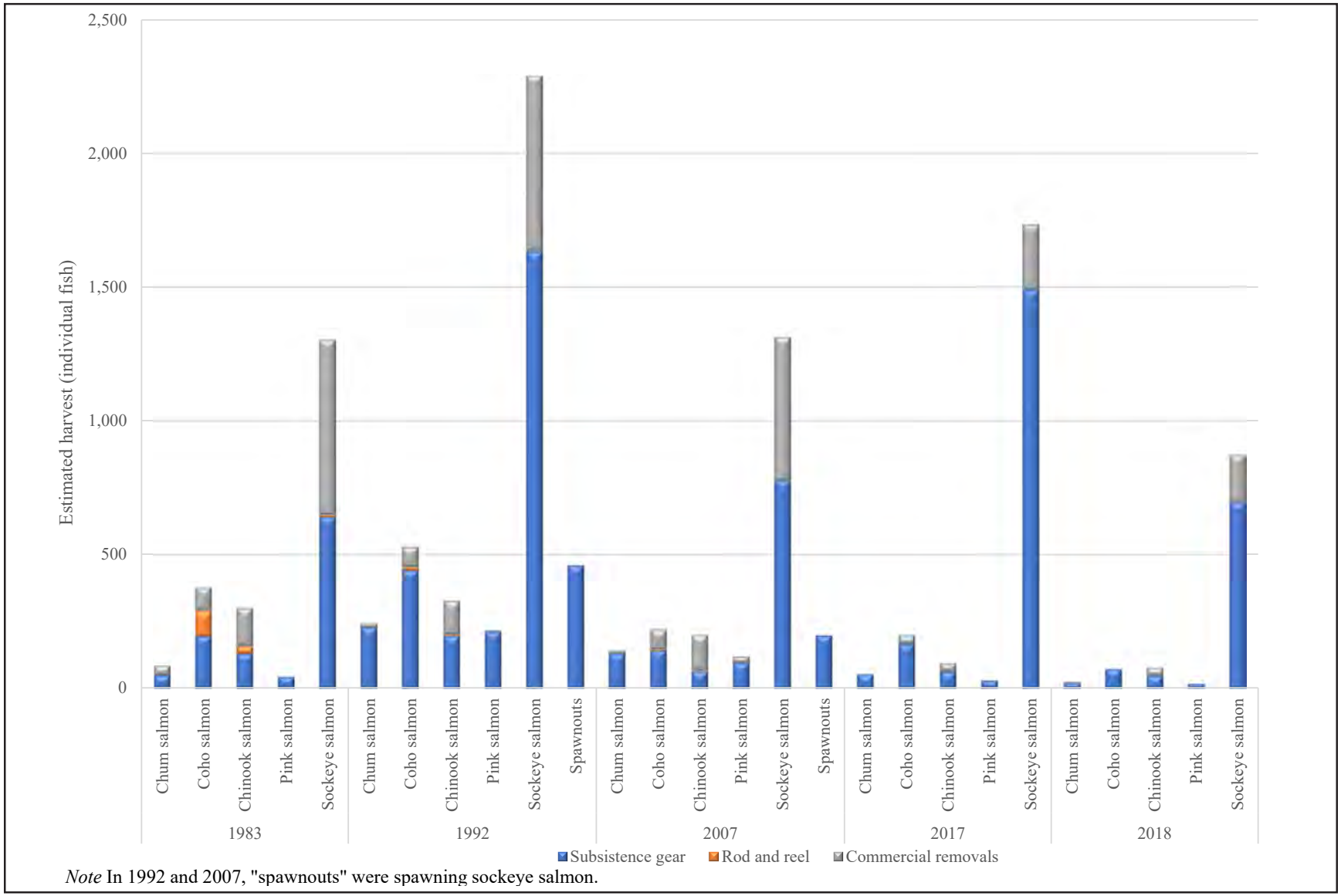


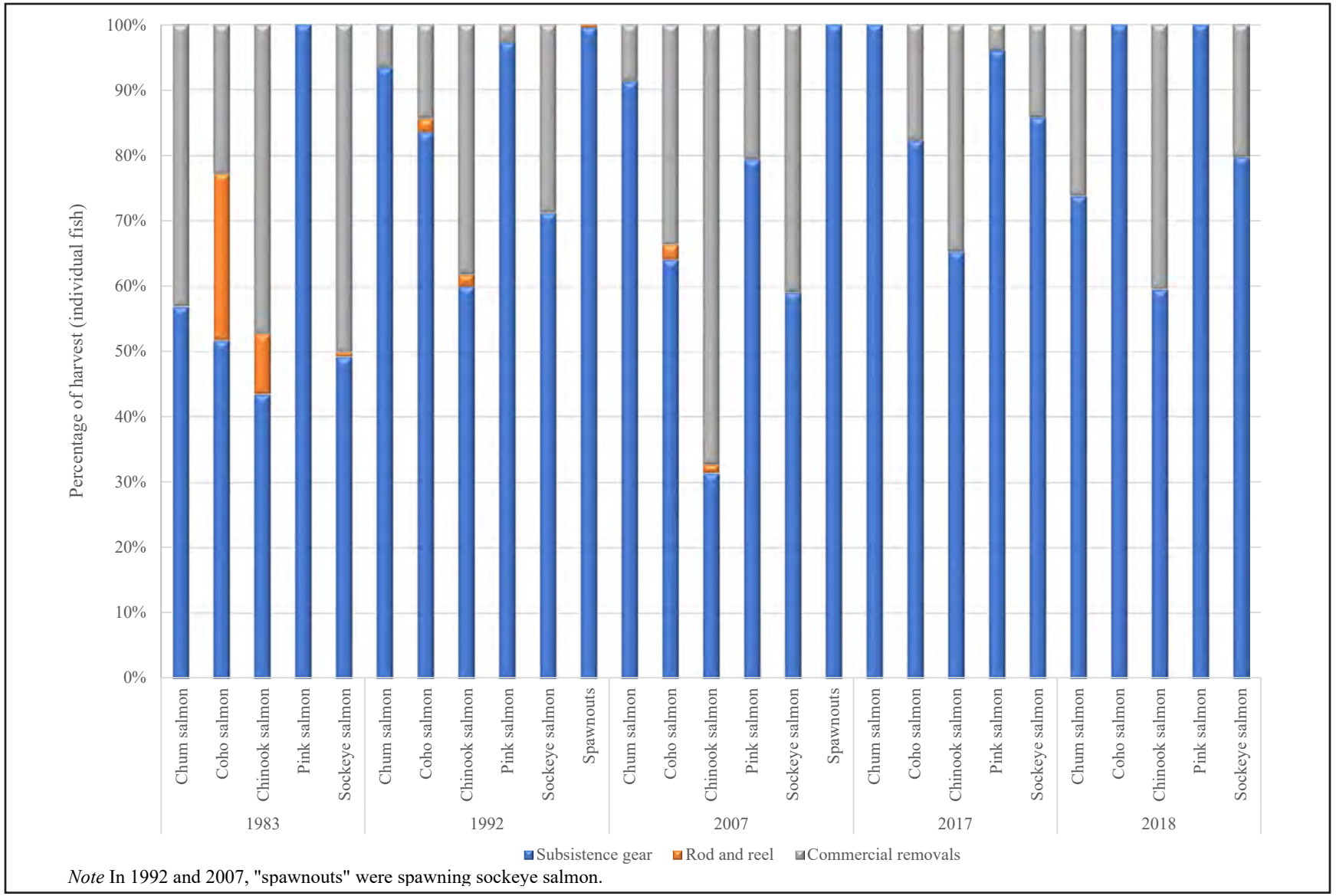
Figure 5-28.–Composition of historical estimated subsistence salmon harvests, by individual fish and based on household surveys, South Naknek, 1983, 1992, 2007, 2017, and 2018.

Based on both the salmon harvest survey data and the subsistence permits, coho salmon have been the second most harvested salmon species by residents of South Naknek the majority of years since 1983, followed closely by Chinook salmon (Figure 5-27; Figure 5-28). According to subsistence permit data, the historical average harvest of coho salmon from 1983–2018 was 219 fish, the 10-year (2009–2018) average was 130 fish, and the five-year (2014–2018) average was 160 fish (Table 5-38). According to the harvest surveys, in 1983 an estimated 196 coho salmon were harvested, the harvest in 1992 was 443 coho salmon, the harvest in 2007 was 142 coho salmon, in 2017 the harvest was 164 fish, and in 2018 a total of 73 coho salmon were harvested (Table 5-39). Results for the five survey years depict a decline in use of rod and reel to harvest coho salmon over time (Figure 5-29). For example, in 1983 harvests by rod and reel accounted for approximately 25% of the total coho salmon harvest, in both 1992 and 2007 coho salmon rod and reel harvests declined to 2%, and no coho salmon were harvested by rod and reel in 2017 and 2018 (Figure 5-30). With a few exceptions, Chinook salmon has been the third most harvested salmon species by residents of South Naknek since 1983 (Figure 5-27). According to subsistence permit data, the historical average harvest of Chinook salmon from 1983–2018 was 173 fish, the 10-year (2009–2018) average was 46 fish, and the five-year (2014–2018) average was 54 fish (Table 5-38). According to the harvest surveys, in 1983 an estimated 131 Chinook salmon were harvested for subsistence, the harvest in 1992 was 197 Chinook salmon, the harvest in 2007 was 63 Chinook salmon, in 2017 the harvest was 62 fish, and in 2018 a total of 47 Chinook salmon were harvested (Table 5-39). Similarly to the trends identified for coho salmon, results for the five survey years depict a decline in use of rod and reel to harvest Chinook salmon over time (Figure 5-29). For example, the percentage of the Chinook salmon harvest caught by rod and reel in 1983 accounted for approximately 9% of the total Chinook salmon harvest, in 1992 rod and reel harvests accounted for 2%, in 2007 this gear type accounted for 1%, and no Chinook salmon were harvested by rod and reel in 2017 or 2018 (Figure 5-30).



Note In 1992 and 2007, "spawnouts" were spawning sockeye salmon.

Figure 5-29.–Historical estimated salmon harvests, by individual fish and by species, harvested by gear type, South Naknek, 1983, 1992, 2007, 2017, and 2018.



Note In 1992 and 2007, "spawnouts" were spawning sockeye salmon.

Figure 5-30.–Historical proportion of salmon harvests, by individual fish and by species, harvested by gear type, South Naknek, 1983, 1992, 2007, 2017, and 2018.

Pink salmon and chum salmon are typically not the preferred salmon species for residents of South Naknek. Each of these species of salmon have, based on household surveys and the permit data, since 1987 made up less than 10% of the total subsistence salmon harvest composition (Table 5-38; Table 5-39).

The subsistence permits do not ask separately about the harvests of spawning sockeye salmon and non-spawning sockeye salmon; therefore, the only available data for spawning sockeye salmon harvests are from the post-season household surveys. South Naknek households reported harvesting spawning sockeye salmon for study years 1992 and 2007. The estimated spawning sockeye salmon harvests for 1992 was 460 fish, and an estimated 198 spawning sockeye salmon were harvested during the 2007 study year (Table 5-39). No spawning sockeye salmon harvests were reported during this study, and, according to respondents, there has been noticeable decline in subsistence pursuits of spawning sockeye salmon by South Naknek community members over the past decade.

Local Comments and Concerns

Following is a summary of local comments, concerns, and observations related to salmon resource populations and harvest trends that were recorded during the surveys in South Naknek. Some households did not offer any additional information during the survey interviews, so not all households are represented in the summary. In addition, respondents expressed their concerns about salmon during the community review meeting of preliminary data. Comments and concerns collected during household surveys and the community data review meeting are further contextualized with qualitative information obtained from key respondent interviews and participant observation. These concerns have been included in the summary.

Appreciation for Subsistence Salmon

Almost all South Naknek residents expressed an overall sentiment of gratitude for subsistence salmon during the surveys and interviews. These respondents spoke about the many benefits of harvesting and processing subsistence salmon. For example, it was explained that many families left this community when the school closed, but, according to community members, in the summers there are entire families that return to South Naknek to subsistence fish for salmon. People also associated subsistence salmon with important community sharing patterns, access to a heathy food source, and as an important catalyst for intergenerational transmission of cultural practices and traditions. One survey respondent stated: “I’m grateful for salmon, it is the best.”

Bears

Concerns regarding brown bears were mentioned during both years of household harvest surveys. Feedback from South Naknek respondents included remarks about an increase in the number of bears near the community of South Naknek. Community members recounted stories of bears breaking into smokehouses, not fearing humans, and exhibiting aggression toward people who were subsistence fishing. One community member informed project staff that she no longer smoked salmon as a result of the bear activity. Several respondents suggested allowing sport harvests of bears close to the community.

Changes in Harvest Patterns

Some South Naknek respondents mentioned their household needed fewer subsistence salmon during the 2017 and 2018 study years than in the past as a result of fewer families residing in the community; this change was cited as affecting the harvest of spawning sockeye salmon in particular. Respondents elaborated that the spawning sockeye salmon fishery occurs in the fall, and because most families leave at the end of the summer, this resource is no longer as necessary or desired as it was in the past. Additionally, many families in the past had dog teams that were fed spawned-out sockeye salmon; however, there are fewer dogs and no dog teams in contemporary South Naknek.

6. DISCUSSION AND CONCLUSIONS

This project aimed to collect, analyze, and report information about subsistence salmon harvests, harvest methods, and participation levels for Naknek, South Naknek, and King Salmon for 2017 and 2018, and to gain an understanding of the factors that shape salmon harvests in the study communities today and in the past. The project also used subsistence salmon survey data to evaluate the subsistence salmon permit and harvest reporting system. Research staff from the Division of Subsistence and the Bristol Bay Native Association worked together to conduct household salmon surveys for study years 2017 and 2018. Additionally, researchers engaged in participant observation for summer subsistence fishing activities and for the fall spawnout sockeye salmon fishery, and also conducted key respondent interviews with community members from the three study communities who were knowledgeable about subsistence fishing.

