Technical Paper No. 459

Subsistence Salmon Networks in Select Bristol Bay and Alaska Peninsula Communities, 2016

by

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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

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by

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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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ABSTRACT

The harvest, use, and sharing of salmon and other wild resources by Bristol Bay and Alaska Peninsula communities has been well documented by the Division of Subsistence over the past four decades. Remote Alaska Native communities in these regions remain economically and culturally dependent on their traditional fishing and hunting practices. This report describes the results of a project that documented salmon harvest and use patterns in six Bristol Bay and Alaska Peninsula communities (Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, Port Heiden, and Egegik) for 2016 in order to illustrate the household and community networks that facilitate the harvesting, processing, sharing, bartering, and trading of subsistence salmon resources within the communities, across the broader region, and throughout Alaska. Systematic household surveys and semi-structured interviews were used to capture detailed representations of harvest, use, and sharing practices in each study community for the 2016 study year. This report illustrates the qualitative and quantitative data collected during this research and situates the results within a broader discussion of resource management. Employing both types of research methods provided a detailed snapshot of sharing practices for the 2016 study year and allowed for comparisons among study communities, as well as a detailed description of the cultural values that shape these practices and the broader social and historical contexts in which they are embedded.

The study found that subsistence use of salmon was almost universal in the study communities in 2016 and that most households were engaged in the exchange of salmon. In all study communities combined, 96% of households used salmon, 80% of households received salmon from other households, and 56% of all households gave salmon to others. The average per capita harvest of salmon in 2016 in the study communities combined was 118 lb. Sockeye salmon was the main salmon species harvested, composing more than one-half of the salmon harvest, by numbers of fish, in each community. The sharing network analysis revealed that each study community's networks (local and non-local) have unique structural features and that sharing plays a critical role in community cohesion and overall social wellbeing in all the study communities. Salmon harvested by these communities were shared throughout Alaska and elsewhere, but the research documented very few instances of barter or customary trade. The project demonstrated how vastly important salmon resources are not only to the residents of these communities, but also to the extensive network of people living elsewhere.

Key words: subsistence, salmon, sockeye, Chinook, coho, pink, chum, spawning, caribou, moose, brown bear, sharing, networks, subsistence economies, distribution, exchange, traditional ecological knowledge, TEK, wild resources, Bristol Bay, Alaska Peninsula, Alaska Peninsula Management Area, Bristol Bay Management Area, Chignik Management Area, fishing, gillnet, seine, rod and reel, home pack, trade, Alaska Native, GIS

1. INTRODUCTION

Salmon, especially sockeye salmon, are a main component of subsistence harvests in the Bristol Bay and Alaska Peninsula regions of Alaska. Sharing, bartering[1], and customary trade[2] of salmon are long-standing subsistence traditions throughout Alaska that reinforce social relationships, cultural values, and help fulfill subsistence needs. This report describes the results of a project that documented salmon harvest and use patterns in six Bristol Bay and Alaska Peninsula communities for 2016 in order to illustrate the household and community networks that facilitate the harvesting, processing, sharing, bartering, and trade of subsistence salmon resources within the communities, across the broader region, and throughout Alaska. The six communities included in this study, as depicted in Figure 1-1, were Chignik Lake (population 64), Chignik Lagoon (population 85), Chignik Bay (population 95), Perryville (population 110), Egegik (population 85), and Port Heiden (population 98) (Alaska Department of Labor and Workforce Development 2018). Each of these communities has a unique regional sharing pattern identified during past studies conducted by Division of Subsistence researchers. Based on previous research experience, this project was developed with the overarching goal to provide information on how social networks function in the harvest and distribution of subsistence salmon resources throughout the region and state.

The Alaska Department of Fish and Game (ADF&G) Division of Subsistence is charged with gathering, quantifying, evaluating, and reporting information about customary and traditional uses of fish and wildlife resources. By sampling most (or all) of the households in a community, household surveys generate accurate data on the structure of subsistence networks, enabling researchers to investigate the factors that shape these networks and use social network analysis to document and understand household subsistence harvests and resource uses in rural communities throughout Alaska. These surveys often document social relationships that extend to neighboring communities or regional centers, but little detail about these networks is usually collected, limiting ADF&G's ability to investigate the role that community connections play in the lives of people living in rural communities. Also, significant increases in rural outmigration and urbanization in Anchorage and Fairbanks indicate the potential importance of connections between Alaska's rural and urban communities. For these reasons, this study's methods were developed to learn about connections within the community as well as the ways connections within the community are associated with connections to other communities. In addition, researchers explored potential differences in network characteristics across these two kinds of social relationships to better understand how rural outmigration is affecting social relations in urban and rural contexts.

Project Background

The U.S. Fish and Wildlife Service (USFWS) 2016 Fisheries Resource Monitoring Program (FRMP) identified an information need for a "description and analysis of social networks underlying the distribution of fish harvested for subsistence by residents of the Bristol Bay Area and Chignik Area" within the priority information needs for Southwest Alaska (U.S. Fish and Wildlife Service, Office of Subsistence Management n.d.). To address this information need, the project was funded to collect data for a one-year timeframe that focused on salmon harvested and shared by residents of five communities: Chignik Lagoon, Chignik Lake, Perryville, Port Heiden, and Egegik. During the process of applying for and receiving funding for this project, the Division of Subsistence also secured funding from the State of Alaska through the Chinook Salmon Research Initiative for a three-year project to investigate salmon harvest and use patterns in Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville. Capitalizing on the close alignment of study communities and objectives of these two projects, the division consolidated fieldwork and was able to add

1. Alaska Statute (AS 16.05.940(2)) defines barter as the exchange of fish or game for other fish or game resources, or for other food or nonedible items other than money. Barter is also understood to include exchange of fish and game for noncommercial services—including physical work or transportation.
2. Alaska Statute (AS 16.05.940(8)) defines customary trade as the noncommercial exchange of fish or game for limited amounts of cash.

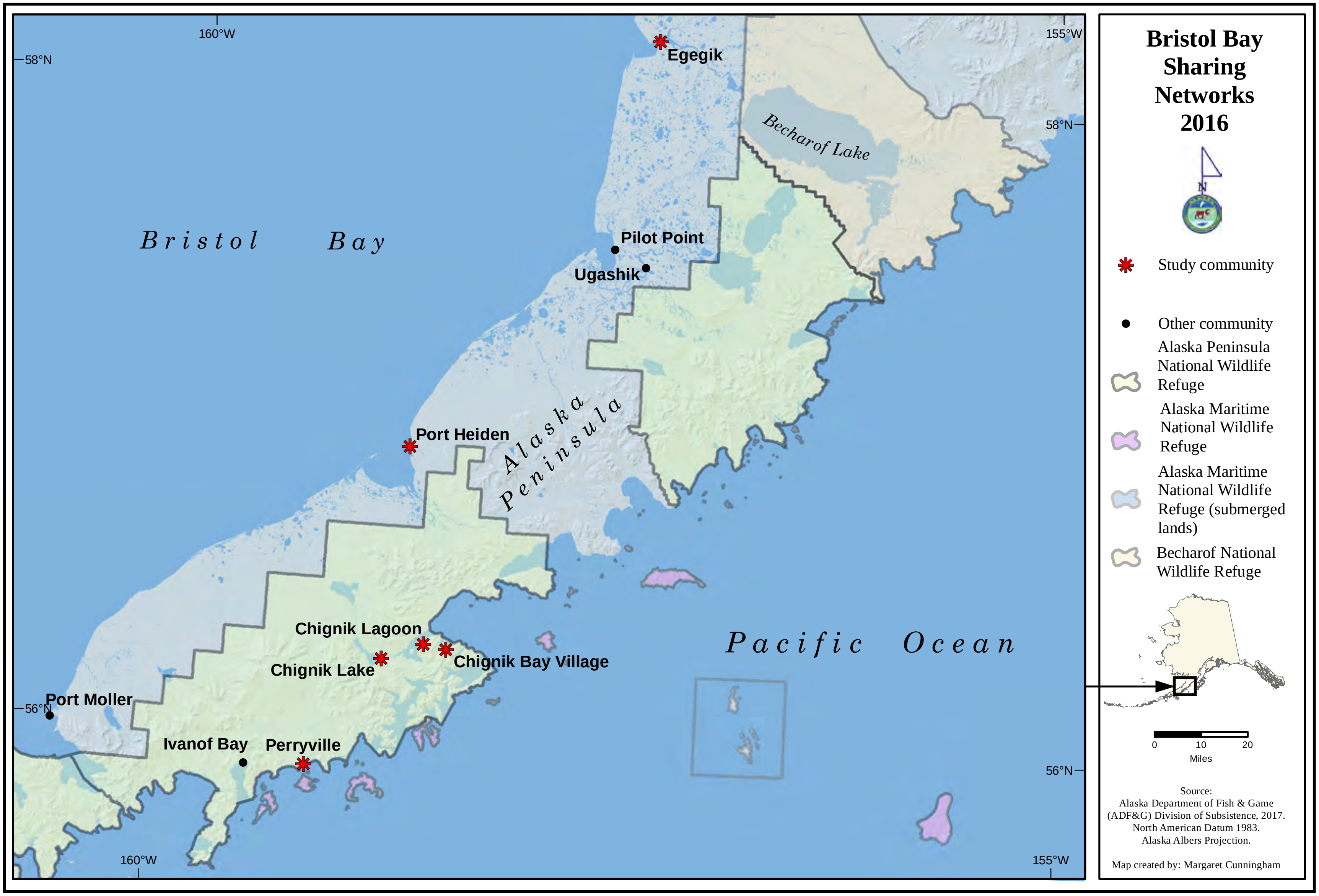

Figure 1-1.–Map of study communities, 2016.

Chignik Bay to the five study communities originally proposed for FRMP funding. After project funding was secured, the National Park Service contacted division researchers about incorporating harvest and use questions for large land mammals into the salmon-focused survey in these communities. A small subset of questions was added to the survey instrument, but due to problems arising in the funding mechanism that resulted in no additional funding, only a basic analysis of these survey data for large land mammals has been performed and no maps were created from the raw spatial data that were collected.

Regional Background

The study communities have different resources, weather patterns, and transportation opportunities depending upon where they are located on the Alaska Peninsula. However, they are also intertwined through their proximity, shared historical and sociocultural factors, and shared reliance upon the local salmon resource. Additionally, there are regional organizations that support or serve all the communities, which further ties them to each other. The following is a brief description of a few broad shared regional characteristics, and in Chapter 2 more detailed background information about each study community will be provided.

Geography

The communities participating in this study lie in a roadless region of Southwest Alaska known as the Alaska Peninsula, which divides the Pacific Ocean and the Gulf of Alaska from the Bering Sea. The northwestern, or Bering Sea, side of the peninsula drains the streams that begin in the mountains of the Aleutian Range. The lakes and rivers flow through a coastal landscape that is low in elevation and covered by tundra, with networks of lichens, grasses, sedges, and low-lying deciduous trees near river corridors. The communities on this side of the peninsula are found where the pristine and scenic rivers that support the salmon habitat meet the bay. Bristol Bay is internationally known for maintaining and executing the world's most valuable commercial salmon fishery.

The Pacific, or southeastern, side has volcanically active mountains sheeted by glaciers and spiked with spires and craters that tower over abruptly breaking cliffs meeting deep blue waters. Glacial melt, gravel, and silt form actively shifting shorter streams and lakes ending in small bays and coves that support distinct pockets of genetic diversity (Schindler et al. 2010).[3, 4, 5]

Governance

While each community maintains a tribal government, all of the communities are within the state's administratively designated Lake and Peninsula Borough, which spans more than 23,000 mi^2. There is low population density in the borough at roughly 6 people per 100 mi^2. Vast tracts of lands are federally designated preservation areas of significant ecological importance to migratory birds, land animals, fish, and marine mammals.

Land Ownership

Lands of the Alaska Peninsula are a mixture of state-, federal-, and Native-owned areas. Through the Alaska Native Claims Settlement Act (ANCSA) of 1971, the Bristol Bay Native Corporation (BBNC) received title

3. Fujita, Rod and M. Burden, "Why is Bristol Bay's salmon run so resilient?" *Environmental Defense Fund* (blog: Fisheries for the Future), October 24, 2019, http://blogs.edf.org/edfish/2019/10/24/why-is-bristol-bays-salmon-run-so-resilient/ (accessed December 2019).
4. Alaska Conservation Foundation, "Bristol Bay watershed – lifeblood of the world's largest wild sockeye salmon run – is threatened by an open-pit mine," https://alaskaconservation.org/protecting-alaska/priorities/protecting-lands-waters/bristol-bay/ (accessed December 2019).
5. Miller, Matthew L., "Bristol Bay Blog Part 2: The Salmon Portfolio," *Cool Green Science* (blog), May 2, 2013, https://blog.nature.org/science/2013/05/02/bristol-bay-blog-part-2-the-salmon-portfolio/ (accessed December 2019).

to approximately 115,000 surface acres and 3 million subsurface acres of land in the Bristol Bay region.[6] BBNC is one of 12 Alaska Native regional corporations formed through ANCSA; in addition to the regional corporations, over 200 village corporations were also formed and each received title to land.

The following are village corporations associated with the study communities: Far West Inc., of Chignik Bay; Chignik Lagoon Native Corporation of Chignik Lagoon; Chignik River Corporation of Chignik Lake; Oceanside Corporation of Perryville; Becharof Corporation of Egegik; and the Alaska Peninsula Corporation, of which Port Heiden residents are shareholders. When formed, these village corporations' shareholders were mostly residents of the communities. As original shareholders pass away, or transfer shares to others, the place of residence of shareholders has become more dispersed. Much of the land selected by the village corporations is near the respective study communities.

Health and Social Services

All of the tribes in the study communities contract with the Bristol Bay Area Health Corporation (BBAHC) to provide healthcare services. BBAHC is a tribal healthcare organization founded in 1973 that provides services within the entire Bristol Bay region under an agreement with the Indian Health Service. The main care facility in Dillingham, a regional hub in Bristol Bay, dates back to 1913 as a hospital. The hospital also served as an orphanage and school for periods after 1919 when the influenza pandemic altered the history of the indigenous people of the Bristol Bay region and state of Alaska.

All of the study communities are served by the Bristol Bay Native Association (BBNA), which is a tribal consortium that started in 1966. BBNA advocated for local Alaska Native residents in negotiating claims to the land in the region during the passage of ANCSA. Individuals enrolled in the early association later became the shareholders of village and regional corporations. In 1973, BBNA incorporated as a non-profit organization and now provides a range of services to the 31 tribes of the region, including those of the study communities. The services provided by BBNA include social, economic, cultural, public safety, Native allotment management, environmental and community education programs and initiatives.

Economic Development

The Bristol Bay Economic Development Corporation formed in 1992 as part of the Community Development Quota (CDQ) program included in the reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act. The program was created to provide economic benefits of the Bering Sea fisheries to the communities located along the Bering Sea coastline through an allocation of a portion of the total allowable catch to the CDQ groups. The groups redistribute earnings from the lease or harvest of the quota to member communities in a variety of ways. Of the study communities only Egegik and Port Heiden are members of this organization.

Education

Beginning in the 1920s, schools run by federal agencies began to operate on the Alaska Peninsula and the schooling season was coordinated with seasonal patterns of the local people (Partnow 2001:250–251). As an example, a school at Chignik Bay, managed by the Bureau of Education, operated during summer months, whereas a school in Perryville, managed by the Bureau of Indian Affairs, operated during the span of fall–spring months. Before the Molly Hootch case that concluded in 1976[7], in order to attend high school in the 1960s, students in the region generally moved from their homes to the neighboring communities of

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6. Bristol Bay Native Corporation, "Land, ANCSA: ANCSA: historic act with far-reaching impact," https://www.bbnc.net/our-corporation/land/ancsa/ (accessed December 2019).
7. The case *Tobeluk v. Lind*, which settled in 1976, is commonly referred to as the Molly Hootch case after the original plaintiff who protested lack of secondary education infrastructure in her rural Alaska hometown that caused students to generally leave home in order to pursue schooling at the high school level. The case revolutionized rural education and made secondary education available to more than 100 rural communities.*
   * Alaskool, "Documenting the 'Molly Hootch' Case," http://www.alaskool.org/native_ed/law/mhootch_erq.html#journal (accessed December 2019) published with permission the journal article by Cotton (1984).

Pilot Point, Naknek, and Dillingham, or students attended boarding schools (such as Mount Edgecumbe in Sitka, Alaska, and Chemawa Indian School near Salem, Oregon) that were operated by the Bureau of Indian Affairs. Mount Edgecumbe High School is now operated by the Alaska Department of Education and Early Development and is still well attended by students from the Bristol Bay region.

The Lake and Peninsula School District provides public education services to the region of this study. Funding to operate the schools is associated with student enrollment. The status of local schools in each community will be further discussed in the community background sections in Chapter 2.

Regulatory Context

Salmon

The six study communities are located within three different salmon management areas—Chignik Management Area, Alaska Peninsula Area, and Bristol Bay Area (Figure 1-2). Regulations for subsistence salmon fishing are often tied to commercial fishing operations in each management area. ADF&G Division of Commercial Fisheries manages salmon commercial fisheries in the Westward Region[8] where the Chignik Management Area (Area L) and Alaska Peninsula Area (Area M) are located and the Central Region[9] where the Bristol Bay Area (Area T) is located. Following are short overviews of each of the three pertinent management areas and the subsistence regulations for each area, which will further illustrate how commercial salmon fisheries influence local salmon harvest opportunities for residents of the six study communities. In addition to harvesting salmon under subsistence regulations, commercial fisheries participants can retain salmon from a commercial catch for home use (5 AAC 39.010). Each overview additionally includes study year salmon fisheries management information to better illustrate salmon fishing opportunities in the study area in 2016.

Chignik Area

The Chignik Management Area (CMA) encompasses all coastal waters and inland drainages on the south side of the Alaska Peninsula from Kilokak Rocks at the southern entrance to Imuya Bay then due south to Kupreanof Point (5 AAC 01.450). The study communities of Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville are all in this area (Figure 1-2). In 1993, the Alaska Board of Fisheries (BOF) made a positive customary and traditional (C&T) determination and specified amounts of salmon reasonably necessary for subsistence (ANS) for salmon in the CMA. Revised ANS findings for the CMA were as follows effective in 2016: Chignik Bay, Central, and Eastern districts combined was 5,200–9,600 early-run sockeye salmon, 2,000–3,800 late-run sockeye salmon, 100–150 Chinook salmon, and 400–700 salmon other than sockeye or Chinook salmon; and in the CMA Perryville and Western districts combined, the ANS was 1,400–2,600 coho salmon and 1,400–2,600 salmon other than coho salmon (Fall et al. 2019:119).[10]

State of Alaska regulations governing subsistence salmon fishing in the CMA require that, to fish, an individual must obtain an annual subsistence salmon permit (Figure 1-3) and must be an Alaska resident (5 AAC 01.480(a) and 5 AAC 01.010(b)). Annually, permits are available locally at the Chignik ADF&G weir facility and from local CMA community vendors, or from the ADF&G Kodiak office. Annually, the permit holder must record daily salmon harvests directly on the permit and return it to ADF&G by December 31. Catch information obtained from subsistence permits is compiled annually and used to assess regional subsistence salmon fisheries. There is an annual limit of 250 salmon per permit (5 AAC 01.480(b)), although ADF&G will issue an additional permit if more fish are needed for subsistence according to a provision stated on the CMA subsistence permit (Figure 1-3).

8. Alaska Department of Fish and Game, "Westward [Region]," http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercialByArea.southwest (accessed November 2019).
9. Alaska Department of Fish and Game, "Central Region," http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.southcentral (accessed November 2019).
10. Note that the BOF revised the ANS for the Chignik District in the CMA in 2019; 5 AAC 01.466(a)–(b) was amended May 31, 2019 (Register 230) in the online Alaska Administrative Code: http://www.akleg.gov/basis/aac.asp (accessed November 2019).

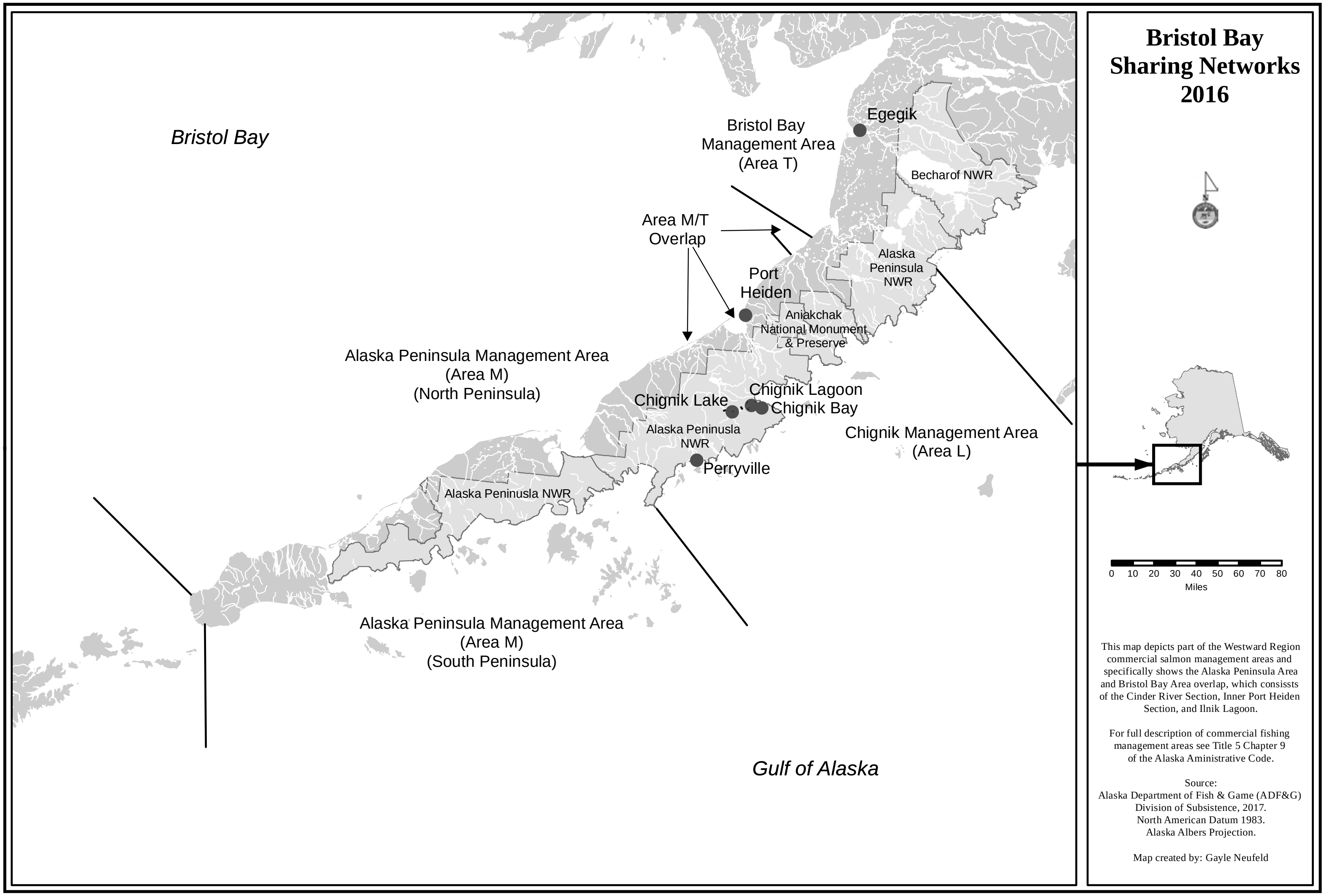

Figure 1-2.–Map of state commercial fishing area boundaries in part of the Westward Region.

2016 CHIGNIK AREA SUBSISTENCE SALMON FISHING PERMIT

Permit expires December 31, 2016

PERMIT #_______________

This permit is valid in the Chignik Management Area Only.

Name: ____

Address: ____

____

I hereby certify that I am an Alaska resident, and any fish taken will be used for subsistence purposes only.

____

Permittee signature Date

Email address:_______________________________________ Renew permit for next year: ☐

The catch report table below must be filled out (even if the permit was not used) and returned to a local Alaska Department of Fish and Game office prior to December 31, 2016. Failure to return the permit could result in future permits being denied (5 AAC 01.015 (C)).

SUBSISTENCE SALMON HARVEST REPORT

Number of salmon by species:

DATE	SPECIFIC LOCATION	KING	SOCKEYE	COHO	PINK	CHUM

- ALL PERSONS MUST HAVE A VALID SUBSISTENCE PERMIT IN POSSESSION WHILE TAKING OR ATTEMPTING TO TAKE SUBSISTENCE SALMON.
- COMPLETE THE SUBSISTENCE HARVEST REPORTS IMMEDIATELY UPON LANDING SALMON. UNSUCCESSFUL TRIPS SHOULD ALSO BE RECORDED.
- THE LIMIT IS **250** SALMON PER PERMIT. ADDITIONAL PERMITS MAY BE ISSUED IF ADDITIONAL SALMON ARE NEED FOR SUBSISTENCE.

REFER TO THE CURRENT SUBSISTENCE REGULATION BOOK FOR COMPLETE REGULATIONS

Return permit to: Chignik Salmon Management, ADF&G, 351 Research Court, Kodiak, AK 99615 by December 31, 2016.

____

Department representative Date

(SEE OPPOSITE SIDE FOR SUBSISTENCE REGULATIONS)

SELECTED SUBSISTENCE REGULATIONS

These listed regulations are not inclusive of all the regulations that apply to subsistence salmon fishing in the Chignik Area.

Figure 1-3.–Chignik Management Area subsistence salmon permit.

Figure 1-3.–Page 2 of 2.

5 AAC 01.015. SUBSISTENCE FISHING PERMITS AND REPORTS. (b)(3) Permits must be retained in the possession of the permittee and be readily available for inspection while taking fish. A person who transports subsistence-taken fish shall have a subsistence fishing permit in their possession.

5 AAC 01.460. FISHING SEASONS. Fish, other than rainbow trout and steelhead trout, may be taken at any time, except as may be specified by a subsistence fishing permit. Rainbow trout and steelhead trout, taken incidental in other subsistence finfish net fisheries, are lawfully taken and may be retained for subsistence purposes.

5 AAC 01.470. LAWFUL GEAR AND GEAR SPECIFICATIONS. (a) Salmon may be taken by seines and gillnets, or with gear specified by a subsistence fishing permit, except that salmon in Chignik Lake may not be taken with purse seines. A gillnet may not be set while staked, anchored, or otherwise fixed in a stream while it obstructs more than one-half of the width of the waterway.

5 AAC 01.475. WATERS CLOSED TO SUBSISTENCE FISHING. Salmon may not be taken (1) from July 1 through August 31, in the Chignik River from a point 300 feet upstream from the Chignik weir to Chignik Lake; (2) in Black Lake or any tributary to Black Lake or tributary to Chignik Lake except in the Clark River and Home Creek from their confluence with Chignik Lake upstream one mile.

AAC 01.480. SUBSISTENCE FISHING PERMITS.

a. Salmon, trout and char may only be taken under the authority of a subsistence fishing permit.
b. Not more than 250 salmon may be taken for subsistence purposes unless otherwise specified on the subsistence fishing permit.
c. A record of subsistence-caught fish must be kept on this permit. The record must be completed immediately upon taking subsistence-caught fish and must be returned to the local representative of the department no later than December 31 of the year issued.

5 AAC 01.485. RESTRICTIONS ON COMMERCIAL FISHERMAN. (a) In the Chignik Area, a commercial salmon fishing license holder may not subsistence fish for salmon during the 12 hours before the first commercial salmon fishing period and the 12 hours following the closure of a commercial salmon fishing period. However, a commercial salmon fishing license holder may subsistence fish for salmon during a commercial salmon fishing period.

SPECIAL PERMIT PROVISIONS

1. The adipose fin must be removed from all subsistence-caught salmon immediately upon capture.
2. A commercial license holder may not fish for both subsistence and commercial salmon at the same time. Further, a commercial salmon vessel may not carry both the subsistence and commercially caught salmon at the same time.
3. A commercial fishing vessel may not simultaneously carry both commercial seine and subsistence gillnet gear.
4. Commercial fisherman may always remove salmon from their commercial catch for home pack. Record the number of salmon taken by species for home pack use on your fish ticket.
5. This permit can be withdrawn at any time.

NOTICE TO FISHERMAN:

Before you fish, be sure you know whose land you are on and check the regulations. State regulations apply on all state, private, and federal lands where authorized. Private landowners may restrict entry on their land. Federal lands may be closed to fishing except by certain rural residents. Persons standing on state or private lands should be sure their fishing activities are legal under state regulations. If you have questions regarding the federal subsistence fisheries, please contact the Federal Office of Subsistence Management at 1-800 478-1456.

Return permit by December 31, 2016 to: Alaska Department of Fish and Game, Chignik Salmon Management, 351 Research Court, Kodiak, AK. 99615. Questions or concerns please contact your local Fish and Game Office: Chignik (907) 845-2243 (May 15 to September 15) or Kodiak (907) 486-1830.

A subsistence salmon permit holder who does not hold a commercial salmon fishing license may subsistence fish for salmon at any time (Wilburn 2019:9). Commercial salmon license holders may subsistence fish for salmon during the commercial fishing season at any time except for 12 hours preceding and 12 hours following the end of a commercial salmon fishing period (5 AAC 01.485). Subsistence salmon fishing gear specifications generally allow the use of seines and gillnets (see 5 AAC 01.470 for specific gear use limitations). Also, various closures of waters to subsistence fishing are specified in 5 AAC 01.475. In 2016 there were no subsistence fishery emergency orders or closures for the CMA.[11]

Federal subsistence fisheries are authorized in portions of the CMA for the permanent residents of the CMA communities. Federal regulations in the CMA apply to waters within or adjacent to the Alaska Peninsula National Wildlife Refuge, Aniakchak National Monument and Preserve, and the Alaska Maritime National Wildlife Refuge (U.S. Fish and Wildlife Service, Office of Subsistence Management 2019:50). Federal and state subsistence regulations in the CMA generally parallel each other; however, federal regulations authorize additional gear, harvest locations, and harvest seasons in portions of the CMA not authorized by the state. Starting in 2013, the federal program established a limited harvest assessment program that required a federal permit to harvest salmon in specific locations and seasons by specific methods on the federal lands and waters of the CMA.[12] For example, a federal subsistence permit is required, in addition to a state subsistence fishing permit, to: take salmon upstream of the Chignik River weir from January 1–August 9 using rod and reel, with no daily harvest or possession limit; take salmon by gillnet in Black Lake or any tributary to Black or Chignik lakes; or, take salmon in Clark River or Home Creek by any gear including handline (U.S. Fish and Wildlife Service 2013:47). In 2016, there were only three federal permits issued to residents of the Chignik Area (Jon Gerken, Branch Chief–Fisheries, U.S. Fish and Wildlife Service, Anchorage, personal communication).

Alaska Peninsula Area

The Alaska Peninsula Area comprises several districts located both north and south of the Alaska Peninsula (5 AAC 09.100 and 5 AAC 09.200), and also waters of the Aleutian Islands west of Unimak Island and east of a neighboring salmon management area (Atka-Amlia) (Figure 1-2).[13] Local subsistence fishing opportunities for Port Heiden households fall on the northern portion of the Alaska Peninsula Area, which includes the waters from Cape Menshikof west to Cape Sarichef (Fall et al. 2019:142). Between the Alaska Peninsula Area and the Bristol Bay Area (also referred to as Area T) is an overlap area. The overlap area was created shortly after statehood to allow Area T commercial salmon permit holders the opportunity to harvest salmon from their traditional fishing locations in Area M nearby the communities of Port Heiden and Pilot Point (Johnson and Murphy 2017:1–2). The BOF adopted a positive C&T finding for salmon in the Alaska Peninsula Area in 1993 and in study year 2016 there was an ANS of 34,000–56,000 salmon (5 AAC 01.416).[14]

Subsistence fishers must obtain a household permit (Figure 1-4); the permit allows for a harvest of 250 salmon per household, and a permit holder may request and obtain an additional permit from the department (5 AAC 01.430). Permits must be filled out to record subsistence harvests and returned to ADF&G by October 31. New permits are mailed annually to fishers who return their permits and permits may be requested from ADF&G offices in person or by phone. Permit vendors are not located in every community

11. *Commercial Fishery Announcements (Includes Subsistence and Personal Use)*, s.v. "Management Area: Chignik; District: All Districts; Species: Salmon; Gear: All Gear Classes; Fishery Type: Subsistence; Effective Year: 2016" (by Alaska Department of Fish and Game), https://www.adfg.alaska.gov/index.cfm?adfg=cfnews.search (accessed November 2019).
12. Federal Register 78, no. 61 (March 29, 2013): 19107–19125: https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07198.pdf (accessed November 2019).
13. Alaska Department of Fish and Game, "Commercial Fisheries Overview: Alaska Peninsula Management Area," http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareaakpeninsula.main, (accessed November 2019).
14. The ANS in 5 AAC 01.416 was last amended June 4, 2004 (Register 170) according to a note in the online Alaska Administrative Code: http://www.akleg.gov/basis/aac.asp (accessed November 2019).

SELECTED SUBSISTENCE REGULATIONS

These listed regulations are not inclusive of all the regulations that apply to subsistence salmon fishing in the Alaska Peninsula Area.

5 AAC 01.430. LIMITS TO NUMBER OF SALMON TAKEN: 250 salmon per household, unless otherwise specified by a local representative of the department. Additional household permits are available by request from the local ADF&G representative.

5 AAC 01.420. LIMITS TO GEAR USED TO TAKE SALMON: Salmon may be taken by seine or gillnet. No set gillnet may exceed 100 fathoms in length. No drift gillnet may exceed 200 fathoms in length. In areas open to commercial salmon fishing, salmon can only be taken with gillnets of not more than 50 fathoms in aggregate length.

5 AAC 01.427. IDENTIFICATION OF GILLNET GEAR: A buoy at one end of any gillnet must be plainly and legibly marked with the operator's first initial, last name, and mailing address of the permit holder or the vessel's ADF&G number.

5 AAC 01.410. FISHING SEASONS: Salmon may be taken at any time except as follows:

1. In those districts and sections open to commercial salmon fishing, salmon may not be taken by a commercial salmon fishing permit holder within 24 hours before and within 12 hours following a commercial salmon fishing period.
2. As otherwise specified on a subsistence fishing permit; and
3. In the waters closed to subsistence fishing for salmon specified in 5 AAC 01.425.

Exceptions to this rule are listed under EXCEPTIONS 1 and 2 below or as listed on an amended permit.

5 AAC 01.423. SPECIAL PROVISIONS:

1. Mortensens Lagoon: (Mortensens Lagoon and waters within 500 yards of the Mortensens Lagoon terminus only). Salmon may be taken at any time, however the following restrictions apply:
   - A. Subsistence gear is restricted to gillnets of 15 fathoms or less in length.
   - B. No more than 50 salmon per permit per season may be taken from Mortensens Lagoon or within 500 yards of the lagoon terminus.
2. False Pass vicinity: That portion of Bechevin Bay and Isanotski Strait bounded by the latitude of Morzhovoi Village (54°54.58' N lat.) and the latitude of Whirl Point (54°49.50' N lat.). Salmon may be taken at any time using gillnets of 50 fathoms or less in length.
3. Fresh waters of Bear River: Salmon may be taken at anytime upstream from the confluence of the Milky River, also known as the Mad Sow River (a tributary of the Bear River) with gear specified on the subsistence permit.
4. Fresh waters of Sandy River: Salmon may be taken at anytime upstream from the Sandy River (oil exploration) aircraft landing strip located five (5) miles (upriver) of the stream terminus, with gear specified on the subsistence permit.

5 AAC 01.425. WATERS CLOSED TO SUBSISTENCE SALMON FISHING:

1. Russell Creek and Nurse Lagoon and within 500 yards from the stream terminus of Russell Creek and Nurse Lagoon.
2. Trout Creek and within 500 yards outside its mouth.
3. Inshore of a line from the Trident Seafood's Dock at Sand Point to Black Point (located on the northwestern side of Popof Island), including the inlet and Humboldt Creek.
4. Black Hills Section: all freshwaters and within 500 yards of any anadromous salmon stream terminus.
5. Bear River Section: waters closed to commercial salmon fishing under 5 AAC 09.350 and 5 AAC 39.290 and waters of Frank's Lagoon and King Salmon River, excluding exceptions in Bear and Sandy Rivers listed earlier on this permit.
6. No subsistence fishing is allowed in waters closed to commercial salmon fishing as described under 5 AAC 09.350 or 5 AAC 39.290 during a commercial salmon fishing period. Exceptions to this rule are listed under SPECIAL PROVISIONS 1 and 2 above or as specified on an amended permit.

ADDITIONAL RESTRICTIONS:

1. **No more than half the width of a stream or its mouth may by obstructed by a net.** This restriction includes blocking the stream mouth while "roundhauling."
2. The operator must be in proximity of his or her gear at all times.
3. **Salmon may not be taken by sport fishing methods while taking subsistence salmon** with a net and you may not **be in possession of sport caught and subsistence caught salmon at the same time.**
4. Subsistence fishing gear may at no time be used within 100 feet of another set gillnet.
5. Definition of subsistence uses: AS 16.05.940(33) subsistence uses means the noncommercial, customary and traditional uses of wild, renewable resources.

Return permit by October 31, 2016 to: Alaska Department of Fish and Game, Alaska Peninsula Salmon Management, 351 Research Court, Kodiak AK 99615. Questions or concerns please contact your local Fish and Game Office: Cold Bay (907) 532-2419; Sand Point (907) 383-2066; Port Moller (907) 375-2716; Kodiak (907) 486-1882.

Figure 1-4.–Alaska Peninsula Area subsistence salmon permit (back page only).

of the management area and Port Heiden households have to get their permits by contacting ADF&G, Division of Commercial Fisheries, in Kodiak, or seasonally through ADF&G offices in Sand Point, Cold Bay, and Port Moller (Fox et al. 2019:12).

A subsistence salmon permit holder who does not hold a commercial salmon fishing license may subsistence fish for salmon at any time unless there are restrictions on the permit[15] (5 AAC 01.410). However, there are waters identified in 5 AAC 01.425 that are always closed to subsistence fishing. In those waters of the Alaska Peninsula Area that are open to commercial salmon fishing, a commercial salmon fishing permit holder may not subsistence fish for salmon during the 24 hours before a commercial fishing period, or the 12 hours following the closure of a commercial fishing period (5 AAC 01.410). Subsistence salmon may only be taken by seine or gillnet while following the net length, net depth, mesh size, and net placement restrictions that are specified on both the subsistence permit and in 5 AAC 01.420 and 5 AAC 01.423. In 2016 there were no subsistence fishery emergency orders for the Alaska Peninsula Area.[16]

Federal subsistence fisheries are authorized in portions of the Alaska Peninsula Area for residents of the Alaska Peninsula. Federal regulations in this area apply to waters within and inland waters adjacent to the Izembeck National Wildlife Refuge, Alaska Peninsula National Wildlife Refuge, Alaska Maritime National Wildlife Refuge, and Aniakchak National Monument and Preserve (U.S. Fish and Wildlife Service, Office of Subsistence Management 2019). Federal regulations governing subsistence salmon fishing in waters under the jurisdiction of the Federal Subsistence Board are generally identical to the state regulations summarized above, with the exception that in addition to gillnet and seine, rod and reel, handline, spear, bow and arrow, and bare hand capture are all legal subsistence gear under federal rules for federally qualified rural residents (Fall et al. 2019:142). There is no separate federal subsistence permit; a state permit is required for subsistence fishing under the federal regulations.

Bristol Bay Area

The Bristol Bay area comprises all waters of Bristol Bay including drainages enclosed by a line from Cape Newenham to Cape Menshikof. Districts within Bristol Bay are described in 5 AAC 06.200 (Figure 1-2). The only study community in the Bristol Bay Area is Egegik, located on the northern portion of the Alaska Peninsula. The BOF has made a positive C&T determination for all finfish in the Bristol Bay Area and has also determined that 157,000–172,171 salmon are reasonably necessary for subsistence uses (5 AAC 01.336).

A permit is required to harvest salmon for subsistence purposes in Bristol Bay, and only one permit may be issued to a household per year (5 AAC 01.330) (see Figure 1-5). Permits are available through local vendors, or area ADF&G offices, or the Anchorage ADF&G office. In the Bristol Bay Area, the subsistence regulations are specific to different areas and are varied; however, regulations that are most relevant to Egegik households are summarized here. There are no bag or possession limits for the harvest of salmon under a subsistence permit except in the Naknek District (5 AAC 01.345(a)). In the waters around Egegik, subsistence fishers were limited to the use of set and drift gillnets (5 AAC 01.320(a)); note that set gillnets could not exceed 10 fathoms in length in the Egegik River (5 AAC 01.320(c)(1)(A)). Unless closed by emergency order, restricted in 5 AAC 01.310 or 5 AAC 01.325, or restricted by the terms of a subsistence permit, subsistence salmon fishing is open in the Bristol Bay Area. Within commercial salmon districts, generally subsistence fishing is limited by time: during the months of May and October, subsistence fishing is permitted from 9:00 am Monday to 9:00 am Friday, and between June 1 and September 30 subsistence fishing may only occur during open commercial fishing periods (5 AAC 01.310(b)). Additionally, some waters of the Bristol Bay Area are closed to subsistence fishing by regulations; some closures are related to

15. The subsistence salmon permit for 2016 did not restrict the times that a permit holder could subsistence fish, but did require a net operator be in proximity to subsistence fishing gear at all times (see Figure 1-4).

16. *Commercial Fishery Announcements (Includes Subsistence and Personal Use)*, s.v. “Management Area: Alaska Peninsula; District: All Districts; Species: Salmon; Gear: All Gear Classes; Fishery Type: Subsistence; Effective Year: 2016” (by Alaska Department of Fish and Game), https://www.adfg.alaska.gov/index.cfm?adfg=cfnews.search (accessed December 2019).

Alaska Department of Fish & Game

Bristol Bay Subsistence Salmon Fishery Permit

ALASKA RESIDENTS ONLY

Community ______________

Permit No. ______________

Year ______________

First Name | Initial | Last Name

Permanent Mailing Address | City

State | Zip Code | Phone number

Number of year-round residents in household ▶

Names of household members who will assist in operation of subsistence net:

1. ______________ 2. ______________ 3. ______________

4. ______________ 5. ______________ 6. ______________

Drainage to be fished: Naknek ☐ Kvichak ☐ Egegik ☐ Ugashik ☐

Nushagak ☐ Togiak ☐ Other ______________

Primary fishing location (specific): ______________

Number of fathoms allowed at this site: 10 ☐ 25 ☐ Gear type: ______________

Please specify set gear, drift gear, spear, or dip net.

I understand that I 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.

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 calendar year of ______________ according to current laws and regulations of the State of Alaska.

Authorizing Officer ______________ Date ______________

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 when the permit expires. Failure to return subsistence catch records is grounds for denial of future permit privileges.

NOTE: Commercially-caught salmon may also be utilized for subsistence purposes and must be reported on the back of this form as well as a Commercial Fish ticket.

Return form to: (fax) 907-267-2450/ (email) dfg.sub.permits@alaska.gov/ or
Division of Subsistence, ADF&G, 333 Raspberry Rd, Anchorage, AK 99518

Figure 1-5.–Alaska Peninsula Area subsistence salmon permit (back page only).

Figure 1-5.–Page 2 of 2.

DAILY SUBSISTENCE SALMON CATCH TOTALS

Please record the dates and locations fished.

Please report spawned-out (red fish) by date and location in the "red" column.

Community __________

Permit No. __________

Year __________

DID NOT FISH ☐ **NAME** ____________________

Date	Specific location	Method*	Red	King	Chum	Pink	Coho	Date	Specific location	Method*	Red	King	Chum	Pink	Coho

What was your total SUBSISTENCE harvest? ▶

TOTAL SUBSISTENCE HARVEST

Red	King	Chum	Pink	Coho

Did you COMMERCIAL fish? YES ☐ **or NO** ☐

Record additional salmon taken from the COMMERCIAL CATCH for home use here: ▶

TOTAL SALMON RETAINED FROM COMMERCIAL CATCH FOR SUBSISTENCE USE

Red	King	Chum	Pink	Coho

location, season, gear type used, or a combination of those factors (5 AAC 01.325). In 2016 there were no subsistence fishery emergency orders for the Egegik District in the Bristol Bay Area.[17]

Federal subsistence fisheries are authorized in portions of Bristol Bay for federally qualified subsistence users. Federal regulations apply to waters within or adjacent to the Togiak National Wildlife Refuge, Becharof National Wildlife Refuge, Alaska Peninsula National Wildlife Refuge, Alagnak Wild and Scenic River corridor, Katmai National Preserve (but not Park), and Lake Clark National Park and Preserve (U.S. Fish and Wildlife Service, Office of Subsistence Management 2019). There is no separate federal subsistence permit; a state permit is required for subsistence fishing under the federal regulations. In the federal waters around Egegik, there is no harvest limit for salmon. Salmon fishing may occur under federal regulations year-round, except, in the Egegik River, fishing periods are restricted to 9:00 am Tuesday to 9:00 am Wednesday and 9:00 am Saturday to 9:00 am Sunday between June 23 and July 17.

Large Land Mammals

Caribou, in particular the Northern Alaska Peninsula caribou herd (located in Game Management Units 9C and 9E), has historically been the most widely used and harvested large land mammal species in the study communities (Fall 1993). Subsistence caribou harvest areas for the study communities have historically been found from around the community of Perryville north toward the Naknek River drainage (Fall 1993). Spatial data collected by the division in 1981 and 1982 show that each community or group of communities used fairly distinct areas for caribou hunting (Fall 1993:5). While it is not the intent of this report to provide detailed historical population trends for this herd, the population of the Northern Alaska Peninsula caribou herd and subsequent hunting regulation changes are important facets to the hunting opportunities available to residents in the study communities and are therefore covered briefly. Historical herd data indicate that the herd has most recently peaked around 20,000 animals in 1984 (Doherty 2015; Hicks 1997). Subsequent large declines in the herd occurred as a result of several factors, including hunting pressure and a shared habitat with the Mulchatna caribou herd (Doherty 2015; Hicks 1997). By 1993 the herd declined to below harvest management goal levels (Doherty 2015); this development affected the local resource harvest opportunity for residents in the study communities. In March 1999, the Alaska Board of Game reviewed the status of the herd and initiated a Tier II[18] permit hunt (Hicks 1997). As a result of continued herd decline, in 2005 both the state and federal hunts closed. The caribou population fell to a low of 2,000 animals in 2006 (Hicks 1997). Over the next decade measures were implemented to help rebound the herd, and in regulatory year 2016–2017 (the year of this study) the herd increased to the point that 198 Tier II permits were issued.[19] Regulations currently allow for three Tier II permits per household, and no individual may hold more than one Tier II permit per species (Doherty 2015).

State of Alaska regulations, including open seasons, permit requirements, and game limits for other large land mammal species relevant to the study communities can be found in the annually published hunting regulations; the current regulatory year is available at ADF&G offices or online.[20] Federal regulations and

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17. *Commercial Fishery Announcements (Includes Subsistence and Personal Use)*, s.v. "Management Area: Bristol Bay; District: Egegik; Species: Salmon; Gear: All Gear Classes; Fishery Type: Subsistence; Effective Year: 2016" (by Alaska Department of Fish and Game), https://www.adfg.alaska.gov/index.cfm?adfg=cfnews.search (accessed December 2019).

18. State Tier II hunts are held when there is not enough of a game population with customary and traditional uses to provide a reasonable opportunity for subsistence uses. Hunters must answer questions on an application concerning their dependence on the game for their livelihood and availability of alternative resources. Applications are scored based on responses to the questionnaire and permits are issued to those with the highest scores.

19. *Caribou Hunting in Alaska: Harvest Statistics*, s.v. "[Year] 2016; [Hunt] Tier II; Hunt # TC505" (by Alaska Department of Fish and Game), http://www.adfg.alaska.gov/index.cfm?adfg=caribouhunting.harvest (accessed November 2019).

20. Alaska Department of Fish and Game, "Alaska Hunting Regulations: Hunting Regulations Book," http://www.adfg.alaska.gov/index.cfm?adfg=wildliferegulations.hunting (accessed September 24, 2019).

other information about hunting on federal lands can be found in the biannual federal wildlife regulations booklet, which is also available online.[21]

Study Objectives

The project had the following objectives:

- Estimate the harvest and use of salmon by residents of Chignik Bay, Chignik Lake, Chignik Lagoon, Egegik, Perryville, and Port Heiden.[22]
- Describe the harvest of salmon in terms of species, gear, location, timing of harvests, and distribution patterns.
- Through harvest surveys and key respondent interviews illustrate the sharing networks within each community, across the broader region, and throughout Alaska.

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*[23] and by the National Science Foundation, Office of Polar Programs in its *Principles for the Conduct of Research in the Arctic*[24], 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 study was a collaboration among the Division of Subsistence; BBNA; and Oregon State University (OSU), Department of Anthropology (Table 1-1). Individuals from each of the entities had collaborated on previous research and realized the 2016 FRMP funding opportunity provided an avenue to further investigate questions that had arisen during previous work. BBNA and Division of Subsistence made initial contact with the proposed study communities and regional organizations to gauge interest in participating in or supporting the project. Initial letters of support for the proposal were received by the Chignik Lake Tribal Council, ADF&G Chignik Advisory Committee, and BBNA (see Appendix A). Informal support for the project was offered by the other proposed study communities. Once the project began, scoping meetings to describe project information were held in each study community in either November 2016 or December 2016 (Table 1-2). Project overview presentations were made by staff from both the Division of Subsistence and BBNA, and resolutions or letters of support approving the project and fieldwork were obtained from each community (see Appendix A). Cooperative agreements were signed with BBNA and OSU (see Appendix B). BBNA collaborated with ADF&G in all study communities to conduct scoping meetings, administer household harvest surveys, conduct community review meetings, and write the final report. OSU collaborated with ADF&G in all aspects mentioned above as well, except for the community scoping meetings. In addition, OSU helped Division of Subsistence staff to design the survey form, contributing most to the design of social network data questions. OSU also analyzed the household social network data.

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21. U.S. Department of the Interior, Federal Subsistence Management Program, "Wildlife," https://www.doi.gov/subsistence/wildlife (accessed September 24, 2019).
22. Although Chignik Bay was not part of the original study funded by the USFWS, after funding for this proposal was granted, division researchers working in the area on other projects were able to consolidate fieldwork and add Chignik Bay to the study.
23. Alaska Federation of Natives. 2013. "Alaska Federation of Natives Guidelines for Research." Alaska Native Knowledge Network. http://www.ankn.uaf.edu/IKS/afnguide.html (accessed March 2015).
24. National Science Foundation Interagency Social Science Task Force. 2012. "Principles for the Conduct of Research in the Arctic." http://www.nsf.gov/od/opp/arctic/conduct.jsp (accessed March 2015).

Table 1-1.–Project staff.

Task	Name	Organization
Southern Regional Program Manager	Brian Davis	ADF&G Division of Subsistence
	Robin Dublin	ADF&G Division of Subsistence
Principal Investigators	Amy Wiita	ADF&G Division of Subsistence
	Drew Gerkey	Anthropology, School of Language, Culture and Society, Oregon State University
	Cody Larson	Bristol Bay Native Association
Data Management Lead	David Koster	ADF&G Division of Subsistence
Administrative support	Jennifer Severence	ADF&G Small Division Administrative Services
	Tracy Ivory Grasty	ADF&G Small Division Administrative Services
	Zayleen Kalalo	ADF&G Division of Subsistence
Programmer	Margaret Cunningham	ADF&G Division of Subsistence
	David Koster	ADF&G Division of Subsistence
Data entry	Alexzandra DePue	ADF&G Division of Subsistence
	Anna Petersen	ADF&G Division of Subsistence
	Lehua Otto	ADF&G Division of Subsistence
	Zayleen Kalalo	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
	Gayle Neufeld	ADF&G Division of Subsistence
Editorial Review Lead	Mary Lamb	ADF&G Division of Subsistence
Produciton Lead	Mary Lamb	ADF&G Division of Subsistence
Field Research Staff	Drew Gerkey	Anthropology, School of Language, Culture and Society, Oregon State University
	Lisa Hutchinson-Scarbrough	ADF&G Division of Subsistence
	Cody Larson	Bristol Bay Native Association
	Shane Scaggs	Anthropology, School of Language, Culture and Society, Oregon State University
	Amy Wiita	ADF&G Division of Subsistence
Local Research Assistants	Billy Anderson	Chignik Bay
	Angela Daugherty	Chignik Bay
	Melissa Stangel	Chignik Bay
	Hanna Overton	Chignik Lagoon
	Alvin Pedersen	Chignik Lagoon
	Justin Smith	Chignik Lagoon
	Jarin Lind	Chignik Lake
	Mitchell Lind	Chignik Lake
	William Lind III	Chignik Lake
	Taylor Lind	Perryville
	Daniel Kosbruk	Perryville
	Victoria Tague	Perryville
	Richard Alto	Egegik
	Anthony Chernikoff	Egegik
	Charles Clayton	Egegik
	Celestee Christensen	Port Heiden
	Evan Kosbruk	Port Heiden
	Jamie Matson	Port Heiden

Table 1-2.–Community scoping meetings, study communities, 2016.

		Attendance	
Community	Date	Community residents	Project staff
Chignik Bay	November 14, 2016	12	2
Chignik Lagoon	November 11, 2016	6	3
Chignik Lake	November 15, 2016	8	2
Perryville	November 13, 2016	8	3
Port Heiden	November 10, 2016	10	3
Egegik	December 15, 2016	5	3

Systematic Household Surveys

The primary method for collecting subsistence harvest and use information in this project was a systematic household survey. Appendix C is an example of the survey instrument used in this project. The survey instrument for this project was developed in coordination with the project partners and a general overview of the questions that would be asked was presented at the scoping meetings for community review and input. Since there was interest by the National Park Service in potentially funding a project about uses and harvests of large land mammals in the area, permission to include large land mammal harvest and use questions on the survey form was requested during the community scoping meetings held in November and December 2016, after which the letters in support of the project, including the large land mammals section, were obtained from the tribal or village council in each of the study communities (Appendix A). As discussed earlier, this project capitalized upon fieldwork already being conducted in several of the proposed study communities, which allowed the community of Chignik Bay to be included in this study. Following receipt of comments at the scoping meetings, ADF&G and OSU finalized the survey instrument for the three Chignik and Perryville study communities in February 2017; the slightly modified survey instrument used in Egegik and Port Heiden was finalized in March 2017. To continue addressing the objectives of the overlapping studies, questions were included in the survey instrument addressing the date of harvest and the spawning condition[25] of harvested salmon; and, in all communities but Egegik and Port Heiden, assessment questions specific to the early and late runs of sockeye salmon were asked.

A key goal was to structure the survey instrument to collect demographic and salmon resource harvest (including by gear type) and use data that are comparable with information collected in other household surveys in the study communities and with data in the Division of Subsistence Community Subsistence Information System (CSIS[26]). Household salmon harvests were collected by number of salmon harvested. Estimated salmon harvests by study community households are reported in numbers of salmon and in pounds usable weight; the estimates include resources harvested by any member of the surveyed households during the study year. “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 given by fishing guides and non-local fishers. Additionally, the household survey included a series of questions regarding stock health, salmon behavior, and escapement for different salmon species and runs—early-run “bright” sockeye salmon, late-run “redfish/spawnout” sockeye[27] salmon, Chinook (king) salmon, and other salmon (pink, coho, and chum salmon combined)—as well as salmon use and harvest effort changes over time, and assessments of resource sufficiency for home use. The survey form was also used

25. The spawning condition of harvested salmon options were “bright,” “red or spawning,” “spawned-out or redfish,” and “unknown.”

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

27. Note that only in Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville did household surveys ask respondents to assess sockeye salmon stock health and behavior for the early run and the late run separately.

to collect information about the social networks of shared salmon resources in Bristol Bay and Chignik communities. The sharing network questions asked about different kinds of exchanges—customary trade, barter, and sharing—within specific social networks within each community, across the broader region, and throughout Alaska. Furthermore, as discussed above, questions concerning large land mammal harvests and uses were added to the survey at the request of the National Park Service, although project funding did not materialize. However, responses to these questions were analyzed and, similarly to salmon harvest results, estimated harvests are presented in this report in numbers of animals harvested and in pounds usable weight. This report also presents results for survey questions about use and harvest effort changes over time for large land mammals and assessments of resource sufficiency for home use. Finally, the last page of the survey form provided respondents an opportunity to provide additional comments or observations about local resources, resource management, or general concerns; likewise, researchers took notes as surveys were executed to record valuable qualitative information gathered during a survey.

Each community in the study was defined using U.S. Census Bureau boundaries. Eligible households were defined as those living within the community for at least three months in 2016. A census was attempted for each community. During the survey effort for all communities a disposition was applied to each residence that researchers attempted to contact. The disposition categories included:

- Contains residents that are eligible to participate in the survey based on length of residency (survey attempted).
- Household occupants are nonresident based on minimum length of residency (less than three months).