Overview of Findings for the Study Communities, 2017 and 2018

Demography

Before discussing salmon harvest and use patterns, an overview of study findings regarding population trends in the study communities is instructive. Community demography shapes patterns of subsistence salmon uses as well as local sharing networks and perceptions of community wellbeing. Of the three study communities, Naknek had the largest population (pop. 413 in 2017, and pop. 434 in 2018), followed by that of King Salmon (pop. 244 in 2017, and pop. 242 in 2018) and South Naknek (pop. 46 in 2017, and pop. 38 in 2018) (tables 4-1, 3-1, and 5-1). The population of South Naknek has decreased significantly over the past 40 years (Figure 5-2). The number of people residing in South Naknek decreased by 72% from 1983 to 2018. During this study, many South Naknek residents suggested the population decline in their community is a result of large families relocating outside of the community and the school closing a decade ago. The population of King Salmon also decreased, but less drastically than at South Naknek, with a 34% decrease from 1983 to 2018 (Figure 3-2). The population decline likely is attributed, at least in part, to the 1994 closure of the King Salmon Air Station. However, Naknek's population has increased since the 1980s (Figure 4-2). The number of people residing in Naknek grew by 13% from 1983 to 2018. Naknek's increasing population may be a result of a growing commercial fishing industry and several families from South Naknek relocated to Naknek in recent years to have access to schooling for their children. Additional housing was also developed after 1983, which is when the borough made 100 building sites within the Naknek community boundary available through a lottery (Morris 1985:28). An indication of a shift in age demographics for all three communities cumulatively is reflected in the Bristol Bay School District student enrollment. In the 1997/1998 school year, pre-kindergarten through grade 12 enrollment was 357 students, while during the study years, or the 2017/2018 school year, enrollment of 128 students was roughly one-third of that from 20 years prior.[1, 2]

Salmon Harvest and Use, 2017 and 2018

As discussed in the community chapters, all five species of wild Alaska Pacific salmon pass through the Naknek River each season. Salmon is a highly valued resource and access to this type of fish was central to the way of life for residents of the study communities in 2017 and 2018.

1. *Data Center: Statistics & Reports*, s.v. "Enrollment Totals (as of October 1 of each year); District Enrollment Totals for all Alaskan Public School Districts; Select Year: 1997–1998" (by Alaska Department of Education & Early Development), https://education.alaska.gov/data-center (accessed August 2020).
2. *Data Center: Statistics & Reports*, s.v. "Enrollment Totals (as of October 1 of each year); District Enrollment Totals for all Alaskan Public School Districts; Select Year: 2017–2018" (by Alaska Department of Education & Early Development), https://education.alaska.gov/data-center (accessed August 2020).

King Salmon

In 2017, 98% of King Salmon households used salmon, 76% of households harvested salmon, 44% of households gave salmon away, and 48% received salmon (Table 3-8). During the first study year, King Salmon residents harvested an estimated total of 19,140 lb, or 79 lb per capita, of salmon. Regarding harvest methods, King Salmon residents caught 66% of the salmon harvest weight using subsistence gillnets, 27% was harvested using rod and reel, 6% was removed from commercial catches, and 2% was harvested using dip net (Table 3-10). In 2018, 87% of King Salmon households used salmon, 63% of households harvested salmon, 46% of households gave salmon away, and 52% received salmon (Table 3-11). An estimated total of 28,154 lb, or 116 lb per capita, of salmon were harvested in 2018, and 84% of the salmon harvest weight was harvested using subsistence nets, 10% using rod and reel, and 6% was removed from commercial catches (Table 3-11; Table 3-13).

Naknek

For Naknek, 87% of households used salmon in 2017, 71% of households harvested salmon, 50% of households gave salmon away, and 54% received salmon (Table 4-8). Naknek residents harvested an estimated total of 56,927 lb, or 138 lb per capita, of salmon during the first study year. Regarding gear types used to harvest salmon, 81% of the salmon weight was harvested using subsistence gillnets, 17% was removed from commercial catches, and the remining 2% was harvested using rod and reel in 2017 (Table 4-10). During the second study year, 90% of Naknek households used salmon, 60% of Naknek households harvested salmon, 45% of households gave salmon away, and 56% received salmon (Table 4-11). For 2018, an estimated total of 47,062 lb, or 108 lb per capita, of salmon were harvested by Naknek households. Naknek residents harvested 85% of the salmon weight using subsistence nets, 14% was removed from commercial catches, and 1% was harvested using rod and reel (Table 4-13).

South Naknek

During the first study year, 91% of South Naknek households used salmon, 78% of households harvested salmon, 48% of households gave salmon away, and 39% received salmon (Table 5-8). In 2017, this community harvested an estimated total of 8,955 lb, or 194 lb per capita, of salmon. South Naknek residents harvested 84% of the salmon weight using subsistence gillnets and the remaining 16% was removed from commercial catches (Table 5-10). In 2018, 90% of South Naknek households used salmon, 58% of South Naknek households harvested salmon, 42% of households gave salmon away, and 68% received salmon (Table 5-11). An estimated 4,436 lb, or 116 lb per capita, of salmon were harvested in study year 2018. Regarding gear types used to harvest salmon, 79% of the salmon weight was harvested using subsistence nets and the remaining 21% was removed from commercial catches (Table 5-13).

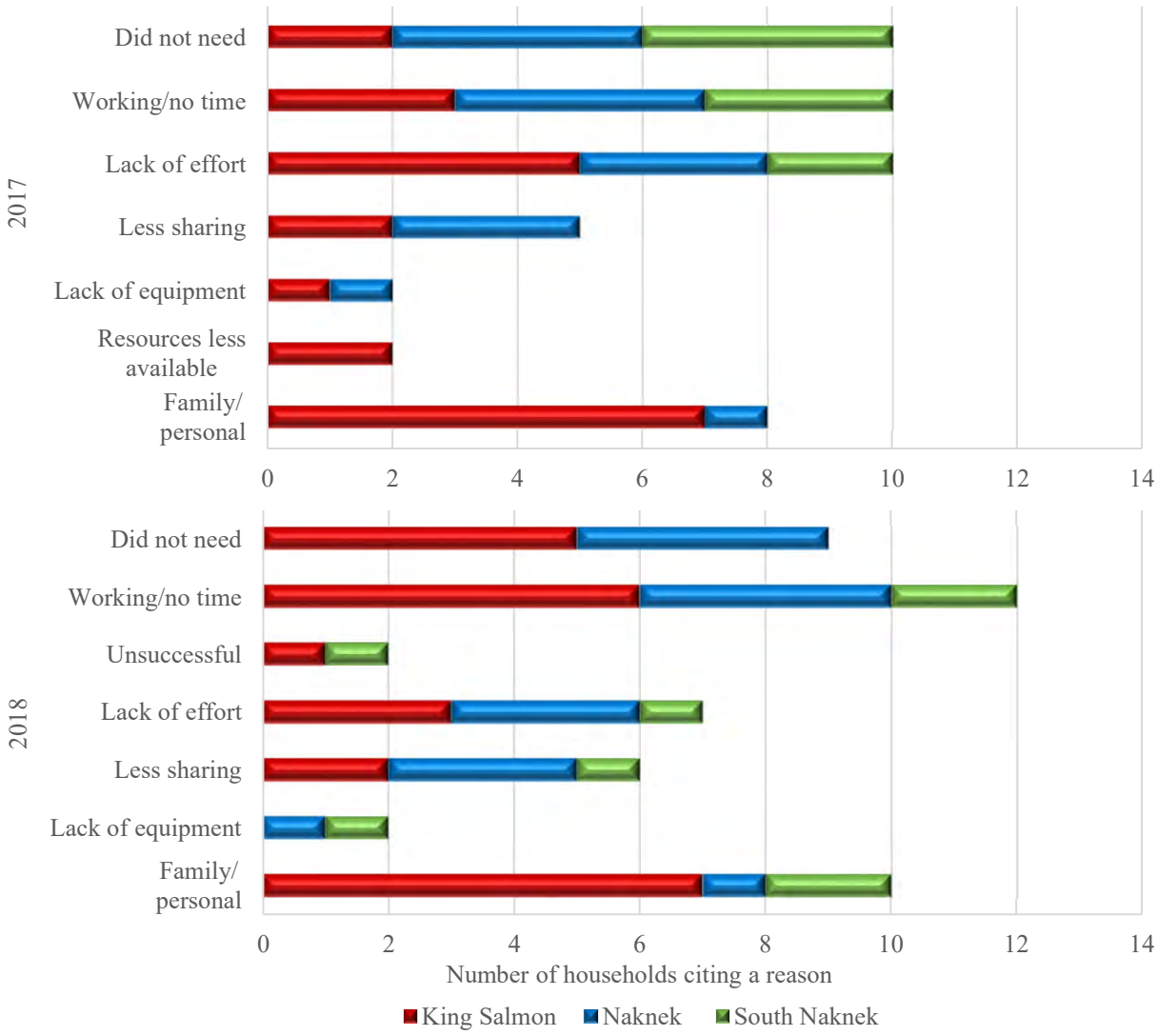
Summary

In summary, for both study years in all three communities, the percentage of households using salmon was 87% or higher. Additionally, across the two study years, more than one-half of the households in each community harvested salmon. Giving and receiving salmon was an activity approximately nearly one-half of households engaged in during the 2017 and 2018 study years. Regarding salmon harvest estimates, Naknek and King Salmon had more households than South Naknek, resulting in larger community harvest estimates. However, the per capita harvest was greater in Naknek and South Naknek than in King Salmon in the first study year, and nearly the same among all study communities in 2018. Salmon harvest methods were similar between Naknek and South Naknek. For example, a larger proportion of the salmon harvest came from removal from commercial catches for Naknek and South Naknek when compared to King Salmon; rod and reel was used to harvest a larger proportion of the salmon harvest weight by King Salmon residents when compared to Naknek and South Naknek.

Comparing Salmon Uses and Harvests in 2017 and 2018 with Previous Years

Assessments of Use

As discussed in the community chapters, respondents assessed 2017 and 2018 uses of salmon compared to the previous five years and offered reasons for changes. During both study years in all three study



Note This chart excludes reasons cited by fewer than two households from all communities and study years combined.

Figure 6-1.–Top reasons cited for why use of salmon was less, study communities, 2017 and 2018.

communities, only a small percentage of responding households claimed using more salmon than in recent years (23% of households or fewer used more salmon). Most households in the study communities cited less or the same use of salmon as compared to the last five years. Working/no time was cited by households in the three study communities as a top reason for less salmon use in 2017 and 2018 (Figure 6-1). In 2017, the other two most cited reasons for less salmon use included did not need as much of the resource and lack of effort. In 2018, family/personal reasons was the second most cited explanation for less salmon use, followed by did not need as much salmon. The majority of project key respondents also observed that many community members work in the summer months, suggesting this resulted in less time to harvest and process subsistence salmon.

Harvest Changes

Changes in the harvest of salmon by study community residents can also be discerned through comparisons with findings from other study years and through reviewing data from the subsistence permit database. The permit data collected by ADF&G begins in 1983, and comprehensive subsistence harvest surveys were conducted in King Salmon, Naknek, and South Naknek for the study years 1983 and 2007 (Holen et al. 2011; Morris 1985), and an additional study was conducted for South Naknek for study year 1992 (the results for which are published in the CSIS).

King Salmon

Based on subsistence permit data, spanning 1983 through 1990, subsistence salmon harvests were relatively steady—ranging between approximately 4,300–6,700 fish. In the early 1990s, the harvest amounts increased significantly, with the highest harvest occurring in 1993 when 10,279 salmon were harvested; however, in the early 2000s, the harvest amounts decreased and remained below 8,000 salmon for the ensuing 18 years (Table 3-38). The historical average harvest of all salmon species based on permit data from 1983–2018 was 6,706 fish, the 10-year (2009–2018) average was 6,030 salmon, and the five-year (2014–2018) average was 6,245 fish.

Based on the post-season harvest survey data, the total community subsistence salmon harvest estimates have increased over time (Figure 3-28). For example, 3,067 salmon were harvested in 1983, the 2007 salmon harvest was 3,926 fish, 3,141 salmon were harvested in 2017, and 5,777 fish (including spawning salmon) were harvested in 2018 (Figure 3-27; Table 3-39). The per capita harvests (in pounds usable weight) of subsistence salmon in King Salmon have ranged 37 lb in 1983, 72 lb in 2007, 53 lb in 2017, and 93 lb in 2018 (Table 3-39). Like the total community subsistence harvest estimates based on number of fish from the household surveys, when comparing per capita subsistence salmon harvests across the four study years, the highest per capita harvests occurred during the more recent studies (2007, 2017 and 2018), while the lowest per capita harvest occurred during the 1983 study.

According to both the salmon harvest survey data and the subsistence permits, sockeye salmon has been the most harvested salmon species for subsistence by residents of King Salmon since 1983 (Figure 3-27). Since 1983, either Chinook or coho salmon has been the second most harvested species; although, since 2000, based on both salmon harvest survey and subsistence permit data, coho salmon has more frequently been the second most harvested species (Table 3-38; Table 3-39). During 2017, based on the harvest survey, a large portion (75%) of the coho salmon harvest was caught using rod and reel—a non-subsistence gear type under both state and federal regulations (Table 3-10); these harvests are not represented in the subsistence permit data or survey data depicted in tables 3-38 and 3-39. In addition, according to survey respondents, participant observations, and key respondent interviews, local participation in rod and reel fishing has remained important over the past 20 years. Pink salmon and chum salmon are typically not the preferred salmon species for residents of King Salmon, and both these species have, based on household surveys and the permit data, historically and contemporarily made up less than 9% of the total salmon harvest composition (Table 3-38; Table 3-39). The subsistence permits do not ask separately about the harvests of spawning sockeye salmon and non-spawning sockeye salmon; therefore, the only available data for spawning sockeye salmon harvests are from the post-season household surveys. The only year in which King Salmon households reported harvesting spawning sockeye salmon was study year 2018 (Table 3-39).

Naknek

According to both the salmon harvest survey data and the subsistence permit system, much year-to-year fluctuation in harvest numbers occurred over the 35 years for which harvest data are available (Figure 4-29). Based on subsistence permit data, spanning 1983 through 1986, subsistence salmon harvests increased from approximately 7,000 salmon to approximately 12,500 salmon (Table 4-38). The harvest amounts dropped to as low as 8,000 salmon during the ensuing four years. However, beginning in 1991 the harvest amounts began to rise again, peaking at an estimated 18,594 salmon in 1997, and then declining and

remaining relatively steady between the range of 12,500–9,000 salmon harvested for the remaining years. The historical average subsistence harvest of all salmon species based on permit data from 1983–2018 was 11,570 fish, the 10-year (2009–2018) average was 11,260 salmon, and the five-year (2014–2018) average was 11,605 fish.

Based on the post-season harvest survey data, and including spawning salmon, the total community subsistence harvest estimates increased from 1983 to 2007 but decreased between 2007 and this study (Figure 4-30). For example, 5,161 salmon were harvested in 1983, the 2007 salmon harvest was 11,956 fish, 10,926 salmon were harvested in 2017, and 10,121 fish were harvested in 2018 (Figure 4-29; Table 4-39). The per capita harvests (in pounds usable weight) of subsistence salmon in Naknek have ranged 59 lb in 1983, 102 lb in 2007, 112 lb in 2017, and 92 lb in 2018 (Table 4-39). Like the total community subsistence harvest estimates based on number of fish from the household surveys, when comparing per capita subsistence salmon harvests across the four study years, the highest per capita harvests occurred in the more recent study years (2007, 2017, and 2018), while the lowest per capita harvest occurred during the 1983 study.

According to both the salmon harvest survey data and the subsistence permits, sockeye salmon has been the most harvested salmon species for subsistence by residents of Naknek since 1983 (Figure 4-27). Since 1983, either Chinook or coho salmon has been the second most harvested species (Table 4-38; Table 4-39). Pink salmon and chum salmon are typically not the preferred salmon species for Naknek residents, and both of these species have, based on household surveys and the permit data, historically and contemporarily made up less than 6% of the total subsistence salmon harvest composition (Table 4-38; Table 4-39). In 1983, based on household surveys, no spawning sockeye salmon harvests were reported. In 2007 an estimated 82 spawning salmon were harvested by Naknek households. This study found an increased estimated spawning salmon harvest amount when compared with the 2007 data. In 2017, Naknek residents harvested an estimated 626 spawning sockeye salmon, and in 2018 an estimated 264 spawning sockeye salmon were harvested (Table 4-39).

South Naknek

Apart from 2017, the studies conducted by the Division of Subsistence have resulted in lower subsistence salmon harvest estimates than those estimated through the subsistence permit database (Figure 5-27). Nevertheless, though there is a difference between the subsistence harvest estimates based on the source, both sets of data show a similar timeline for fluctuations in salmon harvest amounts. Based on subsistence permit data, spanning 1983 through 1990 subsistence salmon harvests were relatively steady—ranging between approximately 1,055–2,911 fish. Beginning in the early 1990s, and lasting until the mid-2000s[3], the estimated salmon harvests increased and ranged between approximately 2,216–3,680 fish. From 2005–2018 the harvest estimates decreased (with exception of 2015 when the harvest was estimated at 3,143 salmon) and remained relatively steady, ranging between a low harvest of approximately 942 salmon to a high harvest estimate of approximately 2,676 fish (Figure 5-27; Table 5-38). According to subsistence permit data, the historical average harvest of salmon from 1983–2018 was 2,272 fish, the 10-year (2009–2018) average was 1,479 fish, and the five-year (2014–2018) average was 1,832 fish (Table 5-38).

The post-season total community subsistence harvest estimates exhibit a similar timeline for fluctuations in salmon harvest amounts as the permit system. For example, 1,062 salmon were harvested in 1983, the 1992 salmon harvest was 3,173 fish, in 2007 a total of 1,406 salmon were harvested, 1,797 salmon were harvested in 2017, and 853 fish were harvested in 2018 (Figure 5-27; Table 5-39). The per capita harvests (in pounds usable weight) of subsistence salmon in South Naknek have ranged 40 lb in 1983, 107 lb in 1992, 117 lb in 2007, 163 lb in 2017, and 91 lb in 2018 (Table 5-39).

According to both the salmon harvest survey data and the subsistence permits, sockeye salmon has been the most harvested salmon species by residents of South Naknek since 1983 (Figure 5-27). Coho salmon has been the second most harvested salmon species by residents of South Naknek the majority of years since

3. Note that 1997 is not included in the estimated harvest range due to the low number of permits issued.

1983, followed closely by Chinook salmon (Figure 5-27; Figure 5-28). Pink salmon and chum salmon are typically not the preferred salmon species for residents of South Naknek. Each of these species of salmon have, based on household surveys and the permit data, since 1987 made up less than 10% of the total subsistence salmon harvest composition (Table 5-38; Table 5-39). During post-season household surveys, South Naknek households reported harvesting spawning sockeye salmon for study years 1992 and 2007. The estimated spawning sockeye salmon harvest for 1992 was 460 fish, and an estimated 198 spawning sockeye salmon were harvested during the 2007 study year (Table 5-39). No spawning sockeye salmon harvests were reported during this study, and according to respondents, there has been noticeable decline in subsistence pursuits of spawning sockeye salmon by South Naknek community members over the past decade.

Combined

In summary, for all three study communities, according to both the salmon harvest survey data and the subsistence permits, sockeye salmon is historically and contemporarily the salmon species most harvested by residents of the Bristol Bay Borough. The second highest harvested species of salmon by households in these three communities is coho salmon. Chinook salmon is ranked the third highest harvested salmon species by residents of the study communities. While subsistence salmon harvests and uses vary from year to year based on a variety of factors, 2017 and 2018 community subsistence salmon harvests as estimated in usable pounds per capita were within a relatively normal range when compared to weights estimated in 2007 (and 1992 for South Naknek), but were higher than the per capita harvest weights estimated in 1983.

Assessments of Permit Reporting System

An objective of this project was to compare findings from the 2017 and 2018 household surveys with the subsistence permit data to provide insight on subsistence harvests and participation. As discussed in the individual community chapters, in 2017 and 2018, project staff opportunistically collected unreturned permits from surveyed households and the data from previously unreturned permits were then included in the subsistence permit database, which provided more accurate permit data by increasing the percentage of returned subsistence permits. The household surveys also provided an opportunity for researchers to gather harvest data from households that did not obtain a subsistence permit but still subsistence fished and also collect information about the amount of salmon retained from commercial catches for home use or salmon harvested with rod and reel. This additional information collected through the administration of household surveys provides a more accurate representation of a study community's fishing season and total harvests for home use than data from returned subsistence salmon permits alone. Regarding spawning sockeye salmon harvests, during survey administration, several Naknek households reported not recording these harvests on their subsistence permits because they already returned the permit to ADF&G. One survey respondent suggested ADF&G add a separate column to the permit for spawning sockeye salmon as a reminder to record these salmon on subsistence permits.

This study determined that a high percentage of households in all three study communities do obtain and return subsistence salmon permits in a normal year. According to the harvest survey results, very few households in the study communities harvested subsistence salmon without a subsistence permit. In King Salmon, no households fished without a permit in 2017 and four surveyed households fished without a permit in 2018; in Naknek, five surveyed households fished without a permit in 2017, and four fished without a permit in 2018; in South Naknek, one surveyed household fished without a permit in 2017 and three households fished without a permit in 2018. For King Salmon, the average subsistence salmon permit return rate from 2009–2018 was 92%, the 10-year average permit return rate for Naknek was 88%, and the South Naknek 10-year average permit return rate was 78% (tables 3-38, 4-38, and 5-38). Because of the high rate of household participation in the subsistence permit program, the subsistence harvest estimates from before and after the time that post-season surveys occurred are not notably different in any of the study communities (Figure 6-2).

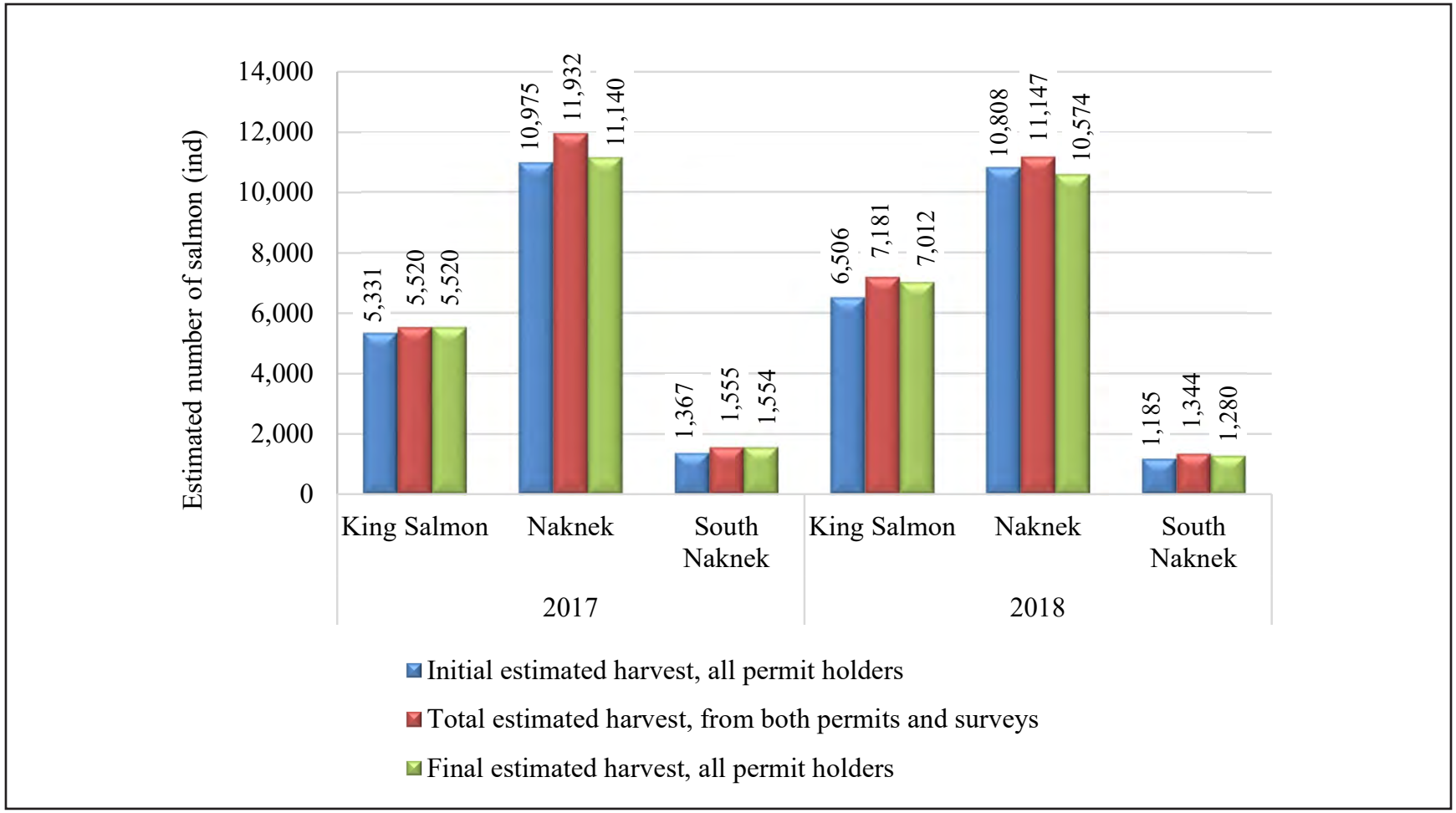


Figure 6-2.–Initial estimated total salmon harvest based on returned permits compared to final estimated total salmon harvest based on returned permits and surveyed households, study communities, 2017 and 2018.

Factors Shaping Local Subsistence Salmon Fishing

Many of the Bristol Bay Borough residents surveyed and interviewed throughout this project expressed an appreciation for salmon. One respondent described salmon as "the backbone and foundation of our community, it ties us together, connects us to our past and determines our future." Community respondents spoke about salmon as an important, healthy food source; a catalyst for intergenerational transmission of cultural practices; and as a symbol for interconnectedness and independence.

As in earlier Division of Subsistence research (Holen et al. 2011; Morris 1985), the 2017 and 2018 study found that sharing salmon remains a key value and practice within and between these study communities. According to survey and key respondent interviews, the exchange of salmon was of critical importance for these communities since many individuals maintained jobs and were reliant upon salmon shared by other, high-harvesting households and detailed networks of exchange. Residents of King Salmon, Naknek, and South Naknek expressed that securing enough salmon each year was important for their household food security, maintaining social networks, and for continuing important traditions.

Summer is an extremely busy time for the majority of people living in the Bristol Bay Borough. Many of these local residents are employed by seasonal industries, including commercial fishing, guided sport fishing, tourism, and construction, all of which occur in the warmer summer months. However, this study found that even when subsistence salmon harvest activities were hampered by conflicts with employment schedules, lack of time, or other restricting factors, most residents in all of the study communities expressed their preference for obtaining local wild salmon compared to commercial food purchased in stores. Many individuals from each of the study communities described carving out time in 2017 and 2018 to participate in subsistence salmon harvesting and processing methods, such as setting a gillnet and processing salmon with their families and friends. However, several King Salmon and Naknek households cited buying fish from commercial processors rather than harvesting and processing subsistence fish. Another project finding was that some King Salmon and Naknek households' solution to a lack of time for putting up subsistence salmon was to pay small local commercial processing facilities to process their subsistence-caught salmon; doing this, these households saved time during the short and busy summer season while securing the amount of subsistence salmon needed. These local commercial processors offer services including fileting, flash freezing, vacuum sealing, and smoking. Some community members viewed these services as a positive resource for community members, while others were worried that buying salmon or using commercial processors may lead to a decrease in subsistence participation by the next generation. Based on the observations of this project's Principal Investigator and Co-Investigator, this is a unique finding when compared to other rural communities in Bristol Bay since most communities do not have access to such salmon-processing services.

As described in the historical overview section, spawning sockeye salmon was historically a commonly used subsistence resource in this region. But according to past studies and this study, harvest and use of this resource has decreased over time. Project respondents provided multiple, compounding reasons for the decline in spawning sockeye salmon harvests and uses. Residents of all three study communities mentioned an apprehension to harvest spawning sockeye salmon in Katmai National Park. These respondents feared accidentally violating a national park regulation, and cited feeling like they are committing a crime when subsistence fishing for spawning sockeye salmon within the national park. For example, one Naknek respondent explained, "I find it odd that someone can use a fishing pole in the lake, no problem, catch a fish, let it go, catch it again, maybe keep it. But you want to use a net, like our people have been doing forever, and it's a problem and you do it in the wrong place, you're in trouble."