If researchers were initially unsuccessful at making contact with an eligible household, at least 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. Sample achievement ranged from 70% of households interviewed in Perryville to 95% of households interviewed in Egegik (Table 1-3). Refusal rates of households declining to participate in the survey ranged from 0% in Egegik to 21% in Perryville. For a household to complete a survey it took from a minimum of 4 minutes to a maximum of 2 hours and 24 minutes (Table 1-4). An average survey lasted from 25 minutes in Egegik to 50 minutes in Port Heiden.

Mapping Locations of Subsistence Salmon Fishing

During household interviews, the researchers asked respondents to indicate the locations of their salmon fishing and large land mammals hunting activities during the study year. Harvest locations and fishing and hunting areas were documented on iPads using the Collector application (ESRI, or Environmental Systems Research Institute) customized for Division of Subsistence data collection needs.[28] ADF&G staff established a standard mapping method. Points (and occasionally lines) were used to mark salmon fishing and harvest locations and polygons were used to indicate hunting areas for large land mammals. The point, line, or polygon 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 input, an attribute box was filled out by the researcher that noted the species harvested, the amounts harvested, month(s) of harvest, how the harvest area was accessed, and harvest method.[29] Once data collection was complete, the data were uploaded through ArcGIS Online to the ESRI cloud server for storage.

28. Product names are given because they are established standards for the State of Alaska or for scientific completeness; they do not constitute product endorsement.
29. The harvest method was "hunting" for large land mammals; for salmon, the harvest methods were seine, rod and reel, gillnetting, or jigging. Note that jigging is a fishing method used with equipment such as rod and reel or handline. Also, respondents were not asked to identify where commercial harvests retained for home use came from.

Table 1-3.–Sample achievement, study communities, 2016.

	Community					
Sample information	Chignik Bay	Chignik Lagoon	Chignik Lake	Perryville	Port Heiden	Egegik
Number of dwelling units	26	25	26	39	43	22
Interview goal	27	26	33	37	39	21
Households interviewed	24	20	28	26	29	20
Households failed to be contacted	2	5	4	4	5	1
Households declined to be interviewed	1	1	1	7	5	0
Households moved or occupied by nonresident	4	0	2	8	4	3
Total households attempted to be interviewed	27	26	33	37	39	21
Refusal rate	4.0%	4.8%	3.4%	21.2%	14.7%	0.0%
Final estimate of permanent households	27	26	33	37	39	21
Percentage of total households interviewed	88.9%	76.9%	84.8%	70.3%	74.4%	95.2%
Interview weighting factor	1.13	1.30	1.18	1.42	1.34	1.05
Sampled population	68	55	84	77	78	37
Estimated population	76.5	71.5	99.0	109.6	104.9	38.9

Source ADF&G Division of Subsistence household surveys, 2017.

Table 1-4.–Survey duration, study communities, 2016.

	Interview length (in minutes)		
Community	Average	Minimum	Maximum
Chignik Bay	39	8	130
Chignik Lagoon	44	12	105
Chignik Lake	41	10	112
Egegik	25	4	73
Perryville	41	8	85
Port Heiden	50	5	144

Source ADF&G Division of Subsistence household surveys, 2017.

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 before the surveys were submitted to the Information Management section at the Division of Subsistence. Once the data had been uploaded, researchers also verified that the household data were logged into the server.

Household Survey Implementation

Chignik Bay

Staff from ADF&G and BBNA traveled to Chignik Bay on November 14, 2016, to hold a community scoping meeting about the proposed work. Informational flyers were distributed in the community prior to the meeting. Approval for the project was granted and the Chignik Bay Tribal Council passed a resolution in support on January 3, 2017. From February 14–17, 2017, two researchers from ADF&G Division of Subsistence, two researchers from OSU, and one researcher from BBNA conducted fieldwork in Chignik Bay. Training with three local research assistants (LRAs) was conducted on February 15, 2017. Four researchers each worked with an LRA to contact the households and conduct the household surveys and harvest mapping. Though there was inclement weather, including a snowstorm, that occurred during this time, this did not hinder the research efforts. During the 4 days of fieldwork, 25 of the 27 households were contacted for a survey; 1 household declined to participate (Table 1-3).

Chignik Lagoon

Staff from ADF&G and BBNA traveled to Chignik Lagoon on November 11, 2016, to hold a community scoping meeting about the proposed work. Informational flyers were distributed in the community prior to the meeting. Approval for the project was granted and the Chignik Lagoon Village Council passed a resolution in support on the same day. From February 17–20, 2017, two researchers from ADF&G Division of Subsistence, two researchers from OSU, and one researcher from BBNA conducted fieldwork in Chignik Lagoon. Training with three LRAs was conducted on February 18, 2017. Four researchers each worked with an LRA to contact the households and conduct the household surveys and harvest mapping. During the 4 days of fieldwork, 21 of the 26 households were contacted for a survey; 1 household declined to participate (Table 1-3).

Chignik Lake

Staff from ADF&G and BBNA traveled to Chignik Lake on November 15, 2016, to hold a community scoping meeting about the proposed work. Informational flyers were distributed in the community prior to the meeting. Approval for the project was granted and the Chignik Lake Traditional Council passed a resolution in support on January 8, 2017. From February 11–14, 2017, two researchers from ADF&G Division of Subsistence, two researchers from OSU, and one researcher from BBNA conducted fieldwork in Chignik Lake. Training with three LRAs was conducted on February 12, 2017. Four researchers each worked with an LRA to contact the households and conduct the household surveys and harvest mapping. During the 4 days of fieldwork, 29 of the 33 households were contacted for a survey; 1 household declined to participate (Table 1-3).

Perryville

Staff from ADF&G and BBNA traveled to Perryville on November 13, 2016, to hold a community scoping meeting about the proposed work. Informational flyers were distributed in the community prior to the meeting. Approval for the project was granted and the Native Village of Perryville passed a resolution in support on November 14, 2016. From February 6–11, 2017, two researchers from ADF&G Division of Subsistence, two researchers from OSU, and one researcher from BBNA conducted fieldwork in Perryville. This was the first community where the survey was conducted, so staff met on February 6, 2017, to review the survey form and to ensure everyone was clear about how to ask questions on the survey form and how to properly record the data. Training with three LRAs was conducted on February 7, 2017, and surveys were conducted from February 8–11, 2017. Four researchers each worked with an LRA to contact the households and conduct the household surveys and harvest mapping. During the 6 days of fieldwork, 33 of the 37 households were contacted for a survey; 7 households declined to participate (Table 1-3).

Port Heiden

Staff from ADF&G and BBNA traveled to Port Heiden on November 10, 2016, to hold a community scoping meeting about the proposed work. Informational flyers were distributed in the community prior to the meeting. Approval for the project was granted and the Native Council of Port Heiden passed a resolution in support on February 6, 2017. From March 6–10, 2017, one researcher each from ADF&G Division of Subsistence, OSU, and BBNA conducted fieldwork in Port Heiden. Training with three LRAs was conducted on March 7, 2017. Three researchers each worked with an LRA to contact the households and conduct the household surveys and harvest mapping. For respondents who did not wish to conduct the survey in their home, a room in a community building was made available. During the 5 days of fieldwork, 34 of the 39 households were contacted for a survey; 5 households declined to participate (Table 1-3).

Egegik

Staff from ADF&G and BBNA traveled to Egegik on December 15, 2016, to hold a community scoping meeting about the proposed work. Informational flyers were distributed in the community prior to the meeting. Approval for the project was granted and the Egegik Village Tribal Council passed a resolution in support on December 16, 2016. From March 11–14, 2017, one researcher each from ADF&G Division of Subsistence, OSU, and BBNA conducted fieldwork in Egegik. Training with three LRAs was conducted on March 12, 2017. Three researchers each worked with an LRA to contact the households and conduct the household surveys and harvest mapping. During the 4 days of fieldwork, 20 of the 21 households were contacted for a survey; no households declined to participate (Table 1-3).

Key Respondent Interviews

While researchers were in the study communities they consulted with the tribal governments and LRAs to identify key respondents to interview. The purpose of the key respondent interviews was to provide additional context for the quantitative data focusing on salmon resource sharing and networks. To guide the key respondents, researchers administered the interviews using a pre-designed key respondent interview protocol designed by ADF&G researcher Amy Wiita (Appendix D). The interviews were conducted in an open-ended and semi-structured format. A total of 32 study community members participated in key respondent interviews; 24 total interview sessions occurred because some of the key respondents participated in the interviews together. In Chignik Lagoon, eight persons participated, in Chignik Lake six persons participated, in both Chignik Bay and Perryville five persons participated, and in both Egegik and Port Heiden four persons participated. The interviews were conducted with a variety of respondents representing different age and gender groups, but all respondents were active and knowledgeable about subsistence harvesting, resource uses, and sharing. Interviews were conducted generally by one or two project staff without the assistance of an LRA. Most interviews were audio recorded with the permission of the respondent and later transcribed verbatim. Four respondents did not give consent to be audio recorded and the information they provided was recorded by handwritten notes and included in the data analysis effort. In addition to investigating salmon resource sharing networks broadly, the interview protocol addressed themes such as household and individual participation in salmon harvesting and processing, observed changes in sharing, and discussion of local and non-local sharing. In addition to gathering qualitative data through the key respondent interview protocol, ADF&G staff took notes to provide additional context for this report. Researchers analyzed key respondent interviews and interview notes in preparation for this report. Key respondents were informed that, to maintain anonymity, their names would not be included in this report. Key respondents received a small stipend to thank them for their contributions to the project and sharing their knowledge.

Data Analysis and Review

Survey Data Entry and Analysis

Surveys were coded for data entry by research staff and reviewed by project lead Wiita 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 a 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 animals 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 a SD, V, and SE:

$$CL\%(\pm) = \frac{t\alpha/_2 \times \frac{s}{\sqrt{n}} \times \sqrt{\frac{N-n}{N-1}}}{\bar{x}} \tag{3}$$

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 all year-round households in each study community. For this study, "year-round" was defined as being domiciled in the community when the surveys took place and for at least three months as their principal place of residence during the study year 2016. 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 (U.S. Census Bureau 2011), the U.S. Census Bureau's American Community Survey (U.S. Census Bureau n.d.), and the Alaska Department of Labor and Workforce Development (Alaska Department of Labor and Workforce Development 2018). Sampling of households, timing of the survey, or eligibility criteria for inclusion in the survey, may explain differences in the population estimates.

Map Data Entry and Analysis

As discussed previously, maps were generated only for salmon based on data collected using an iPad, and the spatial data from mapping hunting and harvest areas for large land mammals may be available by request. Map features were matched to the survey form to ensure that all harvest data were recorded accurately. Once all data were uploaded to the ESRI cloud server, ADF&G Information Management staff created salmon search and harvest location maps in ArcGIS 10.6.1 using a standard template for reports. Although each household survey included a mapping component, not every household shared fishing and harvest locations with researchers; as such, the legend for each map contains a specific sample size in relation to the total sample achieved in the community for spatial data collection. Each map is a partial representation of areas used for salmon fishing and harvesting in 2016. Maps depict salmon search and harvest areas at the community level by species. Again, due to spatial data sample achievement differing from household survey sample achievement, not all the harvested species based on household survey results are depicted on a map; as such, map legends identify locations by species. There are also maps that depict locations by harvest method. Spatial data for jigging and rod and reel fishing were combined, meaning locations by method "rod and reel/jig" may be either rod and reel fishing, or jigging by rod and reel or handline, or a combination of both.

To ensure confidentiality the maps produced for the report do not distinguish between overall search areas and specific harvest locations. Maps were reviewed at a community review meeting in each community to ensure accuracy as well as to identify data the community would like to keep confidential.

Social Network Analysis

The household surveys administered in this project featured three modules designed to collect data on social networks involved in subsistence salmon harvests. The first module focused on local networks, which form when households within each study community harvest, process, or share subsistence salmon with one another. The survey questions used to document these local networks closely follow social network modules used extensively in previous projects by ADF&G. The second and third modules were developed specifically for this project. The second module focused on non-local networks, formed when households in the study communities give salmon to or receive salmon from people living in locations outside the study communities. These exchanges are similar in many ways to sharing documented within the community as local networks, but since sharing partners in non-local networks are not included in our survey sample, we collected more extensive information about each exchange, including the amount, units, and frequency, as well as the location of each partner and their relationship with the survey participant. The third module documented customary trade, barter, and exchange of subsistence salmon for other wild resources, cash, labor, and other items of value (trade networks). This module included exchanges that occurred between residents of the study communities, as well as exchanges between study community residents and people living elsewhere. As for non-local networks, follow-up questions were used to collect more information about exchanges in trade networks, including details about the items exchanged and exchange partners.

After data were collected and processed by ADF&G, OSU conducted a social network analysis using the open-source software program R[30] and the companion program RStudio[31] along with a variety of companion packages, including statnet[32], tidyr[33], ggplot2[34], and stargazer[35]. Due to the unique features of the data collected, different analysis techniques were used for each network module. Local networks were described and compared using common measures, including density, components, reciprocity, and transitivity. Analysis of non-local networks focused on describing the overall number of sharing ties and amounts of salmon exchanged, as well as comparing ties and amounts exchanged with people in different locations and across different relationships. Due to the small number of exchanges documented with the trade networks module, these results were reported more generally. Results are presented for all the study communities combined, along with separate sections with results for each study community.

Key Respondent Interviews

Key respondent interviews that were audio recorded were transcribed verbatim. Key respondent interview data were analyzed using inductive coding to identify all prominent themes linked to wild food sharing traditions and networks (Bernard 2011). Final analysis of the qualitative data yielded the following themes: sharing practices; practices of reciprocity; types of resources shared, bartered, and traded; types of equipment shared; sharing with elders and how sharing practices are passed down through the generations;

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Table 1-5.–Community data review meetings, study communities, 2016.

		Attendance		
Community	Date	Community residents	Project staff	Other
Chignik Bay	October 23, 2018	12	4	
Chignik Lagoon	October 29, 2018	6	3	
Chignik Lake	October 27, 2018	3	2	
Chignik Lake	October 29, 2018	12	2	
Perryville	October 27, 2018	12	2	
Port Heiden	October 31, 2018	9	3	2
Egegik	October 22, 2018	11	4	

sharing with nonproductive persons; work ethic; division of labor; cooperation surrounding the harvest and processing of shared subsistence foods; practices of distributing subsistence foods within communities; practices of barter and customary trade; regional sharing networks; long-distance sharing networks; and socioeconomic and technological influences on the evolution of sharing.

Community Review Meetings

ADF&G staff presented preliminary research findings at a meeting in each community. Table 1-5 shows when a community review meeting occurred in each study community and how many community residents attended. Staff from ADF&G (one), BBNA (one), and OSU (two) conducted community review meetings. Following the review meetings in Egegik and Chignik Bay, bad weather caused flight cancelations that grounded the team in Chignik Bay and delayed the schedule for proceeding to the remaining communities. When travel was again possible, the team split up: one staff member each from ADF&G and OSU went to Perryville, and the other OSU staff member joined the BBNA staff member who went to Chignik Lake for the data review meetings. The final data review meetings were held for Chignik Lagoon and Port Heiden: one staff member each from ADF&G, BBNA, and OSU went to both of those meetings. BBNA scheduled the meetings with the communities and provided each community with flyers that were posted to announce the date, location, and subject of the meeting.

In Egegik, the tribal administrator helped arrange the meeting, held on October 22, 2018, in the conference room of the Egegik Village Council building; 11 residents attended this meeting. In Chignik Bay, the tribal administrator helped arrange the meeting, held on October 23, 2018, at the Community Center and it was attended by 12 residents. In Chignik Lagoon, the tribal administrator helped arrange the meeting, held on October 29, 2018, at the subsistence building and it was attended by six residents. Two meetings were held in Chignik Lake: one on October 27, 2018, and one on October 29, 2018. Both meetings were held at the Chignik Lake Traditional Council office. The first meeting was only attended by three residents, so BBNA and OSU staff conducted outreach and organized another meeting that nine adults and three children attended. In Perryville, the Native Village of Perryville's tribal administrator helped arrange the meeting, held October 27, 2018, in the community room of the Katmai building; a dozen residents attended. In Port Heiden, the tribal administrator helped arrange a data review meeting that was held in conjunction with a National Park Service Aniakchak National Monument Subsistence Resource Commission meeting on October 31, 2018. This meeting was held at the community building referred to by residents as "Ray's Place." In addition to one staff member from ADF&G, BBNA, and OSU, there were nine residents who attended and two federal agency staff. At each meeting, researchers used a Microsoft PowerPoint presentation to present draft results of the project that included data from the harvest survey, associated salmon search and harvest area maps, and a discussion of the social network analysis. The meetings were an opportunity for community members to provide feedback about the results, highlight interesting or puzzling findings, and discuss the next steps of the project. Comments received during the review meetings have been incorporated later in the report (see Chapter 3).

Final Report Organization

This report summarizes the results of systematic household surveys and key respondent interviews conducted by staff from ADF&G, BBNA, and OSU with assistance from LRAs, and the report also summarizes resident feedback provided at community review meetings. The findings are organized by subject matter. The next two chapters summarize the results of the harvest and use portions of the surveys and spatial data results. Chapter 2: "Household Survey Results: Background, Demography, and Harvests and Uses" includes tables and figures that report findings, by community, on demographic characteristics, household participation in using and harvesting salmon and large land mammals, salmon search and harvest areas, as well as harvest and use trends over time. Next is a chapter on assessments—changes to household use of salmon and large land mammals, changes to salmon fishing efforts and locations, and observations of local salmon stocks. Chapter 4: "Household Survey Results: Sharing Networks" presents the results of the sharing networks portion of the household harvest survey, organized by type of network as well as by community. Chapter 5: "Ethnography Results: Sharing Networks" looks at the sharing of resources through an analysis of key respondent interviews and is organized by themes. The final chapter of the report provides summaries of patterns of harvests and sharing of salmon as documented in the household surveys and across study years, and of sharing and exchange patterns based on the qualitative key respondent interviews and the quantitative findings from the social network analyses. A discussion follows about challenges and threats to the subsistence way of life as expressed through subsistence harvesting and exchanges of these harvests. Recommendations for supporting resilience and sustainability in the study communities conclude the report's final chapter.

After the report was finalized, ADF&G mailed the report to the tribal or village councils located in each study community and a short (four-page) summary of the project study findings (see Appendix F) were also mailed to each U.S. Post Office boxholder in all of the study communities.

2. HOUSEHOLD SURVEY RESULTS: BACKGROUND, DEMOGRAPHY, AND HARVESTS AND USES

Community Background

Chignik Bay[1]

The community of Chignik, also referred to as Chignik Bay, is located on the south side of the Alaska Peninsula approximately 457 miles southwest of Anchorage. It is situated at the southern end of Chignik Bay at the head of Anchorage Bay (Figure 1-1). The community's backdrop involves a 3,000-foot mountain with the snow-capped Aleutian Range visible to the north. The mountains trap clouds, fog, and moisture, particularly on the Pacific side. Sand and strong winds associated with the region's frequent coastal storms inspired the Alutiiq people to name this community "Chignik" (spelled *cihniq*), which means "big wind" (Crowell et al. 2001).

The first reference to a settlement at Chignik Bay was by Ivan Petroff in 1880. He called it "Kaluiak" and described it as "a small village of about 30 'deer' [caribou] hunters" (Partnow 2001). In 1888, Chignik was established as a fishing community when fish prospectors from the Fisherman's Packing Company of Astoria, Oregon, set up a salmon saltery to prospect for fish (Davis 1986:91). In the 1890s, two canneries—Hume Brothers and Hume Company, and also the Pacific Steam Whaling Company—began operating in Chignik Bay (Tompkins and Meinhardt 2010:10). In 1905, Northwestern Fisheries Company purchased both canneries, but operated out of the Pacific Steam Whaling plant (Himes-Cornell et al. 2013; Morseth 2003:90, 94; Tompkins and Meinhardt 2010:10). Throughout the 20th century through present, numerous canneries and companies have operated out of Chignik Bay. By 2016, Trident Seafoods owned and operated the only remaining fish processing support facility in Chignik Bay. Trident Seafoods operated a shore-based cannery in Chignik Bay until 2008 when it burned down, which has never been rebuilt; however, fish caught during the 2016 salmon season were processed by floating processors that tie up to the docks or anchor in Anchorage Bay.[2, 3]

Early cannery operations attracted immigrant workers from all over the world, including Scandinavia, Italy, China, Mongolia, Hawaii, and the Philippines; it was not until the 1920s that local Alutiiq people were offered employment by the canneries (Partnow 2001; Tompkins and Meinhardt 2010:11). Most individuals living in the Chignik communities today identify themselves as descendants of the unions of Alutiiq people and immigrants from other villages along the coast of the Alaska Peninsula to Kodiak (Davis 1986:89; Partnow 2001:104; Tompkins and Meinhardt 2010:15–20). Since 1888, Chignik Bay has remained a center for commercial fishing and fish processing operations for the Chignik area. The fishing fleet has evolved from small boats and fish traps owned by the canneries to the privately-owned hand and purse seine boats that are in operation today (Himes-Cornell et al. 2013:44–48; Partnow 2001:24; Sepez et al. 2005:301–304; Tompkins and Meinhardt 2010).

The Chignik canneries at one time processed shrimp, king crab, and Tanner crab (Hutchinson-Scarbrough and Fall 1996:7). These fisheries increased the year-round fishing industry activity in Chignik Bay beginning

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1. These study communities have been featured in previously published ADF&G Technical Papers that included a historical community background summary; as such, these community background descriptions draw heavily from the latest ADF&G Technical Paper publication, Hutchinson-Scarbrough et al. (2016), that provided background information for these same study communities.
2. James Halpin, "Update on the Chignik Cannery Fire," *Anchorage Daily News*, July 21, 2008, https://www.adn.com/voices/article/update-chignik-cannery-fire/2008/07/22/, (accessed October 2019).
3. Trident Seafoods Corporation, "Our Story: Our Processing Plants—Chignik," https://www.tridentseafoods.com/our-story/our-plants/ (accessed October 2019).

in the 1970s as Kodiak shrimp and king crab harvests declined, and interest in the Chignik Area increased (Jackson and Ruccio 2003:2). Each of these fisheries peaked in harvest by the late 1970s and began closing to commercial harvest beginning in 1981 (Stichert et al. 2016:10–14). The shrimp and king crab fisheries in the Chignik Area have remained closed and have been classified by ADF&G as severely depressed, and ADF&G has implemented restrictions on subsistence harvests (ADF&G 1999).

The Chignik municipality is part of the Lake and Peninsula borough and school district.[4] Chignik Bay's federally recognized tribe is the Chignik Bay Tribal Council; the tribal government is a member of the non-profit tribal consortium Bristol Bay Native Association (BBNA). The Alaska Native village corporation is Far West, Incorporated, and many tribal members are shareholders with the regional Bristol Bay Native Corporation (BBNC). Chignik Bay also was incorporated as a city in 1983. Chignik Bay maintains an Alutiiq culture and a subsistence way of life. Commercial fishing provides primary cash income.

Chignik Lagoon[1]

The community of Chignik Lagoon is named because of its location on the south shore of Chignik Lagoon. The community is located about 460 miles southwest of Anchorage on the Pacific side of the Alaska Peninsula (Figure 1-1). Wind, fog, rain, and snow are common features of the area's climate.

The community's origins can be traced to Alaska Native (primarily Alutiiq), Scandinavian, and Russian ancestors that moved to the area from nearby Mitrofania and Sutwik Island in the early 1900s (Morris 1987; Partnow 2001). Early accounts by a Russian priest describe a group of "Koniag Aleut" speakers who lived in five settlements situated along the shore of Chignik Lagoon and along the Chignik River in 1897. At that time, he described them as living in driftwood and thatch houses. He reported that they had used 20 bear skins to construct a prayer house and that they made money trading bear and fox skins (Morseth 2003).

The contemporary community of Chignik Lagoon developed as a fishing village because of the large sockeye salmon runs identified by northwest coast fish prospectors that came to Chignik in 1888. By 1889, three Oregon- and San Francisco-based seafood packing companies established canneries at the present site of the Chignik Lagoon community. By 1892, the three canneries had consolidated and were known as the "Chignik Bay Combination" and later became known as Alaska Packer's Association. In addition, the Alaska Packer's Association operated a coal mine on the Chignik River to assist the operations of the commercial fish processing industry and fisheries-related transportation (Knappen 1929). In 1896, there were 250 fishers and cannery workers employed by the Chignik Lagoon Alaska Packer's Association. By 1897, most of the fishers were of Eastern European descent, and fish packers were of Chinese descent. It was not until the 1920s that local Alaska Natives began to work in the canneries and on the fish traps (Partnow 2001).

Another Alutiiq community located on the northeastern shore of Chignik Lagoon near the sand spit, known as "Old Village," was originally occupied seasonally but grew into a year-round settlement that had a Russian Orthodox Church when the commercial salmon industry began to develop in 1889. In 1903, a summer school opened at the present site of the community of Chignik Lagoon. Chignik Lagoon became a cultural and geographical boundary between the local Alaska Native community that lived primarily on the north side of Chignik Lagoon at "Old Village" and the newer community of mostly immigrant men residing on the south side of Chignik Lagoon at the present location of the community of Chignik Lagoon. In 1919, a flu epidemic decimated many of the Alaska Native residents, and "Old Village" was abandoned. Some of the survivors relocated to the present community of Chignik Lagoon, and others moved to Chignik Lake in 1960 and established a community there when a Russian Orthodox church and school were built.

Chignik Lagoon is part of the Lake and Peninsula borough and school district.[5] Chignik Lagoon's federally recognized tribe is the Native Village of Chignik Lagoon; its village corporation is the Chignik Lagoon Native

4. *Alaska Community Database Online*, s.v. "Chignik" (by Alaska Department of Commerce, Community, and Economic Development), https://dcra-cdo-dcced.opendata.arcgis.com/ (accessed September 2019).
5. *Alaska Community Database Online*, s.v. "Chignik Lagoon" (by Alaska Department of Commerce, Community, and Economic Development), https://dcra-cdo-dcced.opendata.arcgis.com/ (accessed September 2019).

Corporation. The tribal government is a member of BBNA and many tribal members are shareholders with the regional BBNC. The community maintains an Alutiiq culture and a subsistence way of life. Commercial fishing provides primary cash income.

Chignik Lake[1]

The community of Chignik Lake is located on the south side of the Alaska Peninsula approximately 470 miles southwest of Anchorage near the outlet of Chignik Lake into the Chignik River. Wind, fog, rain, and snow are common features of the area's climate. The lake is situated within a narrow pass that leads through the volcanic Aleutian Range from Bristol Bay near Port Heiden to the Pacific Ocean side of the Alaska Peninsula (Figure 1-1). The major watershed in the Chignik Management Area (CMA) serves as the freshwater rearing habitat for much of the salmon that spawn in the CMA. The Chignik watershed consists of different but linked habitats, including the Gulf of Alaska, Chignik Lagoon, Chignik River, Chignik Lake and its tributaries, and Black Lake and its tributaries (Sagalkin et al. 2013). Five species of Pacific salmon return to the Chignik watershed annually and must pass up the Chignik River to get to spawning areas. Sockeye salmon returns consist of both an early and a late run. These two sockeye salmon runs are genetically distinct with the early run spawning primarily in Black Lake and its tributaries and the late run spawning in Chignik Lake and its tributaries (Templin et al. 1999). Chinook salmon spawn in the Chignik River, which is the only Chinook salmon-producing stream in the CMA. Pink, chum, and coho salmon spawn throughout the CMA, including in the Chignik watershed (Wilburn and Renick 2018:1, 5, 7–8). The residents of Chignik Lake use all five species of salmon that run up the river and fish are easily accessible from the water bordering the community.

Although Chignik Bay and Chignik Lagoon were founded around fishing and fish processing, the Chignik Lake community can trace its lineage back to an individual named Dora Artemie Lind Andre (Hutchinson-Scarbrough et al. 2016:14–15). The current location of the community of Chignik Lake during the early 20th century was used as a fall fishing and trapping camp for at least one family—that of Rodeonoff Artemie and his wife Natalia Abrom (Davis 1986:44–45). Rodeonoff Artemie was from Old Harbor, Kodiak Island, and Natalia Abrom was from Ugashik, Alaska. They lived in Bear River, a now-abandoned village located on the Bristol Bay side of the Alaska Peninsula between Port Moller and Port Heiden. Bear River is where one of their daughters, Dora Artemie, was born in 1903 (Davis 1986:45). The Artemies and their children lived a seasonal lifestyle living primarily in Chignik Lagoon at "Old Village" near the spit, but would move to Chignik Lake in the fall and winter where fish and game were more readily available and to trap. Dora married Frederick Lindholm (later shortened to Lind); Frederick Lind was born in the village of Mitrofania in 1901. Dora and her husband and children continued to winter at Chignik Lake using cabins both on Clarks River and Chignik Lake, but the children were sent to school in Port Heiden and Pilot Point (Davis 1986:45; Morris 1987:29). Dora's husband passed away circa 1933[6] and she remarried John Wanka Andre[7] of Chignik Bay. Dora and her second husband settled at the present location of Chignik Lake in the 1960s. (Davis 1986:50; Morris 1987:29). At this time, the first school in Chignik Lake was constructed by Dora's family as well as other people who had moved to Chignik Lake from Old Village, and also from communities located on the Bristol Bay side of the Alaska Peninsula, including Kanatak, Ilnik, and Port Moller. A Russian Orthodox church was also established in the 1960s. In addition to the church and school, the year-round availability of wild foods attracted several families from Perryville, Chignik Bay, and Chignik Lagoon that relocated to the Chignik Lake community. Many Chignik Lake families stayed at summer fish camps and homes along Chignik Lagoon, a tradition that continued until about 2002 (Hutchinson-Scarbrough et al. 2016; Morris 1987). Chignik Lake residents have close connections with residents of Perryville, and, to a lesser extent, Chignik Lagoon and Chignik Bay (Partnow 2001). There is evidence that over the last decade there have been increased connections between Chignik Lake and Port

6. Geni.com, "Frederick Lind," https://www.geni.com/people/Frederick-Lind/6000000033432595048 (accessed November 2019).

7. Geni.com, "John Wanka Andre," https://www.geni.com/people/John-Andre/6000000044219052948 (accessed November 2019).

Heiden due to employment opportunities for Chignik Lake residents in Port Heiden, or through marriages (Hutchinson-Scarbrough et al. 2016).

Chignik Lake is part of the Lake and Peninsula borough and school district.[8] Chignik Lake's federally recognized tribe is the Chignik Lake Village, and the Alaska Native village corporation is Chignik River Limited. The tribe is represented by the BBNA and many of their tribal members are shareholders with the regional BBNC. The community maintains an Alutiiq culture and a subsistence way of life. Commercial fishing provides primary cash income opportunities.

Perryville[1]

The community of Perryville is located on the Pacific Coast of the Alaska Peninsula approximately 500 miles southwest of Anchorage (Figure 1-1). North of Perryville sits Mt. Veniaminof, an active volcano. Its snow-topped peaks supply melted water to create the Kametolook, Three Star, and Long Beach rivers.

Perryville's origins can be traced to the eruption of the Mt. Novarupta volcano on June 6, 1912. At the time of the eruption, the founders of Perryville were residing in the two small communities of Kaguyak (Douglas) and Katmai in what is now Katmai National Park and Preserve on the Pacific coastline of the Alaska Peninsula (Partnow 2001). When the volcano erupted, local families had already moved to summer fish camps on Kaflia Bay to participate in commercial fish operations; as such, there were no casualties from the eruption at Kaguyak or Katmai; however, the eruption forced the long-term evacuation of these communities (Morris 1987:43). The U.S. Coast Guard dispatched rescue resources to bring people to Kodiak Island, and, after a short stay, Captain K. W. Perry transported displaced residents on the cutter *Manning* to a new site (Morris 1987:43). The new settlement was initially called "Perry" after Captain K. W. Perry, and in 1930 the name changed to "Perryville" to comply with U.S. Postal Service community name requirements (Hutchinson-Scarbrough et al. 2016:17).

Though Perryville's location and resources are not as closely situated to the Chignik watershed where most commercial salmon fishing occurs by comparison to most of the other study communities, this project—as well as previous research conducted by the Division of Subsistence—found several residents of Perryville have always participated in the CMA salmon fisheries. Many families have traditionally relocated in the summer to camps and homes located along the north side of Chignik Lagoon where fish were often put away for subsistence, and the camps also provided a summer home base for the family or member of the family who was commercial fishing. The number of families that continued to use summer camps has declined significantly over the last decade (Hutchinson-Scarbrough et al. 2016; Hutchinson-Scarbrough and Fall 1996; Morris 1987); however, as of 2013, three families continued to spend their summers in Chignik Lagoon at their summer camp while they also commercial fished for salmon (Hutchinson-Scarbrough et al. 2016). According to researcher notes taken during survey administration for this project, the same families were still using these homes in the summer of 2016. The community has maintained a steady population and strong ties to the Alutiiq culture and a subsistence way of life. Perryville residents have close connections with residents of Chignik Lake, and, to a lesser extent, Chignik Lagoon and Chignik Bay (Hutchinson-Scarbrough et al. 2016; Partnow 2001).

Perryville is part of the Lake and Peninsula borough and school district.[9] Perryville's federally recognized tribe is the Native Village of Perryville, and Oceanside Corporation is the community's local Alaska Native village corporation. Their tribal community is represented by the BBNA and many members are shareholders with the regional BBNC. Commercial fishing provides the primary cash income, as well as a few jobs with government or non-profit organizations.[10]

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8. *Alaska Community Database Online*, s.v. "Chignik Lake" (by Alaska Department of Commerce, Community, and Economic Development), https://dcra-cdo-dcced.opendata.arcgis.com/ (accessed September 2019).
9. *Alaska Community Database Online*, s.v. "Perryville" (by Alaska Department of Commerce, Community, and Economic Development), https://dcra-cdo-dcced.opendata.arcgis.com/ (accessed September 2019).
10. Lake and Peninsula Borough. 2012. "Lake and Peninsula Borough Comprehensive Plan: Perryville Community Action Plan." http://www.lakeandpen.com/common/pages/DisplayFile.aspx?itemId=1577079 (accessed

Port Heiden

Port Heiden is located 424 miles southwest of Anchorage, Alaska, on the northern side of the Alaska Peninsula near the major river tributary of the Meshik River (Figure 1-1). It is similar in geography to the other Aleutian Range communities: a generally flat coastal plain lacking tree cover that features tundra and short shrub plant communities (Wright et al. 1985). A large bay, called Port Heiden, lies southwest of the community with Strogonof Point ranging as an arm of land that creates a calm and sheltered bay. Several creeks surround Port Heiden and provide access to fish and other resources. The main creeks near Port Heiden are Reindeer Creek (known locally as North River), Barbara Creek, and Birthday Creek. Migratory waterfowl and salmon are the main resources near the community, as well as freshwater fish, shellfish, caribou, brown bear, moose, and other wildlife. Aniakchak National Preserve and Monument lies east of the community.

According to Morseth (2003:3), historically:

> … throughout the 200 year historic period, Aniakchak has consistently been used by people on the Pacific coast… . On the Bristol Bay side, residents of Meshik and Unangashak used the Meshik River … . Settlement patterns indicate that people and whole villages moved frequently until the canneries [of Bristol Bay] were established in the 1880s. From the late 1890s to the 1950s, Aniakchak saw a divergent settlement pattern as immigrant Europeans moved to the area and began families with Alutiiq or Creole women. In this period, a succession of families spent most of the year in isolated cabins, making a living fox farming, trapping, and fishing on the Pacific coast of Aniakchak. This activity peaked during the two decades prior to World War II. The creeks and rivers extending into Aniakchak were also trapped—most notably the Meshik and Aniakchak rivers and Tunangapuk (Birthday) Creek. Today, the coastline is used by people from villages who access it either by boat or airplane.

Meshik is the traditional Sugpiaq ("Aleut") name for the community of Port Heiden.[11] The old site of Meshik was located slightly southwest of the current location of Port Heiden, but influenza epidemics forced community members to relocate from Meshik to other communities in the early 1900s. In 1942, the United States Army constructed Fort Morrow Army Airfield in order to protect the Aleutian chain from the possible threat of a Japanese invasion. During World War II, 5,000 personnel were stationed at the base, and in 1962 the military presence was suspended for strategic purposes, at which time the airfield transitioned to civilian use.[12] A school was established in the early 1950s, which attracted people from surrounding communities. Port Heiden was incorporated as a city in 1972 and began relocation efforts inland due to erosion.[13]

Port Heiden is a part of the BBNA tribal consortium. Port Heiden is also a part of the Alaska Peninsula Corporation, a for-profit corporation with the mission, "To preserve and enhance the quality of life of Alaska Peninsula Corporation shareholders and to protect our culture while managing our assets in a manner which enhances their value."[14] The Native Village of Port Heiden has a council of nine members, including an administrator, president, vice president, secretary/treasurer, and five additional members. Lastly, Port Heiden is a part of the Lake and Peninsula Borough, which was incorporated in 1989 as a "home-rule

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November 2019).

11. Alaska Peninsula Corporation. 2019. "Port Heiden (Meshik)." https://www.alaskapeninsulacorp.com/land/port-heiden/ (accessed August 2019).
12. Alaska Peninsula Corporation. 2019. "Port Heiden (Meshik)." https://www.alaskapeninsulacorp.com/land/port-heiden/ (accessed August 2019).
13. *Alaska Community Database Online*, s.v. "Port Heiden" (by Alaska Department of Commerce, Community, and Economic Development), https://dcra-cdo-dcced.opendata.arcgis.com/ (accessed September 2019).
14. Alaska Peninsula Corporation. 2019. "The Alaska Native Village Corporation of Port Heiden, South Naknek, Ugashik, Kokhanok, and Newhalen." https://www.alaskapeninsulacorp.com/ (accessed August 2019).

borough with a manager form of government," and a school district formed in 1976, of which Port Heiden is in the Upper Peninsula Region.[15] In total, Port Heiden is composed of a total of 51.4 mi^2, of which the majority (50.7 mi^2) is land, and the rest is inland water.

Port Heiden maintains a connection with the commercial fishing industry and is a part of the Northern District of the fisheries Management Area M, which includes the Outer Port Heiden Section and the Inner Port Heiden Section.[16] Most commercial fishers residing in Port Heiden currently fish Area T, namely Ugashik and Pilot Point. The community was estimated to have held 24 permits and 15 fishing vessels in 1990 (Endter-Wada et al. 1992:181). At the time of this report writing (2019), there were eight year-round resident permit holders (J. Christensen Jr., President, Native Village of Port Heiden, Port Heiden, Alaska, personal communication). Port Heiden is also heavily engaged in a subsistence way of life with many families participating in subsistence fishing, hunting, and gathering.

Port Heiden has an airport, a natural boat harbor/launch, but no dock. Fuel is available for both boats and vehicles, and the main means of transportation are cars, ATVs, and snowmachines.[17] A barge from Seattle, Washington, delivers supplies twice a year. Meshik School is located in the community and is a part of the Lake and Peninsula School District. There is a store, post office, and health clinic. The City of Port Heiden and the federally recognized Native Village of Port Heiden (NVPH) are both located in a large community building. There is also one bed-and-breakfast, a satellite company, one hunting guide service, and one contractor business, as well as a seafood processor operated by the NVPH.

Port Heiden residents have historical and familial connections to Chignik Bay, Chignik Lagoon, and Chignik Lake, as well as Perryville and other Alaska Peninsula communities. Many families, both Alaska Native and non-Native, also keep a residence, or have family members in, Anchorage and travel extensively between there and Port Heiden. Port Heiden is not connected to a road system but relies solely on aircraft and boat for transportation to and out of the community.

Egegik[18]

Egegik sits on the southern shore of the productive Egegik River where it empties into Bristol Bay, on the north side of the Alaska Peninsula (Figure 1-1). The Aleutian Range separates the part of the peninsula that drains into the Pacific Ocean to the southeast from the remainder that is located in the Bristol Bay watershed. The north side of the peninsula is a broad, flat plain that slopes gently to the sea; there are few breaks in this coastline except for bays at the mouths of the large rivers, including the Egegik River. There are many small lakes throughout the area, as well as the second largest lake in Alaska—Lake Becharof—from which the Egegik River flows (Wright et al. 1985:13). The landscape is predominantly treeless tundra that supports hardy vegetation such as lichens, mosses, and sedges, as well as patches of willow, alder, and cottonwood trees along streambanks. The many lakes, rivers, bays, and estuaries of the coastal plain provide abundant habitat for migratory waterfowl and have traditionally supported large salmon runs (Wright et al. 1985:64). Freshwater fish species also inhabit the lakes and streams. Caribou, moose, and brown bear used to range throughout the area (Wright et al. 1985:16). The climate of Egegik is best described as transitional between maritime and continental climates (Morris 1987). Common local weather conditions include protracted cloud cover, fog, and drizzling rainfall. Winter winds blow predominantly from the north

15. Lake and Peninsula Borough. 2018. "About LPB/History" http://www.lakeandpen.com/visitors/about_l_p_b/history (accessed August 2019).
16. Alaska Department of Fish and Game. 2019. "Alaska Peninsula Management Area M Statistical Chart." https://www.adfg.alaska.gov/static/fishing/PDFs/commercial/akpeninsula_stat_map.pdf (accessed September 2019).
17. *Alaska Community Database Online*, s.v. "Port Heiden" (by Alaska Department of Commerce, Community, and Economic Development), https://dcra-cdo-dcced.opendata.arcgis.com/ (accessed September 2019).
18. This study community has been featured in previously published ADF&G Technical Papers that included a historical community background summary; as such, this community background description draws heavily from the ADF&G Technical Papers by Morris (1987) and Wright et al. (1985), which provided background information for this same study community.

and the summer winds from the southeast. Temperatures generally range from -20° Fahrenheit in winter to mid-60° Fahrenheit in the summer. Precipitation averages around 20 inches per year.

The earliest evidence of human habitation in the Bristol Bay side of the Alaska Peninsula dates to approximately 7000 B.C. at Ugashik (Wright et al. 1985:18). The first peoples here were hunters of land mammals, especially caribou. Egegik was likely a traditional fish camp for many years (the village was reported by Russians as a fish camp called "Igagik" in 1876), but there is very little information about the population of the study area at the time of European arrival in the late 18th and early 19th centuries. According to Oswalt (1967), the inhabitants were "Peninsular Eskimos" speaking an unknown dialect of Yup'ik. Dumond (1981) categorizes Egegik as the southernmost village in the Yup'ik Eskimo-speaking area. The origins of this dialect have most recently been associated with a migration of people from the mouth of the Kuskokwim River known as the Aglurmiut, a contemporary version of Aglegmiut; this more recent arrival of language and people stemmed from conflicts and warfare on the Bering Sea coast (Pratt 2013). Like other inhabitants of the Bering Sea coast, these people probably had a diversified foraging economy based on marine mammal hunting, caribou hunting, and salmon fishing. There was a portage from Kanatak on the Gulf of Alaska coast to Becharof Lake, from which people would hike or kayak to Egegik Bay areas for summer fish camp. Russians arrived in the Aleutian Islands and Alaska Peninsula in the mid-18th century, establishing a fur trade. Captain James Cook led the first known European exploration of Bristol Bay in 1778. In 1790, a Russian explorer traveled the north coast of the Alaska Peninsula from Unimak Island to the Kvichak River, and then portaged across the peninsula to the Pacific Ocean. Following this, the Russians established a fur trade in Bristol Bay and the northern Alaska Peninsula area. A Russian Orthodox mission grew out of a Russian Post at Nushagak Bay, drawing people into the fur trade and converting them to the Russian Orthodox faith.

After Alaska passed into American ownership in 1867, the next major development was the commercial salmon fishing industry in Bristol Bay. A salmon saltery was established in 1895 at Egegik, followed soon after by several canneries; these processors set the tone for the contemporary community (Morris 1987). The cannery attracted Alaska Natives from the region, as well as workers from the Lower 48, for employment as fishermen and cannery workers. As in the rest of the region, the influenza epidemic of 1918–1919 caused upheaval in the community. Residents report that the community moved from the north bank of the Egegik River to the south in an attempt to isolate themselves from the disease (Morris 1987). Some residents of other communities that survived the epidemic consolidated in Egegik. Egegik first appears in the U.S. Census record in 1880 listed as Igagik. The town appears again in 1890 and 1900 as Igagik, in 1910[19] as Egegak, and in 1920 as Egegik.

Egegik incorporated as a second-class city in 1995 and is part of the Lake and Peninsula Borough.[20] In addition to a post office, the community has a community center, a liquor store, tribal and city offices, a health clinic staffed by an itinerant health aide, churches, and a bulk fuel storage facility. A pre-K–12 school ceased operation after the 2013/2014 school year due to low enrollment. To support Bristol Bay commercial fishing, there are five onshore processors located in Egegik. In 2016, there was a vacant Village Public Safety Officer (VPSO) position in Egegik, with a VPSO stationed in nearby King Salmon, as well as a volunteer fire department. A state-owned gravel runway accommodates regularly scheduled flights from King Salmon and a city dock is available for fuel and freight. Residents rely on seasonal barge service and year-round air service for food, fuel, and supplies. Water comes from community wells and water storage tanks; there is a washeteria in town. There is also a piped sewer system, treatment plant, and sewage lagoon. The community also operates a greenhouse and raises chickens.

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19. Egegak was enumerated by Adolph Hackmaier in Alaska Territory, Division 3, Second District; this record is on enumeration sheets 17–19, collected March 17–18, 1910 and census records are maintained by the National Archives (visit National Archives for more information about historical census data: https://www.archives.gov/research/census).

20. *Alaska Community Database Online*, s.v. "Egegik" (by Alaska Department of Commerce, Community, and Economic Development), https://dcra-cdo-dcced.opendata.arcgis.com/ (accessed September 2019).

Population Estimates and Demographic Information

Chignik Bay

Chignik Bay's population fluctuates greatly from winter to summer because of commercial fishing and fish processing operations. However, there is a core number of people who live in the community year-round and claim Chignik Bay as their residence. The 2010 decennial census identified 41 occupied households in Chignik Bay with a total population of 91 residents, of which 56 (62%) were Alaska Native (Table 2-1; Figure 2-1). The American Community Survey (ACS) conducted by the U.S. Census Bureau for 2016 found that Chignik Bay had a 5-year average total population of 40 residents, of which 28 (70%) were Alaska Native. As estimated from surveys, in 2016, Chignik Bay's population was 77 people residing in 27 households, of which 59 people (77% of population) identified themselves as Alaska Native.

The Alaska Department of Labor (ADL) estimated Chignik Bay's 2016 population to be 95 people (Figure 2-2). The U.S. Census Bureau and earliest ADL estimates both show that after decreasing through the 1950s and 1960s, the population of Chignik Bay grew from 1970 until it peaked in 1990 with a total population of 188. Since then, the population has fluctuated from as high as 178 in 1993 to as low as 77 in 2008 and 2016. Several events likely contributed to population declines since 1990 in Chignik Bay, as well as in Chignik Lagoon and Chignik Lake: the Alaska recession in the mid- to late-1980s, and also the 1989 *Exxon Valdez* oil spill affected communities throughout the state (Fall et al. 1995). Within the Chignik region, in 1991, the Columbia Ward Fisheries fish processing facility closed, which was a support facility for the local fishing fleet and included a store located in Chignik Lagoon. Additionally, in the 2000s there were negative economic effects from the Chignik Salmon Cooperative—a harvesting cooperative sharing a commercial fishery allocation—that resulted in declining ex-vessel values of Chignik salmon harvests, and a shore-based cannery fire[21] in 2008 at Trident Seafoods in Chignik Bay (the cannery was never rebuilt) that resulted in loss of fish tax revenue and jobs to the City of Chignik (Hutchinson-Scarbrough et al. 2016:180–181; Knapp 2007; Knapp and Hill 2003; Wilburn and Stumpf 2017:7).[22, 23]

This study found that the ratio of males to females residing in Chignik Bay in 2016 skewed slightly more toward the male population: 41 males (53%) to 36 females (47%) (Figure 2-3; Table 2-2). The population in 2016 exhibited a strong youth element: approximately one-quarter (28%) of the total population was 9 years old or younger, and 21% of the total population was aged 10–29 years old. The mean household size in 2016 was 2.8 people (Table 2-3). The mean age of residents in 2016 was 32 years old with the youngest community member being under 1 year old and the oldest being 85 years old. The average length of residency of household heads was 31 years, with the maximum being 85 years; for the population overall, the average length of residency was 21 years—nearly a decade less in comparison to the average residency of household heads.

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21. James Halpin, "Update on the Chignik Cannery Fire," *Anchorage Daily News*, July 21, 2008, https://www.adn.com/voices/article/update-chignik-cannery-fire/2008/07/22/, (accessed October 2019).
22. *Alaska Board of Fisheries Meeting Information*, s.v. "Search for meetings: 2019, Anchorage, Alaska Peninsula/Aleutian Islands Areas (All Finfish); Meeting documents: On-Time Public Comments (On-Time Public Comment List, Alaska Board of Fisheries, Alaska Peninsula/Chignik/Bering Sea-Aleutian Islands, Finfish, Anchorage, AK, February 21–26, 2019; pages 57–58)" by Alaska Department of Fish and Game), http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo (accessed November 2019).
23. Trident Seafoods Corporation. 2019. "Our Plants: Chignik." https://www.tridentseafoods.com/our-story/our-plants/ (accessed December 2019).

Table 2-1.–Population estimates, Chignik Bay, 2010 and 2016.

	Census (2010)	5-year American Community Survey (2012–2016) Estimate	Range[a]	This study (2016) Estimate	Range[b]
Total population					
Households	41	14.0	6 – 22	27.0	
Population	91	40.0	23 – 57	76.5	71 – 82
Alaska Native					
Population	56	28.0	15 – 41	58.5	53 – 64
Percentage	61.5%	70.0%	37.5% – 102.5%	76.5%	69.5% – 83.4%

Sources U.S. Census Bureau (2011) for 2010 estimate; U.S. Census Bureau for American Community Survey (ACS) 2016 estimate (5-year average); and ADF&G Division of Subsistence household surveys, 2017, for 2016 estimate.

Note Division of Subsistence household survey elegiblity requirements differ from those used by ACS.

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

b. No range of households is estimated for division surveys.

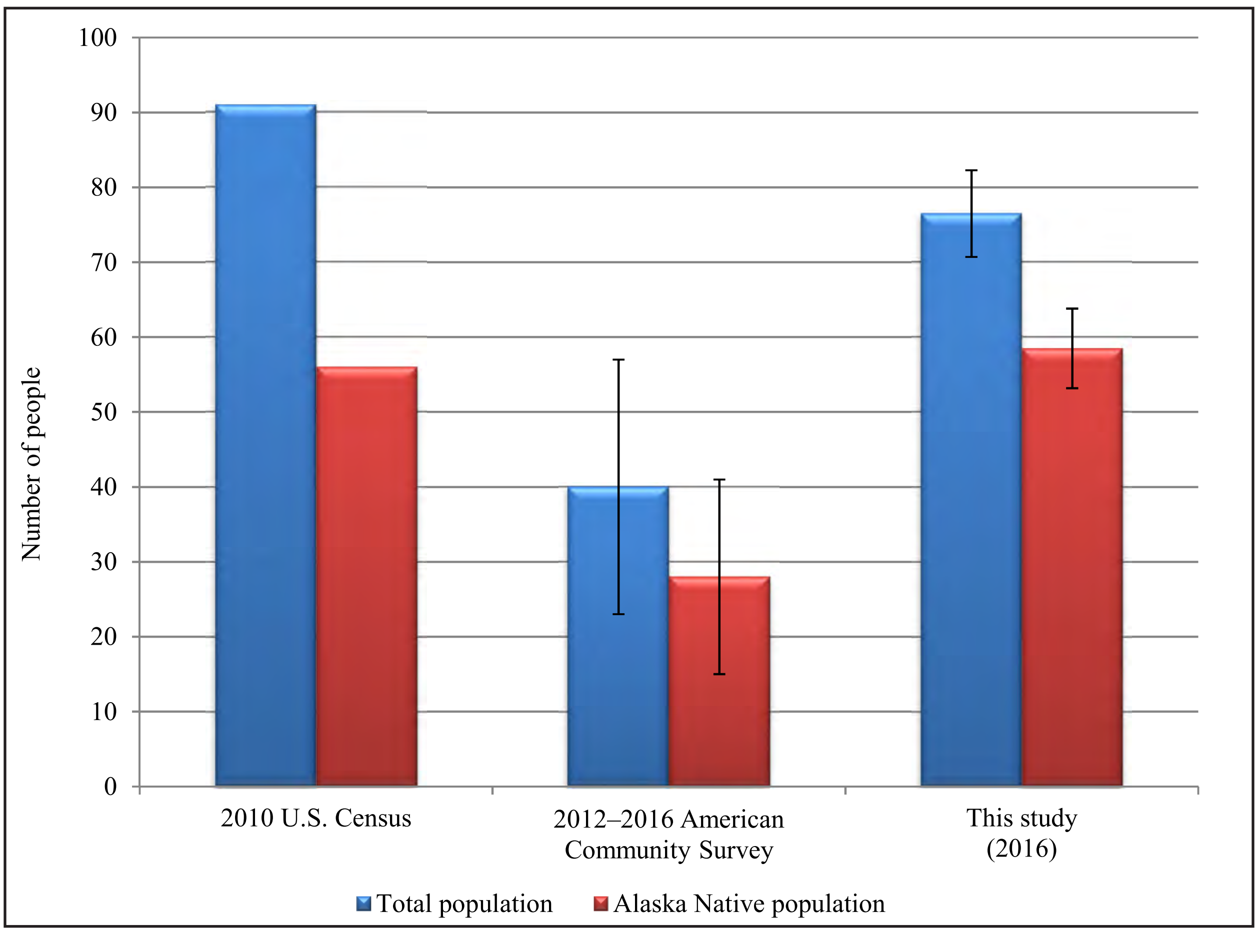


Figure 2-1.–Alaska Native and overall population estimates, Chignik Bay, 2010 and 2016.

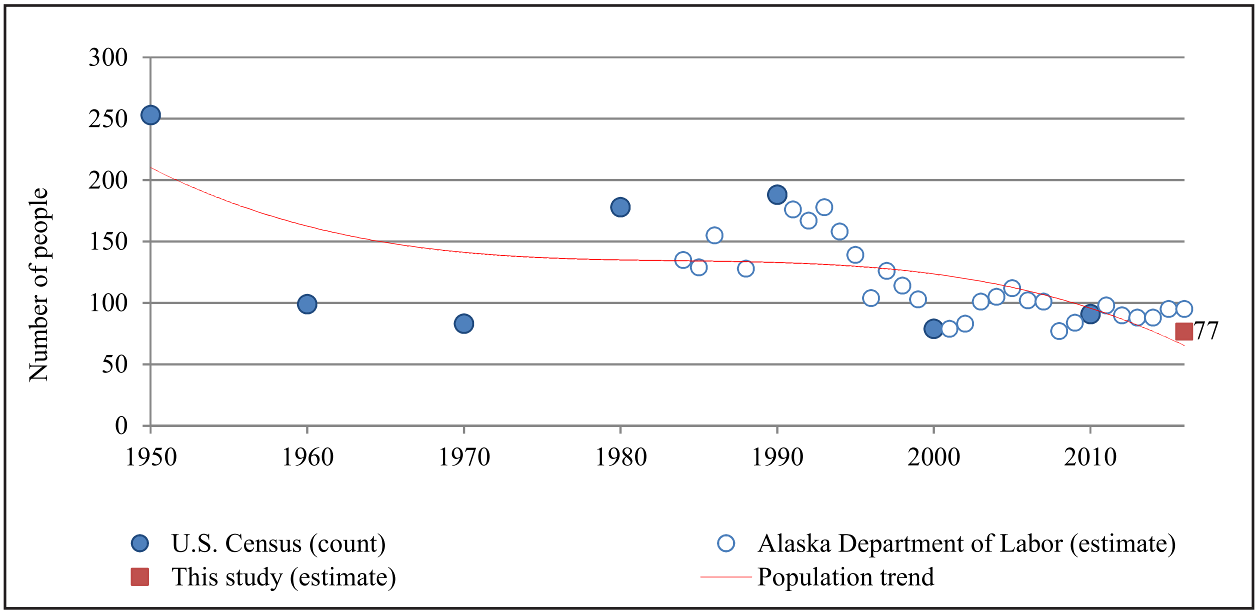


Figure 2-2.–Historical population estimates, Chignik Bay, 1950–2016.