Other respondents interviewed for this project did not know the rules for fishing in the national park and some did not know if they qualified to subsistence fish in the national park. Several families explained they have family or friends at Iliamna Lake and prefer to harvest spawning sockeye salmon in Iliamna Lake (approximately 60 air miles from Naknek Lake) instead of harvesting this fish locally in Naknek Lake. Additionally, several South Naknek respondents mentioned their household needed fewer spawning sockeye salmon in recent years than in the past as a result of smaller families to feed, fewer youth residing in the community during the fall, and no large dog teams to feed. Respondents elaborated that the spawning

sockeye salmon fishery occurs in the fall, and because most children do not reside year-round in South Naknek, there are fewer people available to help harvest and process this subsistence resource. A King Salmon community elder indicated a desire to have this type of fish, but explained that the younger generation never learned "how to put up fall fish" and therefore do not "have the taste for it" or the desire to harvest spawning sockeye salmon.

Another challenge community residents experienced in relation to subsistence fishing during the study years included interactions with bears. Concerns regarding bear activity near subsistence salmon fishing areas were mentioned by many households in all three communities. Feedback from respondents included remarks about an increased presence of brown bears on the beaches where subsistence fishing occurred over the past decade, and, as a result, more occurrences of bears acting aggressively toward people were reported. Community members recounted stories of bears breaking into smokehouses, not fearing humans, and exhibiting aggression toward people while subsistence fishing. A few respondents reported not smoking fish in recent years in order to avoid interactions with bears near their homes.

The number of nonlocal sportfishermen traveling to fish in the Naknek River and Naknek Lake was a concern of some community members during this study. Feedback from these respondents included concerns regarding salmon mortality rates from catch-and-release practices, and disturbances to the local river system from increased sport fishing traffic. However, some households cited the sportfishing industry as having benefits for their community. People explained that sportfishing brought money and job opportunities into their communities. Quite a few community members, largely from King Salmon and Naknek, cited an increased interest in catching salmon for their own consumption using rod and reel fishing gear for fun and as a way to spend time with their families.

Several residents of King Salmon and Naknek remarked on the challenges they experienced while subsistence fishing during the Naknek River Special Harvest Area opening in 2018. These people explained that they stopped subsistence fishing because of gear conflicts with commercial boats. One respondent reported that commercial boats drove over subsistence nets, and another respondent described large waves from commercial boat traffic disturbing their subsistence gillnet running lines. Several community members stopped subsistence fishing during the Naknek River Special Harvest Area opening because of these conflicts.

Conclusions

This two-year study documented the continuing importance of subsistence salmon for the residents of King Salmon, Naknek, and South Naknek. In both study years, almost all households in the three study communities used salmon, coinciding with a high level of household participation in fishing efforts. Wild salmon remain an important source of food in these communities, particularly sockeye salmon, coho salmon and Chinook salmon. These three salmon species are used and harvested by a large number of households within these communities and provide a context for teaching skills and values linked to family traditions and community resilience.

Naknek River salmon are highly valued by local community members and are vital to the present wellbeing of these communities. The people living in King Salmon, Naknek, and South Naknek expressed the importance of having access to locally sourced wild Alaska salmon, not only for themselves, but also for their children and other future generations.

ACKNOWLEDGMENTS

The Division of Subsistence and Bristol Bay Native Association would like to first thank all the residents of King Salmon, Naknek, and South Naknek for being welcoming and receptive to this research project. Additionally, researchers would like to thank the Naknek Native Tribal Council, the South Naknek Traditional Council, the U.S. Fish and Wildlife Service Becharof National Wildlife Refuge staff, and the staff at the ADF&G King Salmon office for supporting this project and providing use of their buildings to hold interviews, surveys, meetings, and LRA training sessions for the project. The survey would not have been as successful as it was without the local research assistants in each community; thank you to: Steven Angasan, Josie Savo, Travis Wassille, Christina Morris, and Lucinda Tallekpalek. Thank you to the key respondents who participated in this project, the knowledge exchanged through these interviews is invaluable and contributed greatly to this report. The authors would like thank Theodore Krieg for his contribution to this report—his research and writing efforts helped produce a robust background chapter for the final publication. In addition, thank you to Monette Schwoerer and Judy Jo Matson for their help and support while researchers were in the communities.

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APPENDIX A—PROJECT SUPPORT LETTERS

NAKNEK NATIVE VILLAGE

P.O. BOX 210 • Naknek, Alaska 99633
Phone: 907.246.4210 • Fax: 907.246.3563

RESOLUTION 2017 - 07

A RESOLUTION IN SUPPORT OF THE BRISTOL BAY NATIVE ASSOCIATION AND ALASKA DEPARTMENT OF FISH AND GAME IN ASSESSING THE NAKNEK RIVER SUBSISTENCE SALMON HARVEST

WHEREAS: Bristol Bay Native Association (BBNA), a regional tribal consortium serving 31 federally recognized Yup'ik, Dena'ina and Aleut tribes in Bristol Bay and the Alaska Peninsula, communicated with us about submitting a proposal; and

WHEREAS: The "Naknek River Subsistence Salmon Harvest Assessment and Cultural Context" project addresses the condition to support salmon fisheries where there is considerable participation by subsistence users; and

WHEREAS: The objectives being proposed in the project will provide the people the Naknek River drainage, and throughout the Bristol Bay region, as well as decision makers with current information to guide the management of the Naknek River salmon fisheries; and

WHEREAS: BBNA's proposals fundamentally aim to address ways to improve or maintain our surrounding environment and resources, and avoid conditions that can impact our region's hunting and fishing way of life.

NOW THEREFORE BE IT RESOLVED by The Naknek Native Village Tribal Council that it authorizes and supports BBNA, and ADF&G's in their efforts which will help in providing sound information to manage our Naknek River Salmon.

CERTIFICATION:
The foregoing resolution was passed by the Naknek Native Village Council on the 12th day of April, 2017 and that a quorum was present.

Signed: Judy J Matson

Title: Sec/Treas

South Naknek Village Council
2521 E. Mt. Village
Drive B-388
Wasilla, Alaska 99654

January 30, 2020

Bristol Bay Native Association
P.O. Box 310
Dillingham, Alaska 99576
Phone: 907-842-5257

Alaska Dept. of Fish and Game
Division of Subsistence
333 Raspberry Road
Anchorage, Alaska 99518
Phone: 907-267-2257

Dear Bristol Bay Native Association and Division of Subsistence:

The South Naknek Village Council is the federally recognized tribal entity representing The Native Village of South Naknek, and is a member tribe of the Bristol Bay Native Association (BBNA). As Secretary/Treasurer of our tribal council, I would like to take this opportunity to express our support for the cooperative research being done by BBNA and ADF&G in our region.

Cody Larson, BBNA's Subsistence Fisheries Scientist, and Bronwyn Jones, Subsistence Resource Specialist with ADF&G Division of Subsistence have held community meetings, surveyed households, interviewed elders, and other experts on the subsistence way of life. A review of the data collected during that time has informed us of the techniques the researchers have used in assessing the salmon harvests on the Naknek River.

We feel the partnership BBNA and ADF&G is essential to getting this research completed in our communities. Please accept this extension of our support for their project titled, "Naknek River Subsistence Salmon Harvest Assessment".

We are working with the research team to help understand how our resources are being harvested and shared throughout our communities along the Naknek River. This is valuable information that the Alaska Department of Fish and Game uses in providing for the subsistence priority for us out here in rural Alaska. Thank you for the opportunity to express our support for the Naknek River Subsistence Salmon Harvest Assessment.

Sincerely,

Fred T. Angasan
Secretary/Treasurer

APPENDIX B—EXAMPLE HOUSEHOLD SURVEY FORM

NAKNEK RIVER SUBSISTENCE SALMON HARVEST ASSESSMENT

NAKNEK
JANUARY 1, 2017, to DECEMBER 31, 2017

This survey is used to estimate subsistence and other non-commercial salmon harvests and uses for the Naknek Area, for 2017. Additional questions will be asked to compare your household's use and harvest of salmon in previous years. We share this information with the Alaska Department of Fish and Game, Bristol Bay Native Association, the Alaska Board of Fisheries, and the Federal Subsistence Board. We work with the local Fish and Game Advisory Committees, and the Federal Regional Advisory Councils to better manage subsistence and to the implement the federal and state subsistence priorities.

We will NOT identify your household, or members of 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 anytime.

HOUSEHOLD ID:		
PERMIT NUMBER:		
COMMUNITY ID:		236
INTERVIEWER 1:		
INTERVIEWER 2:		
INTERVIEW DATE:		
START TIME:		
STOP TIME:		
DATA CODED BY:		
DATA ENTERED BY:		
SUPERVISOR:		

COOPERATING ORGANIZATIONS

BRISTOL BAY NATIVE ASSOCIATION
BOX 310
DILLINGHAM, AK 99576
907-842-5257

DIVISION OF SUBSISTENCE
ALASKA DEPT OF FISH & GAME
333 RASPBERRY ROAD
ANCHORAGE, AK 99518
907-267-2353

HOUSEHOLD MEMBERS

HOUSEHOLD ID

First, I would like to ask about the people in your household, permanent members of your household who sleep at 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, 2017, and December 31, 2017, WHO were the head or heads of this 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?	In what year was this person born?	Where were parents living when this person was born?	How many years has this person lived in the Naknek area?
ID#	*circle*	*relation*	*circle*	*circle*	*year*	*(AK city or state)*	*number*
HEAD	Y N		M F	Y N			
1							
NEXT enter spouse or partner. If household has a SINGLE HEAD, leave HEAD 2 row BLANK, and move to PERSON 3.							
HEAD	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 3	Y N		M F	Y N			
3							
PERSON 4			M F	Y N			
4	0						
PERSON 5			M F	Y N			
5	0						
PERSON 6			M F	Y N			
6	0						
PERSON 7			M F	Y N			
7	0						
PERSON 8			M F	Y N			
8	0						
PERSON 9			M F	Y N			
9	0						
PERSON 10			M F	Y N			
10	0						
PERSON 11			M F	Y N			
11	0						
PERSON 12			M F	Y N			
12	0						
PERSON 13			M F	Y N			
13	0						
PERSON 14			M F	Y N			
14	0						

HOUSEHOLD INFORMATION: 01 **NAKNEK: 236**

HOUSEHOLD MEMBERS

HOUSEHOLD ID

		… IF this person DID have a subsistence permit…				… IF this person commercial fished for SALMON
Person ID# FROM PAGE 2	this person have a subsistence SALMON permit?	Where did they get their permit?	What was their Permit Number?	Did they return their subsistence permit?	Did this person COMMERCIAL FISH for SALMON in 2017?	WERE they they permit holder (P) or Crew (C)
ID#	*circle*	*Location*	*perm. number*	*circle*	*circle*	*circle*
HEAD	Y N ?			Y N ?	Y N ?	P C ?
1						
HEAD	Y N ?			Y N ?	Y N ?	P C ?
2						
PERSON 3	Y N ?			Y N ?	Y N ?	P C ?
3						
PERSON 4	Y N ?			Y N ?	Y N ?	P C ?
4						
PERSON 5	Y N ?			Y N ?	Y N ?	P C ?
5						
PERSON 6	Y N ?			Y N ?	Y N ?	P C ?
6						
PERSON 7	Y N ?			Y N ?	Y N ?	P C ?
7						
PERSON 8	Y N ?			Y N ?	Y N ?	P C ?
8						
PERSON 9	Y N ?			Y N ?	Y N ?	P C ?
9						
PERSON 10	Y N ?			Y N ?	Y N ?	P C ?
10						
PERSON 11	Y N ?			Y N ?	Y N ?	P C ?
11						
PERSON 12	Y N ?			Y N ?	Y N ?	P C ?
12						
PERSON 13	Y N ?			Y N ?	Y N ?	P C ?
13						
PERSON 14	Y N ?			Y N ?	Y N ?	P C ?
14						

HOUSEHOLD INFORMATION: 01 **NAKNEK: 236**

RETAINED COMMERCIAL HARVESTS

HOUSEHOLD ID

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

2. During the last year (JANUARY 1, 2017, to DECEMBER 31, 2017),
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 subsistence harvests section.

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 salmon?

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

If KEEP is "yes"

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

Include COMMERCIALLY HARVESTED salmon 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 COM FISH?*	*B KEEP?*	How many did you remove from your commercial catch?[3]	Of those removed how many did you give to OTHERS?[4]	Units[5]	Person ID from page 2	
			number	*number*	*specify*	*number*	*comments*
CHINOOK SALMON *KING SALMON*	Y N	Y N					
113,000,001							
SOCKEYE SALMON *RED SALMON*	Y N	Y N					
115,000,001							
COHO SALMON	Y N	Y N					
112,000,001							
CHUM SALMON *DOG SALMON*	Y N	Y N					
111,000,001							
PINK SALMON *HUMPIES*	Y N	Y N					
114,000,001							
	Y N	Y N					

If fish were retained from commercial harvests,

Do you household USUALLY retain SALMON from your commercial catch for home use? Y N

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

How much of the salmon you get for home use comes from commercial home-pack?

0%	1-25%	26-50%	51-75%	100%
(0)	*(1)*	*(2)*	*(3)*	*(4)*

Do you record your home-pack on your commercial fish-ticket or on your subsistence permit?

SUBS PERMIT FISH TICKET BOTH NONE

(Circle one)

Approximately what percentage of your income comes from commercial fishing?..... %

1 *"LAST YEAR" means from JANUARY 1, 2017, to DECEMBER 31, 2017.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *Do NOT include amounts skippers gave to crew.*
4 *Record the number from the total amount removed by skippers or crew and given to non-crew members.*
5 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

COMMERCIALLY HARVESTED RESOURCES: 03 **NAKNEK: 236**

HARVESTS: SALMON

HOUSEHOLD ID

1. Do you or members of your household own a net for harvesting salmon? ..... Y N
2. Do you or members of your household own a boat? ..... Y N
   if YES, is that boat used for commercial fishing? ..... Y N

1. Do you or members of your household USUALLY fish for salmon for subsistence, personal use, or sport? ..... Y N

2. During the last year (JANUARY 1, 2017, to DECEMBER 31, 2017),
   did you, or members of your household USE or TRY TO HARVEST salmon? ..... Y N

IF the answer to QUESTION 2 is NO, to 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** … use[2] _____?
- **B** …receive _____ from another HH or community
- **C** …give _____ to another HH or community?
- **D** …try[2] to harvest _____?
- **E** …actually harvest any _____?

if harvest is "yes"

Please estimate how many salmon ALL MEMBERS OF YOUR HOUSEHOLD got during the last year. How many were harvested with ….