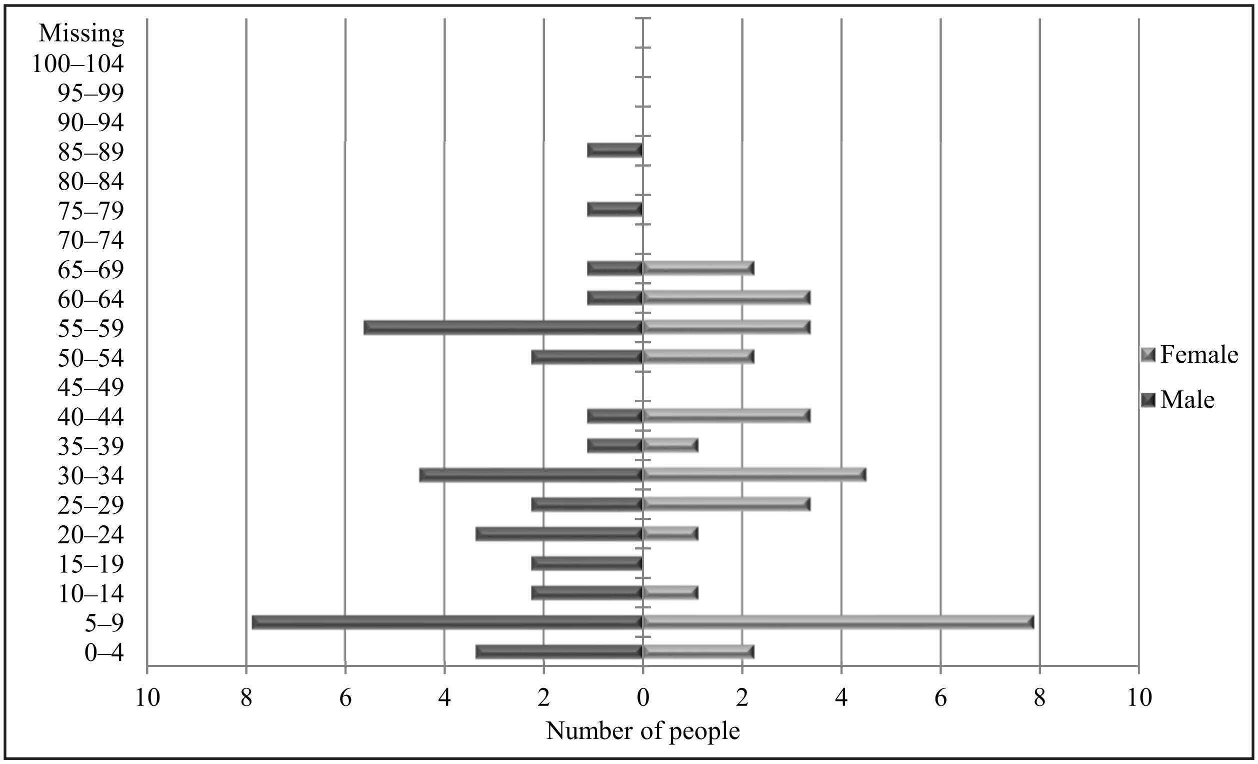


Figure 2-3.–Population profile, Chignik Bay, 2016.

Table 2-2.–Population profile, Chignik Bay, 2016.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	3.4	8.3%	8.3%	2.3	6.3%	6.3%	5.6	7.4%	7.4%
5–9	7.9	19.4%	27.8%	7.9	21.9%	28.1%	15.8	20.6%	27.9%
10–14	2.3	5.6%	33.3%	1.1	3.1%	31.3%	3.4	4.4%	32.4%
15–19	2.3	5.6%	38.9%	0.0	0.0%	31.3%	2.3	2.9%	35.3%
20–24	3.4	8.3%	47.2%	1.1	3.1%	34.4%	4.5	5.9%	41.2%
25–29	2.3	5.6%	52.8%	3.4	9.4%	43.8%	5.6	7.4%	48.5%
30–34	4.5	11.1%	63.9%	4.5	12.5%	56.3%	9.0	11.8%	60.3%
35–39	1.1	2.8%	66.7%	1.1	3.1%	59.4%	2.3	2.9%	63.2%
40–44	1.1	2.8%	69.4%	3.4	9.4%	68.8%	4.5	5.9%	69.1%
45–49	0.0	0.0%	69.4%	0.0	0.0%	68.8%	0.0	0.0%	69.1%
50–54	2.3	5.6%	75.0%	2.3	6.3%	75.0%	4.5	5.9%	75.0%
55–59	5.6	13.9%	88.9%	3.4	9.4%	84.4%	9.0	11.8%	86.8%
60–64	1.1	2.8%	91.7%	3.4	9.4%	93.8%	4.5	5.9%	92.6%
65–69	1.1	2.8%	94.4%	2.3	6.3%	100.0%	3.4	4.4%	97.1%
70–74	0.0	0.0%	94.4%	0.0	0.0%	100.0%	0.0	0.0%	97.1%
75–79	1.1	2.8%	97.2%	0.0	0.0%	100.0%	1.1	1.5%	98.5%
80–84	0.0	0.0%	97.2%	0.0	0.0%	100.0%	0.0	0.0%	98.5%
85–89	1.1	2.8%	100.0%	0.0	0.0%	100.0%	1.1	1.5%	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	**40.5**	**100.0%**	**100.0%**	**36.0**	**100.0%**	**100.0%**	**76.5**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2017.

Table 2-3.–Sample and demographic characteristics, Chignik Bay, 2016.

	Community
Characteristics	Chignik Bay
Sampled households	24
Eligible households	27
Percentage sampled	88.9%
Sampled population	68
Estimated community population	76.5
Household size	
Mean	2.8
Minimum	1
Maximum	7
Age	
Mean	32.1
Minimum[a]	0
Maximum	85
Median	30
Length of residency	
Total population	
Mean	21.1
Minimum[a]	0
Maximum	85
Heads of household	
Mean	30.8
Minimum[a]	1
Maximum	85
Alaska Native	
Estimated households[b]	
Number	23.6
Percentage	87.5%
Estimated population	
Number	58.5
Percentage	76.5%

Source ADF&G Division of Subsistence household surveys, 2017.

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

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

Table 2-4.–Population estimates, Chignik Lagoon, 2010 and 2016.

	Census (2010)	5-year American Community Survey (2012–2016) Estimate	Range[a]	This study (2016) Estimate	Range[b]
Total population					
Households	29	25.0	17 – 33	26.0	
Population	78	59.0	40 – 78	71.5	64 – 79
Alaska Native					
Population	58	45.0	28 – 62	52.0	46 – 58
Percentage	74.4%	76.3%	47.5% – 105.1%	72.7%	64.2% – 81.3%

Sources U.S. Census Bureau (2011) for 2010 estimate; U.S. Census Bureau for American Community Survey (ACS) 2016 estimate (5-year average); and ADF&G Division of Subsistence household surveys, 2017, for 2016 estimate.

Note Division of Subsistence household survey elegiblity requirements differ from those used by ACS.

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

b. No range of households is estimated for division surveys.

Chignik Lagoon

Chignik Lagoon's population fluctuates greatly from winter to summer because of the commercial and subsistence fishing opportunities and employment. In some years during the busy fishing season, the population of Chignik Lagoon triples in size from the core group of year-round residents (Chignik Lagoon Village Council 2016). The U.S. Census Bureau's 2010 census found that Chignik Lagoon had 29 occupied households with a total population of 78 people, of which 58 (74%) were Alaska Native (Table 2-4; Figure 2-4). The ACS 5-year average total population estimate for 2012–2016 was 59 people, of which 45 (76%) were Alaska Native. This study estimated a total population in 2016 of 72 people residing in 26 households, of which 52 people (73% of population) identified themselves as Alaska Native.

The U.S. Census Bureau and ADL estimates both show that Chignik Lagoon's population grew from the 1980s until it peaked at 103 in 2000 (U.S. Census Bureau) and 106 in 2001 (ADL). The population declined through the beginning of the 2000s and has remained relatively stable since 2006 (Figure 2-5).

This study found that the ratio of males to females residing in Chignik Lagoon in 2016 was close at 36 males (51%) to 35 females (49%) (Figure 2-6; Table 2-5). An estimated 18% of males were age 65–69, which was the largest age cohort for males; overall, one-half of males were age 0–39. In comparison, the largest cohorts of females were the 10–14 and 60–64 age cohorts, each composing 19% of the female population; 59% of females were age 0–39. The mean household size was 2.8 people in 2016 (Table 2-6). The average age of residents in 2016 was 36 years; the youngest resident was less than 1 year old and oldest was 69 years old. The average length of residency of household heads was 31 years, with the maximum being 65 years; in comparison, for the population overall, the average length of residency was less (an estimated 25 years).

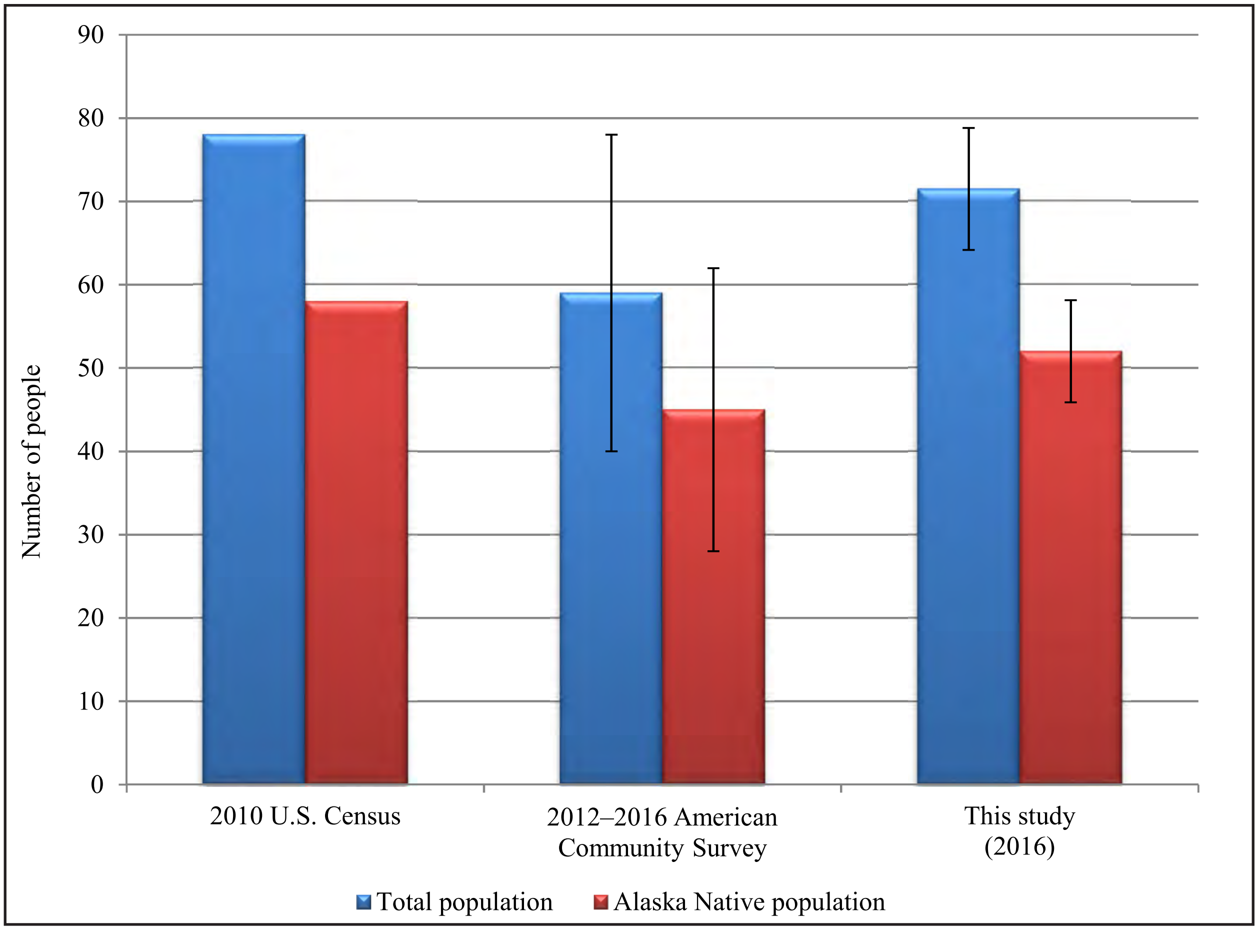


Figure 2-4.–Alaska Native and overall population estimates, Chignik Lagoon, 2010 and 2016.

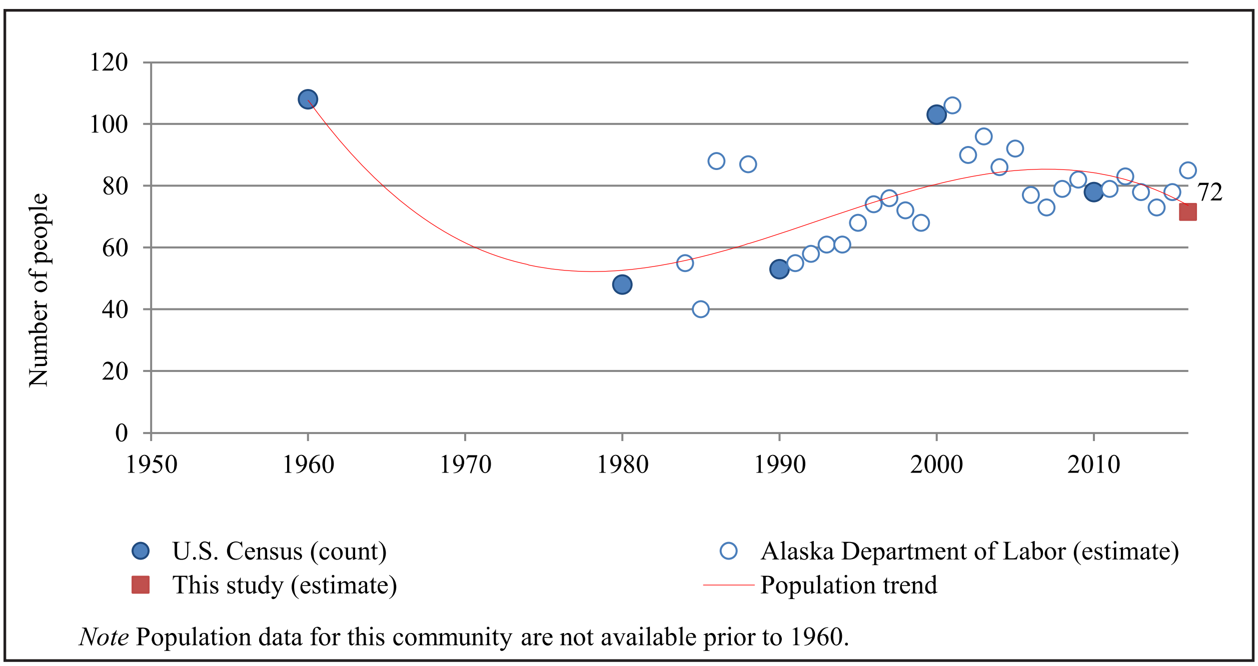


Figure 2-5.–Historical population estimates, Chignik Lagoon, 1950–2016.

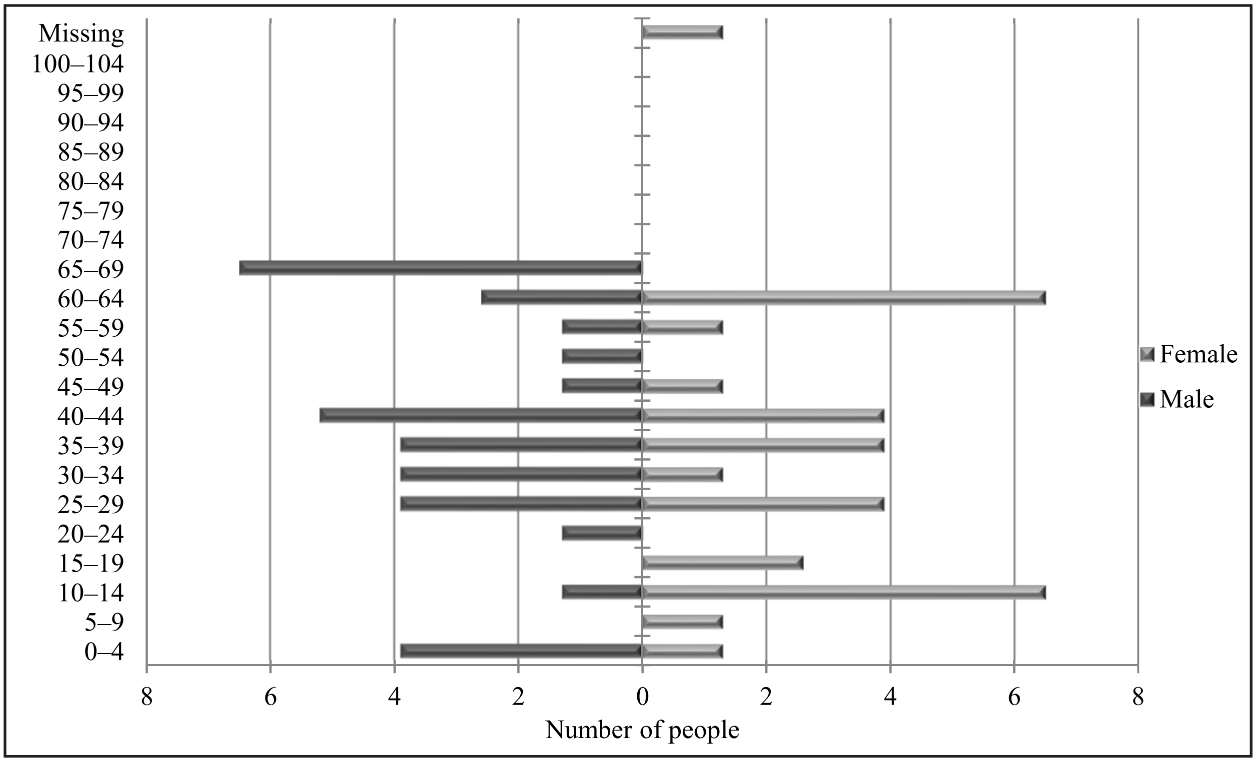


Figure 2-6.–Population profile, Chignik Lagoon, 2016.

Table 2-5.–Population profile, Chignik Lagoon, 2016.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	3.9	10.7%	10.7%	1.3	3.7%	3.7%	5.2	7.3%	7.3%
5–9	0.0	0.0%	10.7%	1.3	3.7%	7.4%	1.3	1.8%	9.1%
10–14	1.3	3.6%	14.3%	6.5	18.5%	25.9%	7.8	10.9%	20.0%
15–19	0.0	0.0%	14.3%	2.6	7.4%	33.3%	2.6	3.6%	23.6%
20–24	1.3	3.6%	17.9%	0.0	0.0%	33.3%	1.3	1.8%	25.5%
25–29	3.9	10.7%	28.6%	3.9	11.1%	44.4%	7.8	10.9%	36.4%
30–34	3.9	10.7%	39.3%	1.3	3.7%	48.1%	5.2	7.3%	43.6%
35–39	3.9	10.7%	50.0%	3.9	11.1%	59.3%	7.8	10.9%	54.5%
40–44	5.2	14.3%	64.3%	3.9	11.1%	70.4%	9.1	12.7%	67.3%
45–49	1.3	3.6%	67.9%	1.3	3.7%	74.1%	2.6	3.6%	70.9%
50–54	1.3	3.6%	71.4%	0.0	0.0%	74.1%	1.3	1.8%	72.7%
55–59	1.3	3.6%	75.0%	1.3	3.7%	77.8%	2.6	3.6%	76.4%
60–64	2.6	7.1%	82.1%	6.5	18.5%	96.3%	9.1	12.7%	89.1%
65–69	6.5	17.9%	100.0%	0.0	0.0%	96.3%	6.5	9.1%	98.2%
70–74	0.0	0.0%	100.0%	0.0	0.0%	96.3%	0.0	0.0%	98.2%
75–79	0.0	0.0%	100.0%	0.0	0.0%	96.3%	0.0	0.0%	98.2%
80–84	0.0	0.0%	100.0%	0.0	0.0%	96.3%	0.0	0.0%	98.2%
85–89	0.0	0.0%	100.0%	0.0	0.0%	96.3%	0.0	0.0%	98.2%
90–94	0.0	0.0%	100.0%	0.0	0.0%	96.3%	0.0	0.0%	98.2%
95–99	0.0	0.0%	100.0%	0.0	0.0%	96.3%	0.0	0.0%	98.2%
100–104	0.0	0.0%	100.0%	0.0	0.0%	96.3%	0.0	0.0%	98.2%
Missing	0.0	0.0%	100.0%	1.3	3.7%	100.0%	1.3	1.8%	100.0%
Total	**36.4**	**100.0%**	**100.0%**	**35.1**	**100.0%**	**100.0%**	**71.5**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2017.

Table 2-6.–Sample and demographic characteristics, Chignik Lagoon, 2016.

	Community
Characteristics	Chignik Lagoon
Sampled households	20
Eligible households	26
Percentage sampled	76.9%
Sampled population	55
Estimated community population	71.5
Household size	
Mean	2.8
Minimum	1
Maximum	5
Age	
Mean	35.6
Minimum[a]	0
Maximum	69
Median	30
Length of residency	
Total population	
Mean	24.5
Minimum[a]	0
Maximum	65
Heads of household	
Mean	31.3
Minimum[a]	0
Maximum	65
Alaska Native	
Estimated households[b]	
Number	24.7
Percentage	95.0%
Estimated population	
Number	52.0
Percentage	72.7%

Source ADF&G Division of Subsistence household surveys, 2017.

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

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

Table 2-7.–Population estimates, Chignik Lake, 2010 and 2016.

	Census (2010)	5-year American Community Survey (2012–2016) Estimate	Range[a]	This study (2016) Estimate	Range[b]
Total population					
Households	27	31.0	21 – 41	33.0	
Population	73	71.0	52 – 90	99.0	89 – 109
Alaska Native					
Population	70	67.0	49 – 85	94.3	84 – 104
Percentage	95.9%	94.4%	69.% – 119.7%	95.2%	85.3% – 105.2%

Sources U.S. Census Bureau (2011) for 2010 estimate; U.S. Census Bureau for American Community Survey (ACS) 2016 estimate (5-year average); and ADF&G Division of Subsistence household surveys, 2017, for 2016 estimate.

Note Division of Subsistence household survey elegiblity requirements differ from those used by ACS.

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

b. No range of households is estimated for division surveys.

Chignik Lake

Chignik Lake's population fluctuates greatly from winter to summer because of the commercial and subsistence fishing opportunities, but there is a core number of people who live in the community year-around and claim residency in Chignik Lake. The 2010 census found that Chignik Lake had 27 occupied households with a total population of 73 people, of which 70 (96%) were Alaska Native (Table 2-7; Figure 2-7). The ACS 5-year average total population estimate for 2012–2016 was 71 people, of which 67 (94%) were Alaska Native. This study estimated that the total population in 2016 was 99 people residing in 33 households, of which 94 people (95% of population) identified themselves as Alaska Native.

The U.S. Census Bureau shows that Chignik Lake's population continued to grow by small increments from 1960 until 1980; ADL estimates show a peak population of 164 residents in 1985 (Figure 2-8). Though the population declined somewhat, it remained steady until 2000 when there was a total population of 145 (U.S. Census Bureau). Since that time, Chignik Lake's population has continued to decline. ADL estimates show 2015 and study year 2016 with the lowest population on record (64 residents), but this study estimated a substantially higher population (99 people).

This study found that the ratio of males to females residing in Chignik Lake was equal in 2016 (Figure 2-9; Table 2-8). For both genders, 50% of the estimated population was 0–24 years old. For males, the largest age cohorts were 0–4 and 20–24, whereas for females the 15–19 age cohort was the largest. The mean household size was three people in 2016 (Table 2-9). The average age of residents in 2016 was 29 years old, with the youngest resident younger than 1 year old and oldest was 78 years old. The average length of residency of household heads was 34 years in 2016; average duration of residency was less for the overall population at 22 years.

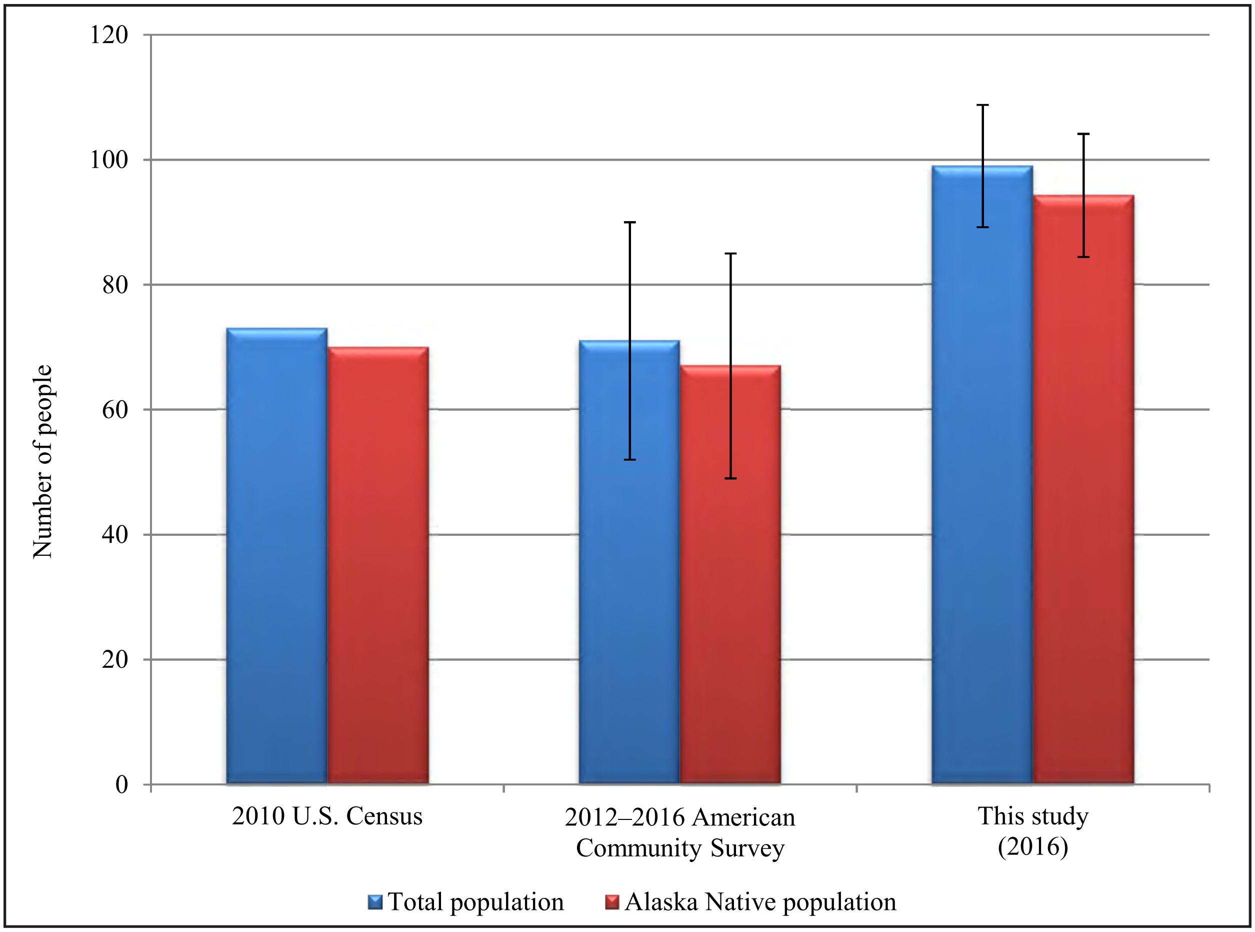
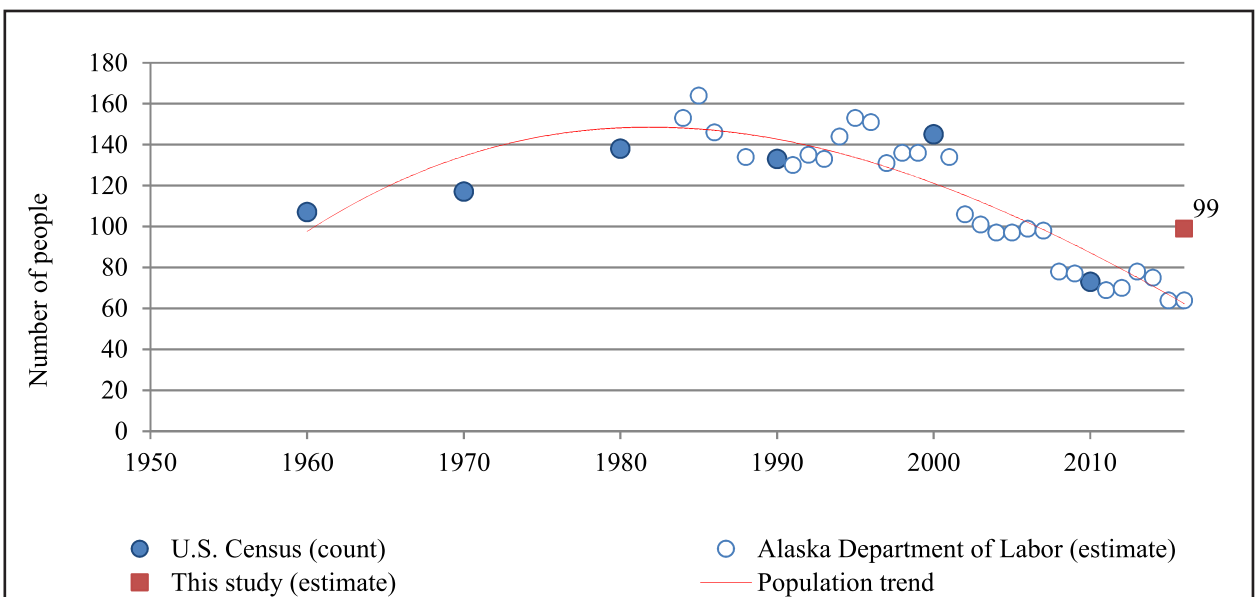


Figure 2-7.–Alaska Native and overall population estimates, Chignik Lake, 2010 and 2016.



Note Population data for this community are not available prior to 1960.

Figure 2-8.–Historical population estimates, Chignik Lake, 1950–2016.

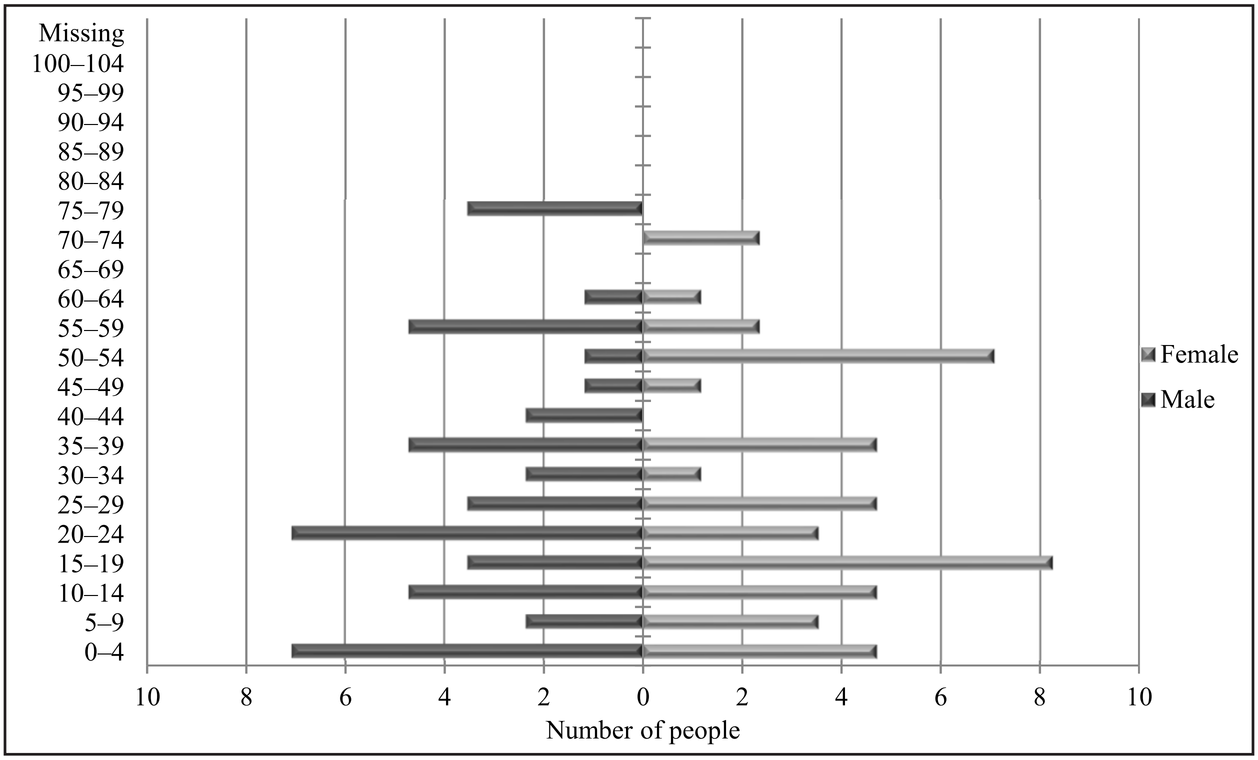


Figure 2-9.–Population profile, Chignik Lake, 2016.

Table 2-8.–Population profile, Chignik Lake, 2016.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	7.1	14.3%	14.3%	4.7	9.5%	9.5%	11.8	11.9%	11.9%
5–9	2.4	4.8%	19.0%	3.5	7.1%	16.7%	5.9	6.0%	17.9%
10–14	4.7	9.5%	28.6%	4.7	9.5%	26.2%	9.4	9.5%	27.4%
15–19	3.5	7.1%	35.7%	8.3	16.7%	42.9%	11.8	11.9%	39.3%
20–24	7.1	14.3%	50.0%	3.5	7.1%	50.0%	10.6	10.7%	50.0%
25–29	3.5	7.1%	57.1%	4.7	9.5%	59.5%	8.3	8.3%	58.3%
30–34	2.4	4.8%	61.9%	1.2	2.4%	61.9%	3.5	3.6%	61.9%
35–39	4.7	9.5%	71.4%	4.7	9.5%	71.4%	9.4	9.5%	71.4%
40–44	2.4	4.8%	76.2%	0.0	0.0%	71.4%	2.4	2.4%	73.8%
45–49	1.2	2.4%	78.6%	1.2	2.4%	73.8%	2.4	2.4%	76.2%
50–54	1.2	2.4%	81.0%	7.1	14.3%	88.1%	8.3	8.3%	84.5%
55–59	4.7	9.5%	90.5%	2.4	4.8%	92.9%	7.1	7.1%	91.7%
60–64	1.2	2.4%	92.9%	1.2	2.4%	95.2%	2.4	2.4%	94.0%
65–69	0.0	0.0%	92.9%	0.0	0.0%	95.2%	0.0	0.0%	94.0%
70–74	0.0	0.0%	92.9%	2.4	4.8%	100.0%	2.4	2.4%	96.4%
75–79	3.5	7.1%	100.0%	0.0	0.0%	100.0%	3.5	3.6%	100.0%
80–84	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	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	**49.5**	**100.0%**	**100.0%**	**49.5**	**100.0%**	**100.0%**	**99.0**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2017.

Table 2-9.–Sample and demographic characteristics, Chignik Lake, 2016.

Characteristics	Community Chignik Lake
Sampled households	28
Eligible households	33
Percentage sampled	84.8%
Sampled population	84
Estimated community population	99.0
Household size	
Mean	3.0
Minimum	1
Maximum	8
Age	
Mean	29.2
Minimum[a]	0
Maximum	78
Median	30
Length of residency	
Total population	
Mean	21.6
Minimum[a]	0
Maximum	68
Heads of household	
Mean	33.5
Minimum[a]	1
Maximum	68
Alaska Native	
Estimated households[b]	
Number	29.5
Percentage	89.3%
Estimated population	
Number	94.3
Percentage	95.2%

Source ADF&G Division of Subsistence household surveys, 2017.

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

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

Table 2-10.–Population estimates, Perryville, 2010 and 2016.

	Census (2010)	5-year American Community Survey (2012–2016) Estimate	Range[a]	This study (2016) Estimate	Range[b]
Total population					
Households	38	30.0	19 – 41	37.0	
Population	113	94.0	65 – 123	109.6	96 – 123
Alaska Native					
Population	110	92.0	64 – 120	99.6	86 – 113
Percentage	97.3%	97.9%	68.1% – 127.7%	90.9%	78.5% – 103.3%

Sources U.S. Census Bureau (2011) for 2010 estimate; U.S. Census Bureau for American Community Survey (ACS) 2016 estimate (5-year average); and ADF&G Division of Subsistence household surveys, 2017, for 2016 estimate.

Note Division of Subsistence household survey elegiblity requirements differ from those used by ACS.

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

b. No range of households is estimated for division surveys.

Perryville

According to the 2010 census, Perryville's population was 113 people residing in 38 households (Table 2-10; Figure 2-10). A large majority of the population—110 people (97%)—was Alaska Native. The ACS 5-year average total population estimate for 2012–2016 was 94 people, of which 92 (98%) were Alaska Native. Survey results estimated a total population in 2016 of 110 people residing in 37 households, of which 100 people (91% of population) identified themselves as Alaska Native.

The first census for Perryville was taken in 1920 and reported a population of 85.[24] The population increased after 1920, and, since 1960, the population has remained relatively stable (Figure 2-11). Perryville is the only community in the CMA that has maintained its population for the last 50 years. The ADL estimated Perryville's 2016 population to be 110 people, which is similar to past years' population estimates. Due to the community's geographic isolation, the community has maintained strong leadership, successfully implemented innovative ideas, and developed a strong sense of self-reliance and independence.[25] There are a few residents who commercial fish, but because the CMA commercial fishery is centered around the Chignik watershed, Perryville does not see the influx of seasonal residents and fishermen that the communities of Chignik experience.

This study found that the ratio of males to females in 2016 was weighted toward a higher female population, especially in comparison to the other CMA communities (Figure 2-12). An estimated 57% of Perryville's population was female, and 43% was male (Table 2-11). This difference in gender is most apparent in Perryville's youngest residents: 21% of the female population is between 0–4 years old, whereas only 3% of the male population falls within that age range.

The mean household size in 2016 was three people (Table 2-12). The average age of community members in 2016 was 29 years old with the youngest resident being younger than 1 year old, and the oldest was 93. The average length of residency of household heads in 2016 was 32 years; for the population overall, the average length of residency was an estimated 23 years.

24. ADLWD (Alaska Department of Labor and Workforce Development) Research and Analysis Section. 2019. "1880 to 2000 Census data: 1920 Census, population of outlying possessions by minor civil divisions." http://live.laborstats.alaska.gov/cen/hist.cfm (accessed September 2019).

25. Lake and Peninsula Borough. 2012. "Lake and Peninsula Borough Comprehensive Plan: Perryville Community Action Plan." http://www.lakeandpen.com/common/pages/DisplayFile.aspx?itemId=1577079 (accessed November 2019).

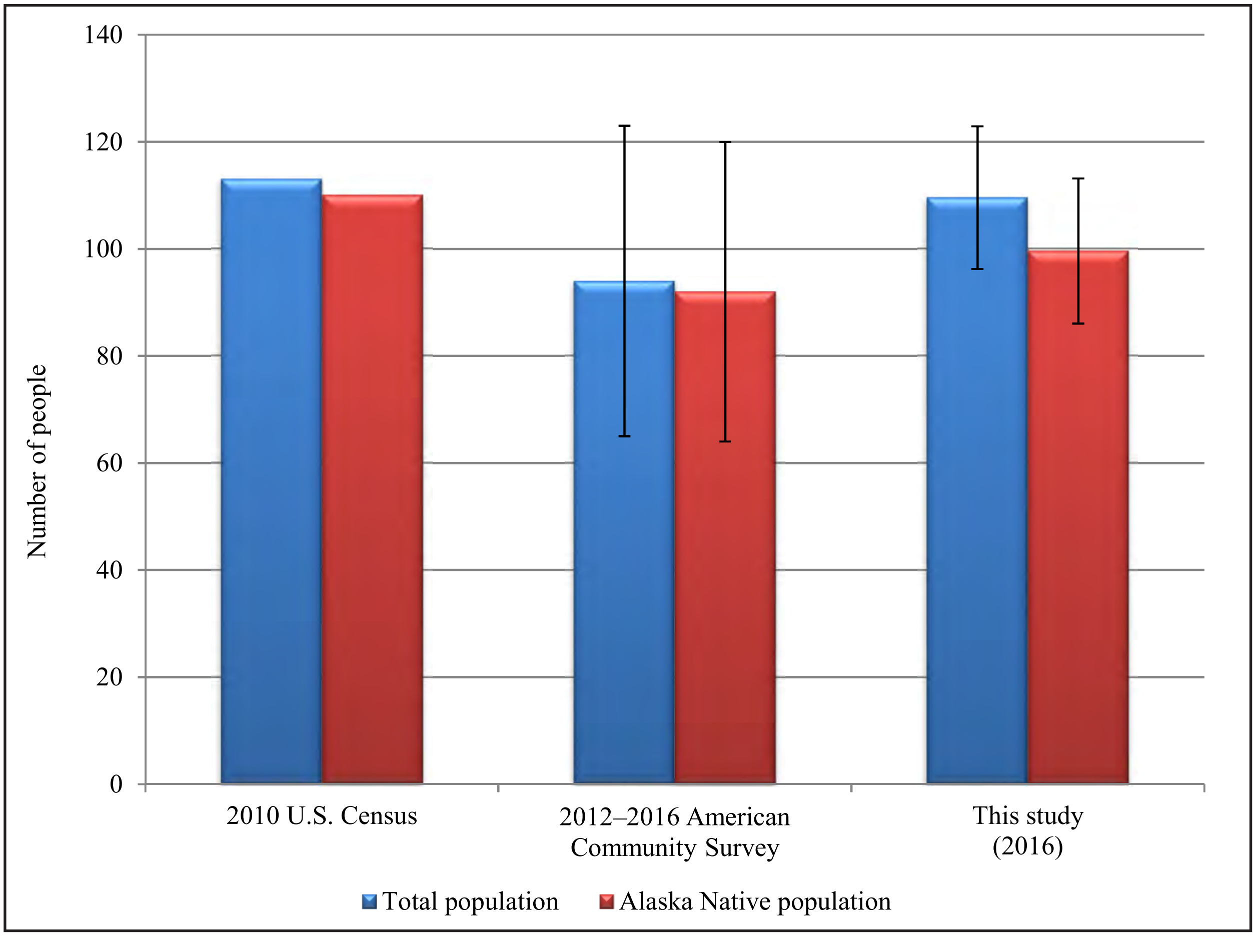


Figure 2-10.–Alaska Native and overall population estimates, Perryville, 2010 and 2016.

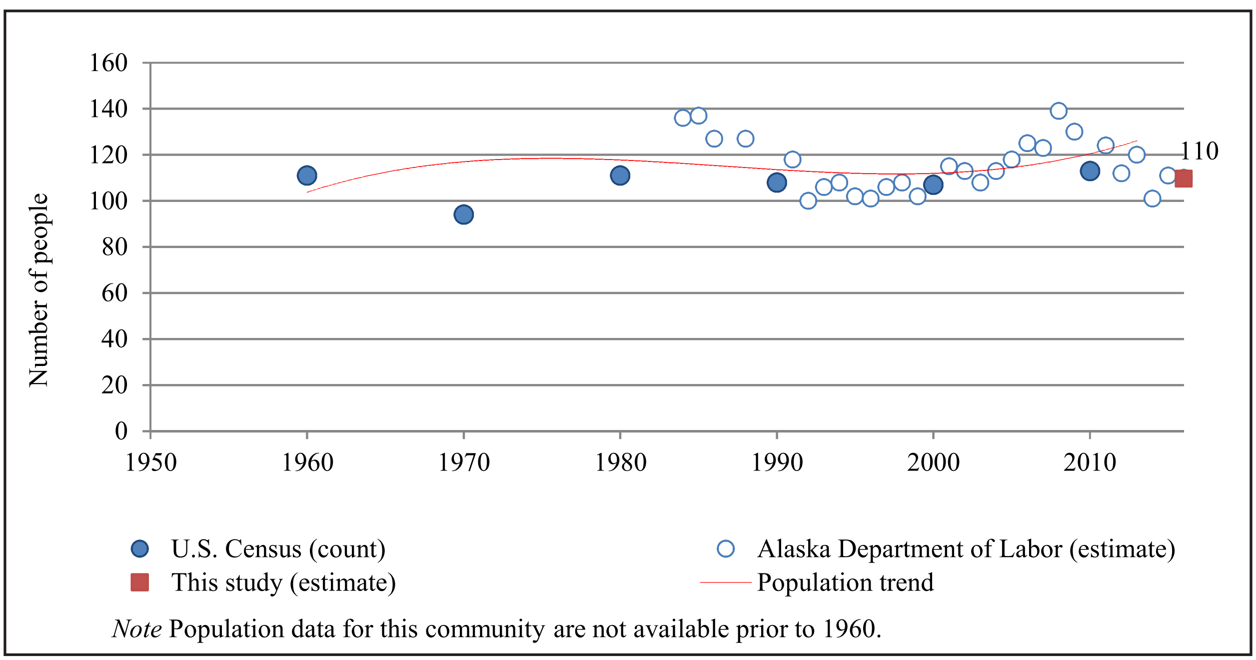


Figure 2-11.–Historical population estimates, Perryville, 1950–2016.

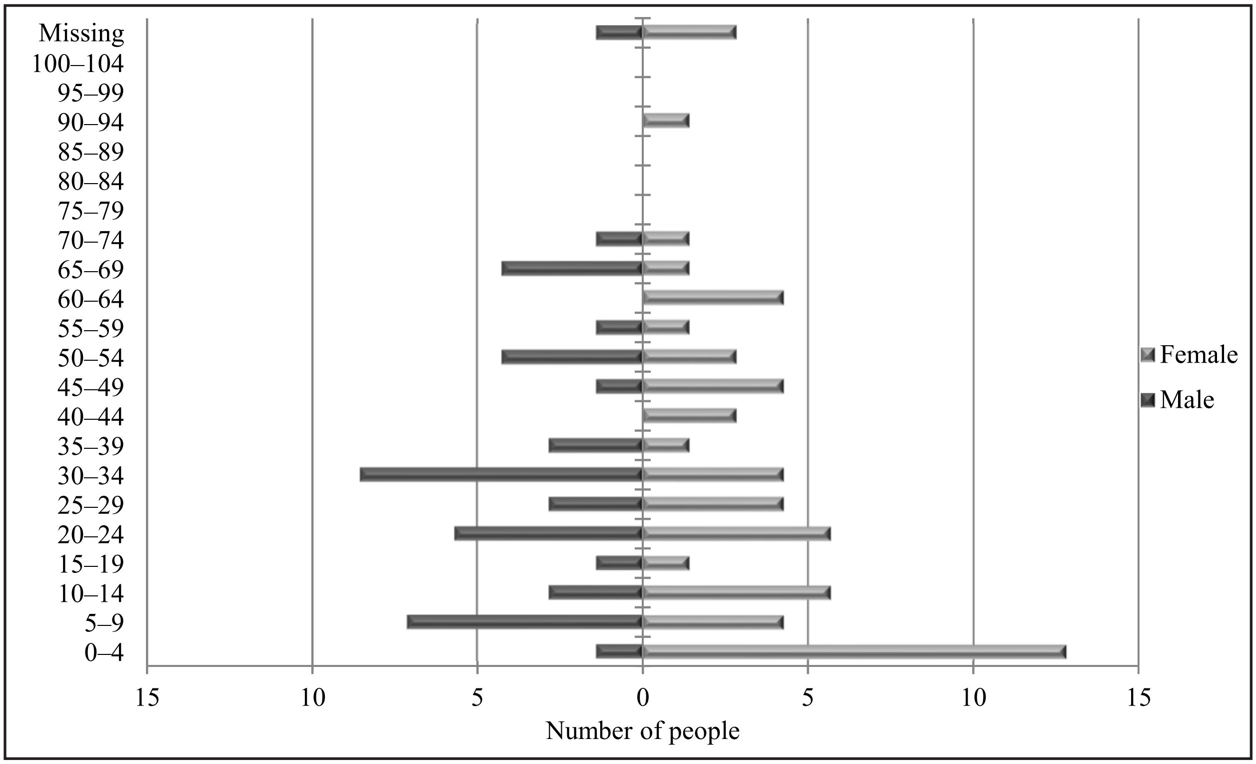


Figure 2-12.–Population profile, Perryville, 2016.

Table 2-11.–Population profile, Perryville, 2016.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	1.4	3.0%	3.0%	12.8	20.5%	20.5%	14.2	13.0%	13.0%
5–9	7.1	15.2%	18.2%	4.3	6.8%	27.3%	11.4	10.4%	23.4%
10–14	2.8	6.1%	24.2%	5.7	9.1%	36.4%	8.5	7.8%	31.2%
15–19	1.4	3.0%	27.3%	1.4	2.3%	38.6%	2.8	2.6%	33.8%
20–24	5.7	12.1%	39.4%	5.7	9.1%	47.7%	11.4	10.4%	44.2%
25–29	2.8	6.1%	45.5%	4.3	6.8%	54.5%	7.1	6.5%	50.6%
30–34	8.5	18.2%	63.6%	4.3	6.8%	61.4%	12.8	11.7%	62.3%
35–39	2.8	6.1%	69.7%	1.4	2.3%	63.6%	4.3	3.9%	66.2%
40–44	0.0	0.0%	69.7%	2.8	4.5%	68.2%	2.8	2.6%	68.8%
45–49	1.4	3.0%	72.7%	4.3	6.8%	75.0%	5.7	5.2%	74.0%
50–54	4.3	9.1%	81.8%	2.8	4.5%	79.5%	7.1	6.5%	80.5%
55–59	1.4	3.0%	84.8%	1.4	2.3%	81.8%	2.8	2.6%	83.1%
60–64	0.0	0.0%	84.8%	4.3	6.8%	88.6%	4.3	3.9%	87.0%
65–69	4.3	9.1%	93.9%	1.4	2.3%	90.9%	5.7	5.2%	92.2%
70–74	1.4	3.0%	97.0%	1.4	2.3%	93.2%	2.8	2.6%	94.8%
75–79	0.0	0.0%	97.0%	0.0	0.0%	93.2%	0.0	0.0%	94.8%
80–84	0.0	0.0%	97.0%	0.0	0.0%	93.2%	0.0	0.0%	94.8%
85–89	0.0	0.0%	97.0%	0.0	0.0%	93.2%	0.0	0.0%	94.8%
90–94	0.0	0.0%	97.0%	1.4	2.3%	95.5%	1.4	1.3%	96.1%
95–99	0.0	0.0%	97.0%	0.0	0.0%	95.5%	0.0	0.0%	96.1%
100–104	0.0	0.0%	97.0%	0.0	0.0%	95.5%	0.0	0.0%	96.1%
Missing	1.4	3.0%	100.0%	2.8	4.5%	100.0%	4.3	3.9%	100.0%
Total	**47.0**	**100.0%**	**100.0%**	**62.6**	**100.0%**	**100.0%**	**109.6**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2017.

Table 2-12.–Sample and demographic characteristics, Perryville, 2016.

Characteristics	Community Perryville
Sampled households	26
Eligible households	37
Percentage sampled	70.3%
Sampled population	77
Estimated community population	109.6
Household size	
Mean	3.0
Minimum	1
Maximum	7
Age	
Mean	29.2
Minimum[a]	0
Maximum	93
Median	30
Length of residency	
Total population	
Mean	22.8
Minimum[a]	0
Maximum	93
Heads of household	
Mean	31.7
Minimum[a]	1
Maximum	93
Alaska Native	
Estimated households[b]	
Number	32.7
Percentage	88.5%
Estimated population	
Number	99.6
Percentage	90.9%

Source ADF&G Division of Subsistence household surveys, 2017.

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

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

Table 2-13.–Population estimates, Port Heiden, 2010 and 2016.

	Census (2010)	5-year American Community Survey (2012–2016)		This study (2016)	
		Estimate	Range[a]	Estimate	Range[b]
Total population					
Households	35	23.0	11 – 35	39.0	
Population	102	73.0	54 – 92	104.9	93 – 116
Alaska Native					
Population	87	54.0	36 – 72	87.4	75 – 100
Percentage	85.3%	74.0%	49.3% – 98.6%	83.3%	71.5% – 95.2%

Sources U.S. Census Bureau (2011) for 2010 estimate; U.S. Census Bureau for American Community Survey (ACS) 2016 estimate (5-year average); and ADF&G Division of Subsistence household surveys, 2017, for 2016 estimate.

Note Division of Subsistence household survey elegiblity requirements differ from those used by ACS.

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

b. No range of households is estimated for division surveys.

Port Heiden

Table 2-13 shows population information for Port Heiden for the project study year (2016), the 2010 decennial census, and the 5-year average ACS estimate for 2012–2016. The estimated 2016 population from this project's survey effort was 105 people, and the Alaska Native population was estimated at 87 individuals (83% of population) (Table 2-13; Figure 2-13). The estimated number of households was 39 with a mean household size of 2.7 occupants (Table 2-14). There were an estimated 31 Alaska Native households. Household survey estimates barely differed from the 2010 U.S. Census Bureau results but slightly diverged from the 5-year average ACS estimate (Table 2-13). The U.S. Census Bureau estimated 35 households (102 people) in 2010 and an Alaska Native population of 87 people (85% of the total community) while the ACS estimated for 2016 that there were 23 households, 73 people, and an Alaska Native population of 54 people (74% of the total community).

Figure 2-14 shows the historical population of Port Heiden beginning in 1960, when, according to the U.S. Census Bureau, just fewer than 80 people lived in Port Heiden. The population continued to rise until its peak in the mid-1990s of around 140 individuals; the population then declined to its current lower estimate. Although the overall rise in population (from 1960 to the 2016 estimate of 105) was 31 people, little evidence exists in other research to ascertain reasons for the population flux.

There were more males in Port Heiden (an estimated 61) compared to the estimated 44 females in 2016 (Figure 2-15; Table 2-15). Within both groups most residents were under the age of 30 years old. Connections to the commercial fishing industry may inform some of the reasons why the majority of the population was male and aged younger than the 40–44 age range. In 2016, children of all ages and both genders lived in Port Heiden; of note, there were six females and males each in the 0–4 age range, and one-third of males and 22% of females were younger than age 15. The largest female group was the 30–34 age cohort. The average age of a Port Heiden resident during the study was 29, with the minimum age being less than a year old and the maximum being 85 years old (Table 2-14). The average length of residency for the total population was 17 years; household heads on average have lived in the community for 24 years.

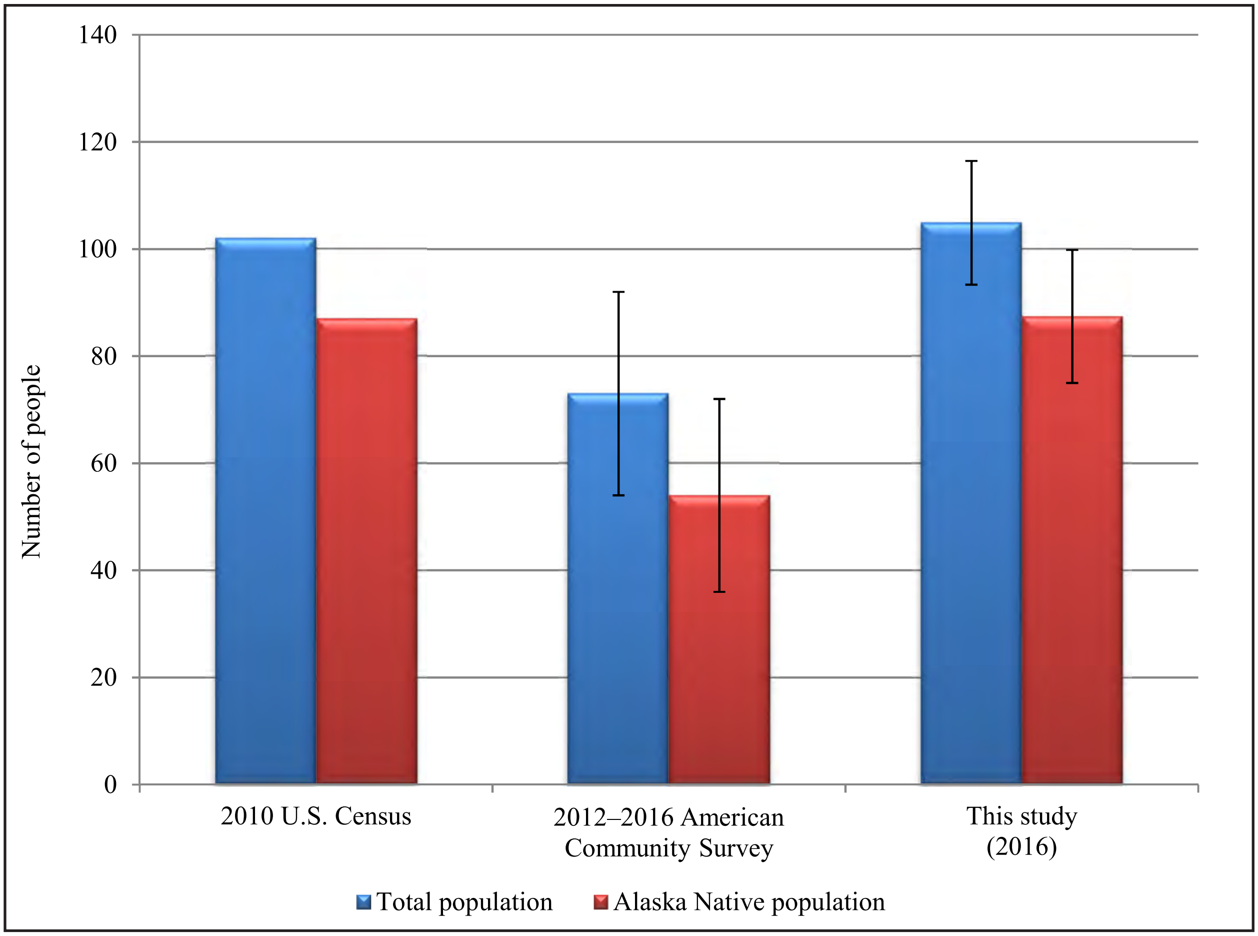


Figure 2-13.–Alaska Native and overall population estimates, Port Heiden, 2010 and 2016.