INCLUDE salmon that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.DO NOT INCLUDE catch and release fish or retained commercial harvests.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	Date	Amount harvested	Specify Gear Type	Units[3]
						dd / mm	*(number harvested)*	*gear type*	*specify*
CHINOOK SALMON *KING SALMON*	Y N	Y N	Y N	Y N	Y N				IND
113000000									
COHO SALMON *SILVER SALMON*	Y N	Y N	Y N	Y N	Y N				IND
112000000									

1 *"LAST YEAR" means between JANUARY 1, 2017, to DECEMBER 31, 2017.*

2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*

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

SALMON: 04 **NAKNEK: 236**

HARVESTS: SALMON

HOUSEHOLD ID

… Continued

During the last year,[1]

did you or members of your household…

- **A** … use[2] _____?
- **B** …receive _____ from another HH or community
- **C** …give _____ to another HH or community?
- **D** …try[2] to harvest _____?
- **E** …actually harvest any _____?

if harvest is "yes"

Please estimate how many salmon ALL MEMBERS OF YOUR HOUSEHOLD got during the last year. How many were harvested with ….

INCLUDE salmon that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.DO NOT INCLUDE catch and release fish or retained commercial harvests.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	Date	Amount harvested	Specify Gear Type	Units[4]
						dd / mm	*(number harvested)*	*gear type*	*specify*
SOCKEYE SALMON *RED SALMON*	Y N	Y N	Y N	Y N	Y N				IND
115000000									
CHUM SALMON	Y N	Y N	Y N	Y N	Y N				IND
111000000									
PINK SALMON	Y N	Y N	Y N	Y N	Y N				IND
114000000									

1 *"LAST YEAR" means between JANUARY 1, 2017, to DECEMBER 31, 2017.*

2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*

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

SALMON: 04 **NAKNEK: 236**

HARVESTS: SALMON

HOUSEHOLD ID

… Continued

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

A … use[2] _____?
B …receive _____ from another HH or community
C …give _____ to another HH or community?
D …try[2] to harvest _____?
E …actually harvest any _____?

if harvest is "yes"

Please estimate how many salmon ALL MEMBERS OF YOUR HOUSEHOLD got during the last year. How many were harvested with ….

INCLUDE salmon that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.DO NOT INCLUDE catch and release fish or retained commercial harvests.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	Date	Amount harvested	Specify Gear Type	Units[4]
						dd / mm	*(number harvested)*	*gear type*	*specify*
UNKNOWN SALMON	Y N	Y N	Y N	Y N	Y N				IND
119000000									
SPAWNING SOCKEYE *RED FISH*	Y N	Y N	Y N	Y N	Y N				IND
117050000									

1 *"LAST YEAR" means between JANUARY 1, 2017, to DECEMBER 31, 2017.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

SALMON: **NAKNEK: 236**

SUBSISTENCE SUMMARY: SALMON

HOUSEHOLD ID

ASSESSMENTS: SALMON 115,000,000

Note: Ask the following questions to all households and continue with other questions if the household USED SALMON last year (January 1,2017 to December 31, 2017) or in recent years.

Last year[1] ….

…did your household USE LESS, the SAME, or MORE SALMON for home use than in recent years? X L S M
(X = do not use)

If LESS or MORE…

WHY was your use different?..... _____ 1
_____ 2

…did your household GET ENOUGH SALMON for home use? Y N

(If yes, continue with the next section at the bottom on this page)

IF NO, about how many SALMON does your household need annually? _____

IF NO, did your household do anything differently because you did not get enough SALMON for home use? Y N

IF YES…

What did your household do differently? _____ 1
_____ 2

How would you describe the impact of your household not getting enough SALMON for home use last year?

(circle one) not noticable? (0) minor? (1) major? (2) severe? (3)

*Note: Ask the following questions only for households that HARVESTED or ATTEMPTED to harvest SALMON last year.**

Last year[1] ….

... did you or members of your household need to work harder (spend more time / take more trips) than you usually have in recent years in order to get the amount of SALMON that you needed for home use? Y N

If YES, please explain why. _____ 1
_____ 2

Last year[1] ….
… did you or members of your household need to travel further, or to different locations than you usually go in order to harvest SALMON for home use?

Travel further: Y N
Different locations: Y N

If YES, please explain why and where? _____ 1
_____ 2

How do you usually harvest your SALMON taken for home use?

Home Pack? (4) Seine? (7) Set gillnet? (5) Rod and Reel? (15) Handline? (16) Other? (17) _____ 1

circle methods(s) *(Specify)* 2

If you use a rod and reel, handline, or jigging gear to harvest SALMON why?

Conservation? (1) Selectivity? (2) Gillnet mesh too small? (3) Tradition? (4) Ease? (5) Fun? (6) Other? (7) _____ 1
2

circle response(s) *(Specify)*

1 'Last year' means from (JANUARY 1, 2017, to DECEMBER 31, 2017)

ASSESSMENTS OF SALMON : 66 **NAKNEK: 236**

SUBSISTENCE SUMMARY: SALMON

HOUSEHOLD ID

OBSERVATIONS: SALMON 115,000,000

❶ Have you observed any changes to the number (abundance) of SALMON in your area? Y N

IF YES…
Which species? CHINOOK SOCKEYE COHO CHUM PINK
(circle all that apply)

What changes have you observed? 1 2

❷ Have you observed any changes in the quality or appearance of SALMON you harvested last year? Y N

IF YES…
Which species? CHINOOK SOCKEYE COHO CHUM PINK
(circle all that apply)

What changes have you observed? 1 2

❸ Have you observed any changes in the behavior of SALMON in your area; such as run timing or harvest location? Y N

IF YES…
Which species? CHINOOK SOCKEYE COHO CHUM PINK
(circle all that apply)

What changes have you observed? 1 2

❹ Do you believe current Fish and Game regulations provide adequate opportunity to get the fish you need for home use? Y N

IF NO, please explain. 1 2

❺ Do you usually fish for spawned out sockeye salmon (red fish)? Y N

Have you ever fished for spawned out sockeye salmon (red fish)? Y N
… if NO, why?

Do you have any other comments or concerns about SALMON fishing?

ASSESSMENTS OF SALMON : 66 **NAKNEK: 236**

HARVEST SUMMARY: SALMON

HOUSEHOLD ID

If this household did NOT USE or HARVEST salmon last year, go to the ASSESSMENT section below.
Otherwise, continue with mapping, network, and assessment sections…

NETWORKS *…then ask the network and assessment questions below*

During the last year,[1]

…who caught the SALMON your household used? (Enter most important sources first.)

		People in THIS household	#NAME?	People in OTHER COMMUNITIES
	role	*(enter person ID# from page 2)*	*(HHID of other households)*	*(community names)*
	CAUGHT SALMON			
1	11000000			

…who processed the SALMON your household used? (Enter most important sources first.)

	role	*(enter person ID# from page 2)*	*(HHID of other households)*	*(community names)*
	PROCESSED SALMON			
2	11000000			

..who else (not yet names) GAVE SALMON to your household? (Enter most important households or communities first.)

	role	*(HHID of other households)*	*(community names)*
	GAVE SALMON TO US.		
3	11000000		

1 *"LAST YEAR" means between JANUARY 1, 2017, to DECEMBER 31, 2017.*

NETWORKS & ASSESSMENTS OF SALMON: 66, 67 **NAKNEK: 236**

COMMENTS & SUMMARY

HOUSEHOLD ID

QUESTIONS, COMMENTS, CONCERNS

Do you have any questions, comments, or concerns?

INTERVIEW SUMMARY

Use this space for interviewer's comments about survey, especially factors that might have affected the household's responses.

BE SURE TO FILL IN THE STOP TIME ON THE FIRST PAGE!!!!

INTERVIEW SUMMARY: 300 **NAKNEK: 236**

APPENDIX C—KEY RESPONDENT INTERVIEW PROTOCOL: SUMMER

Naknek River Subsistence Salmon Harvest Assessment
KRI Protocol
Summer fishing

Project name: Naknek River Subsistence Salmon Harvest Assessment
Village name:
Location of interview:
Key respondent name:
Interviewer name:
Date of interview:
Year and place of birth of respondent:

Overview

- How many years have you be subsistence fishing in the Naknek area?

- What type of salmon do you fish for?

- How do you get your fish?

    - How has this changed over time?

Regulations

- Have any regulations affecting your opportunity for subsistence?
    - Commercial
    - Sport
    - Subsistence
    - State
    - Federal
    -
- Since 2016 subsistence fishing periods have open to 24 hours and 7 days a week, how has you fishing efforts changed by this new regulation?
    - amount/needs?
    - Limits listed on permit?
- Do you have any recommendations for regulatory change or management?

Social/cultural

- Who do you fish with?

- How do you put up/ preserve the fish? (freezer, dry, smoke, can, salt, wood types etc.) (processor?)
    - who does what tasks when harvesting and processing salmon
    -
- Are there traditional things <u>you</u> do when harvesting salmon?

- Are there traditional things <u>you</u> do when processing salmon?

- Have you noticed any changes among younger generations in relation to salmon harvesting?

<u>Non-local harvesters</u>

- Do you feel the amount of non-local (summers visitor/commercial fishermen/ sport fishermen) engaging in subsistence fishing here in Naknek has changed over time, if yes in what ways?

<u>Sport Fishing</u>

- Tell me view of sport fishing on the Naknek River and how it relates to subsistence fishing?

<u>Permits:</u>

- Do you usually get a subsistence permit?

- Who's permit do you record a harvest on if you are sharing a net?

APPENDIX D—KEY RESPONDENT INTERVIEW PROTOCOL: FALL

Naknek River Subsistence Salmon Harvest Assessment
KRI Protocol
Red Fish

Project name: Naknek River Subsistence Salmon Harvest Assessment
Village name:
Location of interview:
Key respondent name:
Interviewer name:
Date of interview:
Year and place of birth of respondent:

Personal History of your interactions with the fishery:

- Can you tell me about subsisting for Red fish in Naknek throughout your lifetime?
    - How long have you been going up to the lakes for fallfish?
    - Who taught you to fish for spawned out reds?
    - In the past, was it easy to access this fishery?

Current:

- Why do you fall fish?
- When do you typically go for reds?
    - Has this timing/location changed at all?
- Do you use the landing to get to Naknek Lake?
    - Before the landing what put in did you use to access the Naknek River?
- Where in Naknek Lake do you fish for spawned out reds? Has this changed overtime?
- How many trips do you take to fish for spawned outs?
- Who do you fish with?
- Do you share your catch?
- How many spawned out fish do you aim to get?
- How do you put up/ process red fish?

- How do you eat red fish?
- Do you record your harvest on your subsistence permit?

APPENDIX E—CONVERSION FACTORS

The following table presents the conversion factors used in determining how many pounds were harvested of each resource surveyed. For instance, if respondents reported harvesting 3 individual pink salmon, the quantity would be multiplied by the appropriate conversion factor (in this case 2.73) to show a harvest of 8.19 lb of pink salmon.

		Conversion factor					
		King Salmon		Naknek		South Naknek	
Resource name	Reported units	2017	2018	2017	2018	2017	2018
Chum salmon	Individual	4.70	4.67	4.70	4.67	4.70	4.67
Chum salmon [CF retention]	Individual	4.70	4.67	4.70	4.67	4.70	4.67
Coho salmon	Individual	4.77	4.88	4.77	4.88	4.77	4.88
Coho salmon [CF retention]	Individual	4.77	4.88	4.77	4.88	4.77	4.88
Chinook salmon	Individual	8.30	7.56	8.30	7.56	8.30	7.56
Chinook salmon [CF retention]	Individual	8.30	7.56	8.30	7.56	8.30	7.56
Pink salmon	Individual	2.73	2.61	2.73	2.61	2.73	2.61
Pink salmon [CF retention]	Individual	2.73	2.61	2.73	2.61	2.73	2.61
Sockeye salmon	Individual	3.97	3.81	3.97	3.81	3.97	3.81
Sockeye salmon [CF retention]	Individual	3.97	3.81	3.97	3.81	3.97	3.81
Spawning sockeye salmon	Individual	3.97	3.81	3.97	3.81	3.97	3.81
Unknown salmon	Individual	4.82	4.17	4.66	4.10	4.53	4.18

Source ADF&G Division of Subsistence household surveys, 2018 and 2019.

APPENDIX F—COMMUNITY MEETING NOTICE

The Division of Subsistence, ADF&G and BBNA, Natural Resource Department will be hosting the

Subsistence Salmon Community Data Review Meetings for:

King Salmon: Wednesday Jan. 29th 12PM at USFWS Offices

South Naknek: Thursday Jan. 30th 12PM at the Council

Naknek: Thursday Jan. 30th 6:00 pm at Dolly's Hall

Come enjoy some snacks and hear about the results from the 2017 and 2018 subsistence salmon harvest survey you may have participated in. We look forward to your questions and feedback.

Questions or Concerns:

Contact: Bronwyn Jones with the Division of Subsistence
267-2178 or Bronwyn.jones@alaska.gov

Cody Larson with BBNA, Natural Resource Department
842-624 or clarson@bbna.com

APPENDIX G—PROJECT SUMMARY FOR EACH STUDY COMMUNITY

COMMUNITY SUMMARY - Technical Paper No. 470

The Harvest and Use of Salmon—King Salmon, Naknek, and South Naknek, Alaska, 2017 and 2018

King Salmon, Alaska, 2017 and 2018

Study Overview

This study is part of the effort to collect data about the full range of salmon harvests and uses by the communities of King Salmon, Naknek, and South Naknek, Alaska. This summary provides an overview of the results of a household survey administered for the study years 2017 and 2018. Data for the final report also were derived from in-depth interviews conducted with key respondents, as well as insight from researchers who conducted participant observation and attended community meetings. The project was funded by the Alaska Sustainable Salmon Fund. This information was collaboratively collected by research staff of the Alaska Department of Fish and Game (ADF&G) Division of Subsistence, research staff from the Natural Resources Department of Bristol Bay Native Association (BBNA), and with the help of local research assistants (LRAs) from the study communities.