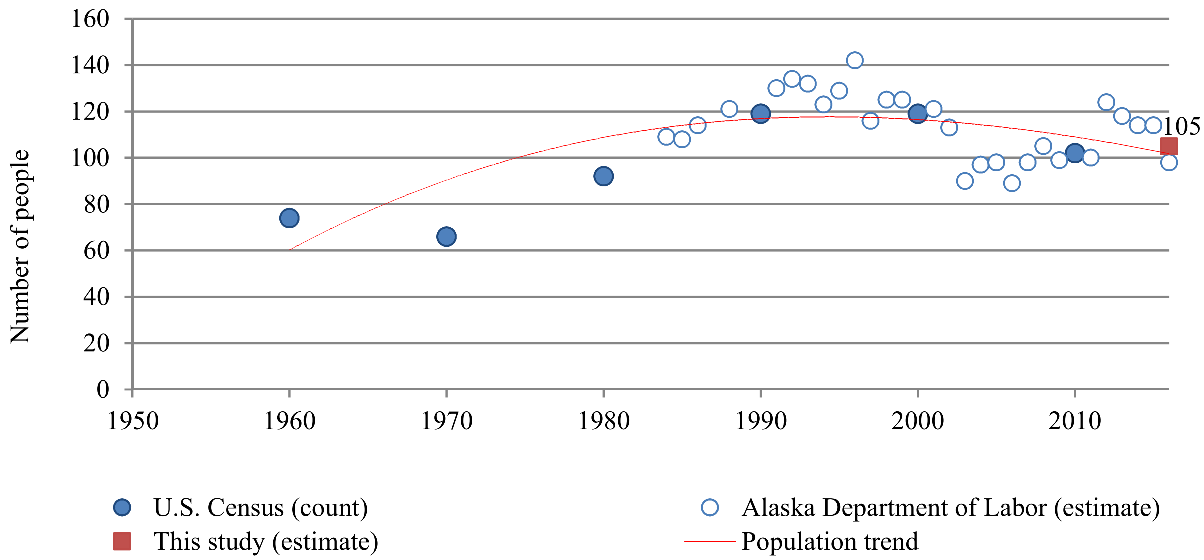
Table 2-14.–Sample and demographic characteristics, Port Heiden, 2016.

Characteristics	Community Port Heiden
Sampled households	29
Eligible households	39
Percentage sampled	74.4%
Sampled population	78
Estimated community population	104.9
Household size	
Mean	2.7
Minimum	1
Maximum	5
Age	
Mean	28.9
Minimum[a]	0
Maximum	85
Median	30
Length of residency	
Total population	
Mean	17.2
Minimum[a]	0
Maximum	60
Heads of household	
Mean	24.1
Minimum[a]	0
Maximum	60
Alaska Native	
Estimated households[b]	
Number	30.9
Percentage	79.3%
Estimated population	
Number	87.4
Percentage	83.3%

Source ADF&G Division of Subsistence household surveys, 2017.

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

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



Note Population data for this community are not available prior to 1960.

Figure 2-14.–Historical population estimates, Port Heiden, 1950–2016.

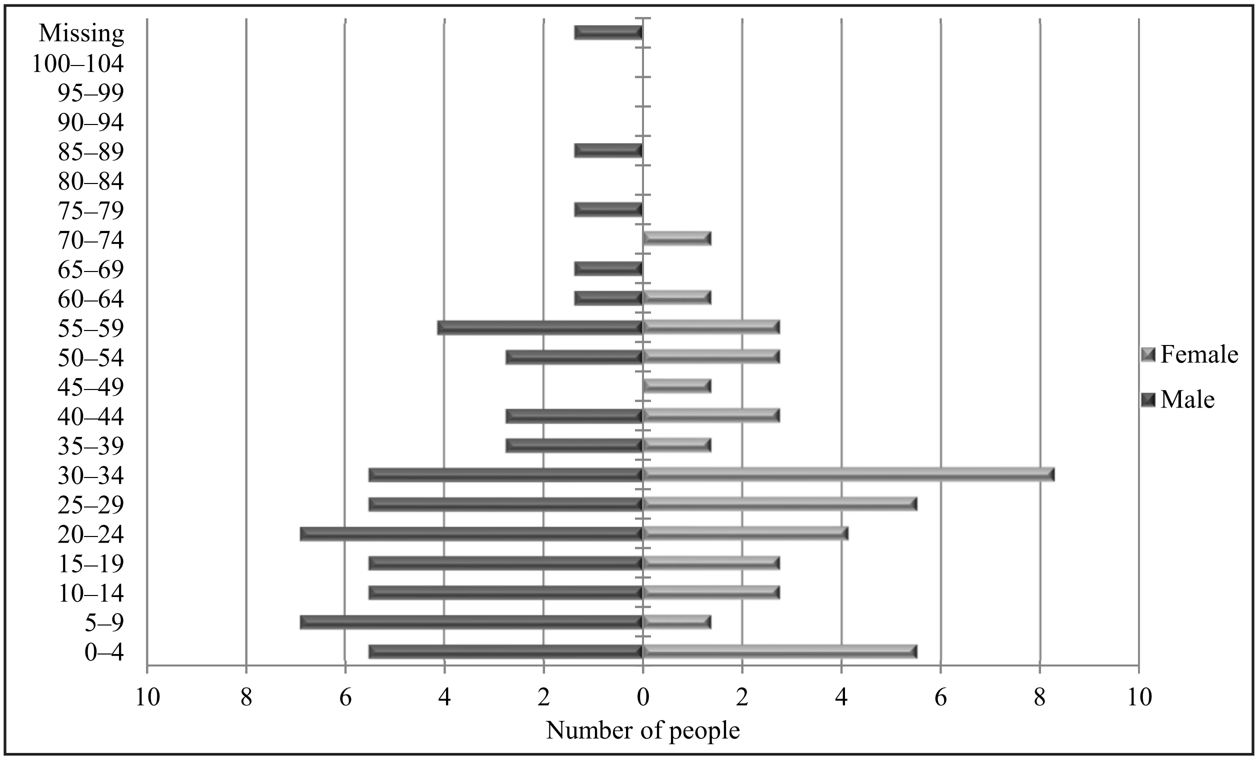


Figure 2-15.–Population profile, Port Heiden, 2016.

Table 2-15.–Population profile, Port Heiden, 2016.

Age	Male Number	Male Percentage	Male Cumulative percentage	Female Number	Female Percentage	Female Cumulative percentage	Total Number	Total Percentage	Total Cumulative percentage
0–4	5.5	9.1%	9.1%	5.5	12.5%	12.5%	11.0	10.5%	10.5%
5–9	6.9	11.4%	20.5%	1.4	3.1%	15.6%	8.3	7.9%	18.4%
10–14	5.5	9.1%	29.5%	2.8	6.3%	21.9%	8.3	7.9%	26.3%
15–19	5.5	9.1%	38.6%	2.8	6.3%	28.1%	8.3	7.9%	34.2%
20–24	6.9	11.4%	50.0%	4.1	9.4%	37.5%	11.0	10.5%	44.7%
25–29	5.5	9.1%	59.1%	5.5	12.5%	50.0%	11.0	10.5%	55.3%
30–34	5.5	9.1%	68.2%	8.3	18.8%	68.8%	13.8	13.2%	68.4%
35–39	2.8	4.5%	72.7%	1.4	3.1%	71.9%	4.1	3.9%	72.4%
40–44	2.8	4.5%	77.3%	2.8	6.3%	78.1%	5.5	5.3%	77.6%
45–49	0.0	0.0%	77.3%	1.4	3.1%	81.3%	1.4	1.3%	78.9%
50–54	2.8	4.5%	81.8%	2.8	6.3%	87.5%	5.5	5.3%	84.2%
55–59	4.1	6.8%	88.6%	2.8	6.3%	93.8%	6.9	6.6%	90.8%
60–64	1.4	2.3%	90.9%	1.4	3.1%	96.9%	2.8	2.6%	93.4%
65–69	1.4	2.3%	93.2%	0.0	0.0%	96.9%	1.4	1.3%	94.7%
70–74	0.0	0.0%	93.2%	1.4	3.1%	100.0%	1.4	1.3%	96.1%
75–79	1.4	2.3%	95.5%	0.0	0.0%	100.0%	1.4	1.3%	97.4%
80–84	0.0	0.0%	95.5%	0.0	0.0%	100.0%	0.0	0.0%	97.4%
85–89	1.4	2.3%	97.7%	0.0	0.0%	100.0%	1.4	1.3%	98.7%
90–94	0.0	0.0%	97.7%	0.0	0.0%	100.0%	0.0	0.0%	98.7%
95–99	0.0	0.0%	97.7%	0.0	0.0%	100.0%	0.0	0.0%	98.7%
100–104	0.0	0.0%	97.7%	0.0	0.0%	100.0%	0.0	0.0%	98.7%
Missing	1.4	2.3%	100.0%	0.0	0.0%	100.0%	1.4	1.3%	100.0%
Total	**60.7**	**100.0%**	**100.0%**	**44.2**	**100.0%**	**100.0%**	**104.9**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2017.

Table 2-16.–Population estimates, Egegik, 2010 and 2016.

	Census (2010)	5-year American Community Survey (2012–2016)		This study (2016)	
		Estimate	Range[a]	Estimate	Range[b]
Total population					
Households	29	22.0	11 – 33	21.0	
Population	109	80.0	56 – 104	38.9	37 – 41
Alaska Native					
Population	51	26.0	14 – 38	27.3	26 – 29
Percentage	46.8%	32.5%	17.5% – 47.5%	70.3%	65.9% – 74.7%

Sources U.S. Census Bureau (2011) for 2010 estimate; U.S. Census Bureau for American Community Survey (ACS) 2016 estimate (5-year average); and ADF&G Division of Subsistence household surveys, 2017, for 2016 estimate.

Note Division of Subsistence household survey elegiblity requirements differ from those used by ACS.

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

b. No range of households is estimated for division surveys.

Egegik

During 2016, an estimated 39 individuals lived in 21 households in Egegik; 70% of the estimated population was Alaska Native (Table 2-16). This study's estimates are significantly lower than the 5-year ACS estimate from 2012–2016 of 80 individuals and the 2010 decennial census of 109 people. Interestingly, despite the difference in population estimates, the ACS and this study estimated a similar number of households and number of Alaska Native residents (Table 2-16; Figure 2-16). While historically Egegik was a predominantly Alaska Native village, the contemporary economy is based on commercial fishing and fish processing, bringing an annual influx of non-local residents.

The population of Egegik has fluctuated since the 1950 U.S. Census count with an overall decreasing trend (Figure 2-17). The population peaked in 1960 at 150 residents and this study's estimate is the lowest at 39 people. Since 1980, a decadal pattern is evident in the population estimates: growth through the 1980s, relatively high estimates in the 1990s and 2010s with lower estimates through the 2000s. The population from this estimate and from ADL show a marked decrease from 2015. A lack of year-round employment has likely contributed to the fluctuations in population over time. Families that have left Egegik often return in the summer to fish and stay in homes they own or with relatives in the community, a practice that has been going on since at least the 1980s (Morris 1987). With few employment options and declining availability of local caribou herds, more families have moved away. The local K–12 school closed during 2014, likely contributing to the recent low population estimates.

Of the 21 year-round households in Egegik, 20 were surveyed for this study (Table 2-17). Based on this sample, an estimated average of 1.9 people lived in a household during the study period, with a maximum of four residents and a minimum of one. Residents averaged 43 years of age; the youngest resident of any household was less than 1 year old and the oldest was 74 years old. An average resident of Egegik in 2016 had lived in the community for 26 years; among heads of households, the average length of residency was slightly higher at 28 years. More men than women lived in Egegik in 2016, and, for both genders, the majority of the population was between 45 and 74 years old (Table 2-18; Figure 2-18). No residents were between the ages of 30 to 44; there were no females in the community aged 5 to 19 and no males in the 10–14 age group. In comparison, in 1984, 79% of the sampled population was 40 years old or younger (Morris 1987:27).

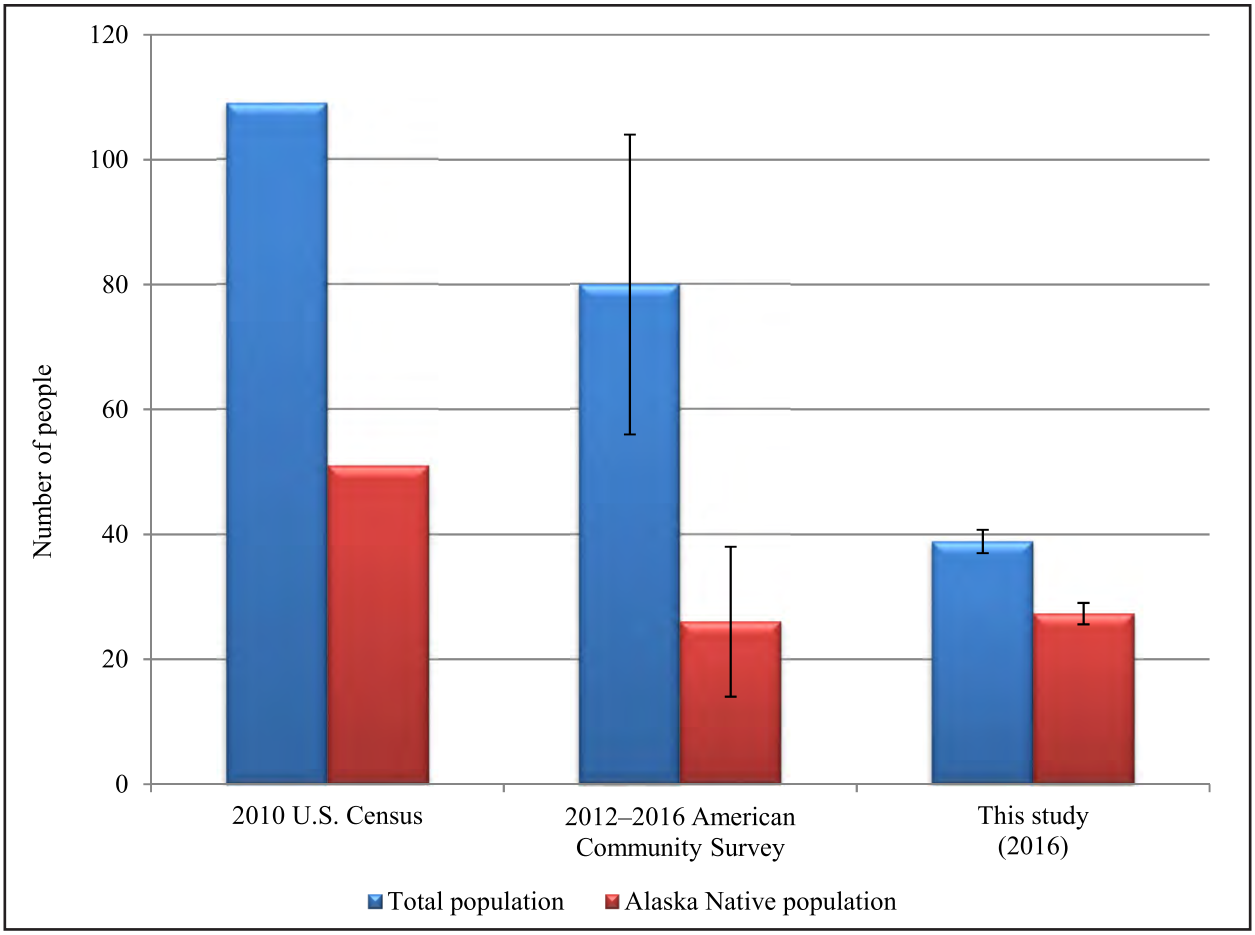


Figure 2-16.–Alaska Native and overall population estimates, Egegik, 2010 and 2016.

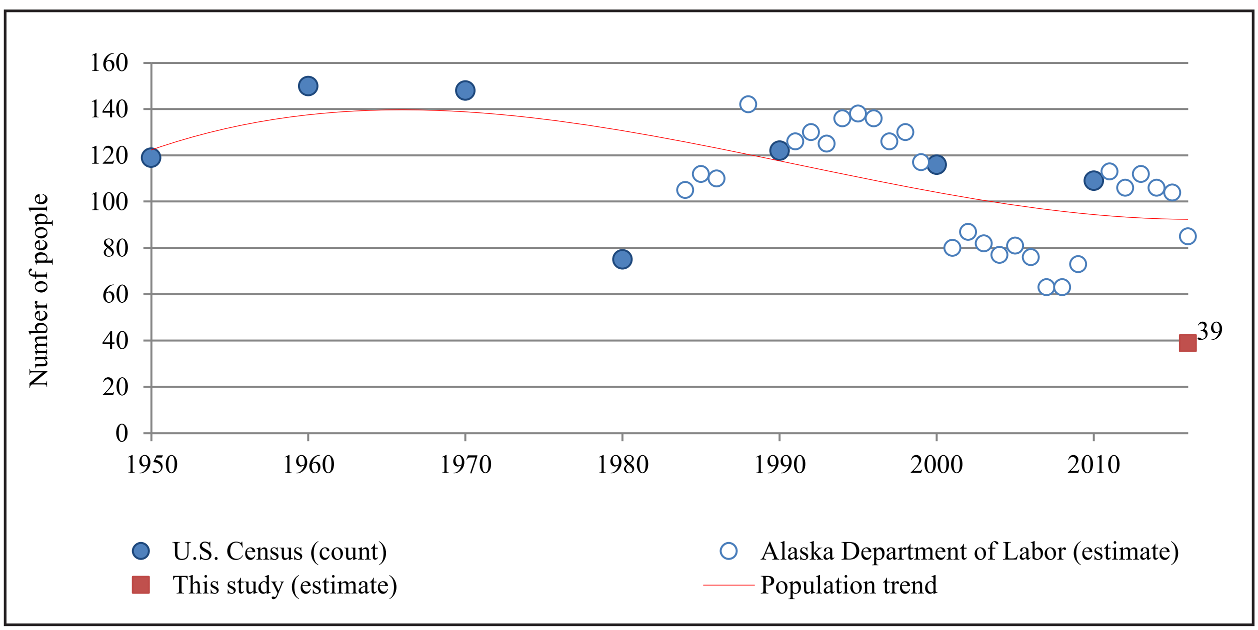


Figure 2-17.–Historical population estimates, Egegik, 1950–2016.

Table 2-17.–Sample and demographic characteristics, Egegik, 2016.

Characteristics	Community Egegik
Sampled households	20
Eligible households	21
Percentage sampled	95.2%
Sampled population	37
Estimated community population	38.9
Household size	
Mean	1.9
Minimum	1
Maximum	4
Age	
Mean	43.2
Minimum[a]	0
Maximum	74
Median	30
Length of residency	
Total population	
Mean	26.3
Minimum[a]	0
Maximum	74
Heads of household	
Mean	28.2
Minimum[a]	0
Maximum	74
Alaska Native	
Estimated households[b]	
Number	17.9
Percentage	85.0%
Estimated population	
Number	27.3
Percentage	70.3%

Source ADF&G Division of Subsistence household surveys, 2017.

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

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

Table 2-18.–Population profile, Egegik, 2016.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	2.1	8.3%	8.3%	1.1	7.7%	7.7%	3.2	8.1%	8.1%
5–9	1.1	4.2%	12.5%	0.0	0.0%	7.7%	1.1	2.7%	10.8%
10–14	0.0	0.0%	12.5%	0.0	0.0%	7.7%	0.0	0.0%	10.8%
15–19	2.1	8.3%	20.8%	0.0	0.0%	7.7%	2.1	5.4%	16.2%
20–24	2.1	8.3%	29.2%	2.1	15.4%	23.1%	4.2	10.8%	27.0%
25–29	1.1	4.2%	33.3%	1.1	7.7%	30.8%	2.1	5.4%	32.4%
30–34	0.0	0.0%	33.3%	0.0	0.0%	30.8%	0.0	0.0%	32.4%
35–39	0.0	0.0%	33.3%	0.0	0.0%	30.8%	0.0	0.0%	32.4%
40–44	0.0	0.0%	33.3%	0.0	0.0%	30.8%	0.0	0.0%	32.4%
45–49	2.1	8.3%	41.7%	2.1	15.4%	46.2%	4.2	10.8%	43.2%
50–54	3.2	12.5%	54.2%	2.1	15.4%	61.5%	5.3	13.5%	56.8%
55–59	3.2	12.5%	66.7%	1.1	7.7%	69.2%	4.2	10.8%	67.6%
60–64	4.2	16.7%	83.3%	1.1	7.7%	76.9%	5.3	13.5%	81.1%
65–69	2.1	8.3%	91.7%	1.1	7.7%	84.6%	3.2	8.1%	89.2%
70–74	2.1	8.3%	100.0%	1.1	7.7%	92.3%	3.2	8.1%	97.3%
75–79	0.0	0.0%	100.0%	0.0	0.0%	92.3%	0.0	0.0%	97.3%
80–84	0.0	0.0%	100.0%	0.0	0.0%	92.3%	0.0	0.0%	97.3%
85–89	0.0	0.0%	100.0%	0.0	0.0%	92.3%	0.0	0.0%	97.3%
90–94	0.0	0.0%	100.0%	0.0	0.0%	92.3%	0.0	0.0%	97.3%
95–99	0.0	0.0%	100.0%	0.0	0.0%	92.3%	0.0	0.0%	97.3%
100–104	0.0	0.0%	100.0%	0.0	0.0%	92.3%	0.0	0.0%	97.3%
Missing	0.0	0.0%	100.0%	1.1	7.7%	100.0%	1.1	2.7%	100.0%
Total	**25.2**	**100.0%**	**100.0%**	**13.7**	**100.0%**	**100.0%**	**38.9**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2017.

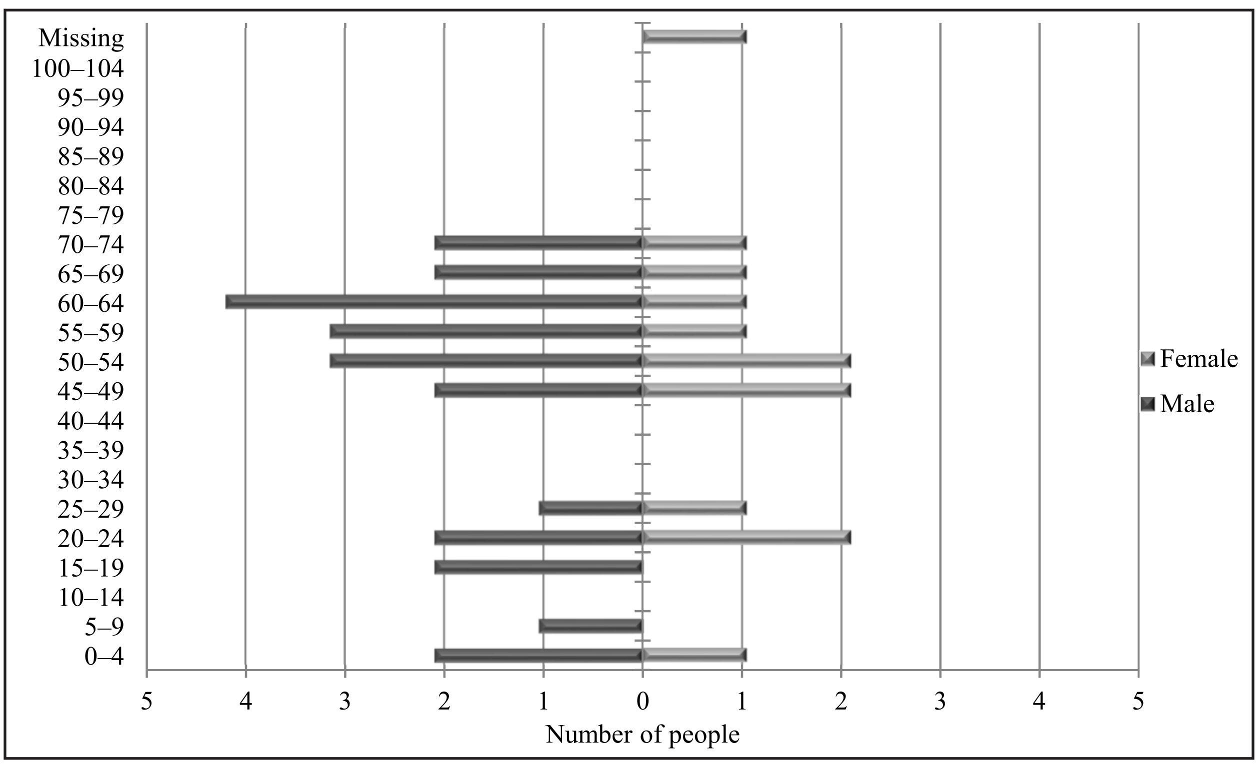


Figure 2-18.–Population profile, Egegik, 2016.

Summary of Harvest and Use Patterns

Survey participants were asked about their engagement with salmon fisheries and hunting effort for three large land mammal species. This section contains a series of tables and figures that provide the estimated results from survey data for both salmon and large land mammals resources combined, and also results that focus specifically on salmon or large land mammals uses and harvests at the species level. First, overall household participation for all communities is reviewed, and then survey results for salmon and large land mammals resources are discussed separately.

Of note is that the survey effort included two ways to identify gear types used for salmon harvests in the study communities. First, respondents were asked to identify the gear type used for salmon harvests reported on the household survey. Second, when identifying fishing and harvest locations on a map, respondents were asked to identify the type of harvest gear used at each location. Note that not every surveyed household provided spatial data and some households did not provide clarification about the gear used at specific fishing and harvest locations. Therefore, the survey results provide two different depictions of salmon harvest patterns by gear type, and each set of results is discussed in different subsections below. Also, respondents were not asked to identify where commercial harvests retained for home use came from, but tables showing harvests by gear type do depict the estimated amount of salmon retained from commercial catches.

Household Participation

The majority of households in all communities used salmon during the study year, ranging from 100% of households in Perryville, Chignik Bay, and Chignik Lagoon to 97% and 96% of households in Port Heiden and Chignik Lake, respectively, to the lowest percentage of households (80%) using salmon in Egegik (figures 2-19 through 2-24). In all the communities, fewer households fished for salmon than used salmon, and most households in all the communities that fished were successful. All households that attempted to harvest salmon were able to do so in Egegik (45% of households), Chignik Bay (63%), and Chignik Lagoon (85%). In Port Heiden, 90% of households fished for salmon and 86% harvested; in Perryville, 77% of households attempted to and 73% of households did harvest salmon; and, in Chignik Lake, 75% of households fished and 71% of households harvested salmon.

In general, more households in each of these communities fished for and used salmon than hunted for or used large land mammals; resource availability and accessible and legal harvest opportunity play a role in this pattern, which will be discussed in more detail later. Furthermore, households were more successful at fishing than at hunting, except in Chignik Bay where every household that hunted or fished was successful. Use of large land mammals in these communities ranged from a high of 93% of households in Chignik Lake to a low of 35% of households in Chignik Lagoon. At least one-half of all households used large land mammals resources in the other four communities: 50% of households in Egegik, 63% in Chignik Bay, 73% in Perryville, and 83% in Port Heiden. Only in Port Heiden did more than one-half of the community households hunt (55%); in Perryville one-half of the households hunted, and in Chignik Lake 46% of households hunted. In the other three communities, one-quarter or fewer households hunted. Port Heiden also had the most households that harvested large land mammals with 48% of households doing so. No households in Egegik or Chignik Lagoon harvested resources from this category. In the remaining communities, an estimated 13%–35% of households harvested at least one large land mammal.

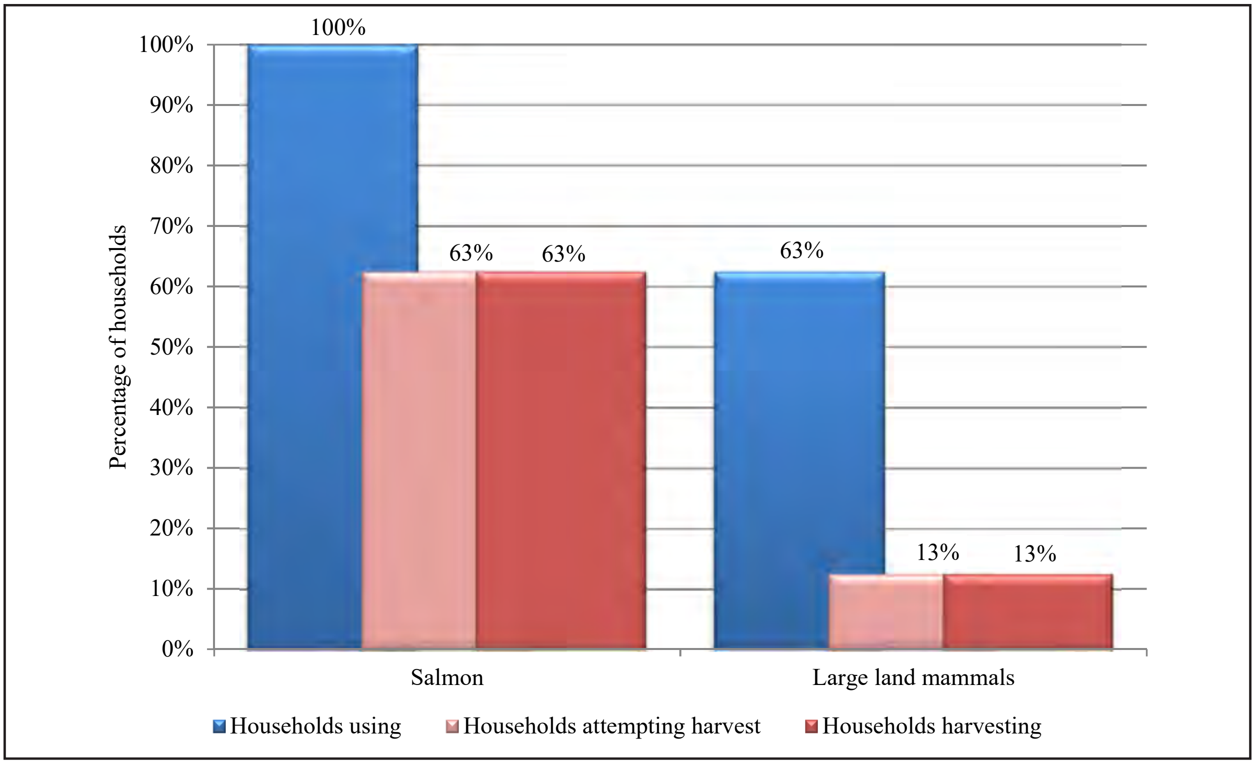


Figure 2-19.–Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Chignik Bay, 2016.

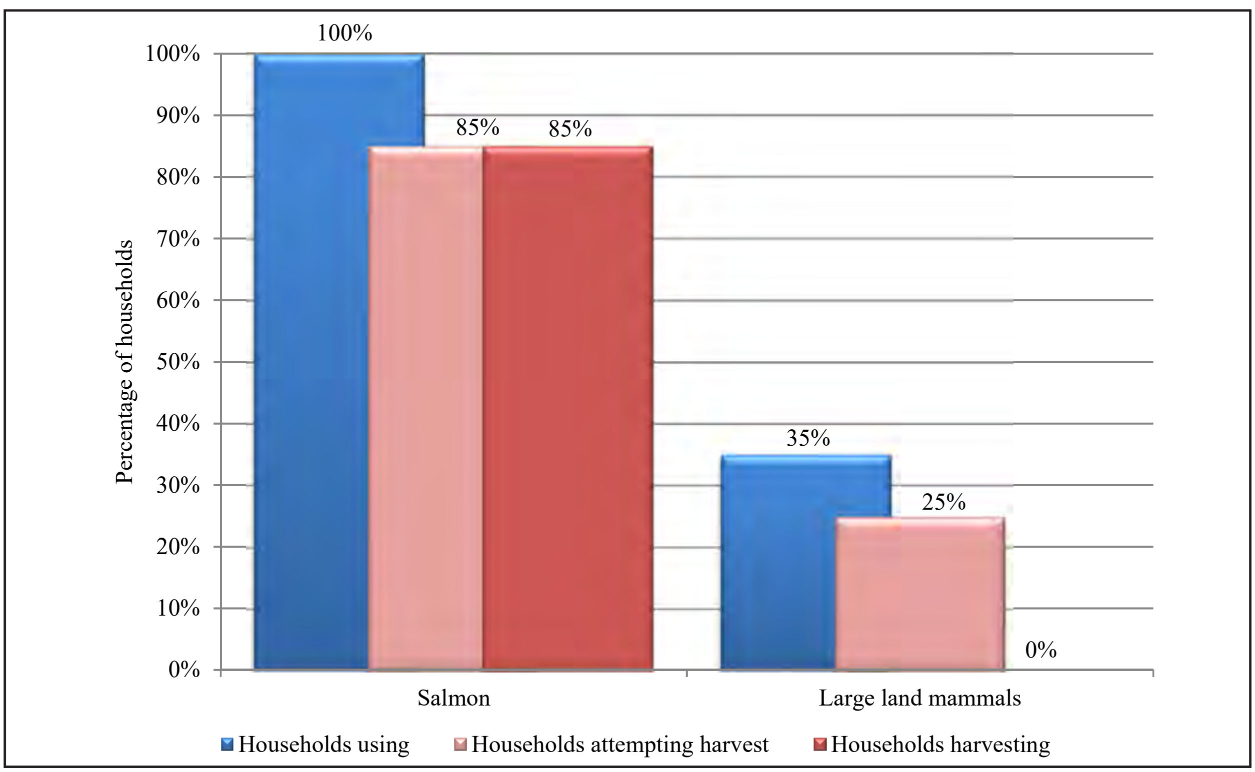


Figure 2-20.–Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Chignik Lagoon, 2016.

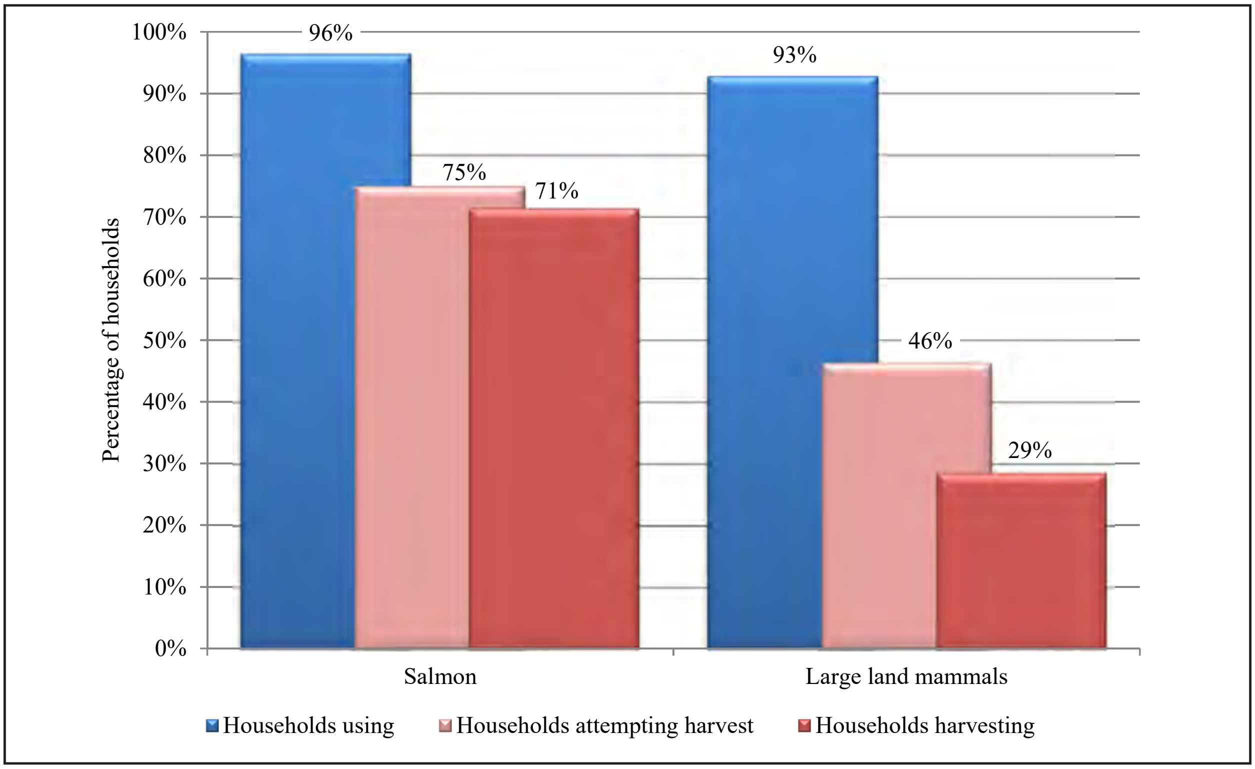


Figure 2-21.–Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Chignik Lake, 2016.

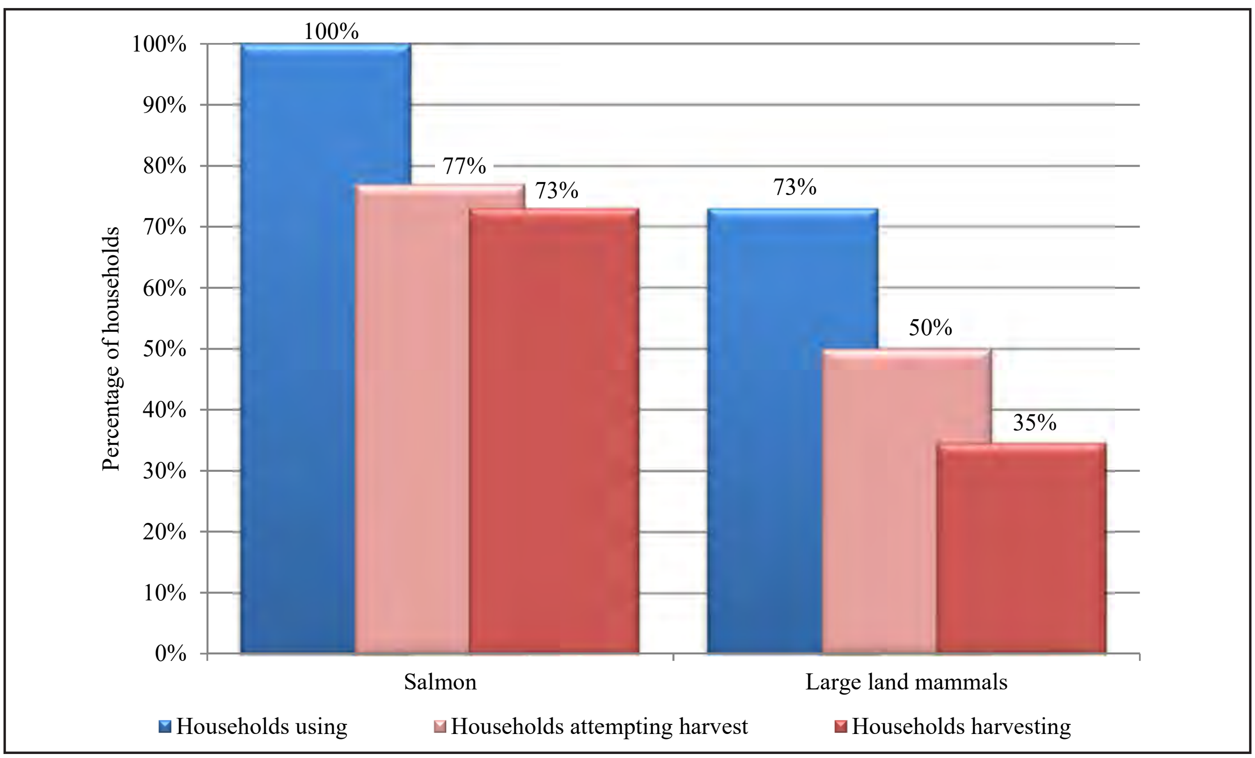


Figure 2-22.–Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Perryville, 2016.

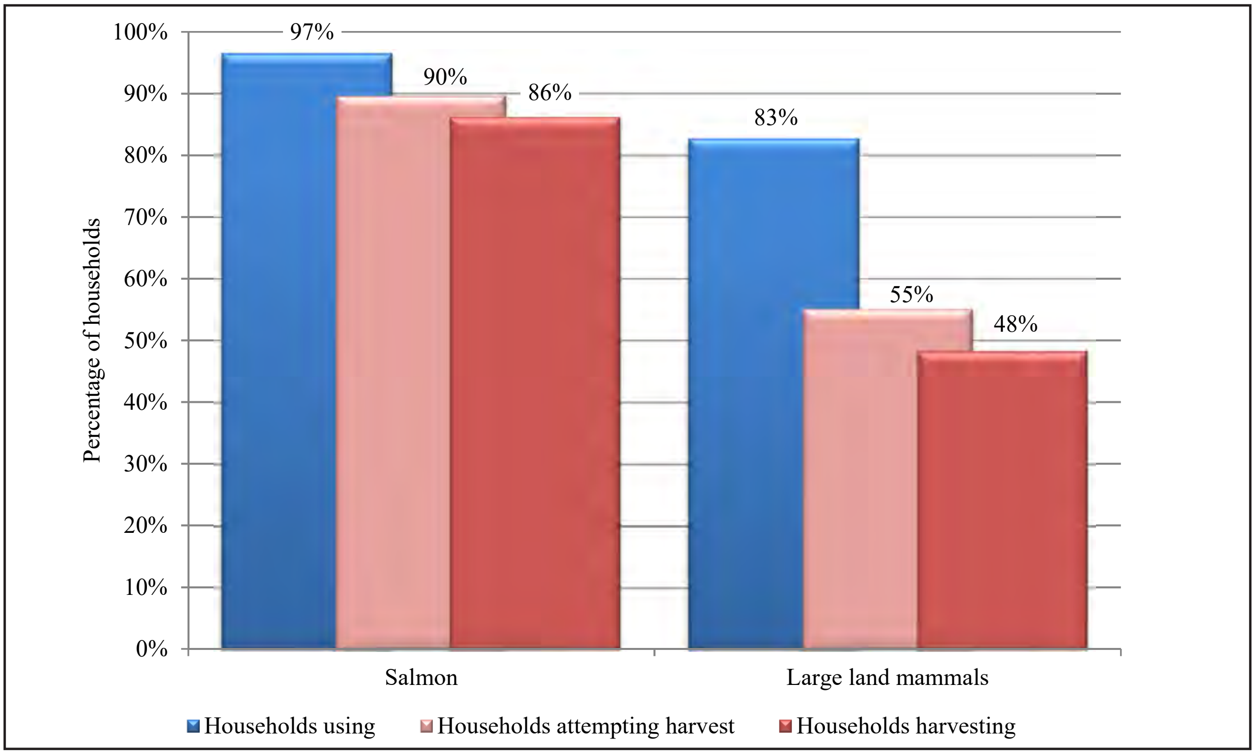


Figure 2-23.–Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Port Heiden, 2016.

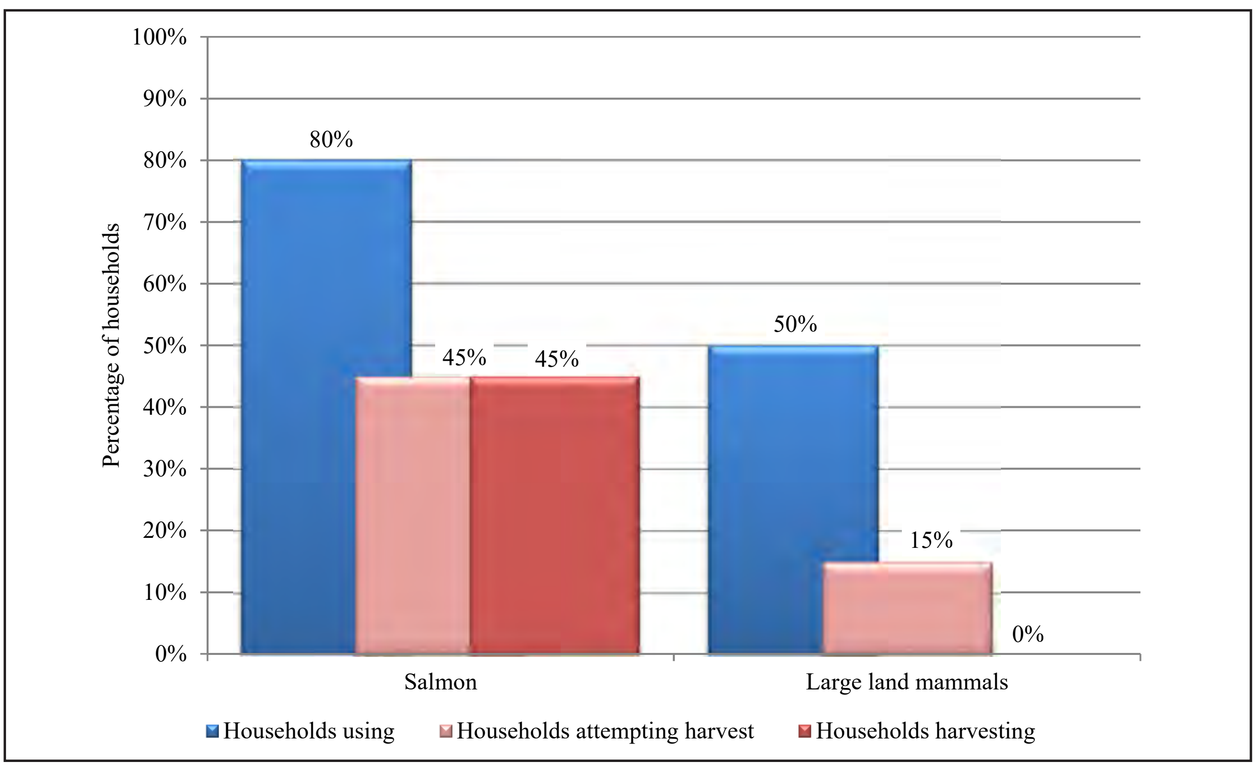


Figure 2-24.–Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Egegik, 2016.

Household Harvest and Use Characteristics by Resource Category

As already discussed in the section "Household Participation," in every community, more households used large land mammals than harvested these resources. Tables 2-19 through 2-24 provide additional estimated use characteristics for both salmon and large land mammals. The estimated percentages of households sharing and receiving the resources, especially large land mammals, illustrate how the uses of these resources are tied to sharing networks. In every community, the percentage of households using large land mammals was closer to the percentage of households that received this resource than the percentage of households that harvested large land mammals. In every community, the percentage of households giving away large land mammals exceeded the percentage of households that harvested these resources, which was due to redistribution. Finally, in every community, more households received large land mammals than gave away these resources. Research during the 1980s and 1990s showed that large land mammals were a staple in the subsistence economy of these communities (Fall 1993; Krieg et al. 1996, 1998; Wright et al. 1985). With local declines in these resource populations, especially of caribou, leading to reduced hunting opportunity, sharing of resources from other communities became, and remains, an important method for households to obtain large land mammals (Crowley 2017; Harper and McCarthy 2015:4-1–4-12).

Tables 2-19 through 2-24 show household sharing characteristics for salmon also, but the survey form included an additional focused series of questions regarding salmon sharing networks and salmon trading, and those more detailed results are discussed in Chapter 4. In the remaining subsections for this section "Summary of Harvest and Use Patterns," salmon uses and harvests will be discussed separately from large land mammals results.

Household Salmon Harvest and Use Characteristics

Chignik Bay

All five species of Pacific salmon found in Alaska, except for chum salmon, were used, harvested, and shared by Chignik Bay households in 2016 (Table 2-19). Sockeye salmon was the most used, harvested, and shared species by Chignik Bay residents in 2016: 88% of all households used, 54% attempted to harvest as well as harvested, 50% received, and 46% of households gave away sockeye salmon. Chinook salmon were used by 50% of Chignik Bay households, 25% of households fished for and harvested, 29% received, and 21% gave away Chinook salmon in 2016. An estimated 25% of Chignik Bay households used coho salmon; in comparison, about one-half as many households (13%) fished for, harvested, and received coho salmon, and 8% of households gave away this species. Pink salmon was the least used identified species: only 8% of households used, and 4% harvested, pink salmon. Chum salmon were not harvested or used in 2016. Although an estimated 29% of households received salmon and were unsure of what species they received and used, no households harvested salmon of unknown species.

Table 2-19.–Estimated uses and harvests of salmon and large land mammals, Chignik Bay, 2016.

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±)
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	harvest
Salmon	**100.0**	**62.5**	**62.5**	**83.3**	**54.2**	**7,637.0**	**282.9**	**99.8**	**1,728.0**	**ind**	**64.0**	**25.4**
Chum salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Coho salmon	25.0	12.5	12.5	12.5	8.3	58.9	2.2	0.8	11.3	ind	0.4	39.7
Chinook salmon	50.0	25.0	25.0	29.2	20.8	305.7	11.3	4.0	56.3	ind	2.1	41.9
Pink salmon	8.3	8.3	4.2	4.2	4.2	13.2	0.5	0.2	4.5	ind	0.2	69.0
Sockeye salmon	87.5	54.2	54.2	50.0	45.8	7,259.3	268.9	94.9	1,656.0	ind	61.3	25.8
Unknown salmon	29.2	0.0	0.0	29.2	12.5	0.0	0.0	0.0	0.0	ind	0.0	0.0
Large land mammals	**62.5**	**12.5**	**12.5**	**54.2**	**20.8**	**843.8**	**31.3**	**11.0**	**843.8**	**lb**	**31.3**	**39.7**
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Caribou	45.8	12.5	12.5	33.3	12.5	843.8	31.3	11.0	5.6	ind	0.2	39.7
Moose	25.0	8.3	0.0	25.0	12.5	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

Note Resources where the percentage using is greater than the combined received and harvest indicate use from resources obtained during a previous year.

Table 2-20.–Estimated uses and harvests of salmon and large land mammals, Chignik Lagoon, 2016.

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±)
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	harvest
Salmon	**100.0**	**85.0**	**85.0**	**75.0**	**60.0**	**11,602.3**	**446.2**	**162.3**	**2,608.5**	**ind**	**100.3**	**23.1**
Chum salmon	5.0	5.0	5.0	0.0	0.0	490.6	18.9	6.9	97.5	ind	3.8	100.5
Coho salmon	30.0	25.0	25.0	5.0	15.0	619.1	23.8	8.7	118.3	ind	4.6	67.4
Chinook salmon	65.0	55.0	55.0	20.0	25.0	1,003.2	38.6	14.0	184.6	ind	7.1	31.6
Pink salmon	10.0	10.0	10.0	0.0	5.0	380.1	14.6	5.3	130.0	ind	5.0	78.2
Sockeye salmon	100.0	85.0	85.0	60.0	60.0	9,109.4	350.4	127.4	2,078.1	ind	79.9	21.5
Unknown salmon	15.0	0.0	0.0	15.0	10.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Large land mammals	**35.0**	**25.0**	**0.0**	**35.0**	**10.0**	**0.0**	**0.0**	**0.0**	**0.0**	**lb**	**0.0**	**0.0**
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Caribou	30.0	15.0	0.0	30.0	5.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Deer	5.0	NA	NA	5.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Moose	10.0	25.0	0.0	10.0	5.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

Note Resources where the percentage using is greater than the combined received and harvest indicate use from resources obtained during a previous year.

Note "NA" indicates the resource was not included in the survey form; the percentage of households that used, received, or gave away the resource represents households that volunteered the occurrence of use and sharing of the species.

Table 2-21.–Estimated uses and harvests of salmon and large land mammals, Chignik Lake, 2016.

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±)
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	harvest
Salmon	**96.4**	**75.0**	**71.4**	**85.7**	**57.1**	**8,851.4**	**268.2**	**89.4**	**2,013.0**	**ind**	**61.0**	**17.4**
Chum salmon	3.6	3.6	3.6	0.0	0.0	23.7	0.7	0.2	4.7	ind	0.1	79.9
Coho salmon	7.1	3.6	0.0	7.1	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Chinook salmon	21.4	10.7	7.1	14.3	7.1	160.1	4.9	1.6	29.5	ind	0.9	73.5
Pink salmon	14.3	3.6	3.6	10.7	0.0	13.8	0.4	0.1	4.7	ind	0.1	79.9
Sockeye salmon	89.3	75.0	71.4	39.3	53.6	8,653.8	262.2	87.4	1,974.1	ind	59.8	17.2
Unknown salmon	32.1	0.0	0.0	32.1	25.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Large land mammals	**92.9**	**46.4**	**28.6**	**89.3**	**57.1**	**5,392.6**	**163.4**	**54.5**	**5,392.6**	**lb**	**163.4**	**28.0**
Brown bear	7.1	0.0	0.0	7.1	3.6	0.0	0.0	0.0	0.0	ind	0.0	0.0
Caribou	60.7	32.1	14.3	53.6	28.6	883.9	26.8	8.9	5.9	ind	0.2	33.0
Moose	78.6	42.9	25.0	64.3	46.4	4,508.7	136.6	45.5	8.3	ind	0.3	30.9

Source ADF&G Division of Subsistence household surveys, 2017.

Note Resources where the percentage using is greater than the combined received and harvest indicate use from resources obtained during a previous year.

Table 2-22.–Estimated uses and harvests of salmon and large land mammals, Perryville, 2016.

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±)
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	harvest
Salmon	**100.0**	**76.9**	**73.1**	**84.6**	**53.8**	**13,560.5**	**366.5**	**123.8**	**2,982.8**	**ind**	**80.6**	**24.7**
Chum salmon	42.3	26.9	26.9	19.2	15.4	737.5	19.9	6.7	146.6	ind	4.0	45.2
Coho salmon	69.2	50.0	50.0	34.6	23.1	3,373.5	91.2	30.8	644.7	ind	17.4	36.3
Chinook salmon	26.9	26.9	23.1	11.5	11.5	518.1	14.0	4.7	95.3	ind	2.6	72.2
Pink salmon	65.4	53.8	50.0	26.9	23.1	516.0	13.9	4.7	176.5	ind	4.8	32.6
Sockeye salmon	92.3	73.1	65.4	57.7	42.3	8,415.4	227.4	76.8	1,919.7	ind	51.9	26.9
Unknown salmon	19.2	0.0	0.0	19.2	7.7	0.0	0.0	0.0	0.0	ind	0.0	0.0
Large land mammals	**73.1**	**50.0**	**34.6**	**57.7**	**42.3**	**5,948.5**	**160.8**	**54.3**	**5,948.5**	**lb**	**160.8**	**39.0**
Brown bear	7.7	11.5	3.8	3.8	7.7	483.8	13.1	4.4	1.4	ind	0.0	0.0
Caribou	50.0	40.0	16.0	36.0	24.0	853.8	23.1	7.8	5.7	ind	0.2	52.7
Moose	53.8	38.5	19.2	38.5	23.1	4,610.8	124.6	42.1	8.5	ind	0.2	49.1

Source ADF&G Division of Subsistence household surveys, 2017.

Note Resources where the percentage using is greater than the combined received and harvest indicate use from resources obtained during a previous year.

Table 2-23.–Estimated uses and harvests of salmon and large land mammals, Port Heiden, 2016.

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±)
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	harvest
Salmon	**96.6**	**89.7**	**86.2**	**89.7**	**65.5**	**18,812.1**	**482.4**	**179.3**	**4,271.2**	**ind**	**109.5**	**42.0**
Chum salmon	17.2	13.8	13.8	3.4	3.4	251.6	6.5	2.4	52.4	ind	1.3	70.7
Coho salmon	82.8	75.9	72.4	55.2	34.5	2,796.5	71.7	26.7	593.1	ind	15.2	30.3
Chinook salmon	65.5	34.5	27.6	58.6	10.3	1,465.9	37.6	14.0	204.4	ind	5.2	57.2
Pink salmon	10.3	10.3	10.3	0.0	3.4	17.7	0.5	0.2	8.1	ind	0.2	57.7
Sockeye salmon	75.9	69.0	65.5	34.5	51.7	14,280.5	366.2	136.1	3,413.2	ind	87.5	52.1
Unknown salmon	6.9	0.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Large land mammals	**82.8**	**55.2**	**48.3**	**69.0**	**44.8**	**5,365.9**	**137.6**	**51.2**	**5,365.9**	**lb**	**137.6**	**29.2**
Black bear	3.4	NA	NA	3.4	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Brown bear	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Caribou	79.3	51.7	48.3	51.7	44.8	4,639.7	119.0	44.2	30.9	ind	0.8	26.3
Moose	55.2	37.9	3.4	51.7	10.3	726.2	18.6	6.9	1.3	ind	0.0	103.7
Dall sheep	3.4	NA	NA	3.4	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

Note Resources where the percentage using is greater than the combined received and harvest indicate use from resources obtained during a previous year.