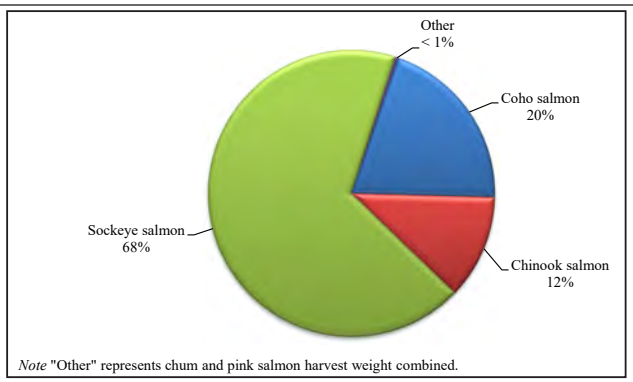
Acknowledgments

The Division of Subsistence and BBNA would like to thank the residents of King Salmon, Naknek, and South Naknek for being welcoming and receptive to this research project; community participation was essential and appreciated. Additionally, researchers thank the Naknek Native Tribal Council, South Naknek Traditional Council, U.S. Fish and Wildlife Service Becharof National Wildlife Refuge staff, and the staff at the ADF&G King Salmon office for supporting this project and providing use of buildings to hold interviews, surveys, meetings, and LRA training sessions. The survey's success is a credit to the work of the local research assistants in each community; thank you to: Steven Angasan, Josie Savo, Travis Wassille, Christina Morris, and Lucinda Tallekpalek. Thank you also to the key respondents who participated in this project. In addition, thank you to Monette Schwoerer and Judy Jo Matson for their help and support while researchers were in the communities.

Highlights of the King Salmon Harvest Survey Findings

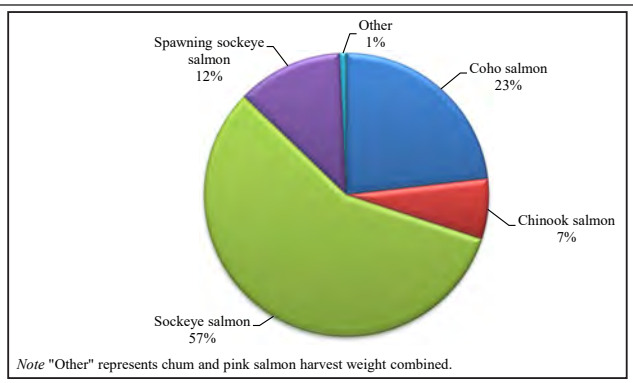
This study found an estimated population for King Salmon in 2017 of 244 individuals in 99 households, and in 2018 the population was estimated to be 242 individuals in 102 households. As in the past, during the 2017 and 2018 study years, many residents of this study community relied on salmon for nutrition and to support their way of life. During the study years more than 85% of King Salmon households used salmon, which coincided with a relatively high level of household participation in harvesting efforts: 76% of households harvested at least one species of salmon in 2017 and 63% of households harvested salmon in 2018. Nearly one-half of the King Salmon households shared salmon with others in both study years: in 2017, 44% of households gave away at least one species of salmon and 48% received salmon from other households; in 2018, 46% of households gave away salmon and 52% received salmon. For both study years, King Salmon residents harvested the majority of their salmon using subsistence nets: 66% of salmon harvest weight in 2017, and 84% of salmon harvest weight in 2018. The other three methods used to harvest salmon were rod and reel, removals from commercial catches, and dip net (in 2017 only). King Salmon community members reported harvesting salmon at popular fishing beaches such as Elder's Beach, Coffee Point, Telephone Point, and Monsen Park. People also reported harvesting salmon closer to Naknek Lake: in Pauls Creek, King Salmon Creek, near Lower Lagoon, Rapids Camp Lodge, and in the mouth of the Naknek River and within Naknek Lake.

In 2017, King Salmon residents harvested an estimated total of 19,140 lb, or 79 lb per capita, of salmon. In 2018, King Salmon residents harvested an estimated total of 28,154 lb, or 116 lb per capita, of salmon. The per capita harvest increased by 47% in the second study year. Figures 1 and 2 show the composition of the salmon harvest by pounds usable weight for King Salmon. In both study years, the majority of the harvest weight was sockeye salmon, followed by coho salmon; also, there were very small harvests of chum and pink salmon that each totaled less than 1% of the harvest weight. In 2017, Chinook salmon composed 12% of the harvest weight; by comparison, in 2018 spawning sockeye salmon composed 12% of the harvest weight, and Chinook salmon composed a smaller proportion (7%).



Note "Other" represents chum and pink salmon harvest weight combined.

Figure 1. Composition of salmon harvest (lb), 2017.



Note "Other" represents chum and pink salmon harvest weight combined.

Figure 2. Composition of salmon harvest (lb), 2018.

Subsistence Permits

This study determined that a high percentage of households in all three study communities do obtain and return subsistence salmon permits in a normal year; regarding King Salmon specifically, no surveyed households fished without a permit in 2017 and four surveyed households fished without a permit in 2018. The average subsistence salmon permit return rate for King Salmon from 2009–2018 was 92%. Because of the high rate of household participation in the subsistence permit program, the subsistence harvest estimates from before and after the time that post-season surveys occurred are not notably different in any of the study communities (Figure 3).

Conclusions

This study demonstrated the continuing importance of salmon harvesting and processing activities for the residents in King Salmon. According to community members, salmon provide a context for teaching skills and values linked to family traditions and community survival. In both study years, almost all households in King Salmon used and harvested salmon. As in the past, contemporarily wild salmon remain an important source of food in this community. According to both the harvest survey data and the subsistence permits, sockeye salmon has been the most harvested salmon species for subsistence over time, and either Chinook or coho salmon has been the second most harvested species in any given year.

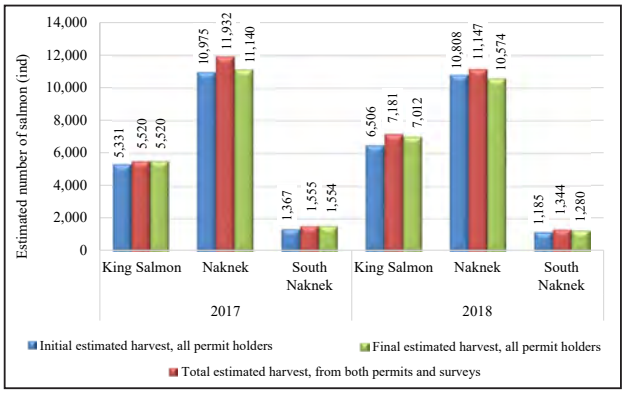


Figure 3. Initial estimated total salmon harvest based on returned permits compared to final estimated total salmon harvest based on returned permits and surveyed households.

Where to Find the Project Data and Final Report

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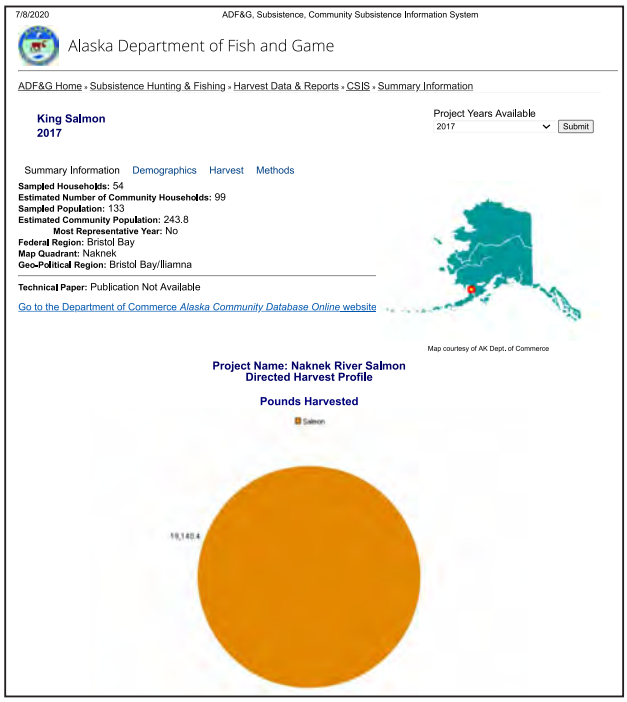

King Salmon data summary for 2017 displayed on the CSIS.

Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 470, Anchorage.

In King Salmon, hard copies of the technical paper are available at the ADF&G office. To download a copy of the full technical paper:
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How Can This Data be Used?

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Community harvest data from the 2017 and 2018 household surveys are available to the public and may be used by the AC (or any other person wishing to be part of the BOF process) to submit proposals or use as testimony.

For information on the **Naknek/Kvichak AC** and how to become involved:

Contact the ADF&G Regional Coordinator: Taryn O'Connor-Brito by phone: (907) 842-5142, or email: taryn.oconnor-brito@alaska.gov

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Southwest: 842-5142

Statewide: 465-4110

You can also visit:

- www.boards.adfg.state.ak.us
- http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/forms/bof_process.pdf
- http://www.adfg.alaska.gov/static/regulations/regprocess/gameboard/pdfs/bog_process.pdf

Contact Us

Please feel free to contact project staff with any questions or comments about the project and report. Additionally, let us know if you have any items of concern or items of interest regarding local wild resources that you would like studied. We welcome the opportunity to work together with individuals, communities and organizations to develop research projects that inform you, your community, fish and game managers, and policy makers.

Contact Information

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Dillingham, AK 99576
Ph: (907) 842-5257
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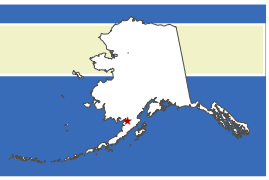
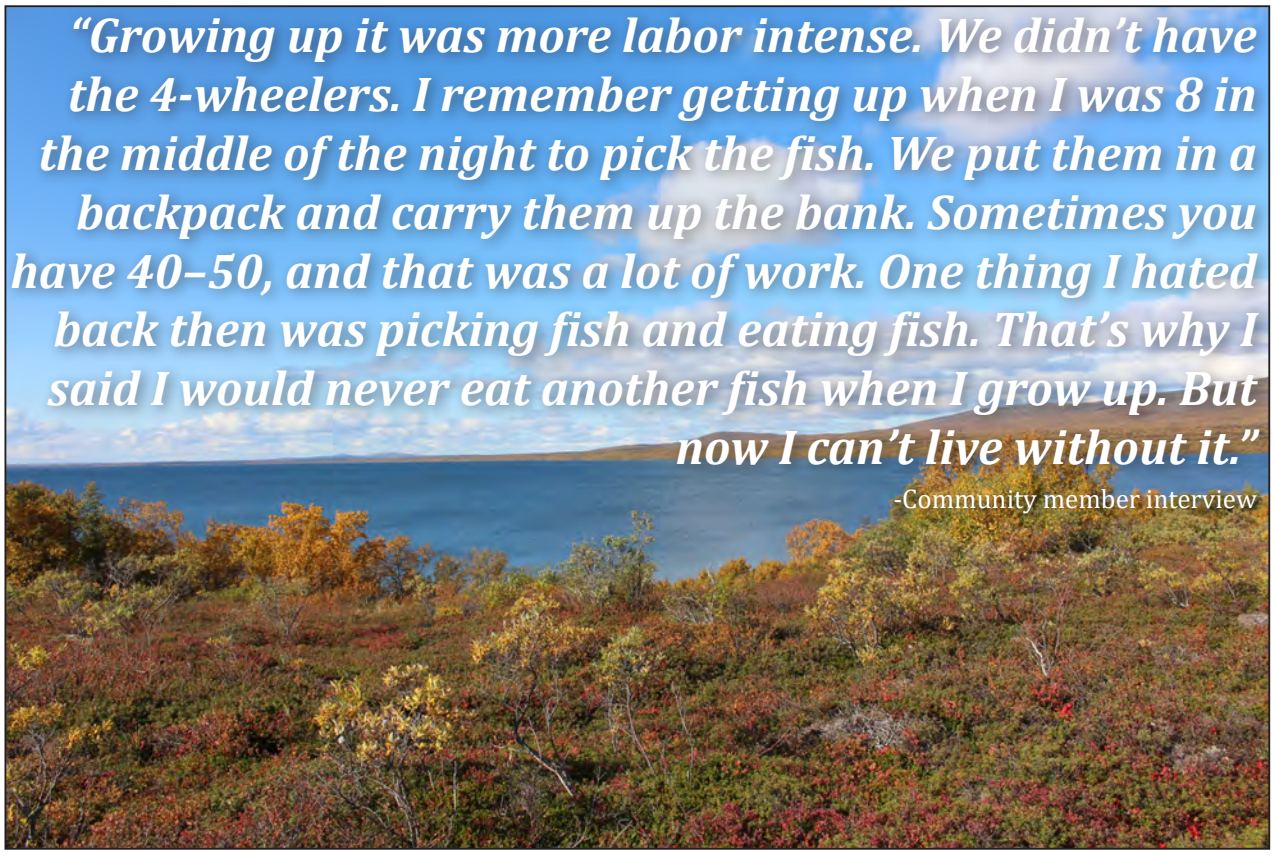


Alaska Department of Fish and Game
Division of Subsistence
333 Raspberry Road
Anchorage, AK 99518-1599



COMMUNITY SUMMARY - Technical Paper No. 470

The Harvest and Use of Salmon—King Salmon, Naknek, and South Naknek, Alaska, 2017 and 2018

Naknek, Alaska, 2017 and 2018

Study Overview

This study is part of the effort to collect data about the full range of salmon harvests and uses by the communities of King Salmon, Naknek, and South Naknek, Alaska. This summary provides an overview of the results of a household survey administered for the study years 2017 and 2018. Data for the final report also were derived from in-depth interviews conducted with key respondents, as well as insight from researchers who conducted participant observation and attended community meetings. The project was funded by the Alaska Sustainable Salmon Fund. This information was collaboratively collected by research staff of the Alaska Department of Fish and Game (ADF&G) Division of Subsistence, research staff from the Natural Resources Department of Bristol Bay Native Association (BBNA), and with the help of local research assistants (LRAs) from the study communities.