Note "NA" indicates the resource was not included in the survey form; the percentage of households that used, received, or gave away the resource represents households that volunteered the occurrence of use and sharing of the species.

Table 2-24.–Estimated uses and harvests of salmon and large land mammals, Egegik, 2016.

Resource	Percentage of households: Use %	Attempt %	Harvest %	Receive %	Give %	Harvest weight (lb): Total	Mean per household	Per capita	Harvest amount: Total	Unit	Mean per household	95% confidence limit (±) harvest
Salmon	**80.0**	**45.0**	**45.0**	**50.0**	**40.0**	**1,944.5**	**92.6**	**50.1**	**441.0**	**ind**	**21.0**	**18.3**
Chum salmon	5.0	5.0	5.0	0.0	0.0	20.1	1.0	0.5	4.2	ind	0.2	45.7
Coho salmon	50.0	35.0	35.0	15.0	20.0	831.8	39.6	21.4	176.4	ind	8.4	23.0
Chinook salmon	50.0	20.0	20.0	30.0	20.0	67.8	3.2	1.7	9.5	ind	0.5	27.0
Pink salmon	5.0	5.0	5.0	0.0	5.0	27.6	1.3	0.7	12.6	ind	0.6	45.7
Sockeye salmon	60.0	35.0	35.0	25.0	25.0	997.2	47.5	25.7	238.4	ind	11.4	20.6
Unknown salmon	20.0	0.0	0.0	20.0	10.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Large land mammals	**50.0**	**15.0**	**0.0**	**50.0**	**15.0**	**0.0**	**0.0**	**0.0**	**0.0**	**lb**	**0.0**	**0.0**
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Caribou	10.0	10.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Moose	40.0	5.0	0.0	40.0	15.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

Note Resources where the percentage using is greater than the combined received and harvest indicate use from resources obtained during a previous year.

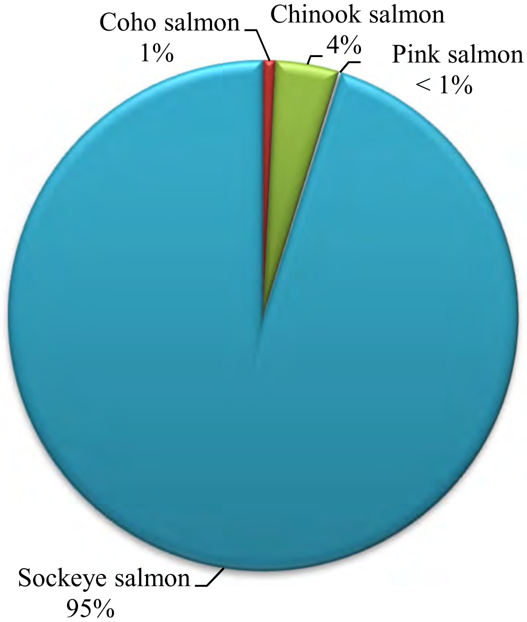


Figure 2-25.–Composition of salmon harvest in pounds usable weight, Chignik Bay, 2016.

In 2016, a total of 1,728 salmon (7,637 lb) were harvested by Chignik Bay residents. This equated to an average of 64 salmon (283 lb) harvested per household and 23 salmon (100 lb) per capita. Sockeye salmon represented 95% (1,656 fish; 7,259 lb) of Chignik Bay's total salmon harvest, which equated to 61 fish (269 lb) harvested per household and 95 lb (22 fish) per capita (Figure 2-25; Table 2-19). Chinook salmon was the second most used and harvested salmon species and represented 4% of the community harvest of salmon by weight (56 fish; 306 lb). Coho salmon represented only 1% of all the salmon harvest (11 fish; 59 lb), and pink salmon represented less than 1% (5 fish; 13 lb) of the total salmon harvest in 2016.

In 2016, household survey results estimated that 69% of the salmon harvest weight caught by Chignik Bay residents was obtained by removal from commercial harvests, 31% of the harvest was caught from subsistence gear (predominantly by seine [27%]), and a nominal harvest of a single species was by rod and reel (Table 2-25). As was the case for total salmon, most of the sockeye salmon harvest weight (68%) was removed from commercial harvests, and 32% was harvested by subsistence gear (3% by gillnet and 29% by seine). Chinook salmon harvested for home use were primarily obtained by removal from commercial harvests (96% of harvest weight), and 4% of the Chinook salmon harvest weight was caught by rod and reel. The coho salmon harvest was caught mostly using subsistence set and drift gillnets (80%) and 20% was obtained by removal from commercial catches. The few pink salmon harvested were all removed from commercial harvests.

The 2016 harvests of all salmon species, by pounds or number of salmon harvested by gear type, by Chignik Bay households are depicted in Figure 2-26 and Table 2-26. Out of a total 1,728 salmon harvested, most salmon (1,191 fish; 5,275 lb) were harvested by removal from commercial harvests; additionally, an estimated 534 salmon (2,350 lb) were harvested with subsistence gear. A total of 1,131 sockeye salmon (4,956 lb) were removed from commercial harvests, and the rest were caught with subsistence gear, including set gillnet (14 fish; 59 lb), drift gillnet (34 fish; 148 lb), and seine (478 fish; 2,096 lb). Most Chinook salmon harvested in 2016 by Chignik Bay residents were removed from commercial harvests (54 fish; 294 lb); additionally, Chinook salmon were caught by rod and reel (2 fish; 12 lb). Coho salmon were harvested equally by subsistence set gillnet and drift gillnet (the subsistence gillnet harvest was nine fish); also, fewer fish were removed from commercial harvests (two fish).

Table 2-25.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Chignik Bay, 2016.

				Subsistence methods															
	Percentage	Removed from commercial catch		Set gillnet		Drift gillnet		Seine		Handline		Other		Subsistence gear, any method		Rod and reel		Any method	
Resource	base	Number	Pounds	Number	Pounds	Number	Pounds	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%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**68.9%**	**69.1%**	**1.0%**	**1.1%**	**2.2%**	**2.2%**	**27.7%**	**27.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**30.9%**	**30.8%**	**0.1%**	**0.2%**	**100.0%**	**100.0%**
	Total	**68.9%**	**69.1%**	**1.0%**	**1.1%**	**2.2%**	**2.2%**	**27.7%**	**27.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**30.9%**	**30.8%**	**0.1%**	**0.2%**	**100.0%**	**100.0%**
Chum 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%	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%	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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Coho salmon	Gear type	0.2%	0.2%	25.0%	28.5%	11.8%	13.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	2.0%	0.0%	0.0%	0.7%	0.8%
	Resource	20.0%	20.0%	40.0%	40.0%	40.0%	40.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	80.0%	80.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.1%	0.2%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.6%	0.0%	0.0%	0.7%	0.8%
Chinook salmon	Gear type	4.5%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	3.3%	4.0%
	Resource	96.0%	96.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	4.0%	100.0%	100.0%
	Total	3.1%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	3.3%	4.0%
Pink salmon	Gear type	0.4%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.2%
	Resource	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.2%
Sockeye salmon	Gear type	94.9%	94.0%	75.0%	71.5%	88.2%	86.3%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	98.3%	98.0%	0.0%	0.0%	95.8%	95.1%
	Resource	68.3%	68.3%	0.8%	0.8%	2.0%	2.0%	28.9%	28.9%	0.0%	0.0%	0.0%	0.0%	31.7%	31.7%	0.0%	0.0%	100.0%	100.0%
	Total	65.4%	64.9%	0.8%	0.8%	2.0%	1.9%	27.7%	27.4%	0.0%	0.0%	0.0%	0.0%	30.4%	30.2%	0.0%	0.0%	95.8%	95.1%
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%	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%	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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

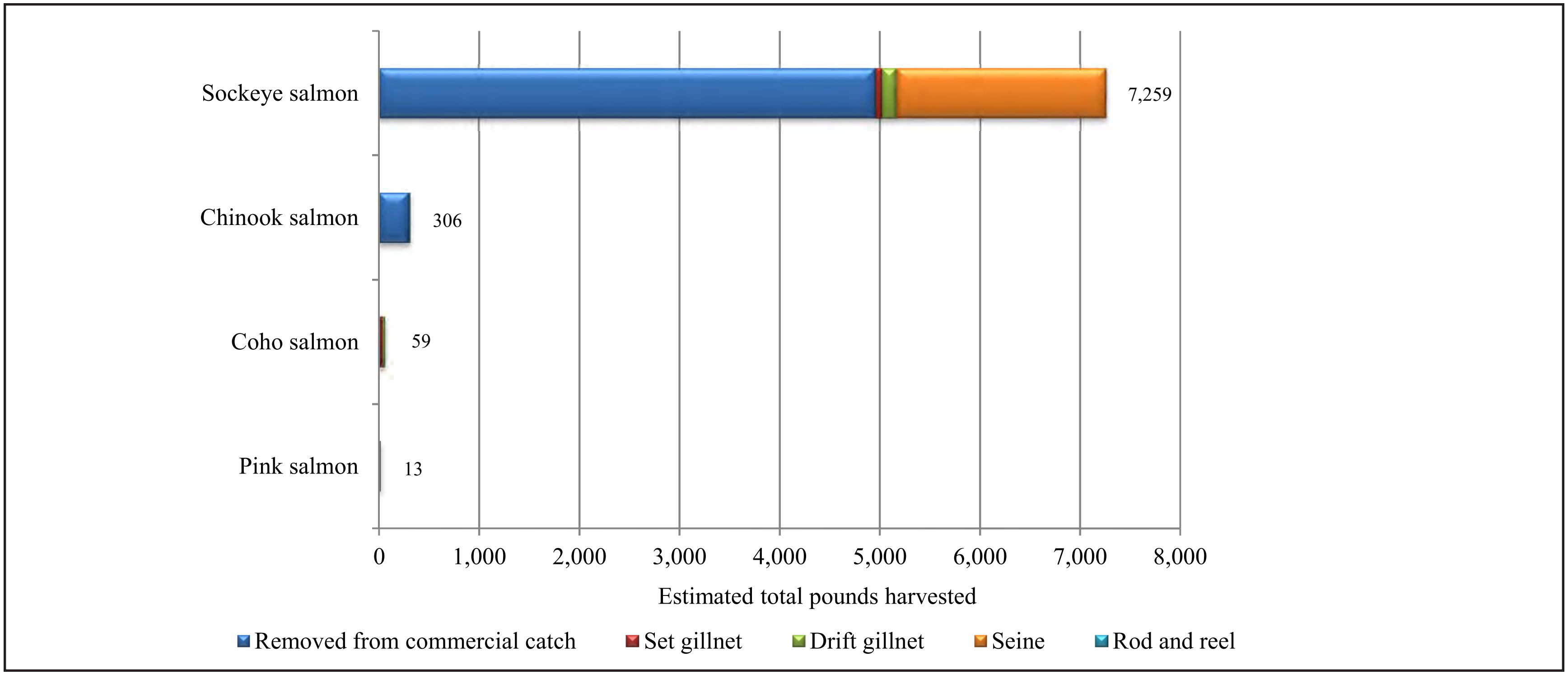


Figure 2-26.–Estimated harvests of salmon in pounds usable weight by gear type and resource, Chignik Bay, 2016.

Table 2-26.–Estimated harvests of salmon by gear type and resource, Chignik Bay, 2016.

			Subsistence methods																
	Removed from commercial catch		Set gillnet		Drift gillnet		Seine		Handline		Other methods		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**1,191.4**	**5,274.6**	**18.0**	**82.7**	**38.3**	**171.5**	**478.1**	**2,095.9**	**0.0**	**0.0**	**0.0**	**0.0**	**534.4**	**2,350.1**	**2.3**	**12.2**	**1,728.0**	**7,637.0**
Chum salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coho salmon	2.3	11.8	4.5	23.5	4.5	23.5	0.0	0.0	0.0	0.0	0.0	0.0	9.0	47.1	0.0	0.0	11.3	58.9
Chinook salmon	54.0	293.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	12.2	56.3	305.7
Pink salmon	4.5	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	13.2
Sockeye salmon	1,130.6	4,956.2	13.5	59.2	33.8	147.9	478.1	2,095.9	0.0	0.0	0.0	0.0	525.4	2,303.0	0.0	0.0	1,656.0	7,259.3
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

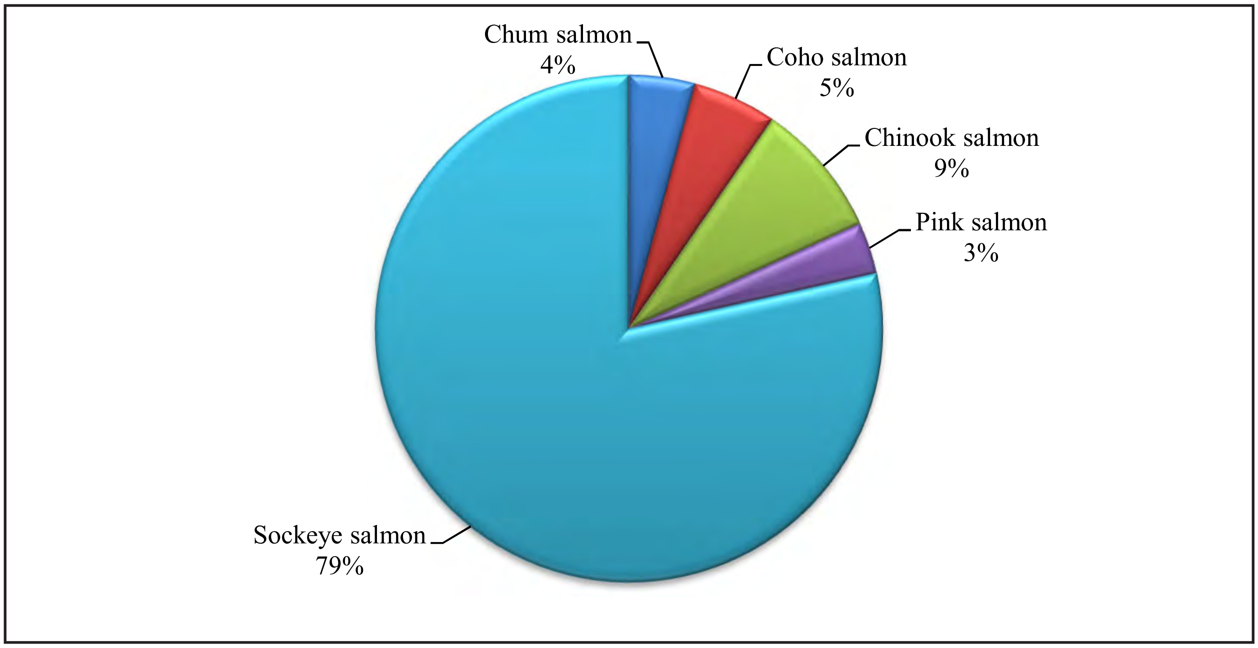


Figure 2-27.–Composition of salmon harvest in pounds usable weight, Chignik Lagoon, 2016.

Chignik Lagoon

All five species of Pacific salmon found in Alaska were used, harvested, and shared (except chum salmon were not shared) by Chignik Lagoon households in 2016 (Table 2-20). Sockeye salmon was the most used, harvested, and shared species: every household (100%) used sockeye salmon, 85% of households both attempted to harvest and harvested this species, and sockeye salmon were shared and received by 60% of households. Chinook salmon, the second most used and harvested salmon species, were used by 65% of Chignik Lagoon households, and 55% of households both attempted to harvest and harvested, 20% received, and 25% gave away Chinook salmon. An estimated 30% of all households used, 25% attempted to harvest and harvested, 5% received, and 15% gave away coho salmon. Pink and chum salmon were used the least; 10% of households used and harvested pink salmon and one-half as many (5%) gave away pink salmon, and 5% used and harvested chum salmon in 2016, but no households shared this species.

In 2016, a total of 2,609 salmon (11,602 lb) were harvested by Chignik Lagoon residents. This equated to an average harvest of 100 salmon (446 lb) per household and 37 salmon (162 lb) per capita. Sockeye salmon represented 79% (9,109 lb; 2,078 fish) of the total salmon harvest, which equated to 80 fish (350 lb) harvested per household and 29 fish (127 lb) harvested per capita (Figure 2-27; Table 2-20). Chinook salmon represented 9% (1,003 lb; 185 fish) of the community harvest of salmon by weight; that harvest was 7 fish (39 lb) harvested per household. Coho salmon harvested represented 5% (619 lb; 118 fish) of all the salmon harvest weight; the coho salmon harvest equated to an average household harvest of 5 fish (24 lb). Chum salmon represented 4% of the weight of all species of salmon harvested with 98 fish (491 lb) harvested, which was an estimated household average harvest of 4 fish (19 lb). Pink salmon was the least harvested species and represented 3% of the total salmon harvest weight with 130 fish (380 lb) harvested in Chignik Lagoon, which equated to an average of 5 fish (15 lb) per household harvested in 2016.

Table 2-27.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Chignik Lagoon, 2016.

				Subsistence methods															
	Percentage	Removed from commercial catch		Set gillnet		Drift gillnet		Seine		Handline		Other		Subsistence gear, any method		Rod and reel		Any method	
Resource	base	Number	Pounds	Number	Pounds	Number	Pounds	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%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**38.0%**	**39.4%**	**19.5%**	**18.9%**	**0.0%**	**0.0%**	**40.1%**	**38.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**59.6%**	**57.8%**	**2.4%**	**2.8%**	**100.0%**	**100.0%**
	Total	**38.0%**	**39.4%**	**19.5%**	**18.9%**	**0.0%**	**0.0%**	**40.1%**	**38.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**59.6%**	**57.8%**	**2.4%**	**2.8%**	**100.0%**	**100.0%**
Chum salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.3%	10.8%	0.0%	0.0%	0.0%	0.0%	6.3%	7.3%	0.0%	0.0%	3.7%	4.2%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.7%	4.2%	0.0%	0.0%	0.0%	0.0%	3.7%	4.2%	0.0%	0.0%	3.7%	4.2%
Coho salmon	Gear type	8.1%	9.1%	4.9%	5.8%	0.0%	0.0%	1.2%	1.5%	0.0%	0.0%	0.0%	0.0%	2.4%	2.9%	0.0%	0.0%	4.5%	5.3%
	Resource	68.1%	68.1%	20.9%	20.9%	0.0%	0.0%	11.0%	11.0%	0.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	0.0%	100.0%	100.0%
	Total	3.1%	3.6%	0.9%	1.1%	0.0%	0.0%	0.5%	0.6%	0.0%	0.0%	0.0%	0.0%	1.4%	1.7%	0.0%	0.0%	4.5%	5.3%
Chinook salmon	Gear type	14.2%	17.1%	0.0%	0.0%	0.0%	0.0%	0.6%	0.8%	0.0%	0.0%	0.0%	0.0%	0.4%	0.5%	59.2%	64.9%	7.1%	8.9%
	Resource	76.1%	76.1%	0.0%	0.0%	0.0%	0.0%	3.5%	3.5%	0.0%	0.0%	0.0%	0.0%	3.5%	3.5%	20.4%	20.4%	100.0%	100.0%
	Total	5.4%	6.7%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	1.4%	1.8%	7.1%	8.9%
Pink salmon	Gear type	0.0%	0.0%	6.4%	4.4%	0.0%	0.0%	9.3%	6.4%	0.0%	0.0%	0.0%	0.0%	8.4%	5.7%	0.0%	0.0%	5.0%	3.3%
	Resource	0.0%	0.0%	25.0%	25.0%	0.0%	0.0%	75.0%	75.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	1.2%	0.8%	0.0%	0.0%	3.7%	2.5%	0.0%	0.0%	0.0%	0.0%	5.0%	3.3%	0.0%	0.0%	5.0%	3.3%
Sockeye salmon	Gear type	77.7%	73.8%	88.7%	89.8%	0.0%	0.0%	79.5%	80.5%	0.0%	0.0%	0.0%	0.0%	82.5%	83.5%	40.8%	35.1%	79.7%	78.3%
	Resource	37.1%	37.1%	21.7%	21.7%	0.0%	0.0%	40.0%	40.0%	0.0%	0.0%	0.0%	0.0%	61.7%	61.7%	1.3%	1.3%	100.0%	100.0%
	Total	29.5%	29.0%	17.3%	17.0%	0.0%	0.0%	31.8%	31.3%	0.0%	0.0%	0.0%	0.0%	49.1%	48.3%	1.0%	1.0%	79.7%	78.3%
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%	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%	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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

In 2016, household survey results estimated that 58% of all the salmon harvest weight harvested by Chignik Lagoon residents for home use was harvested by subsistence methods (19% by gillnet; 39% by seine), 39% by removal from commercial harvests, and 3% by rod and reel (Table 2-27). Most (62%) of the sockeye salmon harvest weight was caught by subsistence gear (22% by set gillnet; 40% by seine). Chinook salmon harvested for home use were primarily removed from commercial harvests (76% of Chinook salmon harvest weight); 20% of the Chinook salmon harvest weight was caught by rod and reel and 4% by subsistence seine. Coho salmon were also mostly obtained by removal from commercial catches (68% of harvest weight). The remainder of the coho salmon harvest weight was caught by subsistence gear (21% set gillnet; 11% seine). All of the chum and pink salmon harvests were caught by subsistence net: the chum salmon harvest was caught by seine (100%), and the pink salmon harvest was caught by both set gillnet (25%) and seine (75%).

The 2016 harvests of all salmon species, by pounds or number of salmon harvested by gear type, by Chignik Lagoon households are depicted in Figure 2-28 and Table 2-28. Out of a total 2,609 salmon harvested, most salmon (1,554 fish) were harvested with subsistence gear: 508 salmon (2,202 lb) were harvested by set gillnet and 1,045 salmon (4,521 lb) by seine. In addition, 991 total salmon (4,561 lb) were removed from commercial harvests and 64 fish (319 lb) were harvested using rod and reel. Note that all species were harvested by seine, but only sockeye, coho, and pink salmon were harvested by set gillnet.

Sockeye salmon, like total salmon, were primarily harvested with subsistence gear; there were 451 fish (1,978 lb) harvested by set gillnet and 831 fish (3,642 lb) harvested by seine. An estimated 770 sockeye salmon (3,377 lb) were also obtained from commercial catches and 26 fish (114 lb) caught by rod and reel. Most Chinook and coho salmon harvested in 2016 by Chignik Lagoon residents were removed from commercial harvests: 140 Chinook salmon (763 lb) and 81 coho salmon (422 lb). Most of the rest of the Chinook and coho salmon harvested were caught by rod and reel (38 Chinook salmon; 205 lb) or set gillnet (28 coho salmon; 129 lb).

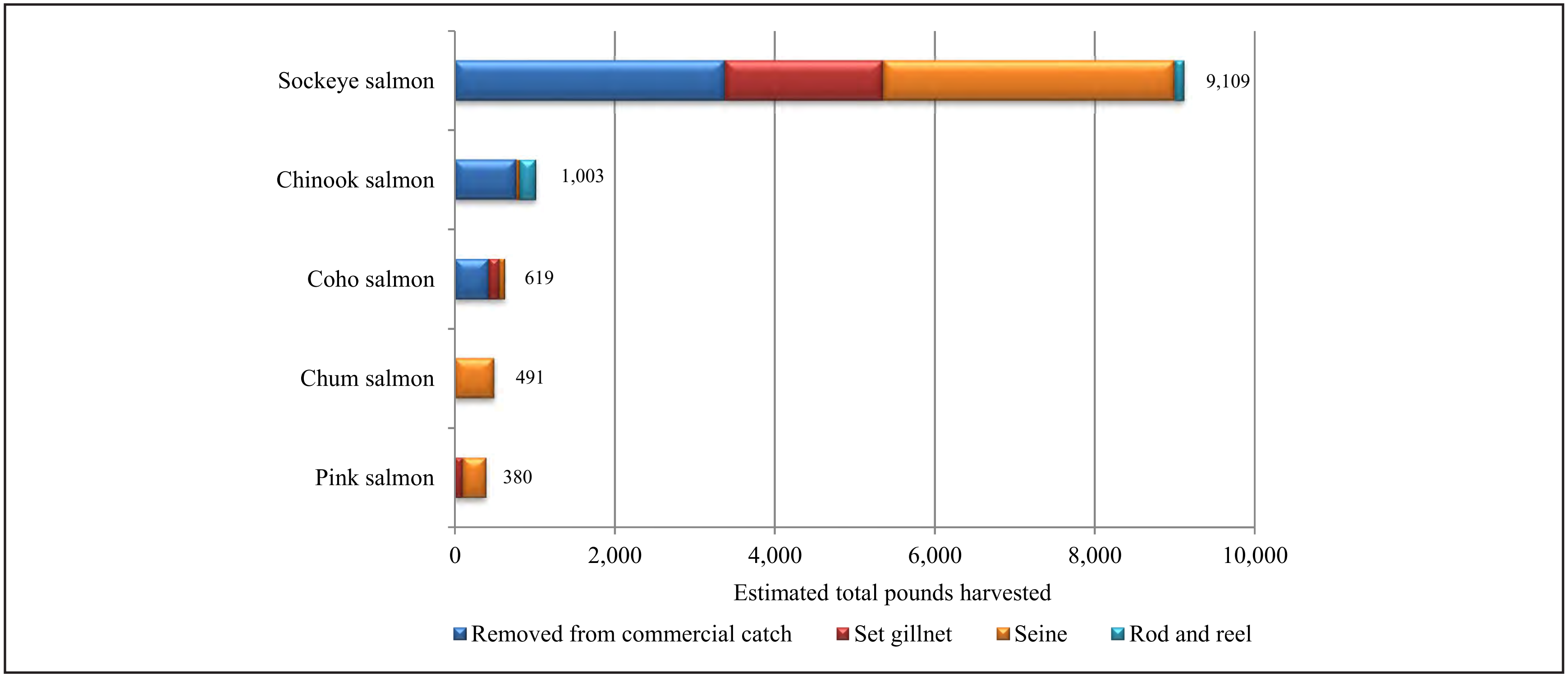


Figure 2-28.–Estimated harvests of salmon in pounds usable weight by gear type and resource, Chignik Lagoon, 2016.

Table 2-28.–Estimated harvests of salmon by gear type and resource, Chignik Lagoon, 2016.

			Subsistence methods															
	Removed from commercial catch		Set gillnet		Drift gillnet		Seine		Handline		Other methods		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**991.3**	**4,561.2**	**508.3**	**2,201.7**	**0.0**	**0.0**	**1,045.2**	**4,520.5**	**0.0**	**0.0**	**0.0**	**0.0**	**1,553.5**	**6,722.2**	**63.7**	**318.8**	**2,608.5**	**11,602.3**
Chum salmon	0.0	0.0	0.0	0.0	0.0	0.0	97.5	490.6	0.0	0.0	0.0	0.0	97.5	490.6	0.0	0.0	97.5	490.6
Coho salmon	80.6	421.8	24.7	129.3	0.0	0.0	13.0	68.0	0.0	0.0	0.0	0.0	37.7	197.3	0.0	0.0	118.3	619.1
Chinook salmon	140.4	763.0	0.0	0.0	0.0	0.0	6.5	35.3	0.0	0.0	0.0	0.0	6.5	35.3	37.7	204.9	184.6	1,003.2
Pink salmon	0.0	0.0	32.5	95.0	0.0	0.0	97.5	285.1	0.0	0.0	0.0	0.0	130.0	380.1	0.0	0.0	130.0	380.1
Sockeye salmon	770.3	3,376.5	451.1	1,977.5	0.0	0.0	830.7	3,641.5	0.0	0.0	0.0	0.0	1,281.8	5,618.9	26.0	114.0	2,078.1	9,109.4
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	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

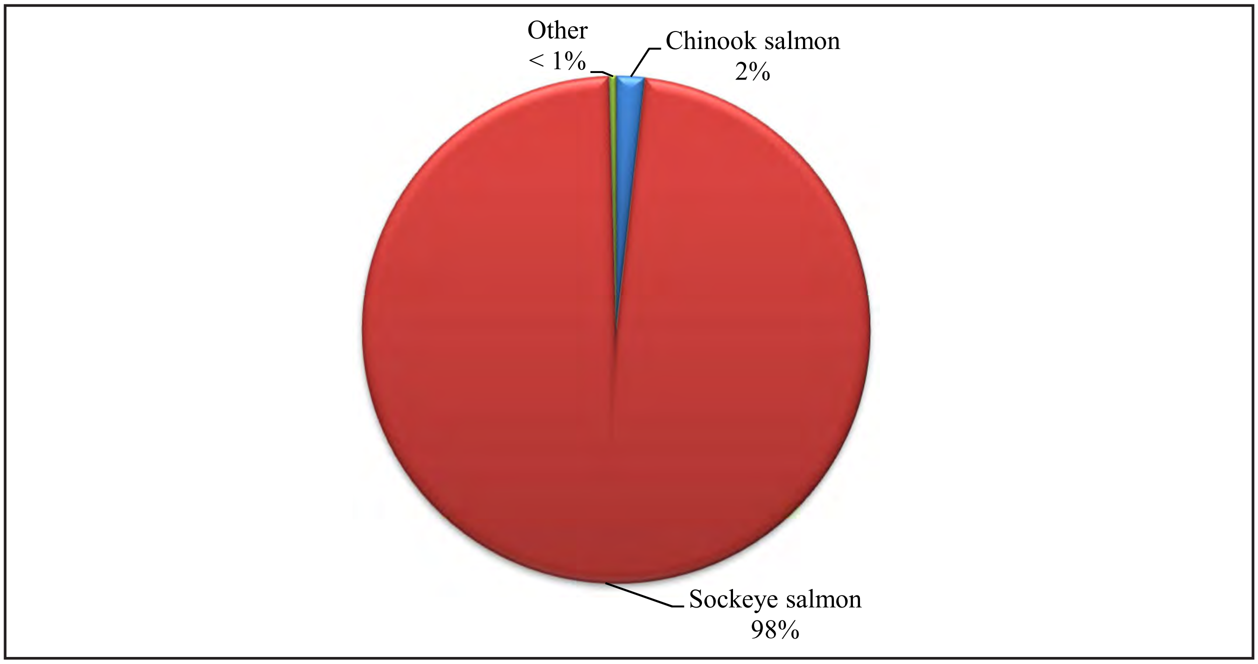


Figure 2-29.–Composition of salmon harvest in pounds usable weight, Chignik Lake, 2016.

Chignik Lake

All five species of Pacific salmon found in Alaska were used by Chignik Lake households in 2016 (Table 2-21). Sockeye salmon was the most used, harvested, and shared species: most households (89%) used, 75% attempted to harvest, 71% harvested, 39% received, and 54% gave away sockeye salmon. Chinook salmon was the second most harvested salmon species—although by a substantially smaller proportion of community households than harvested sockeye salmon—and more households (32%) used unknown salmon resources than used Chinook salmon. Chinook salmon were used by 21% of Chignik Lake households, 11% attempted to harvest, 7% harvested and gave away, and 14% received Chinook salmon. An estimated 14% of all households used, 4% harvested, and 11% received pink salmon, but no households gave away pink salmon. Coho and chum salmon were used the least by Chignik Lake households in 2016 out of all the salmon species (by 7% and 4% of households, respectively).

In 2016, a total of 2,013 salmon (8,851 lb) were harvested by Chignik Lake residents. This equated to an average harvest of 61 salmon (268 lb) per household and 20 salmon (89 lb) per capita. Sockeye salmon represented 98% (1,974 fish; 8,654 lb) of the total salmon harvest weight, which equated to 262 lb harvested per household and 87 lb harvested per capita (Figure 2-29; Table 2-21). Chinook salmon represented 2% of the community harvest of salmon by weight: an estimated harvest of 30 fish (160 lb) equated to 1 fish (5 lb) per household harvested. Chum and pink salmon each represented less than 1% of the total salmon harvest weight in 2016. There was no harvest of coho salmon; however, 7% of households received coho salmon—likely from another Chignik Lake household not interviewed or a household from another community.

In 2016, household survey results estimated that 91% of the total salmon harvest, in pounds usable weight, that was obtained by Chignik Lake residents for home use was harvested by subsistence methods: 59% by set gillnet, 4% by drift gillnet, 16% by seine, and 12% by handline. Also, an estimated 9% of the salmon harvest weight came from removal from commercial harvests, but no rod and reel harvests occurred (Table 2-29). Most (93%) of the sockeye salmon harvest weight was caught by subsistence gear: 60% by set gillnet, 16% by seine, 13% by handline, and 4% by drift gillnet. Also, 7% of the sockeye salmon harvest weight was obtained from commercial harvest removals.

Table 2-29.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Chignik Lake, 2016.

				Subsistence methods															
	Percentage	Removed from commercial catch		Set gillnet		Drift gillnet		Seine		Handline		Other		Subsistence gear, any method		Rod and reel		Any method	
Resource	base	Number	Pounds	Number	Pounds	Number	Pounds	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%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**
	Resource	**8.5%**	**8.8%**	**58.8%**	**58.7%**	**4.1%**	**4.1%**	**16.0%**	**16.0%**	**12.5%**	**12.4%**	**0.0%**	**0.0%**	**91.5%**	**91.2%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**
	Total	**8.5%**	**8.8%**	**58.8%**	**58.7%**	**4.1%**	**4.1%**	**16.0%**	**16.0%**	**12.5%**	**12.4%**	**0.0%**	**0.0%**	**91.5%**	**91.2%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**
Chum salmon	Gear type	2.7%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%
	Resource	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%
Coho 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%	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%	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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Chinook salmon	Gear type	13.7%	16.4%	0.2%	0.2%	0.0%	0.0%	1.1%	1.4%	0.0%	0.0%	0.0%	0.0%	0.3%	0.4%	0.0%	0.0%	1.5%	1.8%
	Resource	80.0%	80.0%	8.0%	8.0%	0.0%	0.0%	12.0%	12.0%	0.0%	0.0%	0.0%	0.0%	20.0%	20.0%	0.0%	0.0%	100.0%	100.0%
	Total	1.2%	1.4%	0.1%	0.1%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.3%	0.4%	0.0%	0.0%	1.5%	1.8%
Pink salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	1.3%	0.0%	0.0%	0.3%	0.2%	0.0%	0.0%	0.2%	0.2%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.2%	0.2%
Sockeye salmon	Gear type	83.6%	80.6%	99.8%	99.8%	100.0%	100.0%	98.9%	98.6%	98.1%	98.7%	0.0%	0.0%	99.4%	99.4%	0.0%	0.0%	98.1%	97.8%
	Resource	7.3%	7.3%	59.9%	59.9%	4.2%	4.2%	16.2%	16.2%	12.5%	12.5%	0.0%	0.0%	92.7%	92.7%	0.0%	0.0%	100.0%	100.0%
	Total	7.1%	7.1%	58.7%	58.5%	4.1%	4.1%	15.9%	15.8%	12.2%	12.2%	0.0%	0.0%	90.9%	90.6%	0.0%	0.0%	98.1%	97.8%
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%	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%	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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

The harvests of the remaining species trailed the sockeye salmon harvest considerably. All of the chum salmon harvest was removed from commercial catches, all of the pink salmon harvest was caught by handline, and Chinook salmon primarily came from commercial harvest removals (80% of harvest weight). The remaining 20% of the Chinook salmon harvest weight was caught by subsistence methods (8% by set gillnet and 12% by seine).

The 2016 harvests of all salmon species, by pounds or number of salmon harvested by gear type, by Chignik Lake households are depicted in Figure 2-30 and Table 2-30. Out of a total 2,013 salmon harvested, most salmon (1,841 fish; 8,069 lb) were harvested with subsistence gear: 1,185 fish (5,195 lb) by set gillnet, 83 fish (362 lb) by drift gillnet, 323 fish (1,419 lb) by seine, and 251 fish (1,094 lb) by handline. In addition, 172 salmon (782 lb) were removed from commercial harvests. As mentioned previously, more Chinook salmon were obtained from commercial harvests (24 fish; 128 lb) than harvested by subsistence methods (6 fish; 32 lb), although Chinook salmon composed only 16% of the harvest weight obtained from commercial harvests (Table 2-30; Table 2-29). In comparison to all the other study communities, Chignik Lake households fished for sockeye salmon using more gear types and had the highest harvest by subsistence handline (figures 2-26, 2-28, 2-30, 2-32, 2-34, and 2-36).

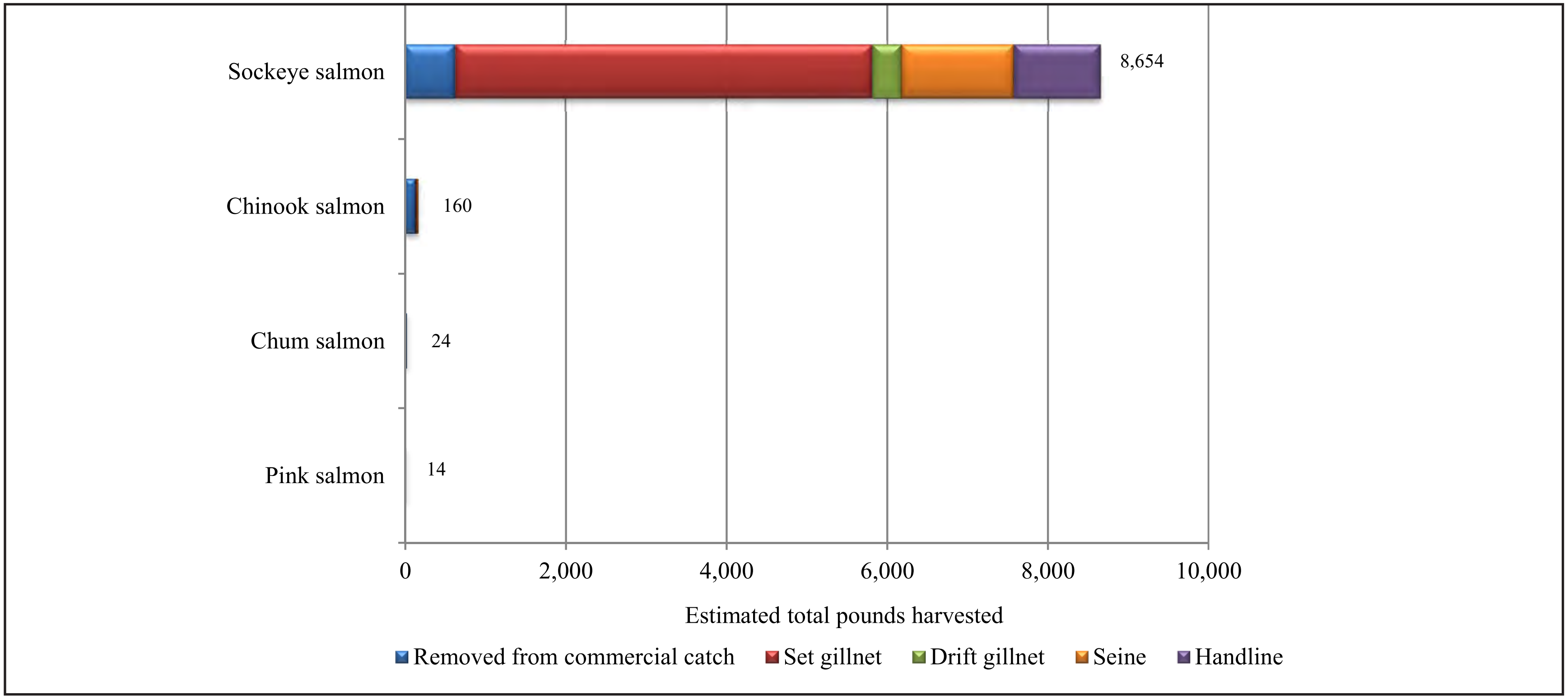


Figure 2-30.–Estimated harvests of salmon in pounds usable weight by gear type and resource, Chignik Lake, 2016.

Table 2-30.–Estimated harvests of salmon by gear type and resource, Chignik Lake, 2016.

			Subsistence methods															
	Removed from commercial catch		Set gillnet		Drift gillnet		Seine		Handline		Other methods		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**172.1**	**782.1**	**1,184.5**	**5,194.7**	**82.5**	**361.6**	**322.9**	**1,419.3**	**251.0**	**1,093.6**	**0.0**	**0.0**	**1,840.9**	**8,069.3**	**0.0**	**0.0**	**2,013.0**	**8,851.4**
Chum salmon	4.7	23.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	23.7
Coho salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chinook salmon	23.6	128.1	2.4	12.8	0.0	0.0	3.5	19.2	0.0	0.0	0.0	0.0	5.9	32.0	0.0	0.0	29.5	160.1
Pink salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	13.8	0.0	0.0	4.7	13.8	0.0	0.0	4.7	13.8
Sockeye salmon	143.8	630.3	1,182.1	5,181.9	82.5	361.6	319.4	1,400.1	246.3	1,079.8	0.0	0.0	1,830.3	8,023.4	0.0	0.0	1,974.1	8,653.8
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

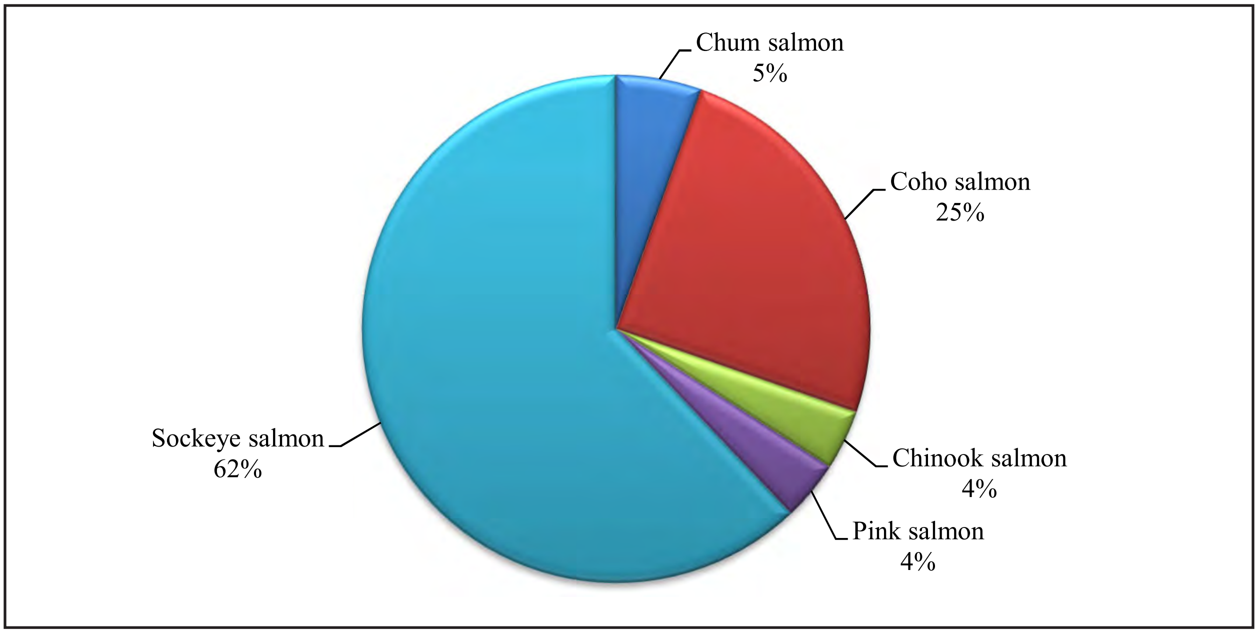


Figure 2-31.–Composition of salmon harvest in pounds usable weight, Perryville, 2016.

Perryville

All five species of Pacific salmon found in Alaska were used, harvested, and shared by Perryville households in 2016 (Table 2-22). Sockeye salmon was the most used, harvested, and shared species: most (92%) households used, 73% attempted to harvest, 65% harvested, 58% received, and 42% gave away sockeye salmon. Coho salmon, the second most used salmon species, were used by 69% of Perryville households; also, 50% of households attempted to harvest and harvested, 35% received, and 23% gave away coho salmon. An estimated 65% of all households used pink salmon, 54% attempted to harvest, 50% harvested, 27% received, and 23% gave away pink salmon. Fewer than 50% of households used the remaining two salmon species. Chinook salmon were used, harvested, and shared the least: 27% of households used, 27% attempted to harvest, 23% harvested, and 12% of households received and gave away Chinook salmon in 2016. Overall, most households that fished were successful, although only for coho and chum salmon were all fishing households successful. Also, 19% of households received and used unknown salmon resources.

In 2016, a total of 2,983 salmon (13,561 lb) were harvested by Perryville residents, which equated to an average of 81 salmon (367 lb) per household and 27 salmon (124 lb) per capita harvested. Sockeye salmon represented most (62%) of the total salmon harvest weight; the sockeye salmon harvest was 1,920 fish (8,415 lb) that equated to 52 fish (227 lb) harvested per household and 18 fish (77 lb) harvested per capita (Figure 2-31; Table 2-22). Coho salmon composed one-quarter (25%) of the salmon harvest weight; an estimated harvest of 645 fish (3,374 lb) equated to 17 fish (91 lb) per household and 6 fish (31 lb) per capita harvested. Chum salmon represented 5% of the overall salmon harvest weight; an estimated harvest of 147 fish (738 lb) equated to 4 fish (20 lb) harvested per household and 1 fish (7 lb) harvested per capita. Chinook and pink salmon each represented 4% of the total salmon harvest weight; however, due to the size difference between these species, more pink salmon (177 fish) were harvested than Chinook salmon (95 fish). In Perryville, an estimated three Chinook salmon and five pink salmon were harvested per household.

Table 2-31.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Perryville, 2016.

				Subsistence methods															
	Percentage	Removed from commercial catch		Set gillnet		Drift gillnet		Seine		Handline		Other		Subsistence gear, any method		Rod and reel		Any method	
Resource	base	Number	Pounds	Number	Pounds	Number	Pounds	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%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**7.3%**	**8.0%**	**73.0%**	**72.9%**	**0.0%**	**0.0%**	**16.4%**	**15.8%**	**2.4%**	**2.4%**	**0.0%**	**0.0%**	**91.8%**	**91.2%**	**0.9%**	**0.9%**	**100.0%**	**100.0%**
	Total	**7.3%**	**8.0%**	**73.0%**	**72.9%**	**0.0%**	**0.0%**	**16.4%**	**15.8%**	**2.4%**	**2.4%**	**0.0%**	**0.0%**	**91.8%**	**91.2%**	**0.9%**	**0.9%**	**100.0%**	**100.0%**
Chum salmon	Gear type	0.0%	0.0%	6.1%	6.7%	0.0%	0.0%	0.0%	0.0%	19.6%	21.6%	0.0%	0.0%	5.4%	6.0%	0.0%	0.0%	4.9%	5.4%
	Resource	0.0%	0.0%	90.3%	90.3%	0.0%	0.0%	0.0%	0.0%	9.7%	9.7%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	4.4%	4.9%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%	0.0%	0.0%	4.9%	5.4%	0.0%	0.0%	4.9%	5.4%
Coho salmon	Gear type	26.0%	27.5%	25.2%	29.0%	0.0%	0.0%	0.0%	0.0%	39.2%	45.0%	0.0%	0.0%	21.0%	24.4%	44.4%	51.6%	21.6%	24.9%
	Resource	8.8%	8.8%	85.0%	85.0%	0.0%	0.0%	0.0%	0.0%	4.4%	4.4%	0.0%	0.0%	89.4%	89.4%	1.8%	1.8%	100.0%	100.0%
	Total	1.9%	2.2%	18.4%	21.1%	0.0%	0.0%	0.0%	0.0%	1.0%	1.1%	0.0%	0.0%	19.3%	22.2%	0.4%	0.4%	21.6%	24.9%
Chinook salmon	Gear type	31.8%	35.0%	0.9%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.9%	22.2%	26.8%	3.2%	3.8%
	Resource	73.1%	73.1%	20.9%	20.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.9%	20.9%	6.0%	6.0%	100.0%	100.0%
	Total	2.3%	2.8%	0.7%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.8%	0.2%	0.2%	3.2%	3.8%
Pink salmon	Gear type	0.0%	0.0%	7.1%	4.5%	0.0%	0.0%	0.0%	0.0%	19.6%	12.6%	0.0%	0.0%	6.1%	4.0%	33.3%	21.6%	5.9%	3.8%
	Resource	0.0%	0.0%	87.1%	87.1%	0.0%	0.0%	0.0%	0.0%	8.1%	8.1%	0.0%	0.0%	95.2%	95.2%	4.8%	4.8%	100.0%	100.0%
	Total	0.0%	0.0%	5.2%	3.3%	0.0%	0.0%	0.0%	0.0%	0.5%	0.3%	0.0%	0.0%	5.6%	3.6%	0.3%	0.2%	5.9%	3.8%
Sockeye salmon	Gear type	42.2%	37.5%	60.8%	58.6%	0.0%	0.0%	100.0%	100.0%	21.6%	20.7%	0.0%	0.0%	66.7%	64.8%	0.0%	0.0%	64.4%	62.1%
	Resource	4.8%	4.8%	68.9%	68.9%	0.0%	0.0%	25.4%	25.4%	0.8%	0.8%	0.0%	0.0%	95.2%	95.2%	0.0%	0.0%	100.0%	100.0%
	Total	3.1%	3.0%	44.4%	42.8%	0.0%	0.0%	16.4%	15.8%	0.5%	0.5%	0.0%	0.0%	61.3%	59.1%	0.0%	0.0%	64.4%	62.1%
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%	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%	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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

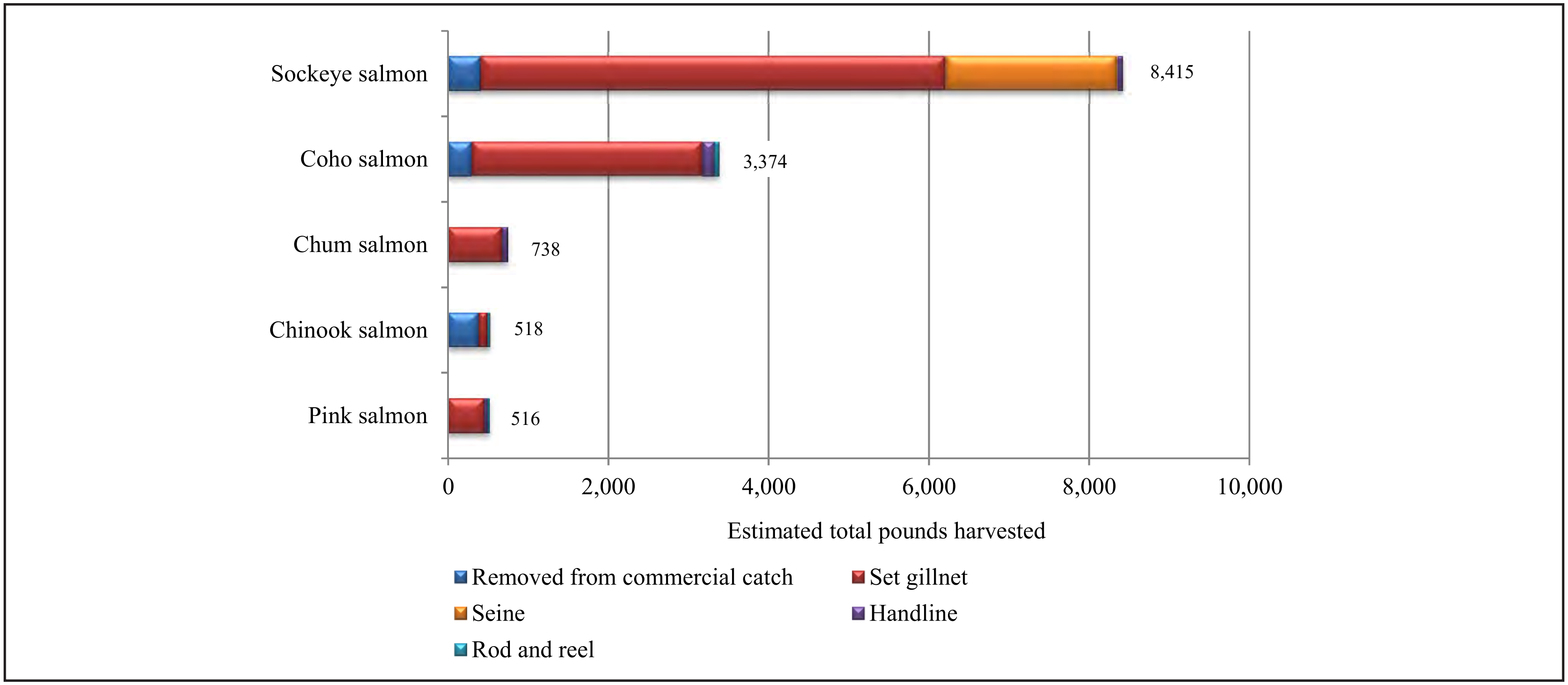


Figure 2-32.–Estimated harvests of salmon in pounds usable weight by gear type and resource, Perryville, 2016.

Table 2-32.–Estimated harvests of salmon by gear type and resource, Perryville, 2016.

			Subsistence methods																
	Removed from commercial catch		Set gillnet		Drift gillnet		Seine		Handline		Other methods		Subsistence gear, any method		Rod and reel		Any method	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**219.2**	**1,082.3**	**2,177.3**	**9,892.2**	**0.0**	**0.0**	**488.1**	**2,139.7**	**72.6**	**330.8**	**0.0**	**0.0**	**2,738.0**	**12,362.7**	**25.6**	**115.5**	**2,982.8**	**13,560.5**
Chum salmon	0.0	0.0	132.3	665.9	0.0	0.0	0.0	0.0	14.2	71.6	0.0	0.0	146.6	737.5	0.0	0.0	146.6	737.5
Coho salmon	56.9	297.9	547.9	2,867.1	0.0	0.0	0.0	0.0	28.5	148.9	0.0	0.0	576.3	3,016.0	11.4	59.6	644.7	3,373.5
Chinook salmon	69.7	378.9	19.9	108.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	108.3	5.7	30.9	95.3	518.1
Pink salmon	0.0	0.0	153.7	449.4	0.0	0.0	0.0	0.0	14.2	41.6	0.0	0.0	167.9	491.0	8.5	25.0	176.5	516.0
Sockeye salmon	92.5	405.5	1,323.5	5,801.6	0.0	0.0	488.1	2,139.7	15.7	68.6	0.0	0.0	1,827.2	8,009.9	0.0	0.0	1,919.7	8,415.4
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	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

In 2016, household survey results estimated that 91% of salmon, in pounds usable weight, were harvested by Perryville residents for home use by subsistence methods: 73% by set gillnet, 16% by seine, and 2% by handline (Table 2-31). An additional 8% of the harvest weight was obtained by removal from commercial harvests and 1% was harvested with rod and reel. Most (95%) of the sockeye salmon harvest weight was caught by subsistence gear (69% by set gillnet; 25% by seine; and 1% by handline); the remaining 5% of the sockeye salmon harvest weight was obtained by removal from commercial harvests. Sockeye salmon was the only species harvested by seine in Perryville in 2016. Coho salmon composed 51% of the harvest weight by rod and reel, and Chinook and pink salmon composed 27% and 22% of the rod and reel harvest weight, respectively.

The 2016 harvests of all salmon species, by pounds or number of salmon harvested by gear type, by Perryville households are depicted in Figure 2-32 and Table 2-32. Out of a total of 2,983 salmon harvested, most were harvested with subsistence gear: 2,177 total salmon (9,892 lb) by set gillnet, 488 sockeye salmon (2,140 lb) by seine, and 73 total salmon (331 lb) by handline. In addition, 219 fish (1,082 lb) were removed from commercial harvests and 26 fish (116 lb) were harvested using rod and reel.

Regarding subsistence gear use, there were 4 species of salmon harvested using handline: coho salmon (29 fish; 149 lb), sockeye salmon (16 fish; 69 lb), chum salmon (14 fish; 72 lb), and pink salmon (14 fish; 42 lb). As mentioned previously, a large proportion of the total salmon harvest was caught by subsistence set gillnet; for every species, except Chinook salmon, subsistence gillnet accounted for the majority of the harvest weight (69%–90%) (Table 2-31). There were 1,324 sockeye salmon (5,802 lb) harvested by set gillnet, or 43% of the total salmon harvest weight (Table 2-32; Table 2-31). Most of the Chinook salmon caught for home use were removed from commercial harvests (70 fish; 379 lb); an additional 20 Chinook salmon (108 lb) were caught with set gillnet, and 6 Chinook salmon (31 lb) were harvested by rod and reel (Table 2-32).

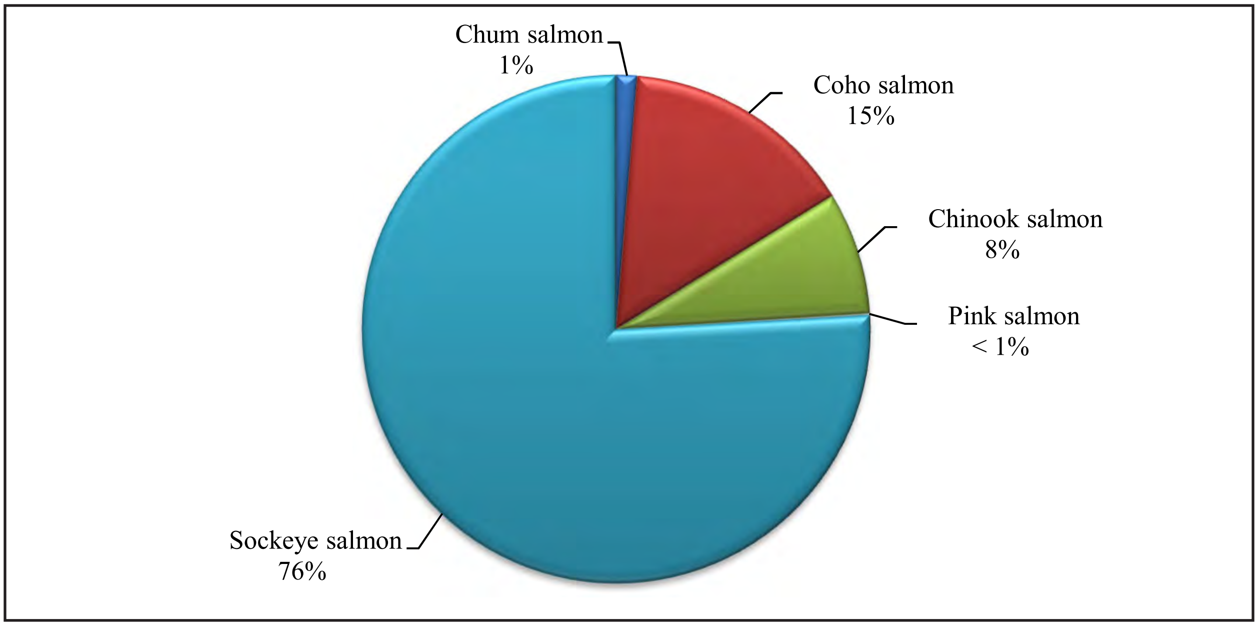


Figure 2-33.–Composition of salmon harvest in pounds usable weight, Port Heiden, 2016.

Port Heiden

Sockeye salmon made up the highest portion (76%) of the salmon harvest, in pounds usable weight, caught by Port Heiden households in 2016, followed by coho (15%) and Chinook (8%) salmon (Figure 2-33). Both pink and chum salmon made up 1% or less of the estimated pounds harvested. Harvest and use rates were highest for coho salmon—by 72% and 83% of households, respectively (Table 2-23). The next most harvested and used species, by percentage of households, was sockeye salmon (66% and 76%, respectively), followed by Chinook salmon (28% and 66%, respectively), chum salmon (14% and 17%, respectively), and pink salmon (10% of households both harvested and used this species). Fifty-two percent of households gave away sockeye salmon and 59% received Chinook salmon. In contrast, 35% of households received sockeye salmon and 10% gave away Chinook salmon. Based on the difference between the proportion of households that gave and received these species, giving and receiving of salmon resources may have occurred both among households within Port Heiden and to and from households from other communities. Similarly, 35% of households gave away the most used species, which was coho salmon, but 55% of households received coho salmon.

The total estimated harvest of all salmon species in 2016 was 18,812 lb. The sockeye salmon harvest, at 14,281 lb (136 lb, or 33 fish, per capita), was by far the highest portion of the total salmon harvest. The next most harvested species was coho salmon (2,797 lb; 27 lb per capita). Chinook salmon accounted for 1,466 lb harvested in 2016, or 14 lb per capita. This community's total salmon harvest of 4,271 fish provided 482 lb per household (179 lb, or 41 fish, per capita).

The majority of the sockeye, Chinook, and chum salmon harvests were obtained by subsistence gillnet; coho and pink salmon were largely harvested using rod and reel (Figure 2-34). Set gillnet was the gear type most used by Port Heiden households: 86% of the salmon harvest amount was obtained by set gillnet, 1% by drift gillnet, 2% by removal from commercial catches, and 11% by rod and reel (Table 2-33). Ninety-seven percent of the sockeye salmon harvest weight was obtained by set gillnet, with less than 2% obtained by either rod and reel or commercial removals. The Chinook salmon harvest followed the same pattern—95% harvested by set gillnet, 2% of the harvest weight caught by rod and reel, and 3% obtained by commercial removals. The coho salmon harvest was primarily by rod and reel, with 71% of the pounds harvested caught by this method, followed by set gillnet (19%), drift gillnet (9%), and a nominal harvest

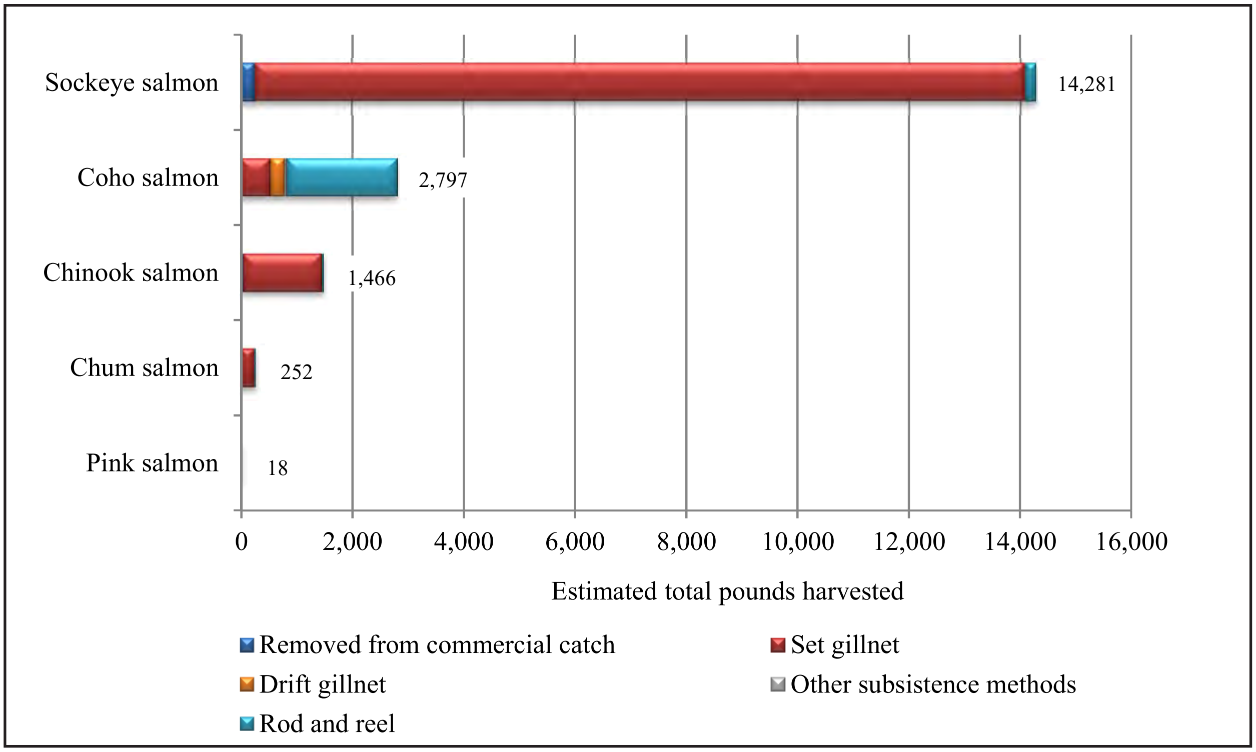


Figure 2-34.–Estimated harvests of salmon in pounds usable weight by gear type and resource, Port Heiden, 2016.

weight brought in by another subsistence method (1%); none of the coho salmon harvest was removed from commercial catches, and coho salmon was the only species harvested by drift gillnet.

An estimated 13,830 lb (3,306 fish) of the sockeye salmon harvest was caught by set gillnet (Table 2-34). Only 253 lb (61 fish) were obtained by commercial catch removals and almost the same amount of sockeye salmon (197 lb; 47 fish) was obtained by rod and reel. Chinook salmon were also harvested mostly by set gillnet (1,398 lb; 195 fish), with only 29 lb (4 fish) harvested by rod and reel. Coho salmon, on the other hand, were largely harvested by rod and reel—1,979 lb (420 fish)—with only 780 lb (165 fish) harvested by gillnet (including both set and drift gillnets). Pink salmon were harvested only by rod and reel, and 48 out of 52 harvested chum salmon were caught by set gillnet. Preferences for gear type in Port Heiden were typically due to seasonal migration of salmon and processing preferences. Chinook salmon were obtained initially by subsistence gillnet to fill community members' smokehouses and for sharing, followed by sockeye salmon being fished for with set gillnet off the main beach close to the community. Coho salmon, however, run later in the season, and were fished for in the local creeks in September and October.

Table 2-33.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Port Heiden, 2016.

Resource	Percentage base	Removed from commercial catch		Subsistence methods: Set gillnet		Drift gillnet		Seine		Handline		Other		Subsistence gear, any method		Rod and reel		Any method	
		Number	Pounds	Number	Pounds	Number	Pounds	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%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**1.5%**	**1.6%**	**85.7%**	**85.0%**	**1.3%**	**1.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.2%**	**0.2%**	**87.2%**	**86.5%**	**11.3%**	**11.9%**	**100.0%**	**100.0%**
	Total	**1.5%**	**1.6%**	**85.7%**	**85.0%**	**1.3%**	**1.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.2%**	**0.2%**	**87.2%**	**86.5%**	**11.3%**	**11.9%**	**100.0%**	**100.0%**
Chum salmon	Gear type	0.0%	0.0%	1.3%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	1.4%	0.8%	0.9%	1.2%	1.3%
	Resource	0.0%	0.0%	92.3%	92.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	92.3%	92.3%	7.7%	7.7%	100.0%	100.0%
	Total	0.0%	0.0%	1.1%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.2%	0.1%	0.1%	1.2%	1.3%
Coho salmon	Gear type	0.0%	0.0%	3.0%	3.3%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	4.7%	5.0%	86.9%	88.3%	13.9%	14.9%
	Resource	0.0%	0.0%	18.8%	18.8%	9.1%	9.1%	0.0%	0.0%	0.0%	0.0%	1.4%	1.4%	29.3%	29.3%	70.7%	70.7%	100.0%	100.0%
	Total	0.0%	0.0%	2.6%	2.8%	1.3%	1.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	4.1%	4.3%	9.8%	10.5%	13.9%	14.9%
Chinook salmon	Gear type	8.2%	13.2%	5.3%	8.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.2%	8.6%	0.8%	1.3%	4.8%	7.8%
	Resource	2.6%	2.6%	95.4%	95.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	95.4%	95.4%	2.0%	2.0%	100.0%	100.0%
	Total	0.1%	0.2%	4.6%	7.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.6%	7.4%	0.1%	0.2%	4.8%	7.8%
Pink 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%	0.0%	0.0%	1.7%	0.8%	0.2%	0.1%
	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%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%
	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%	0.0%	0.0%	0.2%	0.1%	0.2%	0.1%
Sockeye salmon	Gear type	91.8%	86.8%	90.3%	86.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	88.8%	85.0%	9.7%	8.8%	79.9%	75.9%
	Resource	1.8%	1.8%	96.8%	96.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	96.8%	96.8%	1.4%	1.4%	100.0%	100.0%
	Total	1.4%	1.3%	77.4%	73.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	77.4%	73.5%	1.1%	1.0%	79.9%	75.9%
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%	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%	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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Table 2-34.–Estimated harvests of salmon by gear type and resource, Port Heiden, 2016.

Resource	Removed from commercial catch		Subsistence methods: Set gillnet		Drift gillnet		Seine		Handline		Other methods		Subsistence gear, any method		Rod and reel		Any method	
	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**65.9**	**291.8**	**3,660.6**	**15,987.3**	**53.8**	**253.6**	**0.0**	**0.0**	**0.0**	**0.0**	**8.1**	**38.0**	**3,722.5**	**16,279.0**	**482.8**	**2,241.4**	**4,271.2**	**18,812.1**
Chum salmon	0.0	0.0	48.4	232.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.4	232.3	4.0	19.4	52.4	251.6
Coho salmon	0.0	0.0	111.6	526.3	53.8	253.6	0.0	0.0	0.0	0.0	8.1	38.0	173.5	818.0	419.6	1,978.5	593.1	2,796.5
Chinook salmon	5.4	38.6	195.0	1,398.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	195.0	1,398.4	4.0	28.9	204.4	1,465.9
Pink salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	17.7	8.1	17.7
Sockeye salmon	60.5	253.2	3,305.6	13,830.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,305.6	13,830.3	47.1	196.9	3,413.2	14,280.5
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	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

Egegik

Residents of Egegik harvested a total of 1,945 lb of salmon in 2016, which equated to 50 lb of salmon (11 fish) per community member (Table 2-24). Residents harvested mostly sockeye and coho salmon: together, these two species accounted for 94% of the total salmon harvest weight in 2016 (Figure 2-35). The remainder of the harvest came from Chinook salmon (4% of the harvest, by weight), and pink and chum salmon combined (2%). Comparing the harvests of these species in pounds, an estimated 997 lb of sockeye salmon were harvested, or 26 lb per capita, followed by 832 lb (21 lb per capita) of coho salmon, and 68 lb (2 lb per capita) of Chinook salmon (Table 2-24). Egegik residents harvested approximately 28 lb of pink salmon and 20 lb of chum salmon, or roughly 1 lb per capita of each species. More households (35%) harvested sockeye and coho salmon than any other species. Chinook salmon were harvested by 20% of households while chum and pink salmon were harvested by 5% of households. All households that fished for salmon were successful.

As noted above, the sharing of harvested resources is important to the community. More households used most species of salmon than harvested them, and nearly all species of salmon were shared. Sockeye salmon were used by 60% of households in 2016 and coho and Chinook salmon were each used by 50% of households. Egegik residents shared sockeye salmon the most—an estimated 25% of households gave away sockeye salmon and the same percentage received this species. Although slightly fewer households (20%) gave away Chinook salmon in comparison to sockeye salmon, 30% of households received Chinook salmon, which is the highest percentage of households to receive any salmon species. An equal percentage of households gave away coho salmon as gave Chinook salmon, but perhaps because of the smaller size of fish or higher harvest rate, only 15% of households received coho salmon. Sharing occurs between households in the community, as well as with households from outside Egegik. While 5% of Egegik households shared pink salmon, no households in the community received pink salmon, indicating that species was likely sent to another community. No chum salmon were shared or received. While all salmon that were harvested were identified at the species level, 10% of households gave and 20% of households received “unknown” salmon, likely being processed salmon resources that were shared with community residents.

Egegik residents harvested each species of salmon predominantly with subsistence gillnets except for Chinook salmon (this species was mostly harvested through commercial removals) (Figure 2-36). Rod and reel was used to harvest only coho and sockeye salmon (Table 2-35). Looking at the overall pounds of salmon harvested in 2016, 86% of the harvest weight was caught with the use of set gillnets and 6% with drift gillnets (Table 2-36). At the species level, gillnets were used to harvest 100% of the chum and pink salmon harvests, 95% of the coho salmon harvest, 94% of the sockeye salmon harvest, and 22% of the Chinook salmon harvest. The three latter species were also removed from commercial catches, with 78% of the Chinook salmon harvest originating from this method, and also 4% and 3% of the sockeye and coho salmon harvests, respectively. Egegik households harvested less than 2% of their coho and sockeye salmon harvests with rod and reel gear.

Breaking down the community harvest by gear type, Chinook salmon composed 43% of the salmon harvest weight coming from commercial removals, followed by sockeye salmon at 36% and coho salmon at 20%. Looking just at subsistence gear—drift or set gillnets—sockeye salmon composed more than one-half (52%) of the harvest weight, followed closely by coho salmon at 44%, with the remaining three salmon species each composing 2% or less of the total harvest weight by subsistence gillnets. Note that all of the drift gillnet harvest was composed of coho salmon. Egegik households used rod and reel to take a small portion of the overall salmon harvest weight, but what households did harvest with rod and reel was split between coho salmon (53%) and sockeye salmon (47%).

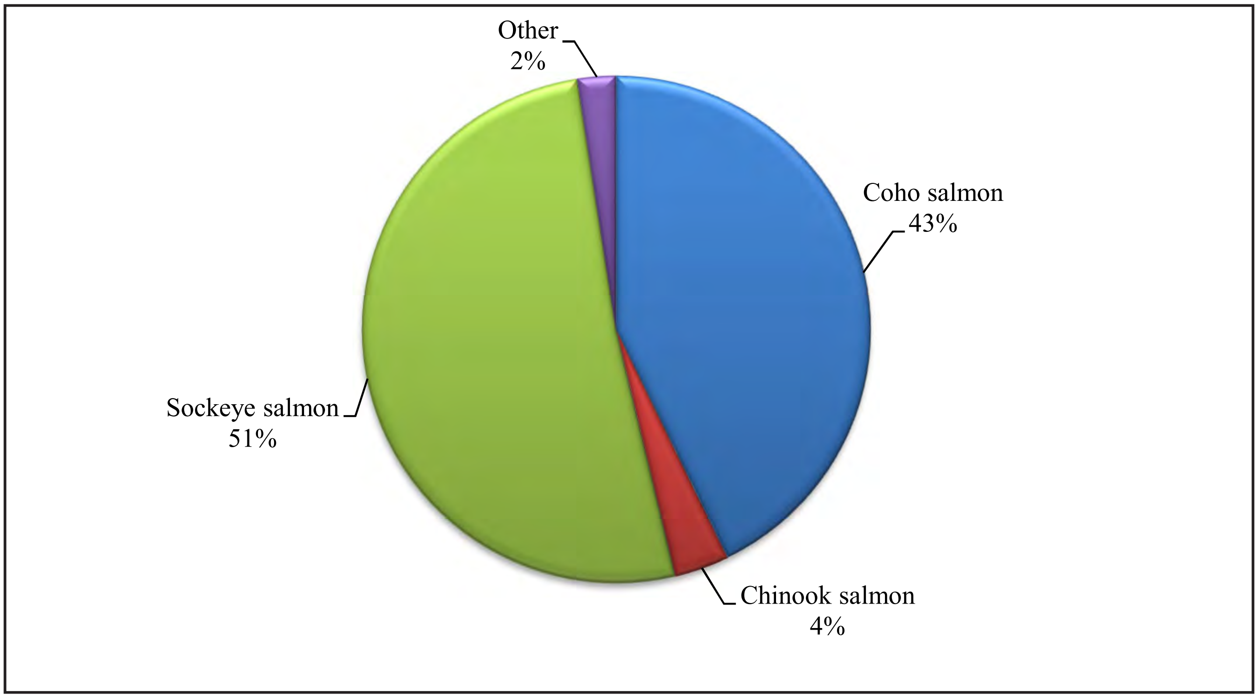


Figure 2-35.–Composition of salmon harvest in pounds usable weight, Egegik, 2016.

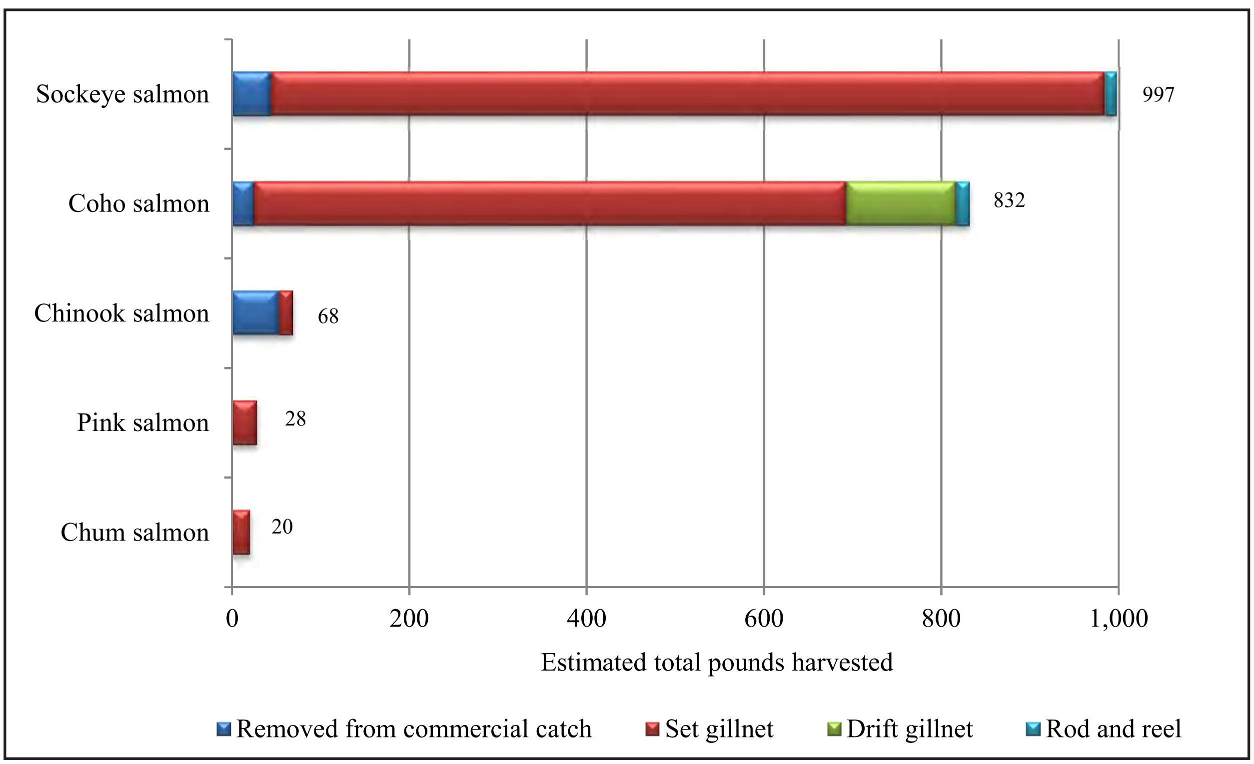


Figure 2-36.–Estimated harvests of salmon in pounds usable weight by gear type and resource, Egegik, 2016.

Table 2-35.–Estimated harvests of salmon by gear type and resource, Egegik, 2016.

Resource	Removed from commercial catch		Subsistence methods: Set gillnet		Subsistence methods: Drift gillnet		Subsistence methods: Seine		Subsistence methods: Handline		Subsistence methods: Other methods		Subsistence methods: Subsistence gear, any method		Rod and reel		Any method	
	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**23.1**	**121.4**	**385.4**	**1,671.3**	**26.3**	**123.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**411.6**	**1,795.1**	**6.3**	**28.0**	**441.0**	**1,944.5**
Chum salmon	0.0	0.0	4.2	20.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	20.1	0.0	0.0	4.2	20.1
Coho salmon	5.3	24.8	141.8	668.4	26.3	123.8	0.0	0.0	0.0	0.0	0.0	0.0	168.0	792.2	3.2	14.9	176.4	831.8
Chinook salmon	7.4	52.7	2.1	15.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	15.1	0.0	0.0	9.5	67.8
Pink salmon	0.0	0.0	12.6	27.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.6	27.6	0.0	0.0	12.6	27.6
Sockeye salmon	10.5	43.9	224.7	940.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	224.7	940.1	3.2	13.2	238.4	997.2
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2017.

Table 2-36.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Egegik, 2016.

Resource	Percentage base	Removed from commercial catch		Subsistence methods: Set gillnet		Subsistence methods: Drift gillnet		Subsistence methods: Seine		Subsistence methods: Handline		Subsistence methods: Other		Subsistence methods: Subsistence gear, any method		Rod and reel		Any method	
		Number	Pounds	Number	Pounds	Number	Pounds	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%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**5.2%**	**6.2%**	**87.4%**	**86.0%**	**6.0%**	**6.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**93.3%**	**92.3%**	**1.4%**	**1.4%**	**100.0%**	**100.0%**
	Total	**5.2%**	**6.2%**	**87.4%**	**86.0%**	**6.0%**	**6.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**93.3%**	**92.3%**	**1.4%**	**1.4%**	**100.0%**	**100.0%**
Chum salmon	Gear type	0.0%	0.0%	1.1%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.1%	0.0%	0.0%	1.0%	1.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.0%	0.0%	1.0%	1.0%
Coho salmon	Gear type	22.7%	20.4%	36.8%	40.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	40.8%	44.1%	50.0%	53.0%	40.0%	42.8%
	Resource	3.0%	3.0%	80.4%	80.4%	14.9%	14.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	95.2%	95.2%	1.8%	1.8%	100.0%	100.0%
	Total	1.2%	1.3%	32.1%	34.4%	6.0%	6.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	38.1%	40.7%	0.7%	0.8%	40.0%	42.8%
Chinook salmon	Gear type	31.8%	43.4%	0.5%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.8%	0.0%	0.0%	2.1%	3.5%
	Resource	77.8%	77.8%	22.2%	22.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.2%	22.2%	0.0%	0.0%	100.0%	100.0%
	Total	1.7%	2.7%	0.5%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.8%	0.0%	0.0%	2.1%	3.5%
Pink salmon	Gear type	0.0%	0.0%	3.3%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.1%	1.5%	0.0%	0.0%	2.9%	1.4%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	2.9%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	1.4%	0.0%	0.0%	2.9%	1.4%
Sockeye salmon	Gear type	45.5%	36.2%	58.3%	56.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	54.6%	52.4%	50.0%	47.0%	54.0%	51.3%
	Resource	4.4%	4.4%	94.3%	94.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	94.3%	94.3%	1.3%	1.3%	100.0%	100.0%
	Total	2.4%	2.3%	51.0%	48.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	51.0%	48.3%	0.7%	0.7%	54.0%	51.3%
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%	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%	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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Salmon Fishing and Harvest Areas

To address the study objective to describe salmon harvests in terms of species, gear used, and location, spatial data were collected from surveyed households. Spatial data collection and analysis methods were described in Chapter 1. Although each surveyed household was asked to provide spatial data, not every household participated in that portion of the survey effort and each map is a partial representation of the areas used in 2016 for salmon fishing; as such, each map identifies the specific sample size for the mapping component of the survey.

For each community, there are maps depicting fishing and harvest locations for each species as well as maps that show where specific gear types were used. Note that there were occasions when respondents identified the condition of the harvested species as spawning and those were included in the depicted locations for the appropriate salmon species. Also, there are instances in which a community harvested a species but no spatial data are available, and this is because the mapping data are gathered separately from the harvest information collected on the survey form and not all households provided spatial data. Regarding the maps showing fishing and harvest locations by gear type used, it is important to note that the data collection effort did not ask respondents to specify whether a drift or set gillnet was used at identified gillnetting locations. Also, for the gear type used, some respondents indicated a method of fishing called jigging (generally using either handline gear or rod and reel); those locations are depicted on the maps along with rod and reel gear use areas. Locations that identify "rod and reel/jig" use represent either where rod and reel gear was used, where the jigging method was used, or a mixture of both.

Chignik Bay

Figure 2-37 shows the 2016 fishing and harvest locations from the 6 out of 24 sampled households that provided spatial data during the household survey. While chum and pink salmon were harvested, no fishing and harvest locations for those species were provided and Figure 2-37 is a partial representation of locations where salmon harvested for home use were fished for and harvested in 2016. Sockeye salmon were harvested in Chignik Lagoon and in Chignik Lake near the mouth of Clark River, and Chinook salmon were taken off the beach by the Chignik Bay village along Anchorage Bay. Sockeye salmon were harvested using seine or gillnet from Chignik Lagoon and by seine in Chignik Lake by Clark River (Figure 2-38). Rod and reel/jig was used in Anchorage Bay by the Chignik Bay village where Chinook salmon were harvested, and also at Reindeer Creek to harvest coho salmon (Figure 2-39; Figure 2-37).

Chignik Lagoon

Based on 11 of 22 sampled Chignik Lagoon households that provided fishing and harvest locations for salmon harvested for home use in 2016, sockeye salmon were taken throughout Chignik Lagoon, as well as on either side of the spit separating Chignik Lagoon and Chignik Bay, and from Clark River, Chignik Lake, and at Cape Ikti near Kuiukta Bay (Figure 2-40). Seine use was more prevalent in the Chignik Bay fishing and harvest areas for sockeye salmon and gillnet use within Chignik Lagoon was predominantly focused in the area of Rocky Point (Figure 2-41). Chinook salmon were taken from upper Chignik Lagoon, at Mensis Point, from the Chignik River, and mouth of Chignik Lake (Figure 2-40). Coho salmon were harvested at the spit on the Chignik Bay side, from Chignik Lagoon, and in Chignik Lake. Pink and chum salmon were taken in Chignik Lagoon and Castle Bay. Salmon were harvested at most locations by gillnet or seine, but by rod and reel in the Chignik River (Figure 2-42).

Chignik Lake

One-half of sampled households (14 of 28) provided information only about where sockeye and Chinook salmon were fished for and harvested; sockeye salmon harvest locations were more widespread, and Chinook salmon were taken only in the upper Chignik River (Figure 2-43). Identified harvest locations by gear type for sockeye salmon were also more varied given that a single Chinook salmon gillnet harvest location was identified (Figure 2-44). Sockeye salmon were harvested using seine and gillnet in upper Chignik Lagoon, upper Chignik River, Chignik Lake, and also in Clark River. Rod and reel/jig was used in Clark River and up a creek by Hatchery Point in Chignik Lake.

Perryville

All five species of salmon found in Alaska were harvested by Perryville households in 2016 and 18 out of 26 sampled households provided fishing and harvest location information for all species. Sockeye salmon were harvested throughout the Chignik River drainage from Anchorage Bay and Chignik Bay to Chignik Lagoon, Chignik River, Chignik Lake, and Clark River (Figure 2-45). Every species was taken off the beach by Perryville, and every species except Chinook salmon was harvested in Kametolook River. Additionally, coho salmon were taken entirely along the Pacific side of the Alaska Peninsula in Ivanof Bay, Longbeach River, and Three Star River. Gillnet was used at most fishing and harvest areas, and seine gear was used in Chignik Lake, Clark River, and in Chignik and Anchorage bays (Figure 2-46). Rod and reel/jig was used in Ivanof Bay, off the beach by Perryville, and in the Kametolook River (Figure 2-46; Figure 2-47).

Port Heiden

Search and harvest locations for all salmon species were mapped by 19 out of 29 sampled households, and the locations were mainly grouped around the beach sites near Port Heiden and at Reindeer Creek (Figure 2-48). Reindeer Creek (known locally as North River) was where fishing with gillnet and rod and reel/jig occurred; a second rod and reel/jig fishing area was located along the shore of Bristol Bay several miles north of the mouth of Reindeer Creek (Figure 2-49). Gillnet was also used on the beaches nearest the community, as well as at the mouth of the Meshik River. Other gear was used at one location on Barbara Creek; this method was reported as hands—one salmon was harvested using bare hands by one household, and five salmon harvested by another household whose members also used bare hands. Non-locally, Port Heiden households also gillnetted on the beach at Naknek and along Ugashik Bay north of the community Pilot Point, and with rod and reel/jig in Chignik Lake. Chinook salmon were harvested at the mouth of the Meshik River, from the community beach sites, and at Reindeer Creek (Figure 2-48). Sockeye salmon were generally harvested at the same locations as Chinook salmon, and also in Chignik Lake, Naknek River, and Ugashik Bay. Gillnets were used to harvest sockeye salmon at most of these locations; the use of rod and reel/jig was only mapped at the mouth of Reindeer Creek and in Chignik Lake (Figure 2-50). Coho salmon harvest locations include Barbara Creek and the coastal location north of Reindeer Creek (Figure 2-48). Chum salmon were harvested at the community beach sites and Reindeer Creek.

Egegik

Egegik households did most of their subsistence salmon fishing directly around the community according to spatial data provided by 8 out of 20 sampled households (Figure 2-51). All species were harvested in the area of Church Hill Beach and Paul’s Beach and coho salmon were fished for up the Egegik River by an area locally referred to as “the rapids.” The gear type used influenced the location of harvests; gillnet was used exclusively around Egegik near Church Hill Beach and Paul’s Beach while rod and reel/jig was used near Paul’s Beach but also up the Egegik River (Figure 2-52). Sockeye salmon were harvested by gillnet in these same areas as well as by rod and reel/jig at Paul’s Beach (Figure 2-53).

Figure 2-37.–Fishing and harvest locations of Chinook, coho, and sockeye salmon, Chignik Bay, 2016.

Figure 2-38.–Fishing and harvest locations of sockeye salmon by gear type, Chignik Bay, 2016.

Figure 2-39.–Fishing and harvest locations of salmon by gear type, Chignik Bay, 2016.

Figure 2-40.–Fishing and harvest locations of Chinook, pink, coho, chum, and sockeye salmon, Chignik Lagoon, 2016.

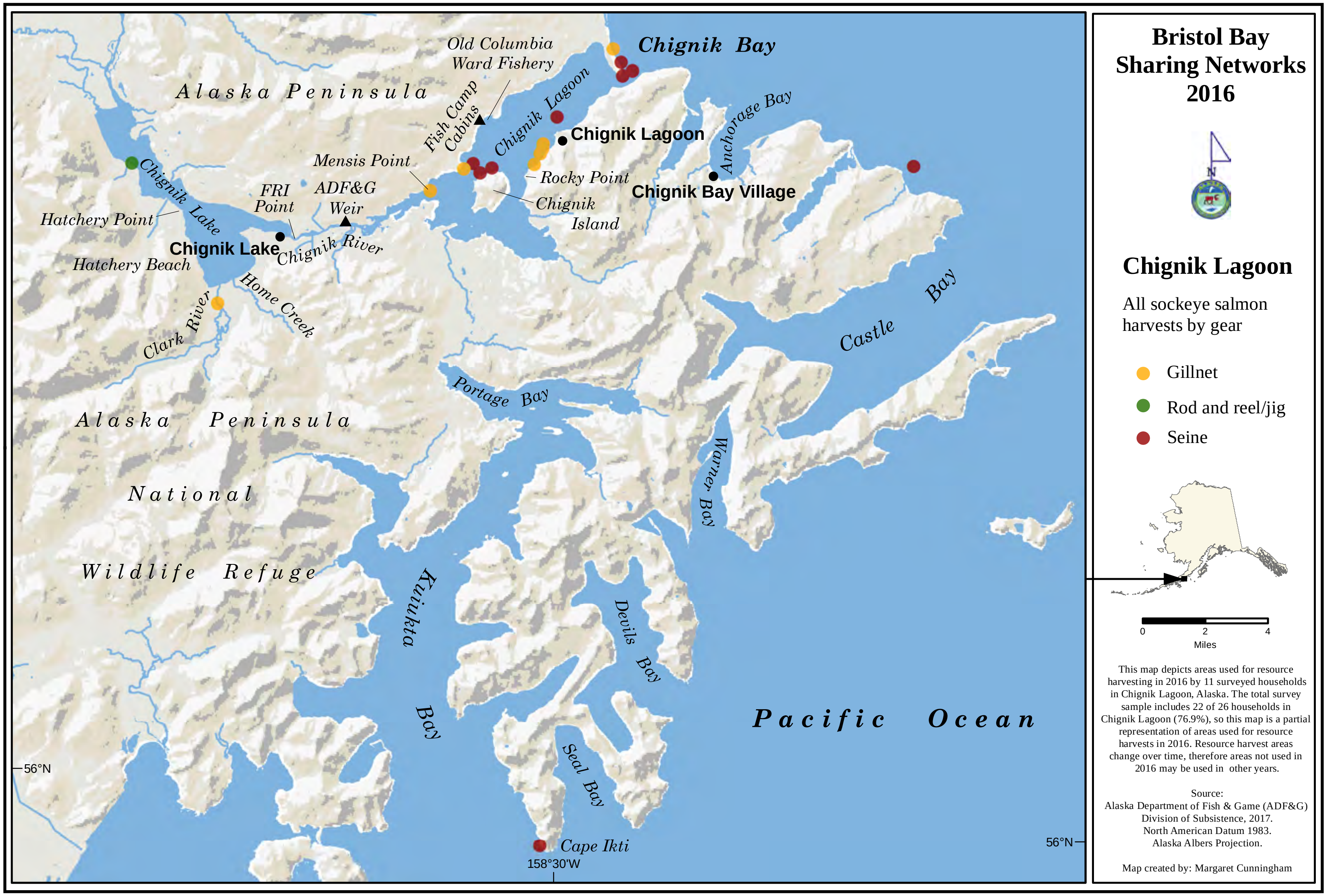


Figure 2-41.–Fishing and harvest locations of sockeye salmon by gear type, Chignik Lagoon, 2016.

Figure 2-42.–Fishing and harvest locations of salmon by gear type, Chignik Lagoon, 2016.

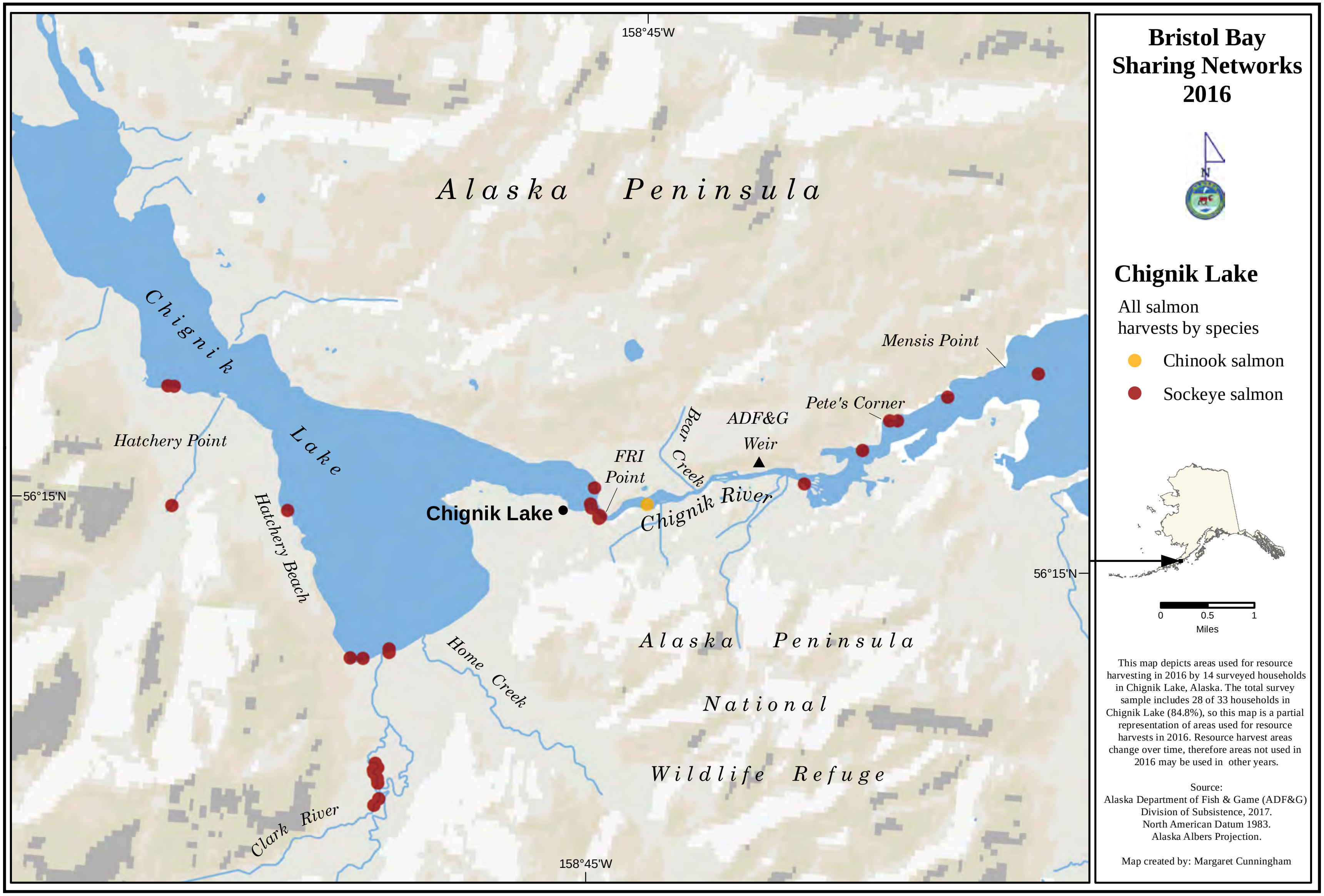


Figure 2-43.–Fishing and harvest locations of Chinook and sockeye salmon, Chignik Lake, 2016.

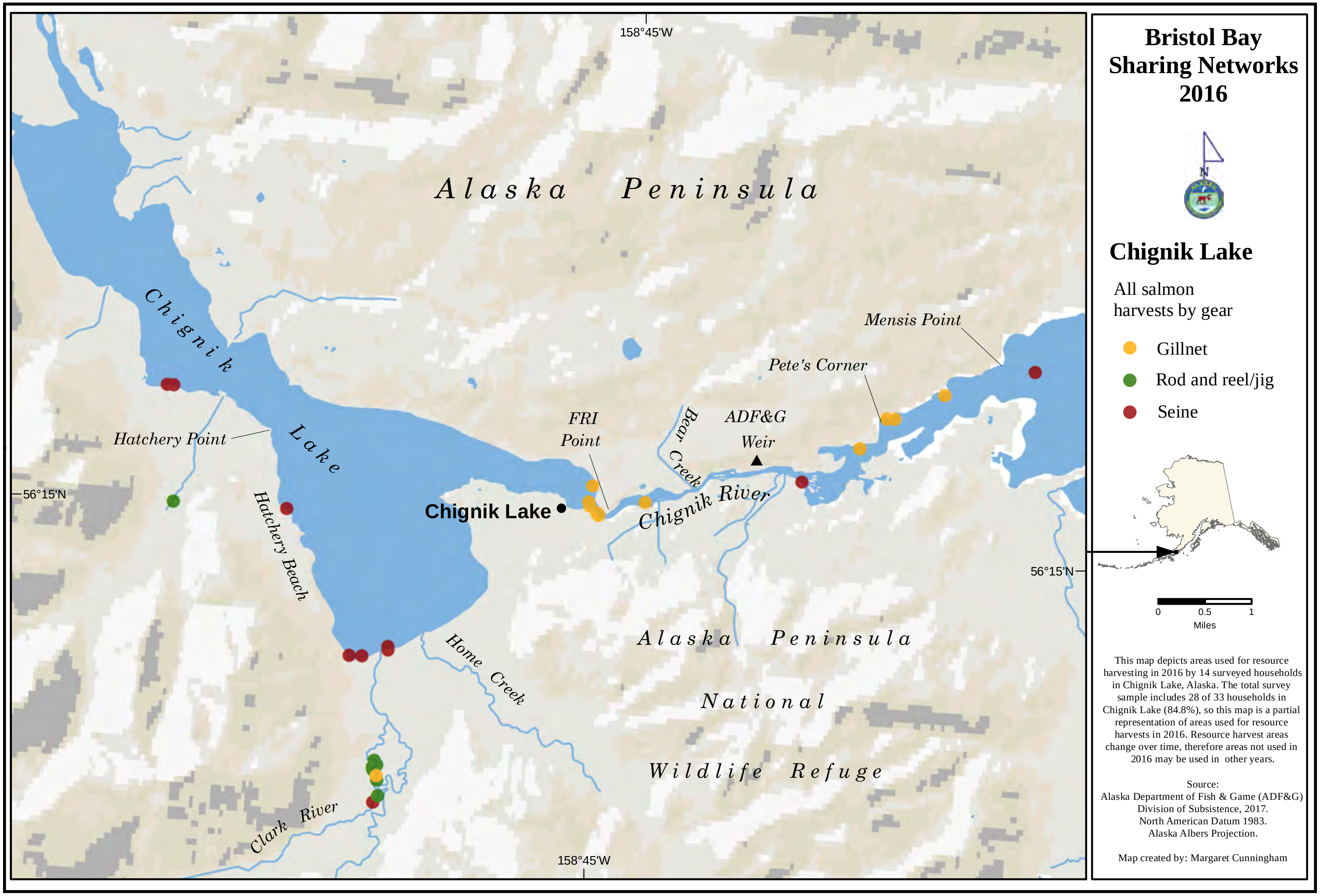


Figure 2-44.–Fishing and harvest locations of salmon by gear type, Chignik Lake, 2016.

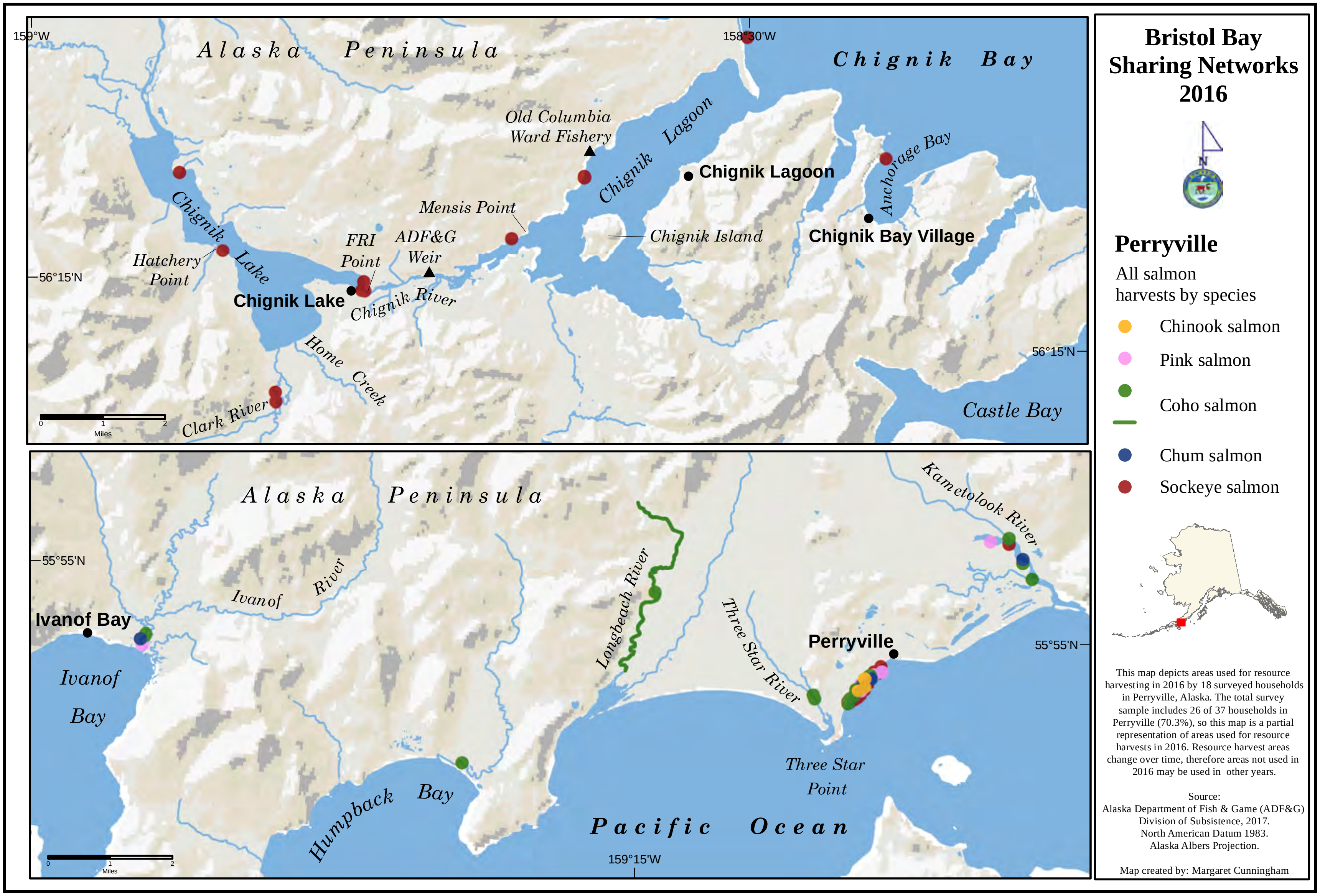


Figure 2-45.–Fishing and harvest locations of Chinook, pink, coho, chum, and sockeye salmon, Perryville, 2016.

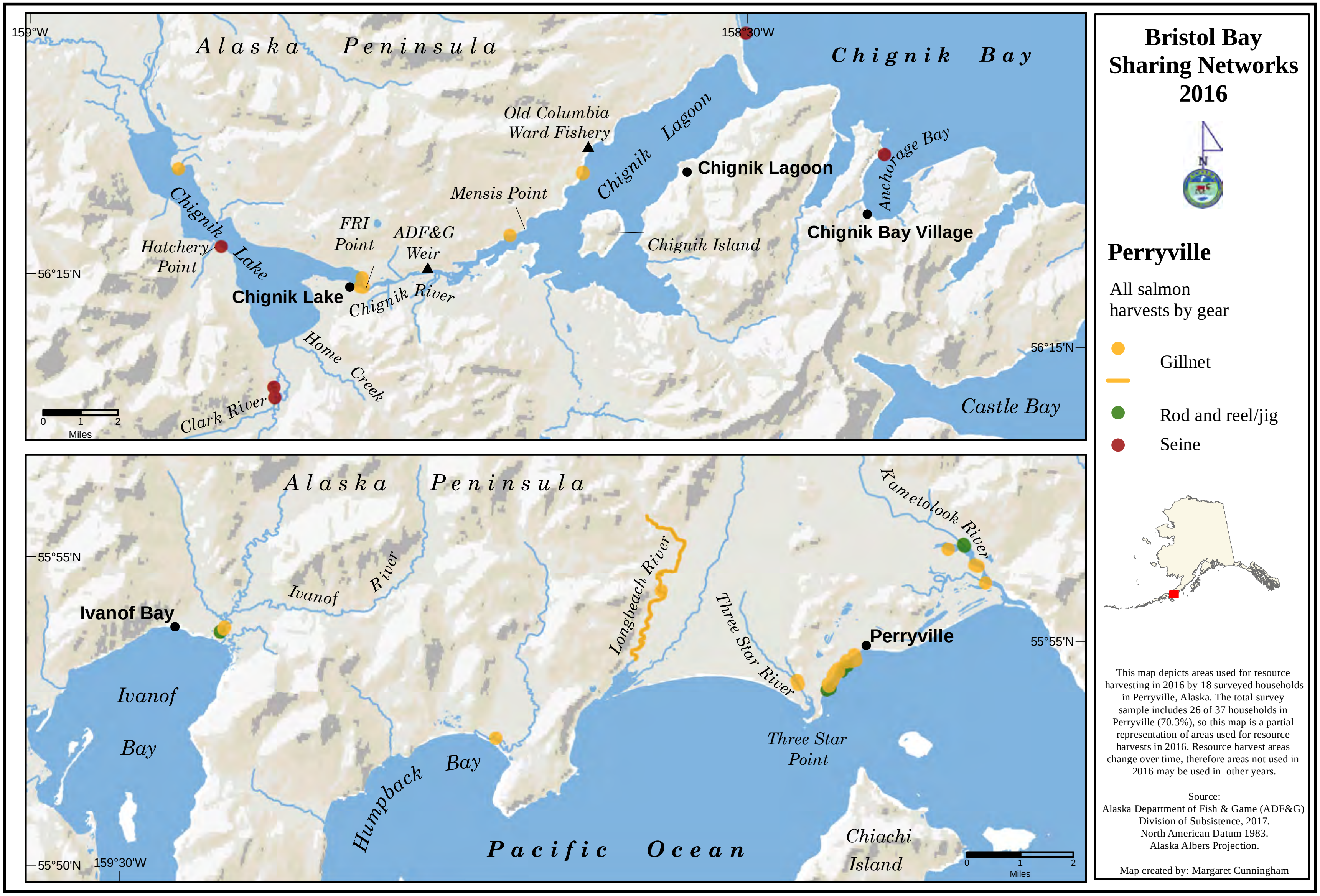


Figure 2-46.–Fishing and harvest locations of salmon by gear type, Perryville, 2016.

Figure 2-47.–Fishing and harvest locations of sockeye salmon by gear type, Perryville, 2016.

Figure 2-48.–Fishing and harvest locations of Chinook, pink, coho, chum, and sockeye salmon, Port Heiden, 2016.

Figure 2-49.–Fishing and harvest locations of salmon by gear type, Port Heiden, 2016.

Figure 2-50.–Fishing and harvest locations of sockeye salmon by gear type, Port Heiden, 2016.

Figure 2-51.–Fishing and harvest locations of Chinook, pink, coho, chum, and sockeye salmon, Egegik, 2016.

Figure 2-52.–Fishing and harvest locations of salmon by gear type, Egegik, 2016.

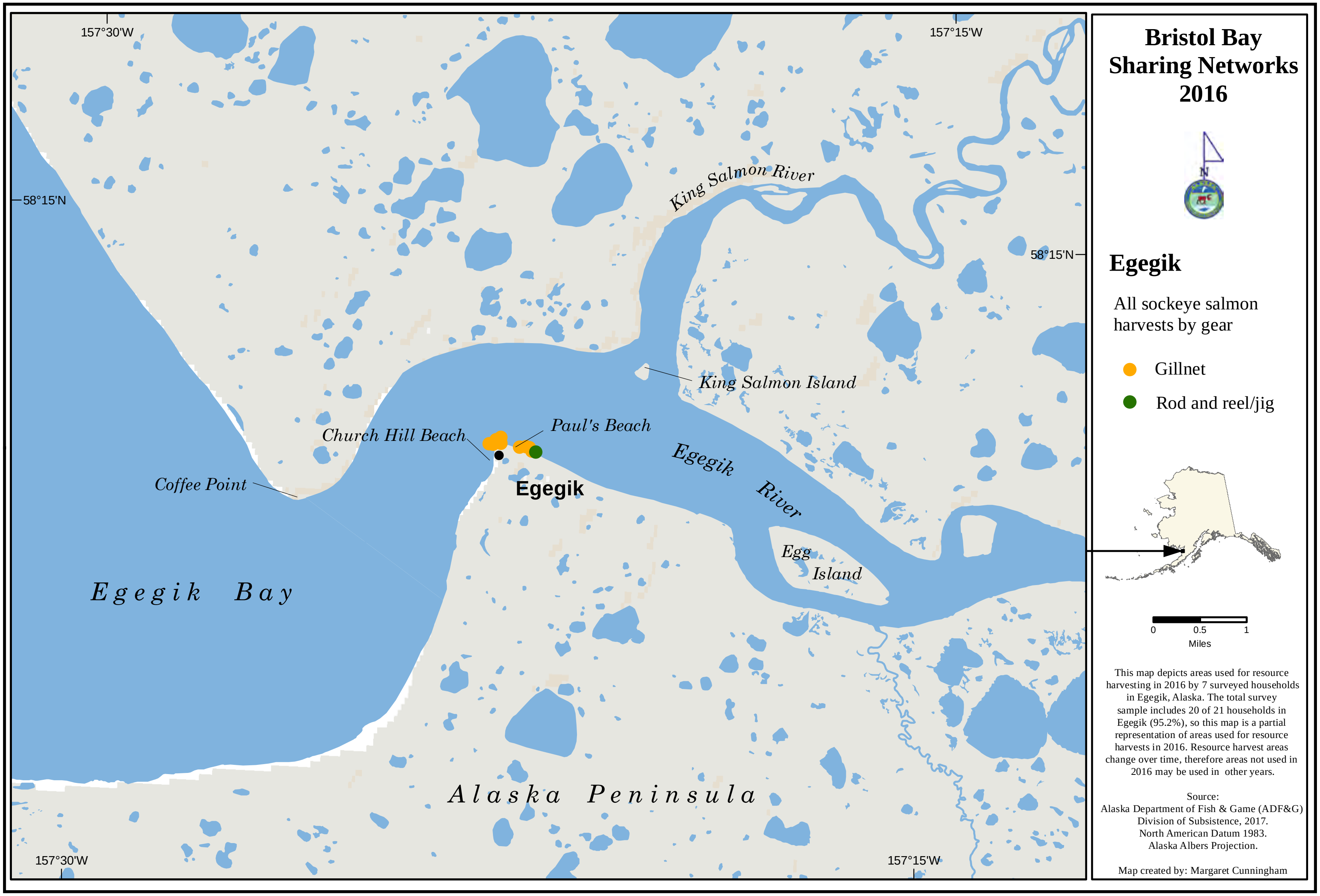


Figure 2-53.–Fishing and harvest locations of sockeye salmon by gear type, Egegik, 2016.

Salmon Harvest Timing

In Chignik Bay, Chignik Lake, Chignik Lagoon, and Perryville, the salmon harvest activities in 2016 using subsistence gear (including hook-and-line gear) or rod and reel began before June and lasted past September (Table 2-37). Most salmon harvests occurred in June (27%) by an estimated 32 households. The next highest amount of salmon harvests occurred in July (21%), followed by August (18%) by 26 households, and September (17%) by 29 households. All salmon harvested through July 11 represented 39% of total salmon harvested in 2016 by all four communities; harvests after July 11 represented 58% of total salmon harvested. There was no timing information available for 3% of salmon harvested for these communities.

In Port Heiden, the majority of salmon (74%) that were harvested by subsistence gear or rod and reel were harvested in June by 20 estimated households, followed by 13% of salmon harvested in August (by 23 estimated households), 5% in July (by 11 estimated households), 5% in September (by 16 estimated households), and 2% after September (by 8 estimated households). No salmon were harvested by households in Port Heiden in January through May for the study year of this project.