Acknowledgments

The Division of Subsistence and BBNA would like to thank the residents of King Salmon, Naknek, and South Naknek for being welcoming and receptive to this research project; community participation was essential and appreciated. Additionally, researchers thank the Naknek Native Tribal Council, South Naknek Traditional Council, U.S. Fish and Wildlife Service Becharof National Wildlife Refuge staff, and the staff at the ADF&G King Salmon office for supporting this project and providing use of buildings to hold interviews, surveys, meetings, and LRA training sessions. The survey's success is a credit to the work of the local research assistants in each community; thank you to: Steven Angasan, Josie Savo, Travis Wassille, Christina Morris, and Lucinda Tallekpalek. Thank you also to the key respondents who participated in this project. In addition, thank you to Monette Schwoerer and Judy Jo Matson for their help and support while researchers were in the communities.

Highlights of the Naknek Harvest Survey Findings

This study found an estimated population for Naknek in 2017 of 413 individuals in 154 households, and in 2018 the population was estimated to be 434 individuals in 153 households. As in the past, during the 2017 and 2018 study years, many residents of this study community relied on salmon for nutrition and to support their way of life. During the study years more than 87% of Naknek households used salmon, which coincided with a relatively high level of household participation in harvesting efforts: 71% of households harvested at least one species of salmon in 2017 and 60% of households harvested salmon in 2018. Approximately one-half of the Naknek households shared salmon with others in both study years: in 2017, 50% of households gave away at least one species of salmon and 54% received salmon from other households; in 2018, 45% of households gave away salmon and 56% received salmon. For both study years, Naknek residents harvested the majority of their salmon using subsistence nets: 81% of salmon harvest weight in 2017, and 85% of salmon harvest weight in 2018. The other two methods used to harvest salmon were removals from commercial catches and rod and reel. During the two study years, Naknek households reported harvesting salmon on the north side of the Naknek River at beaches such as Elder's Beach, Coffee Point, Telephone Point, and Monsen Park. Salmon were also harvested in locations such as Pauls Creek, King Salmon Creek, near Lower Lagoon, Rapids Camp Lodge, and in the mouth of the Naknek River and within several different areas of Naknek Lake.

In 2017, Naknek residents harvested an estimated total of 56,927 lb, or 138 lb per capita, of salmon. In 2018, Naknek residents harvested an estimated total of 47,062 lb, or 108 lb per capita, of salmon. The per capita harvest decreased by 22% in the second study year. Figures 1 and 2 show the composition of the salmon harvest by pounds usable weight for Naknek. In both study years, the majority of the harvest weight was sockeye salmon, followed by Chinook salmon; also, there were very small harvests of chum and pink salmon that each totaled less than 1% of the harvest weight. In 2017, Chinook, coho, and spawning sockeye salmon combined composed 30% of the harvest; in comparison, in 2018 those three species combined composed a smaller proportion (20%).

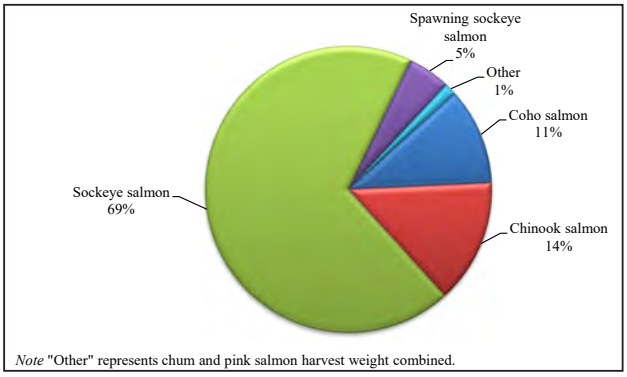


Figure 1. Composition of salmon harvest (lb), 2017.

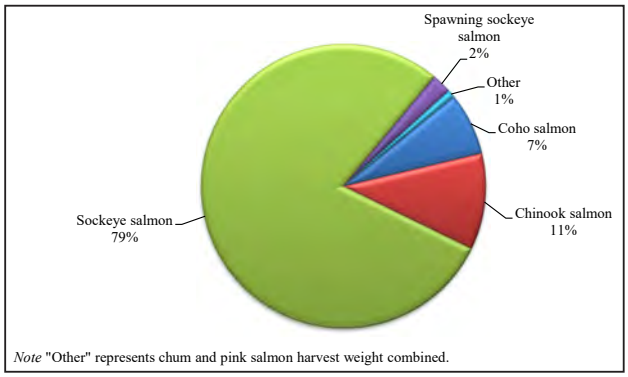


Figure 2. Composition of salmon harvest (lb), 2018.

Subsistence Permits

This study determined that a high percentage of households in all three study communities do obtain and return subsistence salmon permits in a normal year; regarding Naknek specifically, five surveyed households fished without a permit in 2017, and four did so in 2018. The average subsistence salmon permit return rate for Naknek from 2009–2018 was 88%. Because of the high rate of household participation in the subsistence permit program, the subsistence harvest estimates from before and after when post-season surveys occurred are not notably different in any of the communities (Figure 3).

Conclusions

This study demonstrated the continuing importance of harvesting and processing salmon for the residents in Naknek. Summer is a busy time for the majority of people living in this community and many are employed by seasonal industries that occur in summertime; however, this study found that even when subsistence salmon activities were hampered by conflicts with employment schedules or other restricting factors, most residents expressed their preference for obtaining local wild salmon compared to commercial food purchased in stores. Particularly sockeye, Chinook, and coho salmon are used and harvested by a large number of households in Naknek and provide a context for teaching skills and values linked to family traditions and community survival.

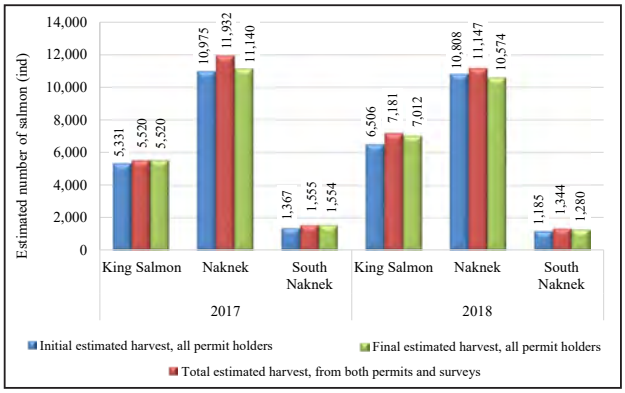


Figure 3. Initial estimated total salmon harvest based on returned permits compared to final estimated total salmon harvest based on returned permits and surveyed households.

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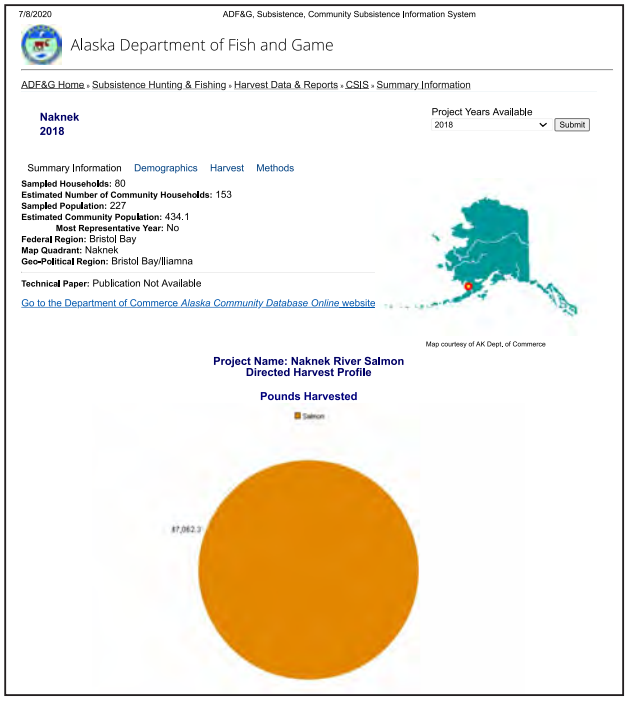

Naknek data summary for 2018 displayed on the CSIS.

Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 470, Anchorage.

In Naknek, hard copies of the technical paper are available at: Naknek Native Village Council Office, Naknek Public Library, and the Naknek School Library. To download a copy of the full technical paper: http://www.adfg.alaska.gov/techpap/TP470.pdf

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Statewide: 465-4110

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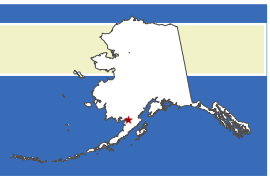

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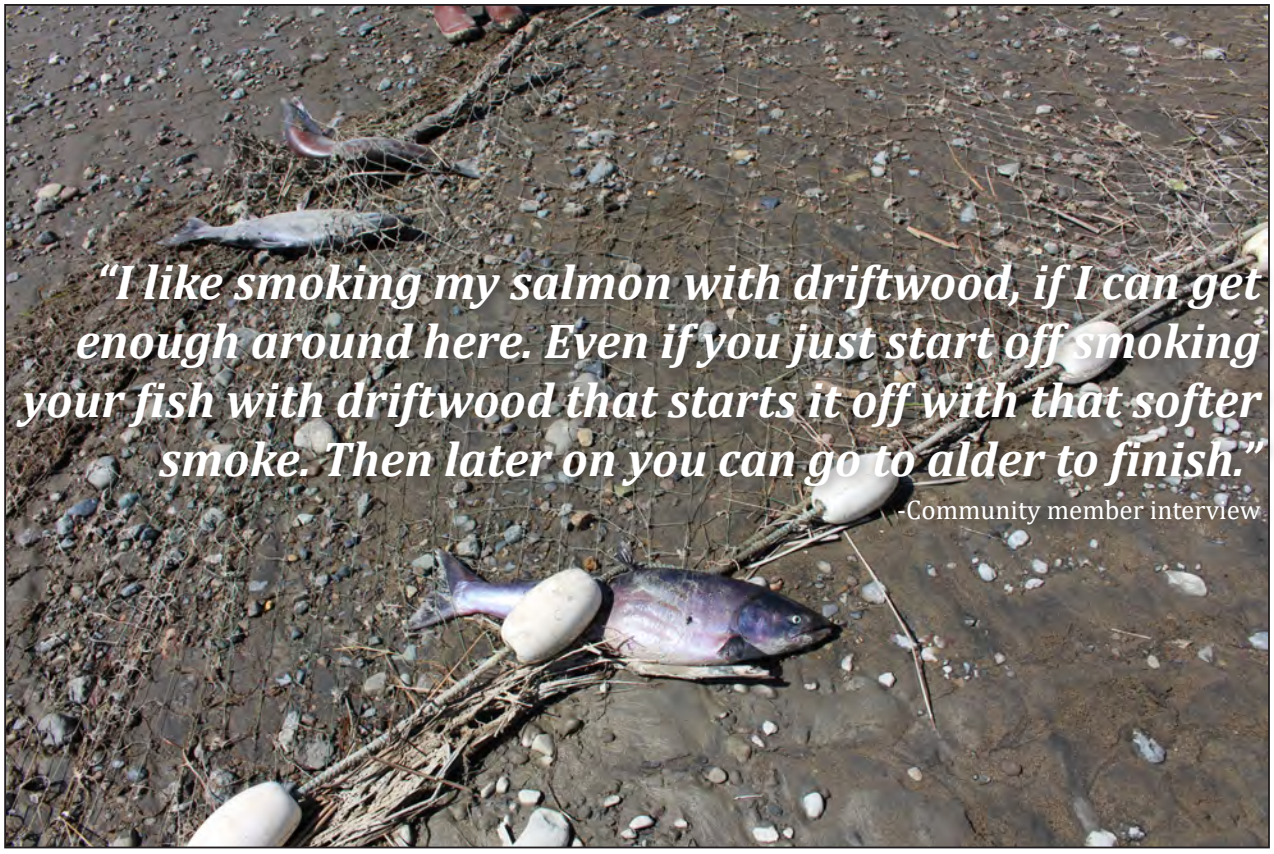


COMMUNITY SUMMARY - Technical Paper No. 470

The Harvest and Use of Salmon—King Salmon, Naknek, and South Naknek, Alaska, 2017 and 2018

South Naknek, Alaska, 2017 and 2018

Study Overview

This study is part of the effort to collect data about the full range of salmon harvests and uses by the communities of King Salmon, Naknek, and South Naknek, Alaska. This summary provides an overview of the results of a household survey administered for the study years 2017 and 2018. Information in the final report also were derived from in-depth interviews conducted with key respondents, as well as insight from researchers who conducted participant observation and attended community meetings. The project was funded by the Alaska Sustainable Salmon Fund. This information was collaboratively collected by research staff of the Alaska Department of Fish and Game (ADF&G) Division of Subsistence, research staff from the Natural Resources Department of Bristol Bay Native Association (BBNA), and with the help of local research assistants (LRAs) from the study communities.

Acknowledgments

The Division of Subsistence and BBNA would like to thank the residents of King Salmon, Naknek, and South Naknek for being welcoming and receptive to this research project; community participation was essential and appreciated. Additionally, researchers thank the Naknek Native Tribal Council, South Naknek Traditional Council, U.S. Fish and Wildlife Service Becharof National Wildlife Refuge staff, and the staff at the ADF&G King Salmon office for supporting this project and providing use of buildings to hold interviews, surveys, meetings, and LRA training sessions. The survey's success is a credit to the work of the local research assistants in each community; thank you to: Steven Angasan, Josie Savo, Travis Wassille, Christina Morris, and Lucinda Tallekpalek. Thank you also to the key respondents who participated in this project. In addition, thank you to Monette Schwoerer and Judy Jo Matson for their help and support while researchers were in the communities.

Highlights of the South Naknek Harvest Survey Findings

This study found an estimated population for South Naknek in 2017 of 46 individuals in 28 households, and in 2018 the population was estimated to be 38 individuals in 26 households. As in the past, during the 2017 and 2018 study years, many residents of this study community relied on salmon for nutrition and to support their way of life. During the study years more than 89% of South Naknek households used salmon, which coincided with a relatively high level of household participation in harvesting efforts: 78% of households harvested at least one species of salmon in 2017 and 58% of households harvested salmon in 2018. In 2017, almost one-half (48%) of households gave away at least one species of salmon, and 39% received salmon from other households. In 2018, 42% of households gave away salmon and 68% received salmon. For both study years, South Naknek residents harvested the majority of their salmon using subsistence nets: 84% of salmon harvest weight in 2017, and 79% of salmon harvest weight in 2018. Both years, the remaining salmon were removed from commercial catches. South Naknek respondents reported harvesting salmon on the southern shore of Naknek River near the mouth of the Naknek River at Dimond M Cannery, near Diamond O Cannery, along the beach between Diamond O Cannery and Bumble Bee Cannery, and along the beach from Diamond NN Cannery and Borough Dock Road. In addition, a few households reported harvesting salmon on the north side of Naknek River between Coffee and Telephone points.