In Egegik, the salmon harvest with subsistence gear or rod and reel occurred from June through September, with the highest percentage of salmon being harvested in August (35%), followed by July (26%), June (24%), and September (16%). An estimated eight households harvested salmon during these months; four households fished in June and in August and two households fished in July and September.

Table 2-37.–Timing of salmon harvests, Chignik area communities, Egegik, and Port Heiden, 2016.

	Estimated households	Estimated amount of salmon harvested	
		Number	Percent
Chignik Bay, Chignik Lake, Chignik Lagoon, and Perryville [a,b]			
No timing available	4.9	186.9	2.8%
Before June	2.6	10.8	0.2%
June	31.9	1,814.0	26.8%
July 1–11	15.8	825.1	12.2%
July 12–31	18.5	594.4	8.8%
August	26.3	1,199.3	17.7%
September	29.0	1,148.5	17.0%
After September	24.8	979.3	14.5%
Any date	**77.8**	**6,758.4**	**100.0%**
Total estimated households	**123**		
Port Heiden [c]			
No timing available	4.0	26.9	0.6%
Before June	0.0	0.0	0.0%
June	20.2	3,122.7	74.3%
July	10.8	223.2	5.3%
August	22.9	558.1	13.3%
September	16.1	191.0	4.5%
After September	8.1	83.4	2.0%
Any date	**33.6**	**4,205.3**	**100.0%**
Total community households [d]	**39**		
Egegik [c]			
No timing available	0.0	0.0	0.0%
Before June	0.0	0.0	0.0%
June	4.2	99.8	23.9%
July	2.1	108.2	25.9%
August	4.2	144.9	34.7%
September	2.1	65.1	15.6%
After September	0.0	0.0	0.0%
Any date	**8.4**	**417.9**	**100.0%**
Total community households [d]	**21**		

Source ADFG Division of Subsistence household surveys, 2017.

a. Communities were combined to ensure adequate aggregation for confidentiality.

b. Dates chosen for display are based on the division of early- and late-run sockeye salmon in the area.

c. In order to ensure adequate aggregation to protect confidentality, results were combined to month of harvest.

d. Total number of households in the community.

Household Large Land Mammals Harvest and Use Characteristics

Chignik Bay

Caribou and moose were the only large land mammals for which use by Chignik Bay households was reported in 2016; no households hunted or used brown bear (Table 2-19). Use of caribou was highest; this species was used by an estimated 46% of households, and also 13% of households attempted to harvest and harvested, 13% shared caribou with other households, and 33% of households received caribou. Moose resources were used by 25% of households, but no moose were harvested by sampled households in 2016 although 8% of households hunted moose. All moose received by Chignik Bay households came either from another community or a household in Chignik Bay that was not surveyed; also, some of the households that received moose gave away a portion of the resource (13% of households shared moose). The large land mammals harvest was composed entirely of caribou: a total of 6 caribou provided a harvested usable weight of 844 lb, with a mean per household harvest of 31 lb and a per capita harvest of 11 lb. It was estimated that one male caribou was harvested in September, and five male caribou in November (Table 2-38).

Chignik Lagoon

Caribou, moose, and deer (from Kodiak) were the only large land mammals for which use by Chignik Lagoon households was reported in 2016; however, no surveyed households harvested any large land mammals (Table 2-20). Use of caribou was highest even though use was based on shared resources. A Chignik Lagoon survey respondent said, “Caribou was given to us this year [2016], it is like gold!” This species was used by an estimated 30% of households, and 15% of households hunted caribou but none were successful. Also, 30% of households received caribou and 5% gave away to other households the caribou resources that had been received. Moose resources were received and further shared by Chignik Lagoon households: 10% of households received and used moose, and 5% gave away moose. Members of one household (5%) volunteered that they received deer from a friend living in Kodiak.

Chignik Lake

Nearly every household (93%) in Chignik Lake used large land mammals in 2016, with 46% attempting to harvest and 29% harvesting resources from this category (Table 2-21). Moose composed the largest proportion (84%) of the large land mammals harvest weight (Figure 2-54). Moose resources were used by an estimated 79% of households, and 43% of households attempted to harvest and 25% harvested this species (Table 2-21). While 46% of households shared moose with other households, a much higher proportion (64%) of households received moose. Caribou composed the remaining 16% of the large land mammals harvest weight; an estimated 61% of households used caribou, 32% attempted to harvest and 14% harvested this species, and 29% shared caribou (Figure 2-54; Table 2-21). Similar to moose, caribou resources were received by more households (54%) than gave away caribou. Brown bear resources were used by 7% of all Chignik Lake households, but no bear harvests were reported for Chignik Lake by those households that were surveyed. Bear resources were received by 7% of households and given to others by 4% of households; received bear likely came from a Chignik Lake household that was not surveyed or a Perryville resident. The large land mammals harvest was composed of 8 moose with a usable weight of 4,509 lb, a mean harvest per household of 137 lb, and a per capita harvest weight of 46 lb. The estimated caribou harvest was composed of a total of 6 caribou, which equated to 884 lb total usable weight, or 27 lb per household. Of the estimated eight moose harvested all were bull moose or of unknown sex; harvests occurred in July, August, September, and December, with September being the month when the most moose were harvested (Table 2-39). The harvested caribou were also bulls and most (four of six) were harvested in September.

Perryville

In 2016, an estimated 73% of Perryville households used large land mammals, one-half (50%) hunted these resources, but, overall, 35% of households harvested large land mammals (Table 2-22). An estimated 42% of households shared large land mammals, but more households (58%) received these resources. Perryville is one of the two study communities that had more than one-third of households harvest large land mammals;

only in Port Heiden did a higher proportion of community households (48%) harvest these resources (Table 2-22; Table 2-23). Moose, caribou, and brown bear were all used and harvested (Table 2-22; Figure 2-55). Moose were used by an estimated 54% of households, and also 39% of households attempted to harvest, 19% harvested, 23% shared with other households, and 39% of households received moose. Caribou use, hunting, harvesting, and sharing rates were similar to those for moose, but a much smaller proportion of Perryville households used (8%), attempted to harvest (12%), harvested (4%), or shared (8%) brown bear. Also, a smaller proportion of households (4%) received brown bear than gave away brown bear. An estimated total of 9 moose harvested contributed a usable weight of 4,611 lb with a mean harvest per household of 125 lb and a per capita weight of 42 lb. The estimated caribou harvest was composed of a total of 6 caribou, which equated to 854 lb total usable weight, or 23 lb per household. There was an estimated 1 brown bear harvested that equated to 484 lb of usable weight. Of the nine moose harvested, seven were identified as bull moose: three harvested in September and four in October (Table 2-40). Of the six caribou harvested, all were bulls harvested in September, and the brown bear was harvested in October.

Port Heiden

Of the large land mammals used in Port Heiden, use of caribou was highest: an estimated 79% of households used the resource, 52% hunted caribou, 48% harvested, and roughly one-half of households shared caribou (gave and received) (Table 2-23). Moose was the second most used of the large land mammals resources—by an estimated 55% of households. Most of the households that used moose received the resource from another household; one-half (55%) of the households used moose and 52% received it while only 3% harvested moose and 10% shared moose. Brown bear resources were used by an estimated 3% of Port Heiden households, but no bear harvests were reported for Port Heiden by those households that were surveyed and no households reported receiving brown bear in 2016; presumably this resource was harvested or received in a previous year. Also, the survey did not ask about use or harvest of black bear or Dall sheep, but 3% of households volunteered that they both received and used those species.

The estimated harvest of large land mammals by Port Heiden households was 5,366 lb, with a mean per household harvest of 138 lb. Caribou composed the largest proportion (86%) of the large land mammals harvest weight: 4,640 lb (119 lb per household) (Figure 2-56; Table 2-23). The moose harvest was an estimated 726 lb total (19 lb per household) for the community. The amount of individual caribou harvested for 2016 by Port Heiden households was 31 caribou, of which 28 were bulls (Table 2-41). By far the most caribou were harvested in the month of September. The one bull moose harvested was taken in September.

Egegik

No large land mammals were harvested by Egegik households in 2016; however, 10% of households hunted for caribou and 5% hunted for moose (Table 2-24). Although no large land mammals were harvested, 40% of households used moose and 10% used caribou, all of which came into the households through sharing. Exchange between communities maintains relationships and use of resources even when those resources are not locally available. Some of the moose resources that were received by households were further shared, with 15% of households giving moose away.

Large Land Mammals Hunting and Harvest Areas

Collecting harvest and hunting locations for large land mammals was included in this survey at the request of the National Park Service. Though the large land mammals harvest and use data are included in this report, the large land mammals spatial data were not produced on maps since data collection and mapping analysis for large land mammals are outside the scope of the OSM-funded project. The ADF&G Division of Subsistence has the raw spatial data and maps depicting hunting and harvest locations could be produced in the future if requested with appropriate funding.

Table 2-38.–Estimated large land mammal harvests by month and sex, Chignik Bay, 2016.

Resource	Estimated harvest by month													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	**Total**
All large land mammals	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.1**	**0.0**	**4.5**	**0.0**	**0.0**	**5.6**
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	4.5	0.0	0.0	**5.6**
Caribou, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	4.5	0.0	0.0	**5.6**
Caribou, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose, bull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose, cow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**

Source ADF&G Division of Subsistence household surveys, 2017.

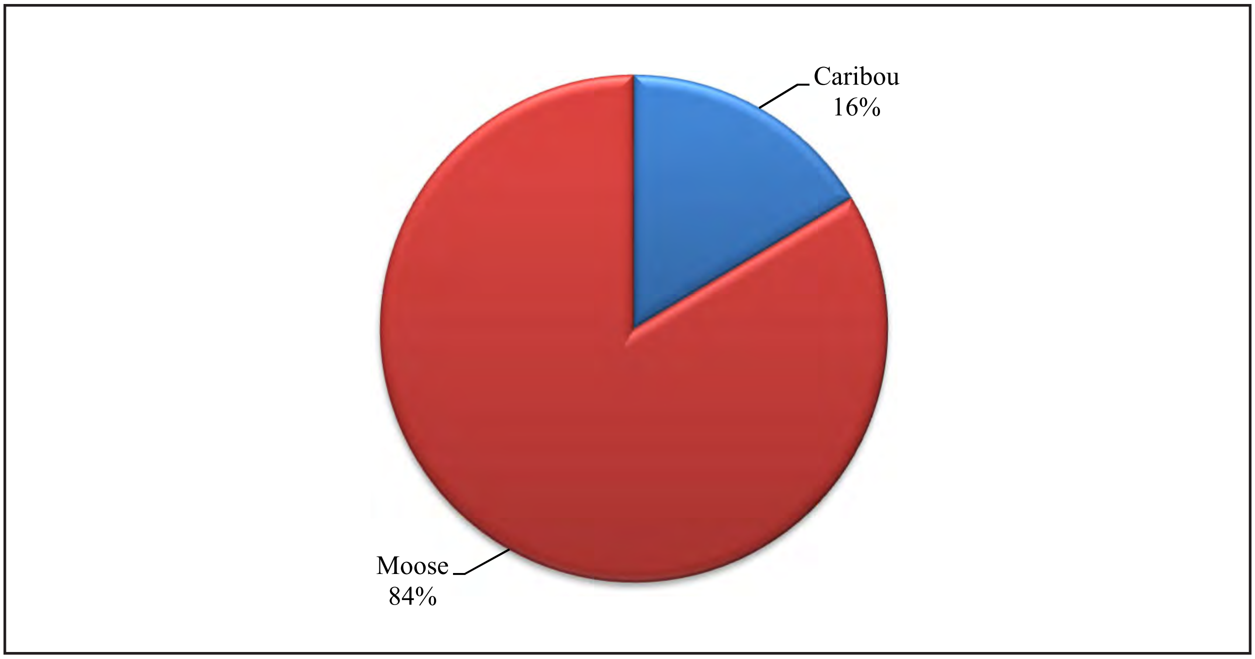


Figure 2-54.–Composition of large land mammal harvest in pounds usable weight, Chignik Lake, 2016.

Table 2-39.–Estimated large land mammal harvests by month and sex, Chignik Lake, 2016.

Resource	Estimated harvest by month													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	**Total**
All large land mammals	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.4**	**2.4**	**7.1**	**0.0**	**1.2**	**1.2**	**0.0**	**14.2**
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.5	0.0	1.2	0.0	0.0	**5.9**
Caribou, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.5	0.0	1.2	0.0	0.0	**5.9**
Caribou, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.2	3.6	0.0	0.0	1.2	0.0	**8.3**
Moose, bull	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.2	3.5	0.0	0.0	1.2	0.0	**8.3**
Moose, cow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**

Source ADF&G Division of Subsistence household surveys, 2017.

Note Due to rounding, the sum of harvest-by-sex estimates may not equal the total amount of the estimated harvest for the species.

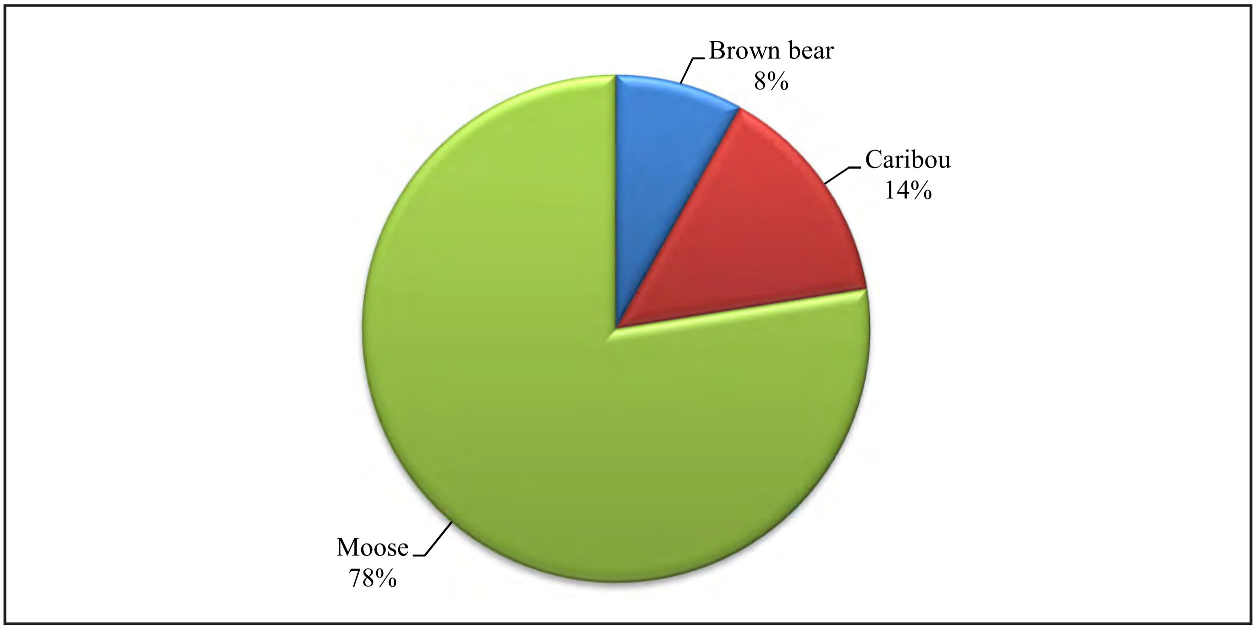


Figure 2-55.–Composition of large land mammal harvest in pounds usable weight, Perryville, 2016.

Table 2-40.–Estimated large land mammal harvests by month and sex, Perryville, 2016.

	Estimated harvest by month													
Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	**Total**
All large land mammals	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**8.5**	**5.7**	**0.0**	**1.4**	**0.0**	**15.7**
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	**1.4**
Caribou	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	0.0	0.0	0.0	0.0	**5.7**
Caribou, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	0.0	0.0	0.0	0.0	**5.7**
Caribou, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	4.3	0.0	1.4	0.0	**8.5**
Moose, bull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	4.3	0.0	0.0	0.0	**7.1**
Moose, cow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	**1.4**

Source ADF&G Division of Subsistence household surveys, 2017.

Note Due to rounding, the sum of harvest-by-sex estimates may not equal the total amount of the estimated harvest.

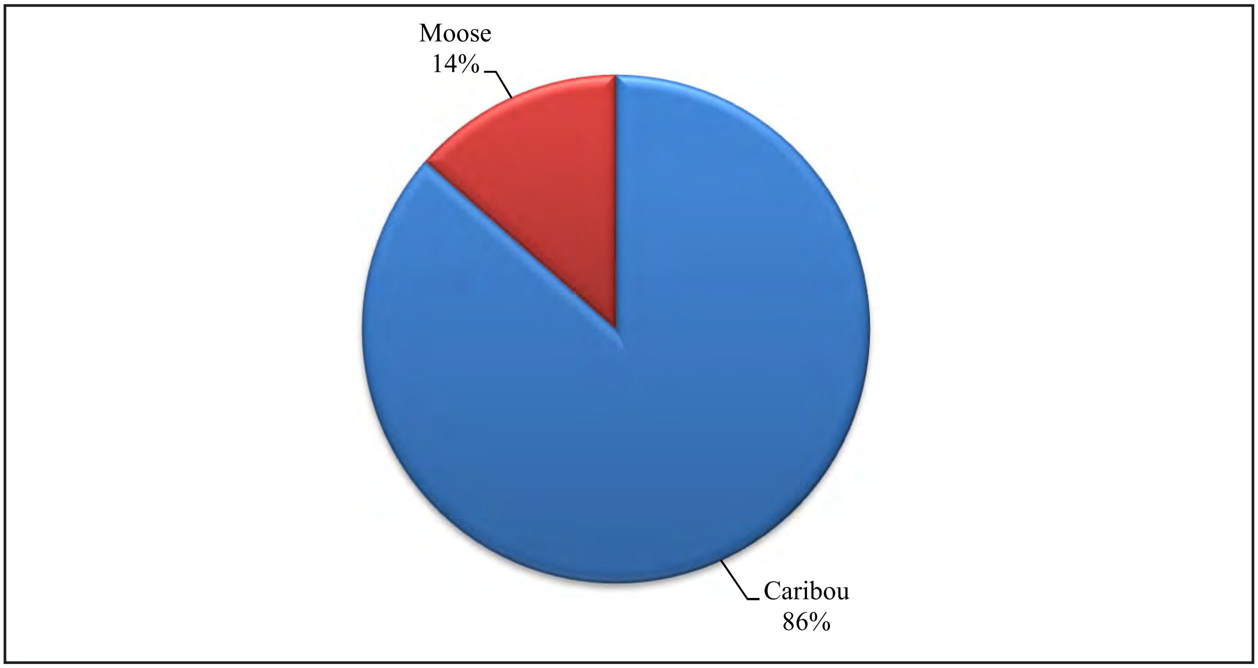


Figure 2-56.–Composition of large land mammal harvest in pounds usable weight, Port Heiden, 2016.

Table 2-41.–Estimated large land mammal harvests by month and sex, Port Heiden, 2016.

	Estimated harvest by month													
Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	**Total**
All large land mammals	**2.7**	**0.0**	**1.3**	**0.0**	**0.0**	**0.0**	**1.3**	**5.4**	**18.8**	**0.0**	**0.0**	**2.7**	**0.0**	**32.3**
Black bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou	2.7	0.0	1.3	0.0	0.0	0.0	1.3	5.4	17.5	0.0	0.0	2.7	0.0	**30.9**
Caribou, male	1.3	0.0	1.3	0.0	0.0	0.0	1.3	5.4	16.1	0.0	0.0	2.7	0.0	**28.2**
Caribou, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	**1.3**
Caribou, unknown sex	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.3**
Moose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	**1.3**
Moose, bull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	**1.3**
Moose, cow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Dall sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**

Source ADF&G Division of Subsistence household surveys, 2017.

Note Due to rounding, the sum of harvest-by-sex estimates may not equal the total amount of the estimated harvest for the species or total harvest.

Comparing Harvests and Uses in 2016 with Previous Years

Harvest Data

Changes in the harvest of resources by residents of the study communities can be discerned through comparisons with findings from other study years. The Division of Subsistence has conducted multiple surveys to collect resource harvest and use data in each study community for all resources or for specific resource categories (such as large land mammals, marine mammals, or salmon). The estimated results from previous surveys are published in the Division of Subsistence Community Subsistence Information System (CSIS[26]) database, and the forthcoming tables and figures were generated using those available data for comparison with results from the 2016 study year.

Salmon

The study communities of Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville are located within the ADF&G's CMA, Port Heiden is located in the Alaska Peninsula Management Area, and Egegik is located in the Bristol Bay Management Area. Subsistence salmon harvest estimates for each of these management areas are developed annually based on permit returns from residents of the communities within each area as well as other Alaska residents who subsistence fished at locations in these management areas. Permit return results and subsistence harvest estimates are published in an annual report; the latest report by Fall et al. (2019) published 2016 results, which is this project's study year. Note that the subsistence salmon permit data published in the annual reports will not be included in the forthcoming tables and figures, which instead use data that focus on estimates for local households that were surveyed in the study communities. Below is a summary of when household surveys occurred in each study community to provide local use and harvest estimates.

To complement permit data, in years when funding was available—from 1993–2008, 2011, and 2014–2016—Division of Subsistence staff, and survey technicians from each community who were trained and hired by the Division of Subsistence, administered face-to-face household subsistence salmon harvest surveys in each of the CMA communities to collect harvest information from households that subsistence fished but did not obtain a permit, or did obtain a permit but had not returned the permit to the department at the end of the year. In years when the post-season survey was conducted, the data were integrated with the permit data, which results in a more reliable estimate of subsistence harvests by households in the CMA communities that were published in the annual report. Additional previous research that the division has conducted in the CMA communities included comprehensive surveys that asked about all resources, and ethnographic studies that included salmon surveys; findings from surveys and ethnographic studies for the CMA communities for study years 1984, 1989, 1991, 2003, and 2011 are published in reports by Morris (1987), Fall et al. (1995), Fall and Utermohle (1995), Hutchinson-Scarbrough and Fall (1996), Fall (2006), and Hutchinson-Scarbrough et al. (2016). The Division of Subsistence also conducted salmon harvest surveys for 2014 and 2015, and while publication of those data in the CSIS and an ADF&G Technical Paper are pending, those data are included in this section.

Additionally, there were salmon harvest surveys conducted in the two other study communities located outside the CMA. Prior to the study year, the division had only done research in Port Heiden regarding subsistence salmon uses and harvests in 1987 (Fall and Morris 1987). Comprehensive subsistence harvest surveys were conducted in Egegik for the study years 1984 and 2014; estimated use and harvest results from both study years are published online in the ADF&G CSIS and Morris (1987) reports the full scope of study findings from the 1984 study year.

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

It is important to note that all salmon resources harvested by the study communities are included in the tables and figures in this section. This means that, for some communities in certain years, in addition to the five salmon species there were additional salmon resources harvested; for example, landlocked salmon or unknown salmon (when the species was not identified) have been harvested. Another salmon resource harvested in some communities is referred to as "redfish" or "spawn-outs," which is salmon in spawning condition; historical harvest estimates for these resources are included as "spawning salmon."

Chignik Bay

In 2016, an estimated 100% of Chignik Bay households used salmon, 63% harvested salmon, and 83% received salmon; in comparison, in past study years, the proportion of households that used salmon ranged from a minimum of 91% in 2011 to 100% of households in 1991, 2003, and 2014 (Table 2-42). In addition, salmon were harvested by a range of 36% of households in 2014 to a high of 80% of households in 1991; also, between 48% of households in 2011 and 77% of households in 2003 received salmon from another household.

In all study years for Chignik Bay, the salmon harvest was composed primarily of sockeye salmon with lesser amounts of coho and Chinook salmon contributing a large portion of the rest of the total salmon harvest (Figure 2-57). In all the study years prior to 2016 there were also small amounts of pink and chum salmon harvested. The sockeye salmon harvest (not including spawning salmon) in 2016 was 1,656 fish (95 lb per capita) in Chignik Bay, compared to an average of 1,872 fish (100 lb per capita) for all study years (Figure 2-57; Figure 2-58). Excluding spawning salmon, the sockeye salmon per capita harvests have fluctuated over time. For example, in 1984 the per capita harvest was 113 lb, and for the next study year occurring 5 years later (1989), the per capita harvest was nearly one-half as much as it was in 1984 with 58 lb per capita harvested; then, in 1991 the per capita harvest was closer to the 1984 estimate at 95 lb, but trailed considerably in comparison to the highest per capita harvest (177 lb) that was estimated in 2011 (Figure 2-58). Though 2011 was the year in which the sockeye salmon pounds per capita harvest was highest in Chignik Bay, in 1984 there was a slightly higher number of total individual sockeye salmon harvested (2,633 fish) compared to 2,573 individual fish harvested in 2011 (Figure 2-57). The sockeye salmon runs in 2011 came in strong and early, and fish size averaged 7.2 lb[27] (larger than normal), which likely accounted for the significantly higher per capita harvest weight compared to other years (Hutchinson-Scarbrough et al. 2016:184).

Throughout the study years, the Chinook salmon per capita harvests ranged from as low as 2 lb per person in 2014 to as high as 24 lb per person in 1991 (Figure 2-58). While the Chinook salmon per capita harvests have been variable throughout the span of all study years, note that the lowest per capita harvest estimates occurred in the most recent study years of 2014, 2015, and 2016. Coho salmon per capita harvests, like those for sockeye and Chinook salmon, have also been variable, ranging from as little as 1 lb per person in 2016 to as high as 35 lb per person in 1989.

Pink and chum salmon harvests over time have been consistently low with harvests of each species ranging from zero to four pounds per capita harvested. Spawning salmon (mostly sockeye salmon) are also harvested in this community. Only in 1989, 1991, 2003, 2011, and 2016 did survey forms ask respondents in Chignik Bay to specify harvests of fish in spawning condition, and estimated per capita harvests have varied over time by ranging from as low as 0 lb per capita in 2016 to as high as 17 lb per capita in 1991.

Salmon harvesting methods remained relatively the same throughout the study years with the largest change evident in 2016 (Figure 2-59). In 2016, 69% of the salmon harvest weight was acquired by removal from commercial harvests ("home pack"), 31% was harvested by subsistence gear, and less than 1% by rod and reel. For all study years combined, on average 32% of the salmon harvest weight came from home pack, 62% was harvested using subsistence gear (gillnet and seines), and 7% was harvested by rod and reel. Since 2003, reliance on home pack has increased gradually at the same time use of rod and reel has

27. Alaska Department of Fish and Game, OceanAK data system query results were provided by Ross Renick, Assistant Area Management Fishery Biologist, ADF&G, Kodiak, personal communication.

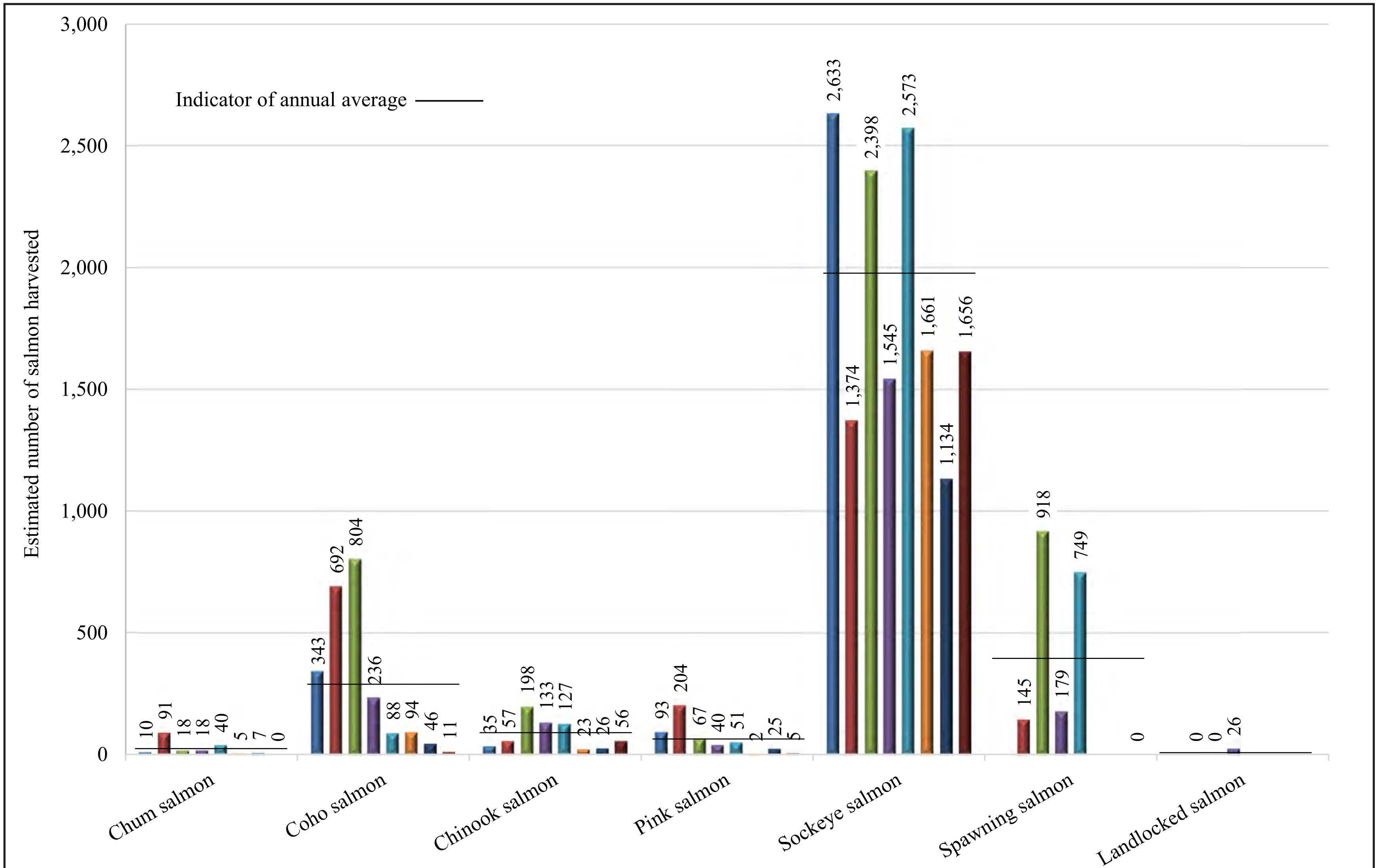
decreased. Not factoring in 2016, the use of subsistence net gear remained relatively the same over the years, ranging from 57%–68% of the salmon harvest weight by Chignik Bay households. In the 2016 study year, escapement for both the early and late sockeye salmon runs was achieved, but commercial harvests were below average (Wilburn and Stumpf 2017:5). Also, commercial fishing started in early June, preventing some commercial fishing families from having the time to put away early-run sockeye salmon. It was noted by researchers who spoke to key respondents and survey respondents that the study year was unseasonably warm, and many families reported holding off on their subsistence fishing activities until fall time when the commercial fishery was over and they had time to put away subsistence fish. This might be a factor for why there was increased home pack contributing to the 2016 harvest weight. Changes in residents' participation in commercial fisheries has changed how residents harvest fish to eat, and researcher notes recorded that some households interviewed in 2016 said they had become more reliant in recent years on non-local commercial fishermen to provide them salmon in addition to what is harvested, in part due to health issues, aging, or lack of equipment needed to obtain fish.

Over time, all species of salmon have generally been retained from commercial harvests for home use (Table 2-43). Estimates for commercial retention of salmon by species have been variable over time, with 2016 having the highest estimate for sockeye salmon in both pounds and fish removed from commercial catches compared to previous study years. In 2011, more Chinook salmon, by individual fish, were removed from commercial harvests; but there were more pounds of Chinook salmon removed from commercial catches in 1991 than other study years. More coho salmon were acquired by home pack in the earlier study years than in later study years.

Table 2-42.–Comparison of estimated uses and harvests of salmon, Chignik Bay, 1984, 1989, 1991, 2003, 2011, and 2014–2016.

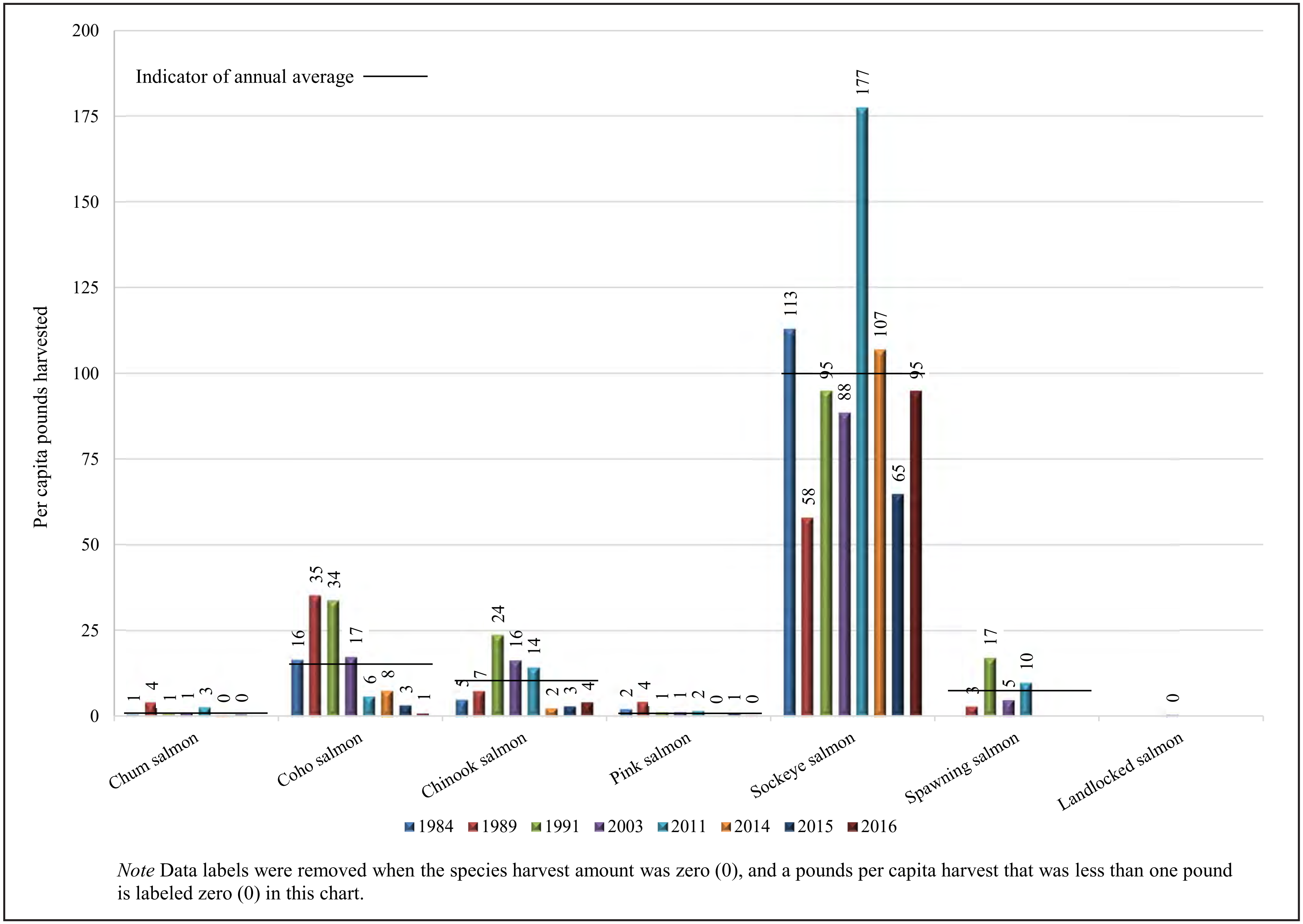
	Percentage of households					Estimated harvest			
Year	Using %	Attempting harvest %	Harvesting %	Receiving %	Giving %	Number	Total pounds	Pounds per household	Pounds per person
1984	94.7	78.9	78.9	68.4	68.4	3,115.0	16,526.0	590.2	136.7
1989	97.1	80.0	77.1	71.4	48.6	2,563.0	13,460.0	345.1	111.8
1991	100.0	80.0	80.0	70.0	66.7	4,403.0	21,825.0	496.0	171.0
2003	100.0	59.1	59.1	77.3	50.0	2,178.0	10,956.0	377.8	129.9
2011	91.3	65.2	60.9	47.8	52.2	3,626.9	16,249.2	625.0	211.4
2014	100.0	36.0	36.0	76.0	32.0	1,785.1	9,007.8	300.3	117.3
2015	95.5	50.0	50.0	72.7	50.0	1,237.8	5,121.2	176.6	71.9
2016	100.0	62.5	62.5	83.3	54.2	1,728.0	7,637.0	282.6	99.8

Sources CSIS for 1984, 1989, 1991, 2003, and 2011; ADF&G Division of Subsistence household surveys, 2015, 2016, and 2017 for remaining three years.



Note All zero (0) harvest amounts indicate the resource was asked about in the survey but no harvest was estimated. Years in which the survey did not ask about spawning salmon or landlocked salmon have no data label.

Figure 2-57.–Historical estimated salmon harvests, by species and individual fish, Chignik Bay, 1984, 1989, 1991, 2003, 2011, and 2014–2016.



Note Data labels were removed when the species harvest amount was zero (0), and a pounds per capita harvest that was less than one pound is labeled zero (0) in this chart.

Figure 2-58.–Historical estimated salmon harvests, by species and pounds per capita, Chignik Bay, 1984, 1989, 1991, 2003, 2011, and 2014–2016.

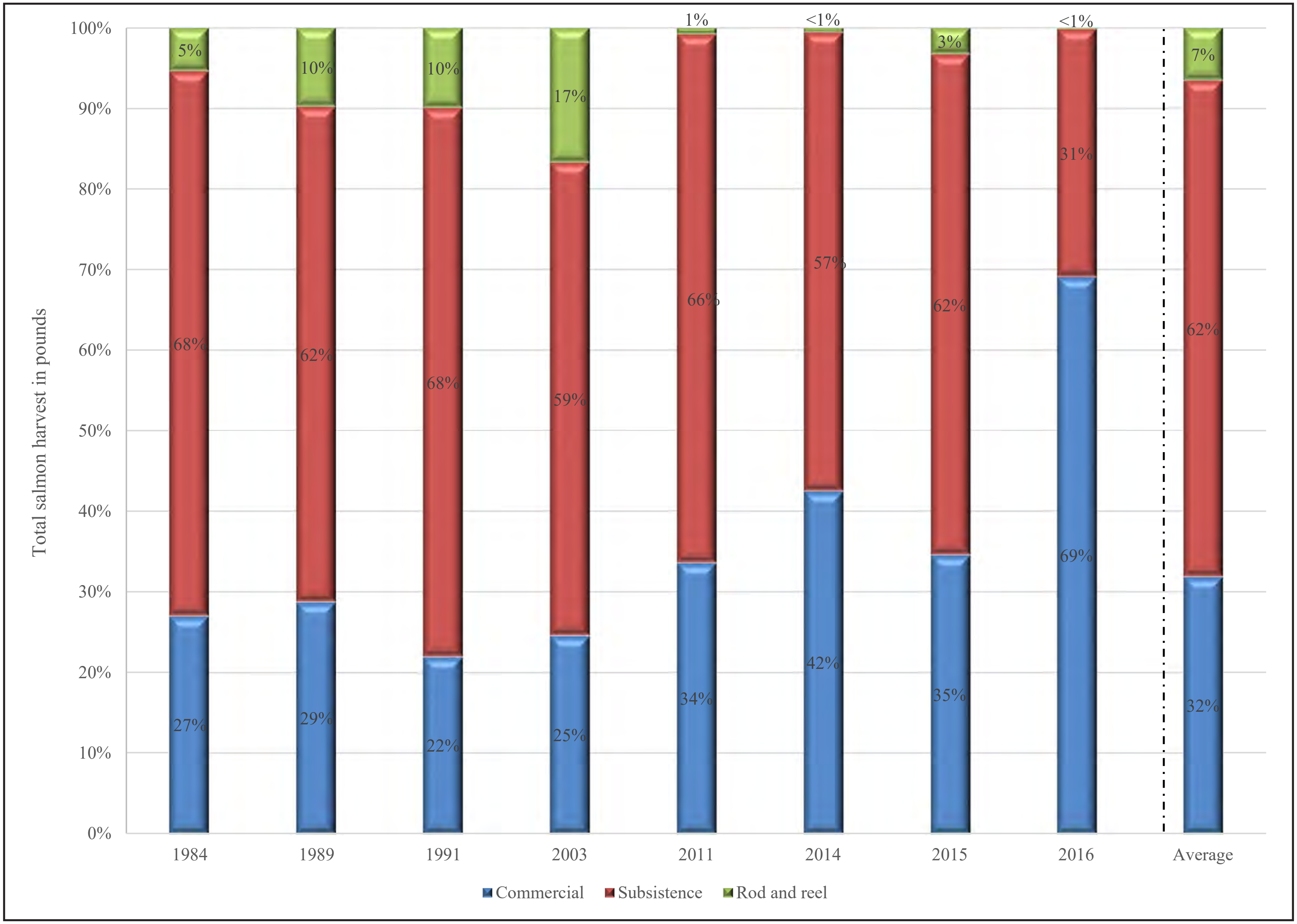


Figure 2-59.–Proportion of total salmon harvest, in pounds usable weight, harvested by gear type, Chignik Bay, 1984, 1989, 1991, 2003, 2011, and 2014–2016.

Table 2-43.–Estimated commercial salmon harvest retention, Chignik Bay, 1984, 1989, 1991, 2003, 2011, and 2014–2016.

	Estimated harvest							
	1984		1989		1991		2003	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Chum salmon	10	61	38	205	10	49	13	68
Coho salmon	80	460	88	541	145	778	65	400
Chinook salmon	18	294	43	678	98	1,500	7	68
Pink salmon	72	195	88	218	31	65	26	75
Sockeye salmon	666	3,450	438	2,225	474	2,392	430	2,076

-continued-

Table 2-43.–Continued.

	Estimated harvest							
	2011		2014		2015		2016	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Chum salmon	0	0	0	0	4	19	0	0
Coho salmon	2	11	49	304	4	19	2	12
Chinook salmon	122	1,055	7	59	12	90	54	293
Pink salmon	0	0	0	0	15	31	5	13
Sockeye salmon	827	4,387	700	3,460	395	1,610	1,131	4,956

Sources CSIS for 1984, 1989, 1991, 2003, and 2011; ADF&G Division of Subsistence household surveys, 2015, 2016, and 2017 for remaining three years.

Chignik Lagoon

In 2016, 100% of Chignik Lagoon households used salmon; similarly, for all study years, 100% of households used salmon except in 2011 (95%) and 1984, when the lowest proportion of households (88%) used salmon (Table 2-44). In 2016, 85% of households harvested salmon, and 75% received salmon; in comparison, for each earlier study year, a range from 60% of households in 1989 to as high as 88% in 2003 harvested salmon, and between 50% of households in 2003 to 80% in 1989 received salmon from another household.

In all study years, the salmon harvest was composed primarily of sockeye salmon with smaller amounts of Chinook and coho salmon contributing most of the rest of the total salmon harvest (Figure 2-60). In some years there were small amounts of pink and chum salmon also harvested. The average sockeye salmon harvest (not including spawning salmon) for all study years was about 1,812 fish, or 122 lb per capita (Figure 2-60; Figure 2-61). The anomalous years were in 1989 and 2015: in 1989, there was a much lower per capita harvest of 57 lb (463 sockeye salmon total), and in 2015 there was a record high harvest of 181 lb per capita (3,407 sockeye salmon total). This lower harvest in 1989 was most likely because that year Chignik Lagoon (body of water) was closed to commercial fishing due to tar balls being found in and outside of Chignik Lagoon as a result of the 1989 *Exxon Valdez* oil spill, which caused concern by local subsistence users as to whether salmon were safe to consume for subsistence (Fall 2006). For 2015, one probable explanation for increased subsistence harvest had to do with increased availability of sockeye salmon. In 2015, both the early- and late-run sockeye salmon runs were strong, exceeded the high end of their escapement goals, and both runs were also above the recent 5- and 10-year averages (Wilburn and Stumpf 2016). The 2016 sockeye salmon harvest (127 lb per capita) was more in line with Chignik Lagoon's historical average harvest of 122 lb per capita. The 2016 household survey and also researcher notes taken during survey administration documented that many local respondents indicated that sockeye salmon were smaller than normal in both 2015 and 2016, but both sockeye salmon runs in 2016 were not as strong as the runs in 2015, which is also confirmed in the commercial harvest reports for 2016 and 2017 (Wilburn and Stumpf 2016; 2017).

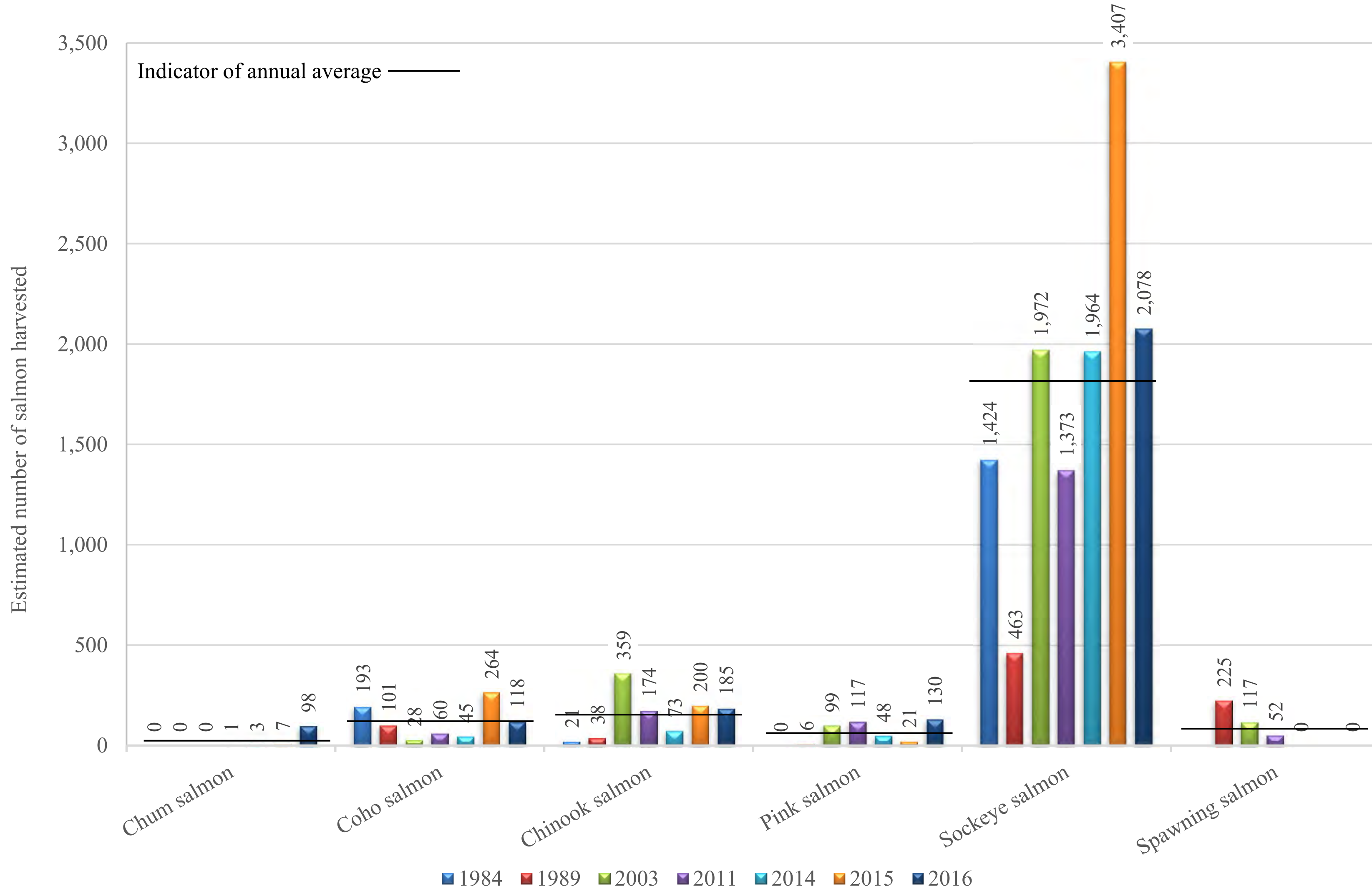
In 2016, an estimated 185 Chinook salmon (14 lb per capita) were harvested by Chignik Lagoon residents. Over time, Chinook salmon harvests have been variable, with an average for all study years combined of 150 Chinook salmon (20 lb per capita) harvested. The highest harvest occurred in 2003—359 fish that equated to 52 lb per person. Chinook salmon is considered a favorite fish by many Chignik Lagoon residents, which is unique to this community among all CMA communities (Hutchinson-Scarbrough et al. 2016). Coho salmon were harvested by Chignik Lagoon residents in all study years; the average harvest overall was 10 lb per capita with a range of 28 to 264 coho salmon harvested historically. Pink salmon were also taken by some households with an average historical harvest of 2 lb per person (60 fish). Chum salmon were not harvested in every study year, but the harvest average from study years 2011–2016 was about 2 lb per capita (27 fish). Spawning salmon (mostly sockeye) were also harvested in this community. Salmon spawning condition was not specified from the primary resource in 1984, 2014, or 2015; but on average for all the relevant study years, 5 lb per person, or 79 spawning salmon, were harvested by all Chignik Lagoon households.

In 1989, 2003, and 2016, 35%–40% of the total salmon harvest weight was removed from commercial catches; in contrast, more than one-half (56%) of the harvest in 1984 was home pack, and 2014 and 2015 are the years for which the lowest proportion of the harvest came from home pack: 20% and 22%, respectively (Figure 2-62). Many Chignik Lagoon families have a commercial fisherman member, or seasonal relatives, who will bring back fish from a commercial catch for home use (Hutchinson-Scarbrough et al. 2016; Hutchinson-Scarbrough and Fall 1996). Rod and reel generally did not contribute much to the overall salmon harvest—less than 1% up to 4%; the one anomalous year was 1989, when 11% of the salmon harvest weight was harvested by rod and reel. Overall, subsistence nets consistently provide the majority of the salmon harvest weight in Chignik Lagoon.

Table 2-44.–Comparison of estimated uses and harvests of salmon, Chignik Lagoon, 1984, 1989, 2003, 2011, and 2014–2016.

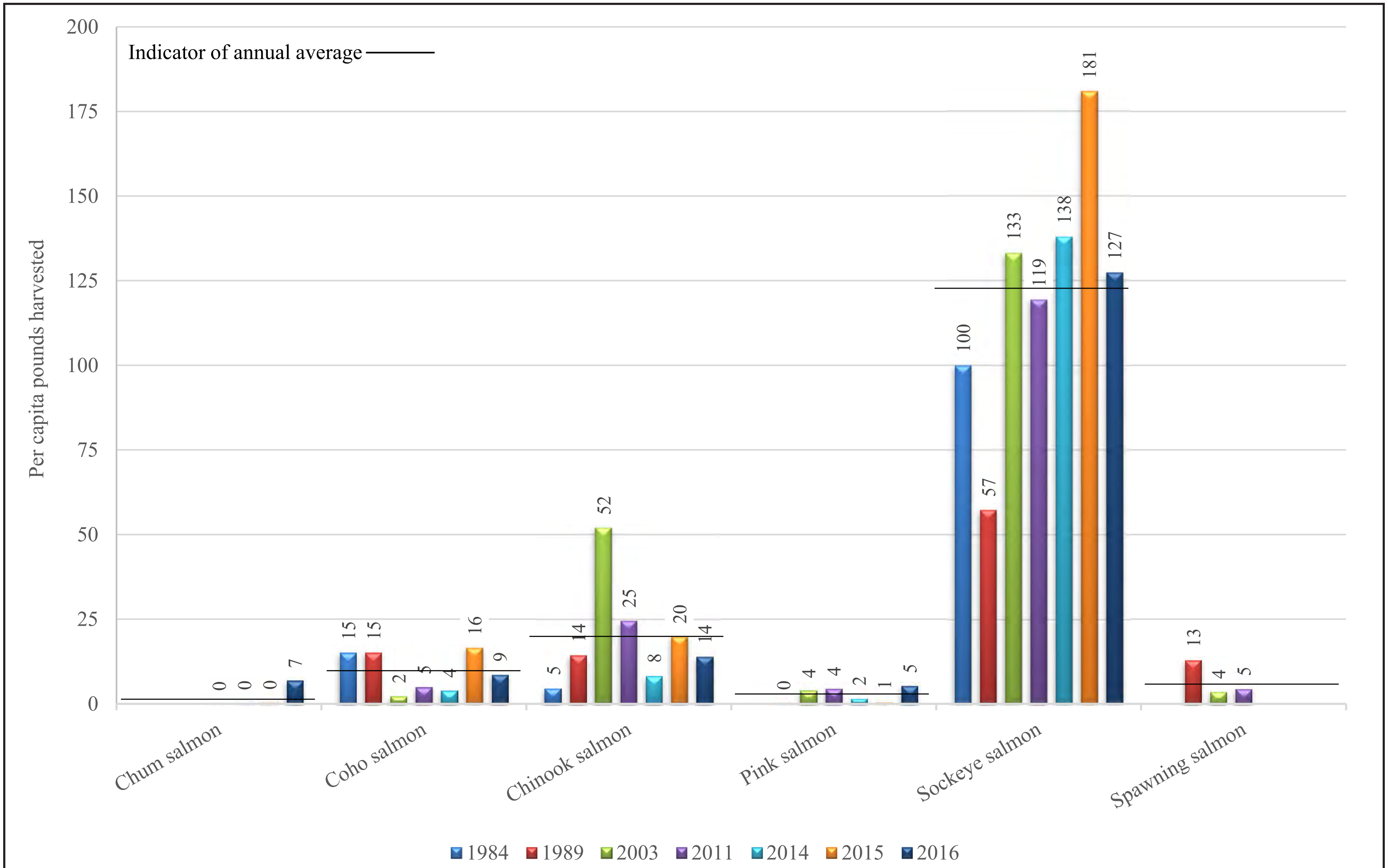
	Percentage of households					Estimated harvest			
Year	Using %	Attempting harvest %	Harvesting %	Receiving %	Giving %	Number	Total pounds	Pounds per household	Pounds per person
1984	88.2	70.6	64.7	52.9	47.1	1,637.0	8,833.0	401.4	119.7
1989	100.0	60.0	60.0	80.0	53.3	833.0	4,110.0	274.0	100.2
2003	100.0	87.5	87.5	50.0	50.0	2,574.0	13,959.0	634.5	195.2
2011	95.0	75.0	75.0	65.0	65.0	1,777.5	9,638.8	419.1	158.1
2014	100.0	75.0	68.8	68.8	62.5	2,134.4	10,706.4	428.3	152.3
2015	100.0	84.2	84.2	73.7	68.4	3,898.6	16,731.5	643.5	218.3
2016	100.0	85.0	85.0	75.0	60.0	2,608.5	11,602.3	446.2	162.3

Sources CSIS for 1984, 1989, 2003, and 2011; ADF&G Division of Subsistence household surveys, 2015, 2016, and 2017 for remaining three years.



Note All zero (0) harvest amounts indicate the resource asked about in the survey but no harvest was estimated. Years in which the survey did not ask about spawning salmon have no data label.

Figure 2-60.–Historical estimated salmon harvests, by species and individual fish, Chignik Lagoon, 1984, 1989, 2003, 2011, and 2014–2016.



Note Data labels were removed when the species harvest amount was zero (0), and a pounds per capita harvest that was less than one pound is labeled zero (0) in this chart.

Figure 2-61.–Historical estimated salmon harvests, by species and pounds per capita, Chignik Lagoon, 1984, 1989, 2003, 2011, and 2014–2016.