In 2017, South Naknek residents harvested an estimated total of 8,955 lb, or 194 lb per capita, of salmon. In 2018, South Naknek residents harvested an estimated total of 4,436 lb, or 116 lb per capita, of salmon. The per capita harvest decreased 40% in the second study year. Figures 1 and 2 show the composition of the salmon harvest by pounds usable weight for South Naknek. In both study years, sockeye salmon composed approximately three-quarters of the total salmon harvest weight; also, chum and pink salmon contributed 3% and 1%, respectively. In 2017, coho and Chinook salmon contributed nearly the same proportion to the total harvest: 10% and 9%, respectively. However, in 2018, Chinook salmon was the second most harvested species and the difference between the proportion that came from Chinook salmon (13%) and coho salmon (8%) was larger.

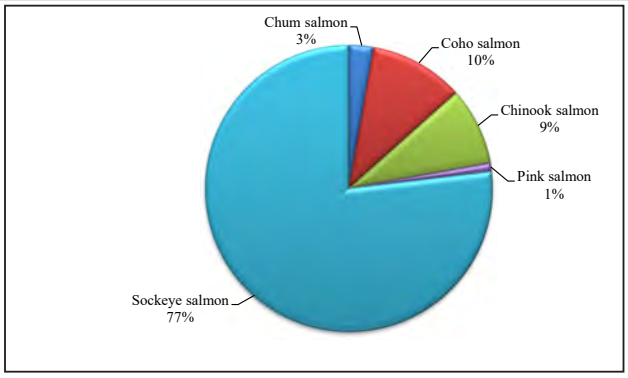


Figure 1. Composition of salmon harvest (lb), 2017.

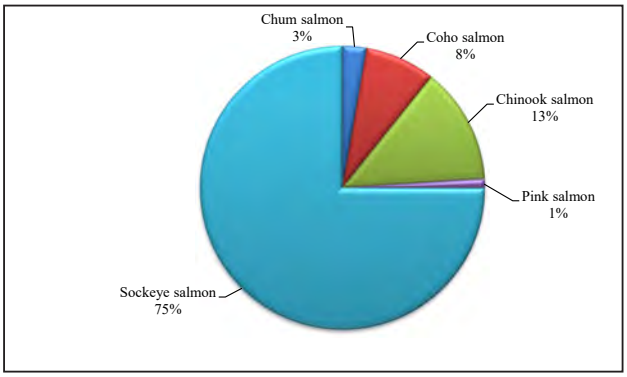


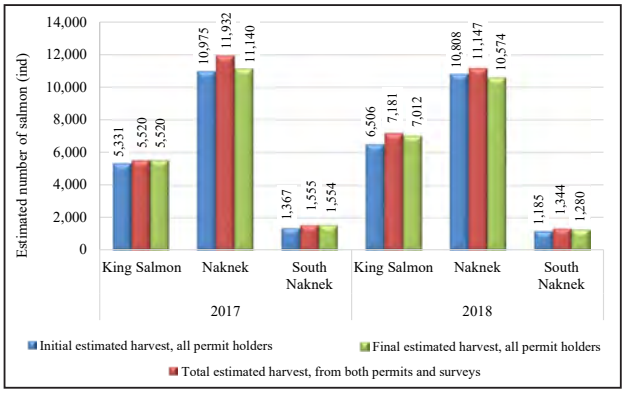
Figure 2. Composition of salmon harvest (lb), 2018.

Subsistence Permits

This study determined that a high percentage of households in all three study communities do obtain and return subsistence salmon permits in a normal year; regarding South Naknek specifically, one surveyed household fished without a permit in 2017 and three households fished without a permit in 2018. The average subsistence salmon permit return rate for South Naknek from 2009–2018 was 78%. Because of the high rate of household participation in the subsistence permit program, the subsistence harvest estimates from before and after the time that post-season surveys occurred are not notably different in any of the study communities (Figure 3).

Conclusions

This study demonstrated the continuing importance of salmon harvesting and processing activities for the residents in South Naknek. In both study years, almost all households in South Naknek used salmon. Though some South Naknek respondents mentioned their household needed fewer subsistence salmon during the 2017 and 2018 study years than in the past as a result of fewer families residing in the community, salmon remain an important source of food in this community, particularly sockeye, coho, and Chinook salmon. Almost all South Naknek residents expressed an overall sentiment of gratitude for subsistence salmon during the surveys and interviews.



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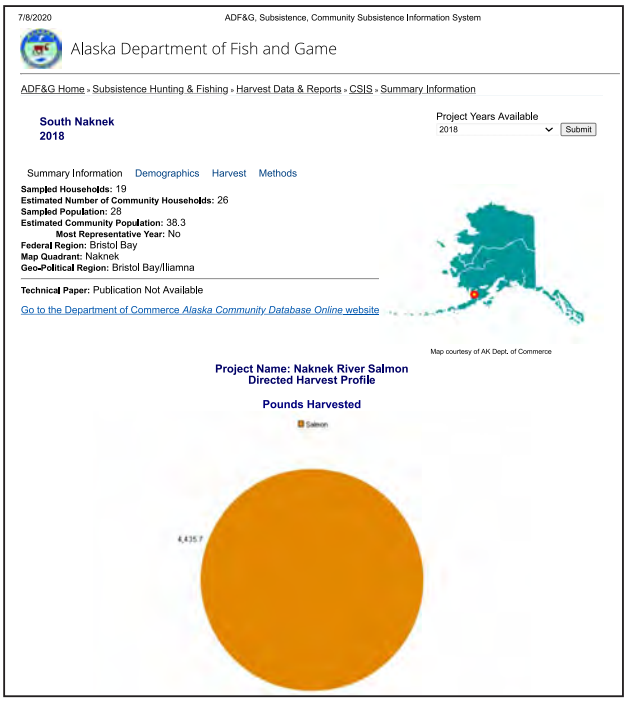

South Naknek data summary (2018) displayed on the CSIS.

Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 470, Anchorage.

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The Alaska Board of Fisheries Process Overview

The Alaska Board of Fisheries' (BOF) main role is to conserve and develop the fishery resources of the state. This involves setting seasons, bag limits, and methods and means for the state's subsistence, commercial, sport, guided sport, and personal use fisheries. The BOF receives written proposals, comments, and oral and written testimony from members of the public, local Fish and Game advisory committees, and ADF&G. The board then deliberates on regulations that respond to people's concerns while also considering the need for long-term conservation and sustainable use of the resource. BOF meetings are open to the public and provide opportunity for public comment. They work under a regional cycle every three years.

Proposals for BOF meetings are accepted from December 1–April 10 in the year before the scheduled BOF meeting. Public comments can be submitted to the ADF&G Boards Support Section at any time up to two weeks prior to the start of the board meeting. The BOF is especially interested in proposals and comments that represent a collective, consensus approach to problem-solving, such as tribal council or advisory committee comments. Comments are included with the meeting packet materials prepared for the BOF meeting. A final chance to submit written comments is to do so in person at the meeting or by fax, and those are provided to board members periodically throughout the meeting.

ADF&G Fish and Game Advisory Committees

Fish and Game advisory committees (AC) are an important component of the BOF process. Advisory committees are local groups that meet to discuss fish and wildlife issues, provide a local forum for those issues, and make recommendations to the Alaska boards of Fisheries and Game. The Naknek/Kvichak Advisory Committee represents the communities of King Salmon, Naknek, South Naknek, and Levelock with 15 undesignated seats. The Naknek/Kvichak AC is an active committee holding 2–3 in-person and teleconference meetings per year focusing on both fish and game management issues.

Community harvest data from the 2017 and 2018 household surveys are available to the public and may be used by the AC (or any other person wishing to be part of the BOF process) to submit proposals or use as testimony.

For information on the **Naknek/Kvichak AC** and how to become involved:

Contact the ADF&G Regional Coordinator: Taryn O'Connor-Brito by phone: (907) 842-5142, or email: taryn.oconnor-brito@alaska.gov

Or visit the ADF&G website by going to this link:

https://www.adfg.alaska.gov/index.cfm?adfg=process.acinfo&ac=naknek_kvichak

Want to know more? To find out more about advisory committees or how to submit a proposal, contact the Board Support Regional Coordinator for your area:

Southwest: 842-5142

Statewide: 465-4110

You can also visit:

- www.boards.adfg.state.ak.us
- http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/forms/bof_process.pdf
- http://www.adfg.alaska.gov/static/regulations/regprocess/gameboard/pdfs/bog_process.pdf

Contact Us

Please feel free to contact project staff with any questions or comments about the project and report. Additionally, let us know if you have any items of concern or items of interest regarding local wild resources that you would like studied. We welcome the opportunity to work together with individuals, communities and organizations to develop research projects that inform you, your community, fish and game managers, and policy makers.

Contact Information

Bronwyn Jones (PI), Div. of Subsistence
333 Raspberry Road
Anchorage, AK 99518
Ph: (907) 267-2178; (907) 267-2353
Email: bronwyn.jones@alaska.gov

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Dillingham, AK 99576
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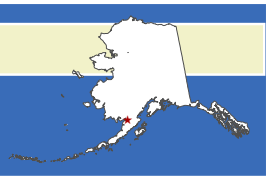

Alaska Department of Fish and Game
Division of Subsistence
333 Raspberry Road
Anchorage, AK 99518-1599

APPENDIX H—REDACTED BRISTOL BAY AREA PERMIT FROM 2013

STATE OF ALASKA
DEPARTMENT OF FISH & GAME
DIVISION OF SUBSISTENCE and DIVISION OF COMMERCIAL FISHERIES

Year 2013

Return form to:
Division of Subsistence, ADF&G, PO Box 1030, Dillingham, AK 99576

SUBSISTENCE SALMON FISHING PERMIT

Permit No. Kil

am applying for a subsistence fishing permit for my household in accordance with current regulations and hereby swear the information contained on this application is a true statement as witnessed by my signature below; and that I have been an Alaska resident for the last calendar year.

Length of residency in the State of Alaska: 7 ______ Phone No. ______

Number of year-round residents in household: ______ 4

5 ______

6 ______

☐ Ugashik ☐

Nushagak ☐ Togiak ☐ Other ☐ ______

Primary fishing location (specific): Nansen Park

Number of fathoms allowed at this site: 10 ☒ 25 ☐ Gear type: Red + King

Applicant's signature ______ Date ______

TO BE COMPLETED BY ISSUING OFFICER ONLY

The above-named person and designated household members are authorized to fish for salmon for subsistence purposes in the Bristol Bay Area during the period 5/28/13 to 9/30/13 according to current laws and regulations of the State of Alaska.

Under authority of this permit the following fish may be taken:

Sockeye 300 Pinks 75 Kings 10

Cohos 10 Chums 75 Spawn-out salmon 100

***NOTE:** Commercially-caught salmon may also be utilized for subsistence purposes and should be reported on the back of this form as well as a Commercial Fish ticket.

C Klutsch ______ 5/28/13
Authorizing Officer Date

NOTE:
1. Only one subsistence salmon fishing permit may be issued to each household per year. People using the net/site and not of this household are required to have their own permit and file a separate report of their harvest.
2. Fish caught for subsistence uses may not be sold or allowed to enter commercial use.
3. An accurate record of fish taken under authority of this permit must be returned to the Alaska Department of Fish and Game office when the permit expires. Failure to return subsistence catch records is grounds for denial of future permit privileges.
4. **Please return this permit as soon as you are through fishing.**

(revised 3/20/2007)

APPENDIX I—EMERGENCY ORDER 48, JULY 2018

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES
NEWS RELEASE

Sam Cotten, Commissioner
Scott Kelley, Director

Contact:
Travis Elison, Naknek/Kvichak Area Biologist
Paul Salomone, Egegik/Ugashik Area Biologist
Phone: (907) 246-3341

King Salmon, Alaska
P.O. Box 37
King Salmon, Alaska 99613
Date Issued: July 7, 2018
Time: 12:00 p.m.

Bristol Bay Eastside Salmon Announcement # 31
Emergency Order 48

This is the Alaska Department of Fish and Game in King Salmon with an announcement for Naknek-Kvichak District fishermen. The time is 12:00 noon and the date is Saturday, July 7, 2018.

On July 6, the Naknek River escapement was 107,000 sockeye for a cumulative of 869,000 sockeye, which is within the escapement goal; the Kvichak River escapement was 94,000 sockeye for a cumulative of 262,000; and the Alagnak River escapement was 25,000 sockeye for a cumulative of 100,000. The Kvichak in-river estimate is 500,000. Harvest on July 6 was an estimated 210,000 sockeye for a cumulative of 1,102,000 sockeye.

The Naknek River Special Harvest Area (NRSHA) will open to drift gillnet gear for an 8.5-hour period from 8:00 p.m. Saturday, July 7 until 4:30 a.m. Sunday, July 8 and again for an 8-hour period from 7:00 a.m. until 3:00 p.m. Sunday, July 8.

As stated in 5 AAC 06.360 *Naknek River Sockeye Salmon Special Harvest Area Management Plan*, the NRSHA consists of the waters of the Naknek River from a line between the ADF&G regulatory markers located at 58° 43.37' N. lat., 157° 03.17' W. long. and 58° 42.67' N. lat., 157° 03.44' W. long. and upstream to the powerlines across the river.

When drift gillnet fishing in the NRSHA no more than 75 fathoms may be in the water at one time and a vessel may not have more than 150 fathoms on board. No part of a drift gillnet may be operated within 150 feet of a set gillnet. Subsistence fishing with set gillnets in the Naknek River will remain open.

Processors, please use Stat. Area Code 324-25 for these NRSHA drift gillnet fishing periods.

Fishermen in the Naknek-Kvichak District should stand-by at 12:00 noon Sunday, July 8 for the next possible announcement.

This has been the Alaska Dept. of Fish & Game in King Salmon.

Read on VHF 7: July 7, 2018 12:00 p.m.
Connected EO's: 2F-T-48-18