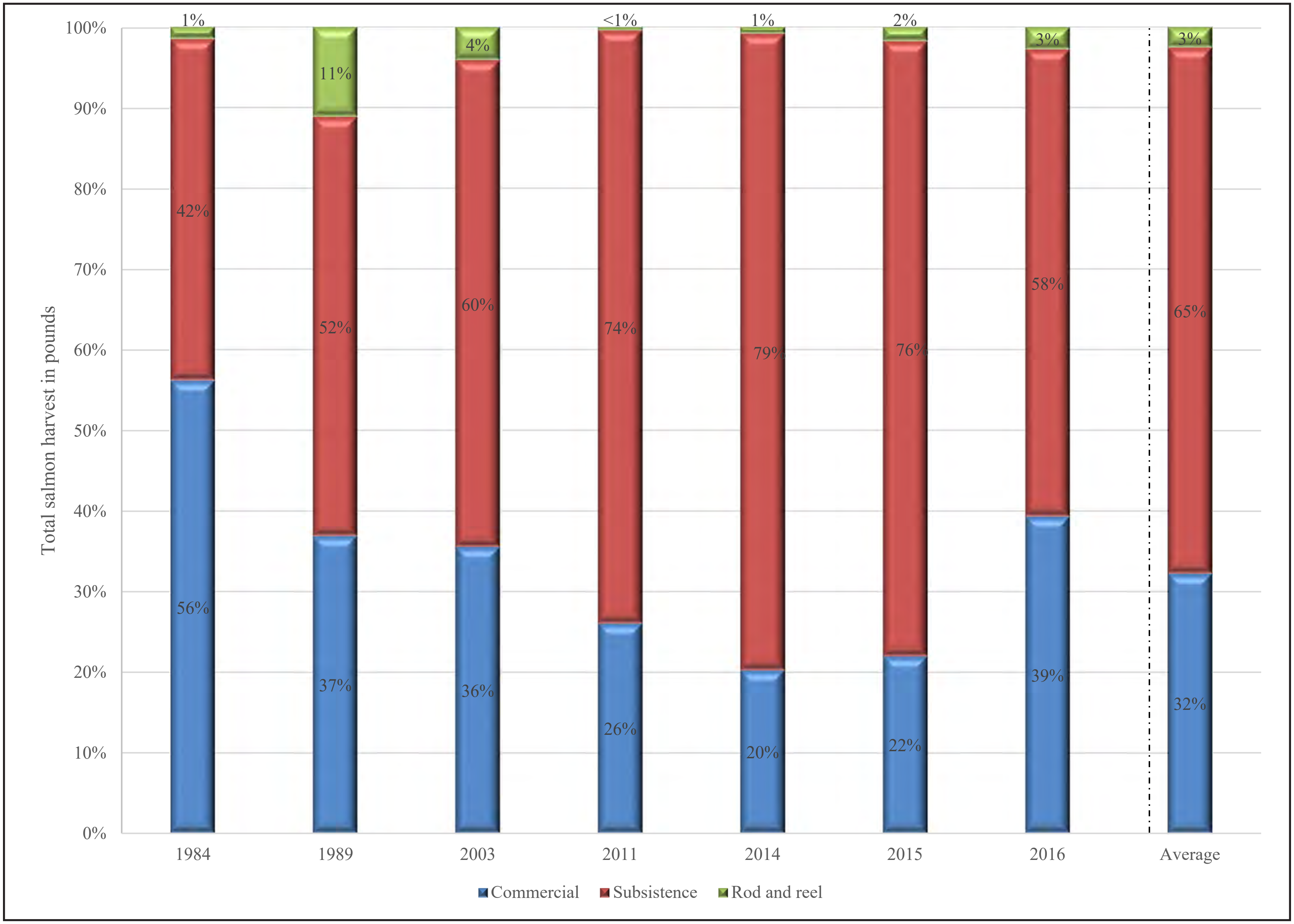


Figure 2-62.–Proportion of total salmon harvest, in pounds usable weight, harvested by gear type, Chignik Lagoon, 1984, 1989, 2003, 2011, and 2014–2016.

Table 2-45.–Estimated commercial salmon harvest retention, Chignik Lagoon, 1984, 1989, 2003, 2011, and 2014–2016.

	Estimated harvest							
	1984		1989		2003		2011	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Chum salmon	0	0	0	0	0	0	1	6
Coho salmon	167	965	22	135	7	43	34	171
Chinook salmon	3	43	17	265	316	3,280	158	1,361
Pink salmon	0	0	6	15	83	234	46	107
Sockeye salmon	764	3,955	217	1,102	292	1,408	163	866

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Table 2-45.–Continued.

	Estimated harvest					
	2014		2015		2016	
Resource	Number	Pounds	Number	Pounds	Number	Pounds
Chum salmon	0	0	7	33	0	0
Coho salmon	16	97	55	262	81	422
Chinook salmon	55	436	161	1,231	140	763
Pink salmon	39	92	7	15	0	0
Sockeye salmon	313	1,545	525	2,139	770	3,376

Sources CSIS for 1984, 1989, 2003, and 2011; ADF&G Division of Subsistence household surveys, 2015, 2016, and 2017 for remaining three years.

Most study years, some Chignik Lagoon commercial fishermen have removed all five species of salmon from a commercial catch for home use, but sockeye and Chinook salmon are the primary species taken using this harvest method (Table 2-45). Sockeye salmon home pack amounts have ranged from as low as 163 fish (866 lb) in 2011 to as high as 770 fish (3,376 lb) in 2016. Commercial retention of sockeye salmon in 1984 was nearly equivalent to 2016, where 764 fish (3,955 lb) were obtained for home use. Chinook salmon are often removed from commercial harvests for home use because this resource is considered a delicacy by many residents, and because commercial fish buyers often do not offer a high price for Chinook salmon (Hutchinson-Scarbrough et al. 2016). Chinook salmon home pack amounts have ranged from as low as 3 fish (43 lb) in 1984 to as high as 316 fish (3,280 lb) in 2003. Coho salmon is the third fish species most often retained from commercial harvests, ranging from as few as 7 fish (43 lb) in 2003 to as high as 167 fish (965 lb) in 1984. Pink salmon are occasionally retained as home pack, but rarely are chum salmon retained.

Chignik Lake

In 2016, 96% of Chignik Lake households used salmon, 71% harvested salmon, and 86% received salmon (Table 2-46). In the past study years, households that used salmon ranged from a minimum of 90% of households in 2014 to 100% in 1984, 1991, and 2011. A range of 74% of households in 2014 to as high as 100% in 1984 harvested salmon, and between 52% of households in 1984 to 86% in 2011 received salmon from another household.

In all study years, excluding spawning salmon, the salmon harvest was composed primarily of sockeye salmon with a smaller amount of coho salmon generally composing the next highest portion of the salmon harvest overall (Figure 2-63). The sockeye salmon harvest was lowest in 2016 with 1,974 fish harvested, and highest in 2014 with 4,020 fish harvested; by weight, the lowest per capita harvest was in 2016 (87 lb) and the highest was in 2014 (264 lb per capita) (Figure 2-63; Figure 2-64). The average per capita harvest of sockeye salmon from 1984 to 2016 was 137 lb per capita (2,828 fish).

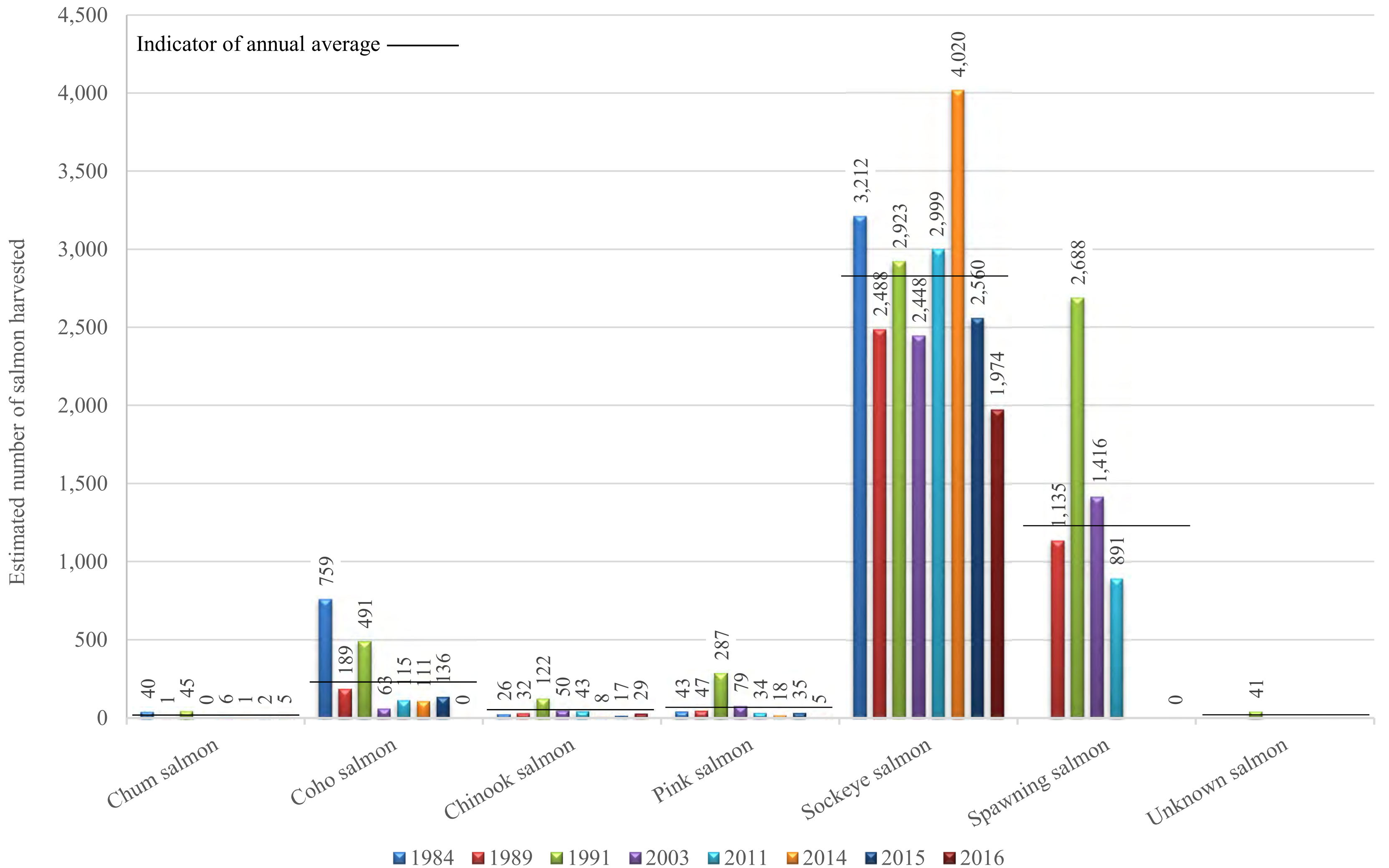
Coho salmon is also harvested, though much less so than sockeye salmon, and harvests have declined since 1984 from 759 fish (28 lb per capita) to as few as none harvested in 2016. Chinook salmon harvests have been variable. In 2016, an estimated 29 Chinook salmon (2 lb per capita) were harvested, and the average harvest for all study years (including 2016) was 41 Chinook salmon (4 lb per capita). The Chinook salmon harvests have ranged from only 1 lb per capita in 2014 to as high as 14 lb per capita in 1991. Chinook salmon runs to the Chignik River have been declining in recent years, and, in 2016, the minimum Chinook salmon escapement was not achieved (Wilburn and Stumpf 2017). A few pink salmon have been harvested every study year; the average harvest for all study years combined is 69 fish, which equated to about 1 lb per person. Chum salmon were taken in greater numbers in 1984 and 1991 than recently (only 5 fish harvested in 2016); the average harvest for all study years combined is 14 chum salmon (1 lb per capita).

Spawning salmon, or redfish, are also a main resource taken for subsistence by Chignik Lake households. In some of the study years, survey forms collected harvest information by spawning condition of salmon, and generally the harvested spawning salmon were identified as sockeye salmon, but sometimes spawning coho salmon harvests were identified by respondents. Spawning salmon harvest data were collected in the 1989, 1991, 2003, 2011, and 2016 study years; the average harvest of this resource for the study years in which these data were collected is 1,226 fish (22 lb per capita).

Table 2-46.–Comparison of estimated uses and harvests of salmon, Chignik Lake, 1984, 1989, 1991, 2003, 2011, and 2014–2016.

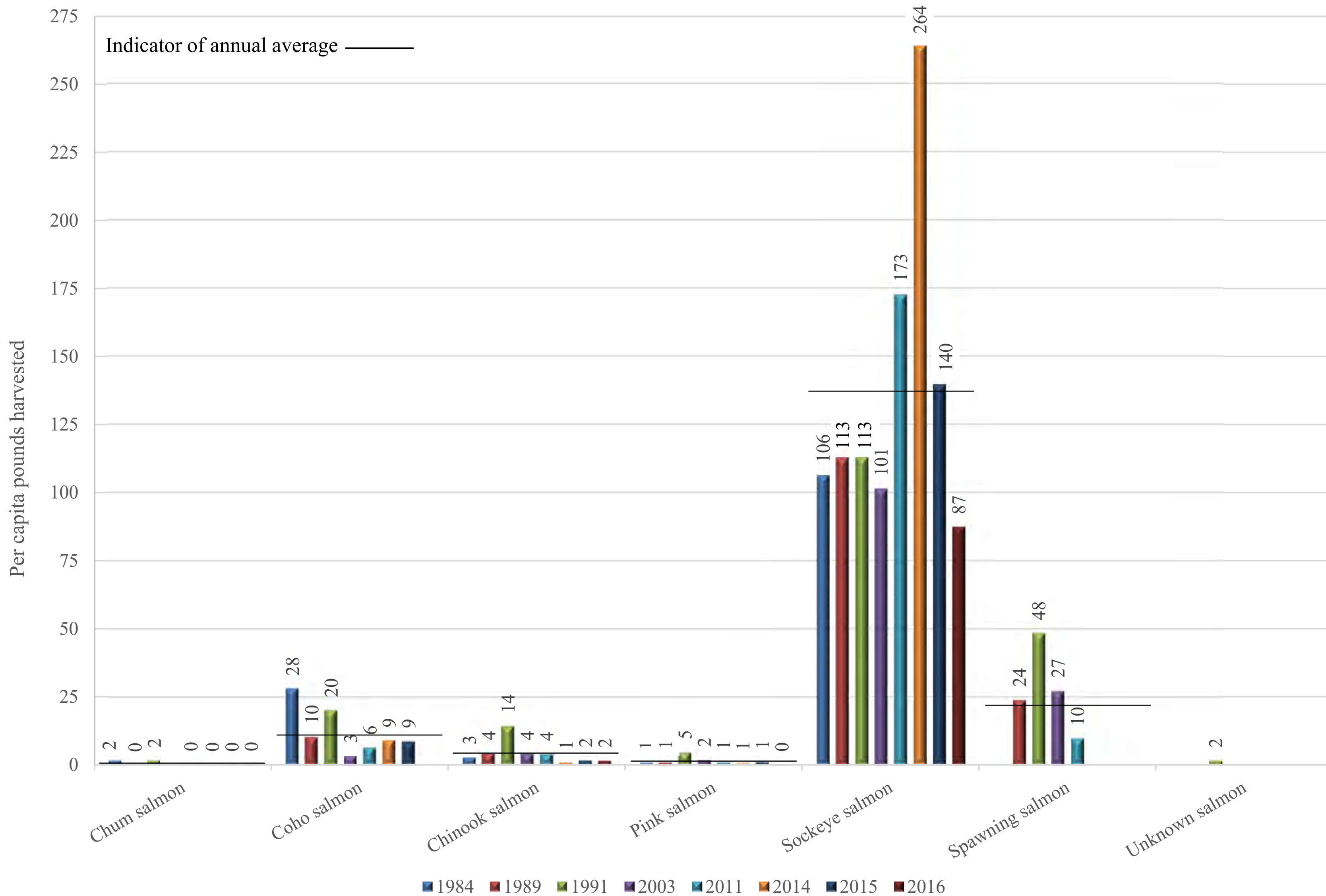
	Percentage of households					Estimated harvest			
Year	Using %	Attempting harvest %	Harvesting %	Receiving %	Giving %	Number	Total pounds	Pounds per household	Pounds per person
1984	100.0	100.0	100.0	52.2	47.8	4,080.0	21,805.0	703.3	139.4
1989	95.2	85.7	85.7	66.7	61.9	3,892.0	17,101.0	610.7	152.6
1991	100.0	95.8	95.8	70.8	91.7	6,599.0	26,614.0	806.4	203.7
2003	95.2	81.0	76.2	81.0	76.2	4,056.0	16,140.0	520.6	138.4
2011	100.0	86.4	81.8	86.4	86.4	4,089.3	17,858.6	661.4	194.0
2014	89.5	84.2	73.7	63.2	73.7	4,157.9	20,668.1	794.9	274.6
2015	92.9	75.0	75.0	67.9	67.9	2,749.8	11,281.7	389.0	151.3
2016	96.4	75.0	71.4	85.7	57.1	2,013.0	8,851.4	268.2	89.4

Sources CSIS for 1984, 1989, 1991, 2003, and 2011; ADF&G Division of Subsistence household surveys, 2015, 2016, and 2017 for remaining three years.



Note All zero (0) harvest amounts indicate the resource was asked about in the survey but no harvest was estimated. Years in which the survey did not ask about spawning salmon have no data label; similarly, there is no data label for years in which no survey respondents identified harvests of unknown salmon.

Figure 2-63.–Historical estimated salmon harvests, by species and individual fish, Chignik Lake, 1984, 1989, 1991, 2003, 2011, and 2014–2016.



Note Data labels were removed when the species harvest amount was zero (0), and a pounds per capita harvest that was less than one pound is labeled zero (0) in this chart.

Figure 2-64.–Historical estimated salmon harvests, by species and pounds per capita, Chignik Lake, 1984, 1989, 1991, 2003, 2011, and 2014–2016.

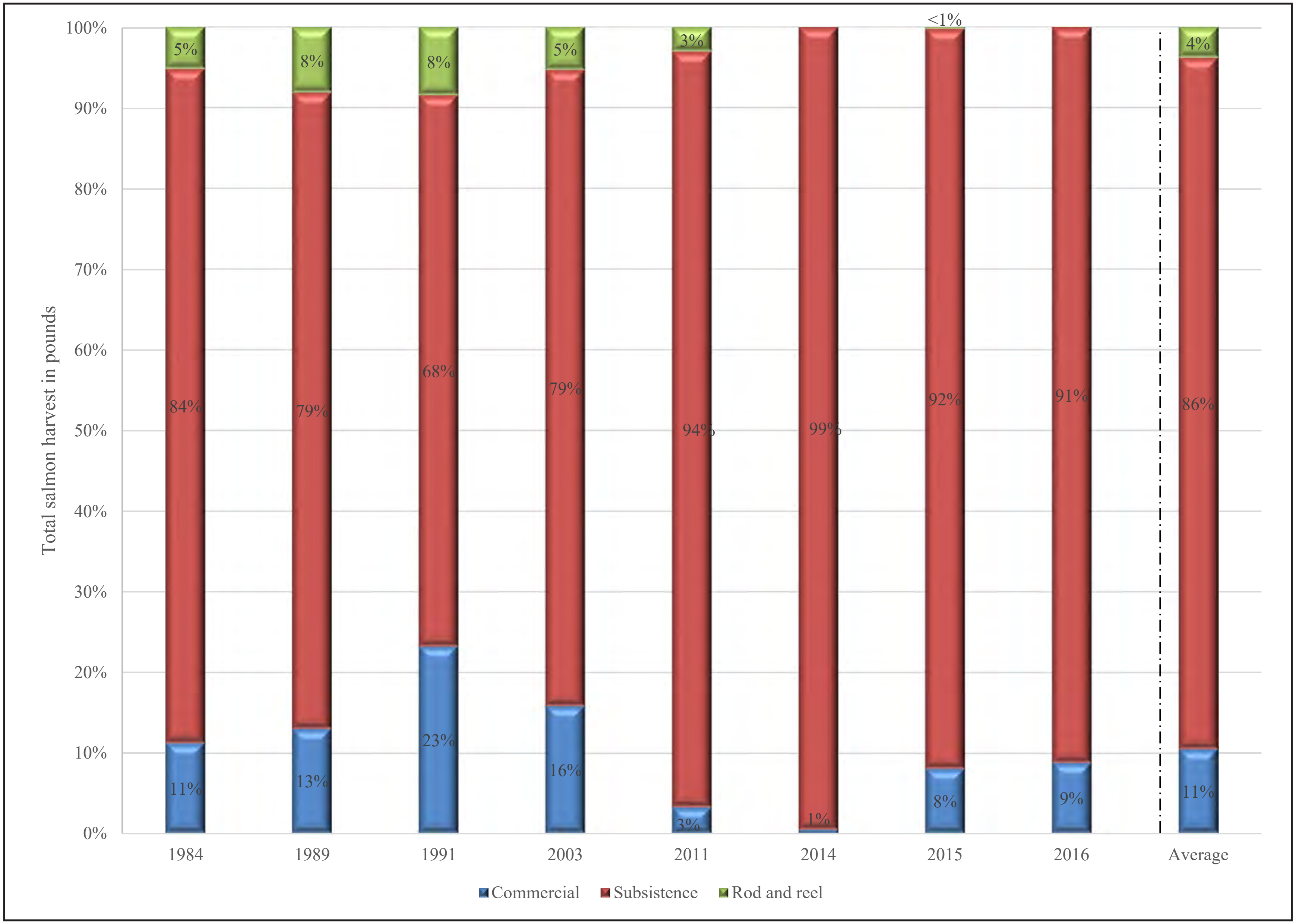


Figure 2-65.–Proportion of total salmon harvest, in pounds usable weight, harvested by gear type, Chignik Lake, 1984, 1989, 1991, 2003, 2011, and 2014–2016.

Table 2-47.–Estimated commercial salmon harvest retention, Chignik Lake, 1984, 1989, 1991, 2003, 2011, and 2014–2016.

	Estimated harvest							
	1984		1989		1991		2003	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Chum salmon	27	160	1	7	25	118	0	0
Coho salmon	40	234	19	115	168	899	0	0
Chinook salmon	11	179	9	146	76	1,154	38	398
Pink salmon	0	0	44	109	198	416	79	224
Sockeye salmon	364	1,885	365	1,856	675	3,409	402	1,939
Unknown salmon					41	204		

-continued-

Table 2-47.–Continued.

	Estimated harvest							
	2011		2014		2015		2016	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Chum salmon	2	13	0	0	2	10	5	24
Coho salmon	0	0	0	0	0	0	0	0
Chinook salmon	29	254	1	11	15	111	24	128
Pink salmon	22	51	0	0	31	67	0	0
Sockeye salmon	52	273	21	101	178	725	144	630
Unknown salmon								

Sources CSIS for 1984, 1989, 1991, 2003, and 2011; ADF&G Division of Subsistence household surveys, 2015, 2016, and 2017 for remaining three years.

In 2016, most (91%) of the salmon harvest weight was harvested using subsistence gear, and the remainder (9%) was obtained from commercial harvests as home pack (Figure 2-65). Salmon harvesting methods used by Chignik Lake households have remained relatively the same since 1987; most of the salmon harvest weight is obtained using subsistence gear (86% on average for all study years combined) with a range of 68% in 1991 to 99% in 2014. Over time, the average salmon harvest weight obtained by removal from commercial harvests was 11%, and 3% by rod and reel. Though there are a few Chignik Lake residents who are commercial license holders, many choose to not bring home many fish from their commercial harvests; in part, this is because subsistence fishing is easily accessible for Chignik Lake residents near their community, and salmon can be obtained during commercial closures or before or after the commercial fishing season (Hutchinson-Scarbrough et al. 2016; Hutchinson-Scarbrough and Fall 1996).

In general, all five species of salmon have been removed from commercial harvests for home use by Chignik Lake fishermen, though the main species obtained by home pack is sockeye salmon, followed by Chinook salmon. In 2016, 144 sockeye salmon (630 lb), 24 Chinook salmon (128 lb), and 5 chum salmon (24 lb) were removed from commercial harvests (Table 2-47). Historically, sockeye salmon home pack amounts have ranged from as low as 21 fish (101 lb) in 2014 to as high as 675 fish (3,409 lb) in 1991. There were more sockeye salmon obtained through commercial removals during the earlier study years of 1984–2003 than the later study years of 2011–2016; the average sockeye salmon harvest by home pack for 1984–2003 was 451 fish (2,272 lb) and for 2011–2016 was 98 fish (432 lb). Chinook salmon have been consistently removed from commercial harvests for home use: in 2016, 5 fish (24 lb) were harvested, but over time Chinook salmon home pack ranged from as low as 1 fish (11 lb) in 2014 to as high as 76 fish (1,154 lb) in 1991. The average coho salmon home pack for 1984–1991 was 76 fish (416 lb); coho salmon have not been obtained at all through home pack since 1991. Though there were not any pink salmon obtained through home pack in 2016, there has been an average of 47 fish (108 lb) harvested by home pack over time (1984–2016). A few chum salmon are usually acquired through home pack with an average harvest of about 8 fish (41 lb) harvested by Chignik Lake residents over time (1984–2016).

Perryville

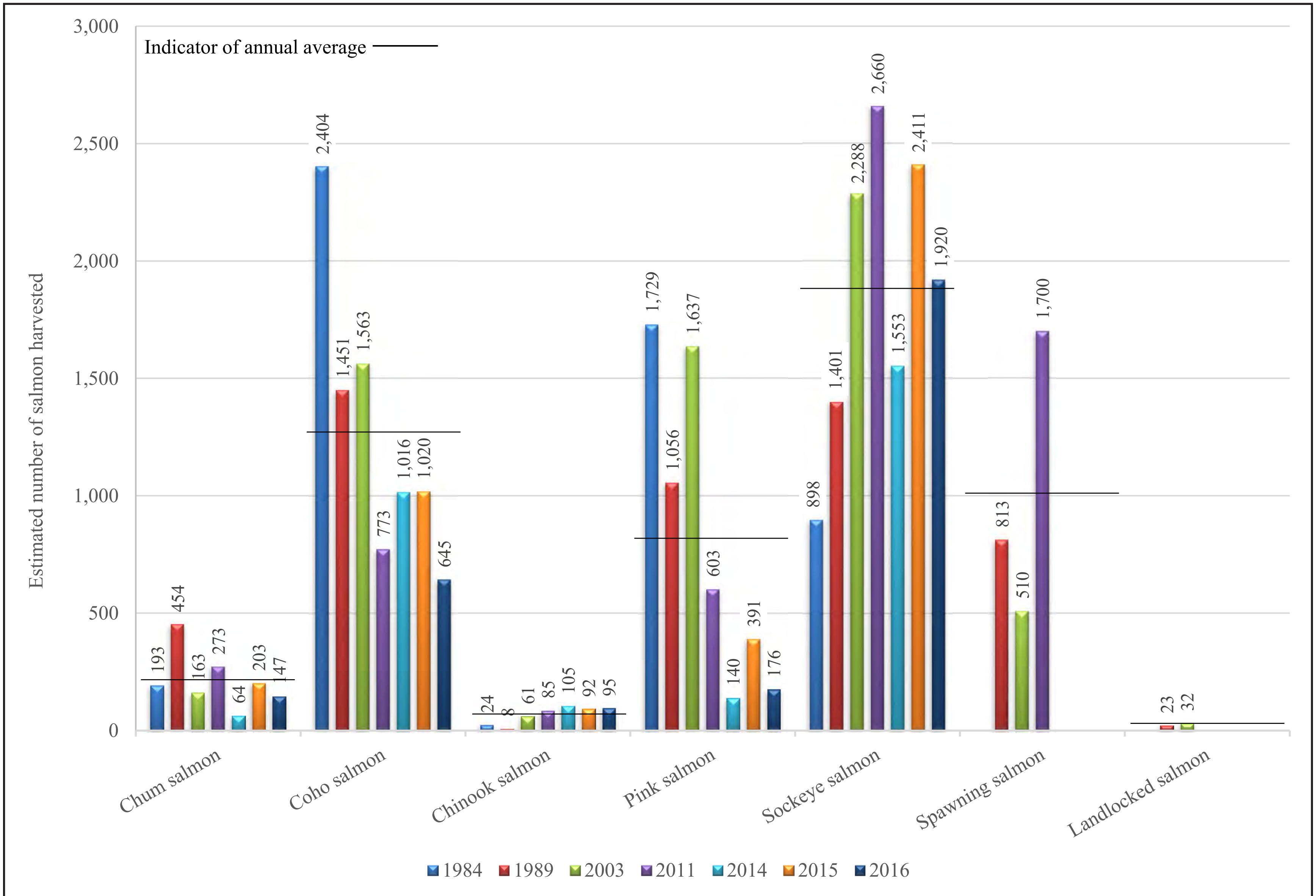
In 2016, 100% of Perryville households used salmon, 73% harvested salmon, and 86% received salmon (Table 2-48). In past study years, the proportion of households that used salmon ranged from a minimum of 96% in 2011, to 97% in 2014, to 100% of households in all other study years. In addition, the proportion of households that harvested salmon ranged from 68% in 2011 to 96% in 2003, and the proportion of households that received salmon ranged from 52% in 1989 to 82% in 2003.

In all study years, the salmon harvest was composed of all salmon species, and Perryville residents harvest more coho, pink, and chum salmon than in the Chignik communities—both historically as well as in 2016. The composition of the salmon harvest by species over time has changed in that more coho salmon were harvested than sockeye salmon in 1984 and 1989, but starting in 2003, sockeye salmon harvests have exceeded coho salmon harvests, which is a trend that has continued through 2016 (Figure 2-66). In 1984, a total of 2,404 coho salmon (121 lb per capita) were harvested and 898 sockeye salmon (41 lb per capita) harvested; in comparison, in 2016, an estimated 645 coho salmon (31 lb per capita) and 1,920 sockeye salmon (77 lb per capita) were harvested (Figure 2-66; Figure 2-67). Of all the study years, the sockeye salmon harvest was highest in 2011 (2,660 fish; 140 lb per capita). Pink salmon were harvested and used annually by Perryville residents, and pink salmon was the third most harvested species on average. Pink salmon harvests were higher from 1984–2003 with an average harvest for those years of 1,474 pink salmon (34 lb per capita). Pink salmon harvests have declined starting in 2011 and the harvest from 2011–2016 averaged 327 pink salmon (7 lb per capita) with the 2016 harvest being the second lowest on record (176 fish; 5 lb per capita).Of note, the 2014 and 2016 commercial pink salmon harvests were well below recent 5-, 10-, and 20-year averages (Wilburn et al. 2015:1, 51; Wilburn and Stumpf 2017:5, 63).

Table 2-48.–Comparison of estimated uses and harvests of salmon, Perryville, 1984, 1989, 2003, 2011, and 2014–2016.

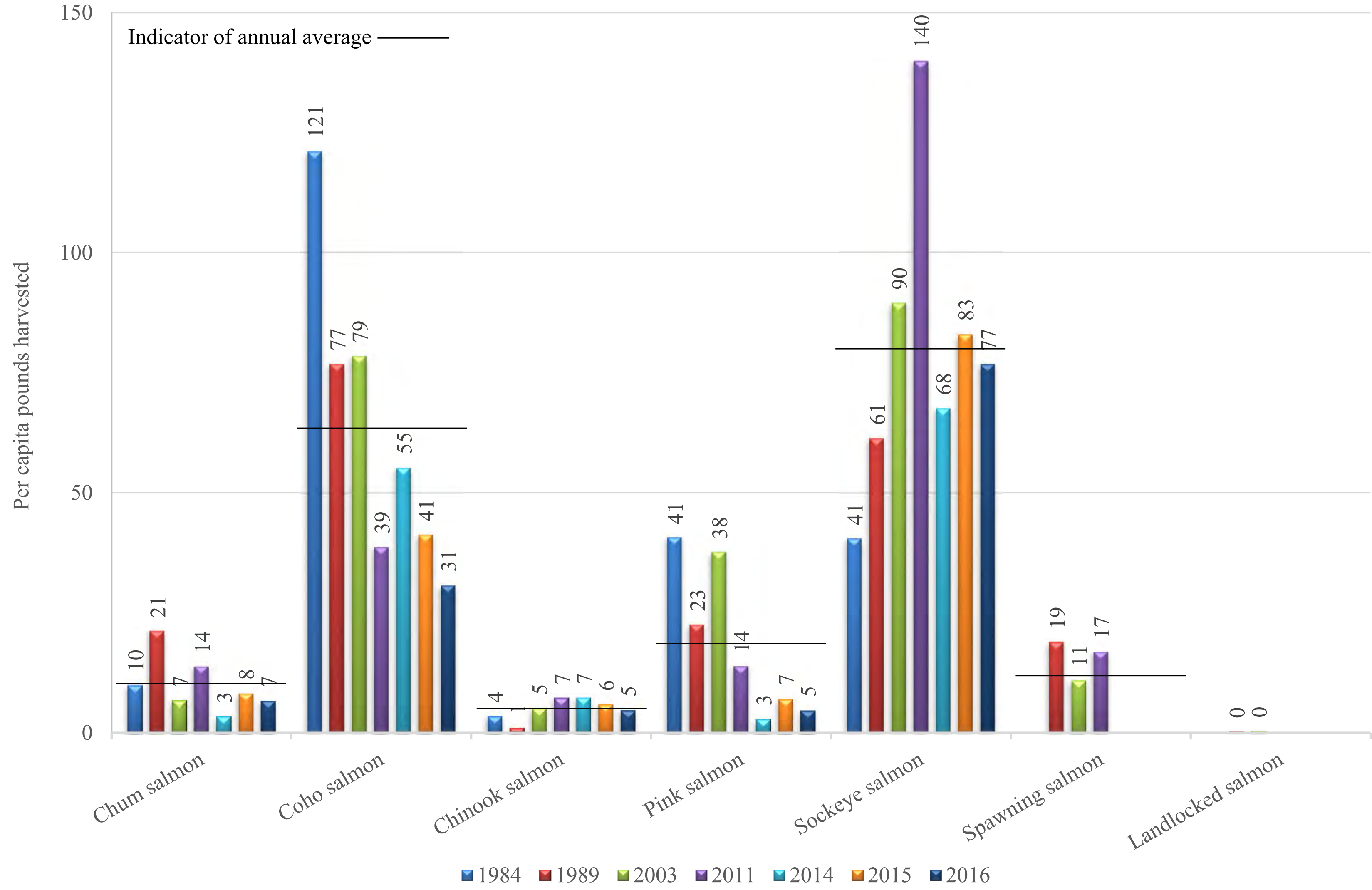
	Percentage of households					Estimated harvest			
Year	Using %	Attempting harvest %	Harvesting %	Receiving %	Giving %	Number	Total pounds	Pounds per household	Pounds per person
1984	100.0	95.0	95.0	60.0	60.0	5,249.0	24,764.0	917.1	215.8
1989	100.0	88.9	88.9	51.5	63.0	5,206.0	23,451.0	756.4	202.2
2003	100.0	96.3	96.3	81.5	85.2	6,253.0	28,269.0	856.6	229.0
2011	96.4	75.0	67.9	75.0	60.7	6,093.6	23,238.2	707.9	230.5
2014	97.1	82.4	76.5	73.5	82.4	2,877.8	15,514.2	397.8	136.6
2015	100.0	90.9	84.8	63.6	60.6	4,117.9	17,217.8	441.5	145.7
2016	100.0	76.9	73.1	84.6	53.8	2,982.8	13,560.5	366.5	123.8

Sources CSIS for 1984, 1989, 2003, and 2011; ADF&G Division of Subsistence household surveys, 2015, 2016, and 2017 for remaining three years.



Note Years in which the survey did not ask about spawning salmon or landlocked salmon have no data label.

Figure 2-66.–Historical estimated salmon harvests, by species and individual fish, Perryville, 1984, 1989, 2003, 2011, and 2014–2016.



Note A pounds per capita harvest that was less than one pound is labeled zero (0) in this chart.

Figure 2-67.–Historical estimated salmon harvests, by species and pounds per capita, Perryville, 1984, 1989, 2003, 2011, and 2014–2016.

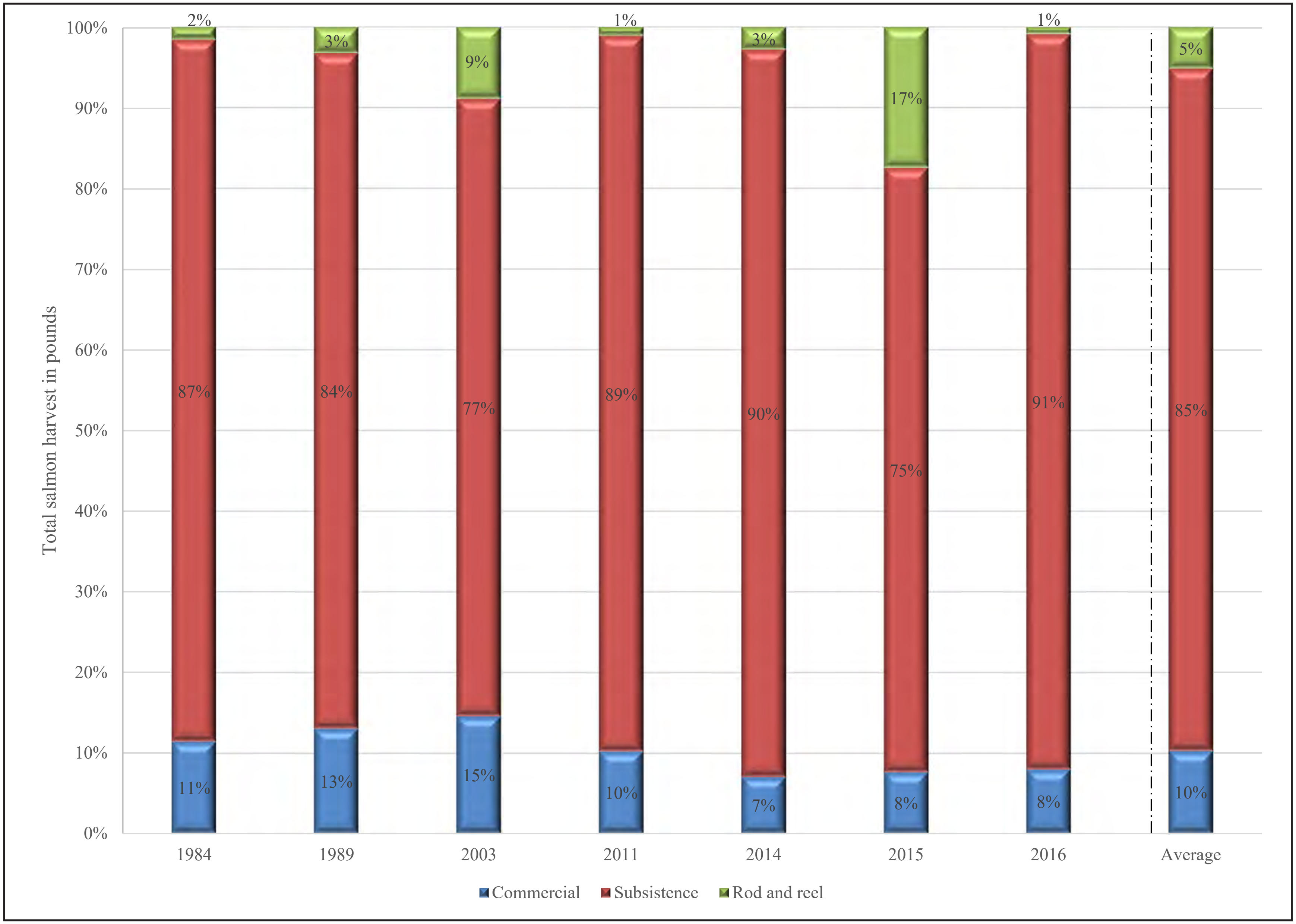


Figure 2-68.–Proportion of total salmon harvest, in pounds usable weight, harvested by gear type, Perryville, 1984, 1989, 2003, 2011, and 2014–2016.

Table 2-49.–Estimated commercial salmon harvest retention, Perryville, 1984, 1989, 2003, 2011, and 2014–2016.

	Estimated harvest							
	1984		1989		2003		2011	
Resource	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Chum salmon	7	40	20	106	18	95	4	18
Coho salmon	311	1,795	124	761	141	871	0	0
Chinook salmon	14	225	1	18	34	355	69	598
Pink salmon	0	0	145	359	73	208	47	109
Sockeye salmon	149	769	357	1,814	537	2,592	311	1,647

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Table 2-49.–Continued.

	Estimated harvest					
	2014		2015		2016	
Resource	Number	Pounds	Number	Pounds	Number	Pounds
Chum salmon	2	14	2	11	0	0
Coho salmon	0	0	0	0	57	298
Chinook salmon	13	103	38	288	70	379
Pink salmon	0	0	2	5	0	0
Sockeye salmon	197	975	248	1,010	93	405

Sources CSIS for 1984, 1989, 2003, and 2011; ADF&G Division of Subsistence household surveys, 2015, 2016, and 2017 for remaining three years.

Chum salmon has also been an important subsistence resource for Perryville residents over time. The chum salmon average harvest estimate over time is 214 fish (10 lb per capita); fluctuating harvests ranged from as low as 64 fish (3 lb per capita) in 2014 to as high as 454 fish (21 lb per capita) in 1989. In addition, data were collected for spawning salmon in 1989, 2003, 2011, and 2016, which includes sockeye and coho salmon. Spawning salmon harvests ranged from 510 fish harvested in 2003 to 1,700 fish harvested in 2011.

Salmon harvesting methods have remained relatively the same since 1984: most of the salmon harvest weight was obtained using subsistence gear (85% on average for all study years combined) with a range from 75% in 2015 to 91% in 2016 (Figure 2-68). Fish obtained by removal from commercial harvests over time averaged approximately 10% of the salmon harvest weight, and rod and reel contributed 5% on average to the harvest weight. Though there are Perryville residents who commercial fish, fishermen do not choose to bring home many fish from their commercial harvests, but will use their commercial boat during a commercial closure to subsistence fish for sockeye salmon and will often bring home sockeye salmon for the community in the middle of the fishing season or when commercial fishing has ended.[28] In addition, coho, chum, and pink salmon streams are accessible to Perryville residents—who can access them by foot, all-terrain vehicle, or skiff—and Chinook salmon can be caught directly off of the beach at the community using rod and reel or a gillnet (Hutchinson-Scarbrough et al. 2016; Hutchinson-Scarbrough and Fall 1996).

All five species of salmon are generally removed from commercial harvests for home use by Perryville commercial fishermen, though the main species obtained over time by home pack was sockeye salmon, followed by Chinook salmon and coho salmon. Sockeye salmon home pack amounts have ranged from as low as 93 fish (405 lb) in 2016 to as much as 537 fish (2,592 lb) in 2003 (Table 2-49). For all study years combined, there was an average of 270 sockeye salmon (1,316 lb) removed from commercial harvests. Chinook salmon home pack amounts ranged from only 1 fish (18 lb) in 1989 to as high as 69 fish (598 lb) in 2011 and 70 fish (379 lb) in 2016. Coho salmon were obtained in higher numbers by removal from commercial harvests from 1984 through 2003 where an average of 192 fish (1,142 lb) were obtained, and coho salmon were not obtained through home pack again until 2016 when 57 fish (298 lb) were harvested. Pink and chum salmon were taken as home pack most of the study years, with most pink salmon retained from commercial harvests from 1989–2011. Chum salmon have been taken in small numbers all study years except 2016; the average harvest for 1984–2015 was nine fish.

Port Heiden

Compared to the study communities in the CMA, fewer previous salmon harvest surveys have occurred in Port Heiden. In 1987, 100% of Port Heiden's households were sampled (37 households) (Fall and Morris 1987:6). In that study year, salmon was the second highest harvested resource category (following land mammals) (Fall and Morris 1987:70).

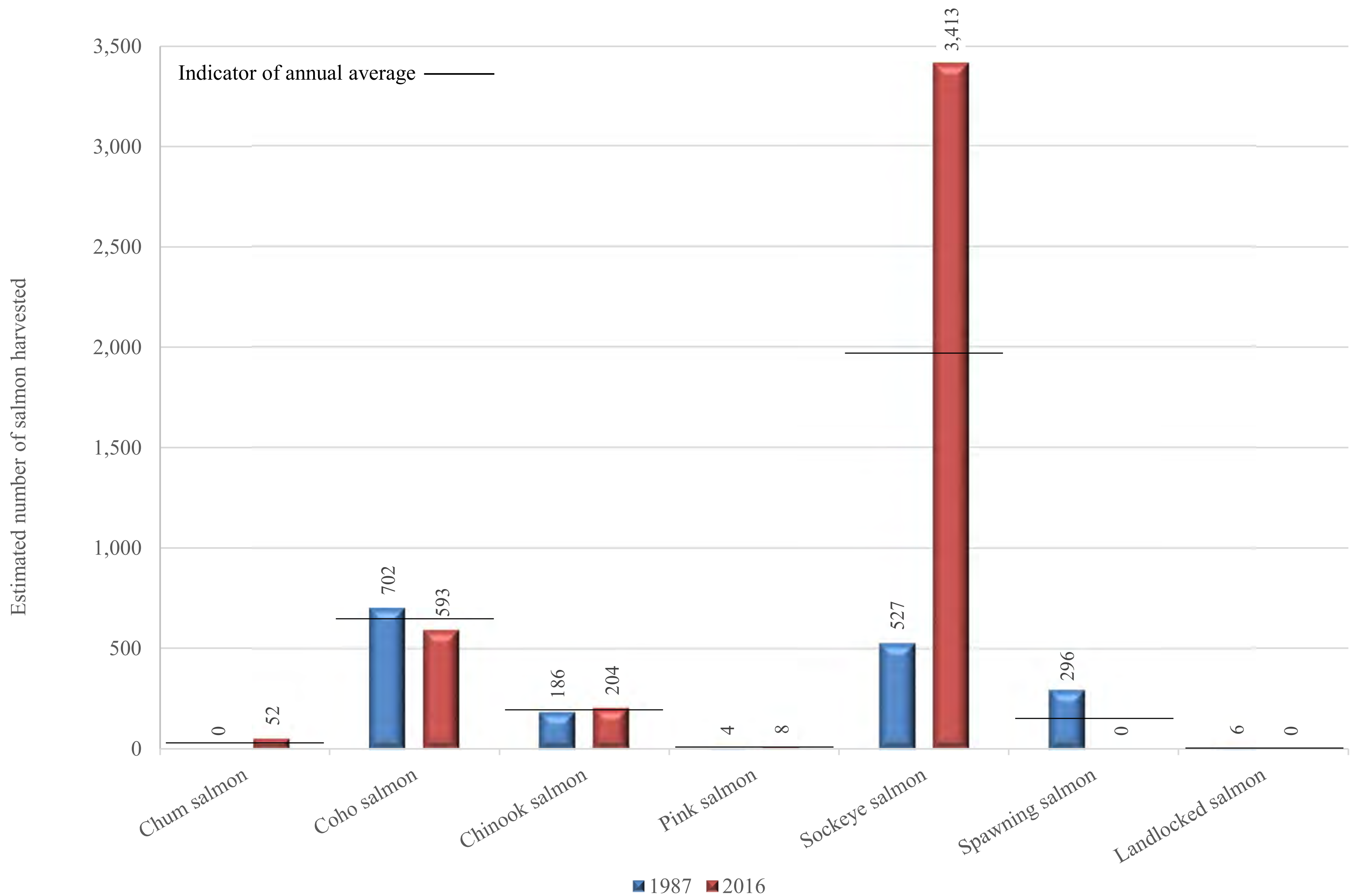
Comparing the study years of 1987 and 2016, salmon use by Port Heiden households was higher in the latter study year: 97% of households used salmon in 2016 compared to 91% in 1987 (Table 2-50). The proportion of harvesting households was also greater in 2016 with 86% of households successfully harvesting salmon compared to 81% in 1987. By any measure, there was a greater harvest of salmon in 2016 than in 1987; both the estimated number of total salmon harvested and pounds harvested in 2016 were more than double the estimates for 1987 and the pounds per capita harvest slightly more than doubled in 2016 (179 lb) in comparison to 1987 (85 lb).

28. In the CMA, commercial salmon fishing permit holders may choose to subsistence fish instead of commercial fish for salmon during a commercial salmon fishing period (5 AAC 01.485).

Table 2-50.–Comparison of estimated uses and harvests of salmon, Port Heiden, 1987 and 2016.

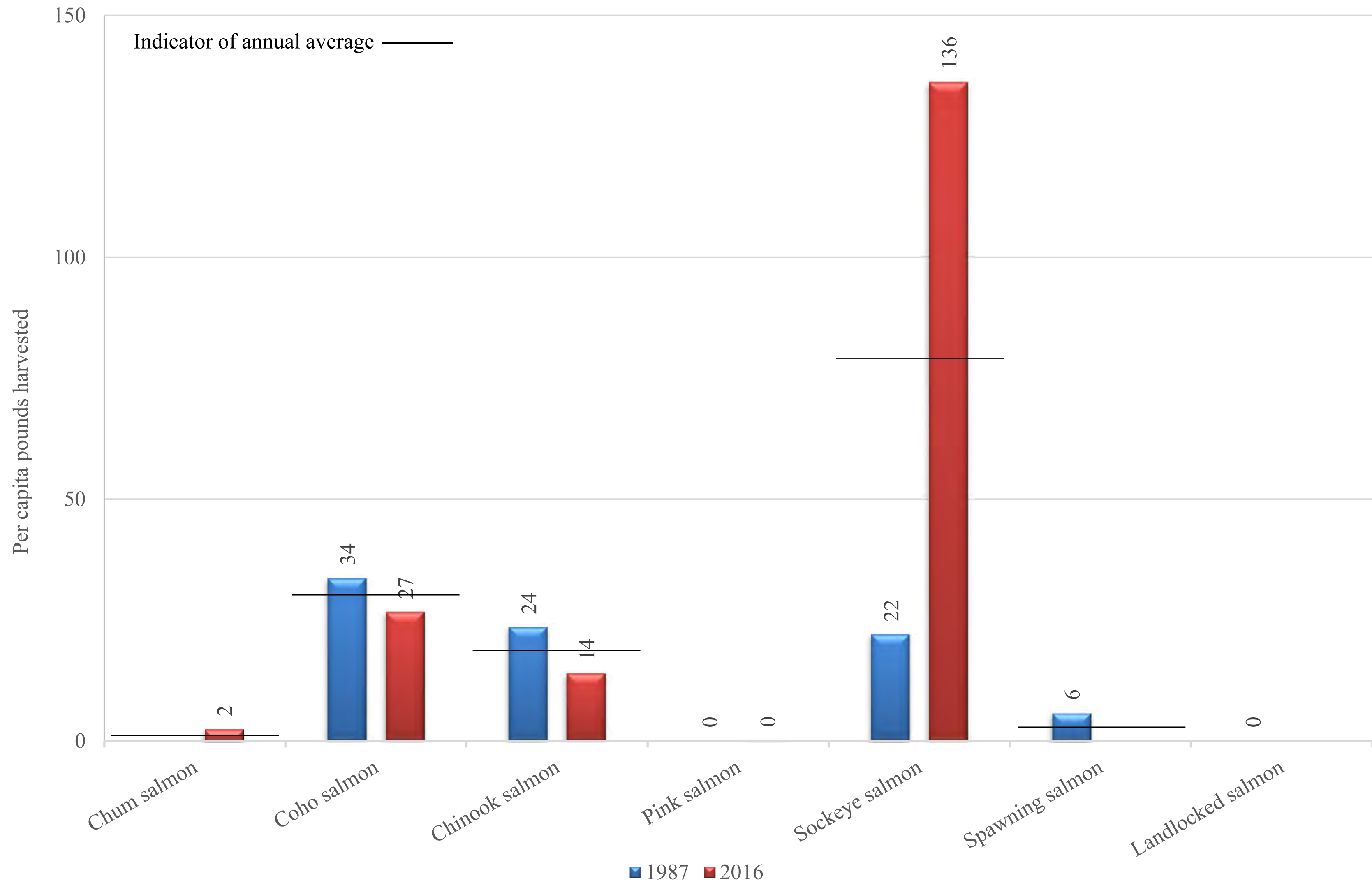
	Percentage of households					Estimated harvest			
Year	Using %	Attempting harvest %	Harvesting %	Receiving %	Giving %	Number	Total pounds	Pounds per household	Pounds per person
1987	91.1	81.1	81.1	64.9	56.8	1,721.0	8,766.0	236.9	85.1
2016	96.6	89.7	86.2	89.7	65.5	4,271.2	18,812.4	482.4	179.3

Sources CSIS for 1987 and ADF&G Division of Subsistence household surveys, 2017.



Note All zero (0) harvest amounts indicate the resource was asked about in the survey but no harvest was estimated.

Figure 2-69.–Historical estimated salmon harvests, by species and individual fish, Port Heiden, 1987 and 2016.



Note Data labels were removed when the species harvest amount was zero (0), and a pounds per capita harvest that was less than one pound is labeled zero (0) in this chart.

Figure 2-70.–Historical estimated salmon harvests, by species and pounds per capita, Port Heiden, 1987 and 2016.

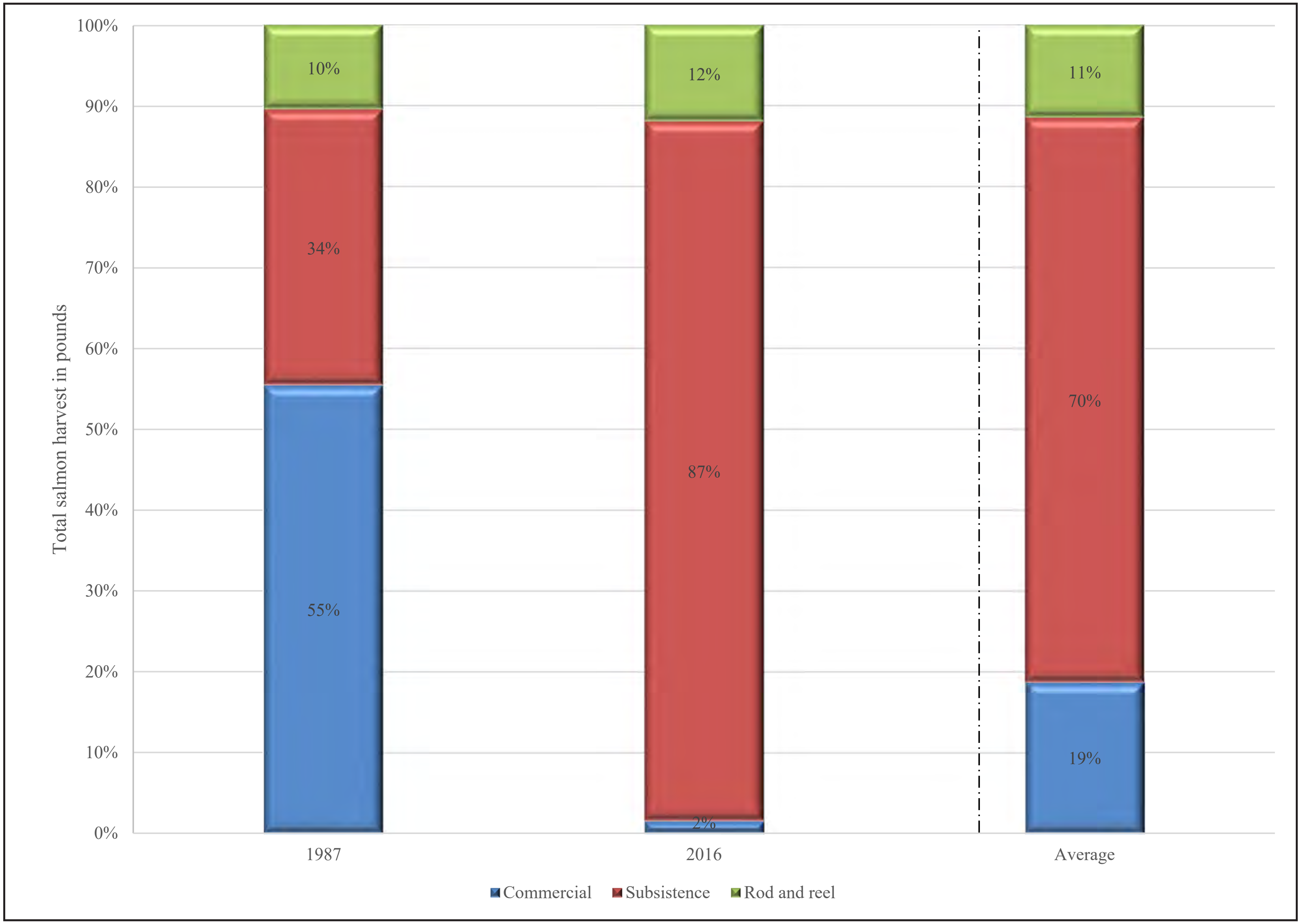


Figure 2-71.–Proportion of total salmon harvest, in pounds usable weight, harvested by gear type, Port Heiden, 1987 and 2016.

Table 2-51.–Estimated commercial salmon harvest retention, Port Heiden, 1987 and 2016.

	Estimated harvest			
	1987		2016	
Resource	Number	Pounds	Number	Pounds
Chum salmon	0	0	0	0
Coho salmon	432	2,134	0	0
Chinook salmon	174	2,266	5	39
Pink salmon	0	0	0	0
Sockeye salmon	107	460	61	253

Sources CSIS, 1987; ADF&G Division of Subsistence household surveys, 2017.

Figure 2-69 shows historical harvests by salmon species for the two study years. The harvest of sockeye salmon shows the greatest difference between the two years; almost seven times more estimated individual sockeye salmon were harvested in 2016 compared to 1987. The difference is also depicted in Figure 2-70, which shows the per capita harvest differences for each species. The coho salmon harvest showed a slight variation between the years, and the difference in the Chinook salmon harvests was only an estimated 18 fish, but accounting for changes in population that is a change of 10 lb per person. In 1987, more than one-half (55%) of the estimated total salmon harvest weight was obtained by commercial catch removals (Figure 2-71). This is a large difference compared to 2016, which shows only 2% of the harvest weight came from commercial removals. Coho, Chinook, and sockeye salmon were retained from commercial catches in 1987; but, in 2016, no coho salmon were retained, Chinook salmon retention decreased dramatically, and the number of sockeye salmon removed from commercial catches decreased by about one-half (Table 2-51). However, the harvest weight caught by subsistence methods increased by 53% in 2016 compared to 1987 and the rod and reel harvest weight proportion stayed about the same despite the almost 30-year span of time.

Egegik

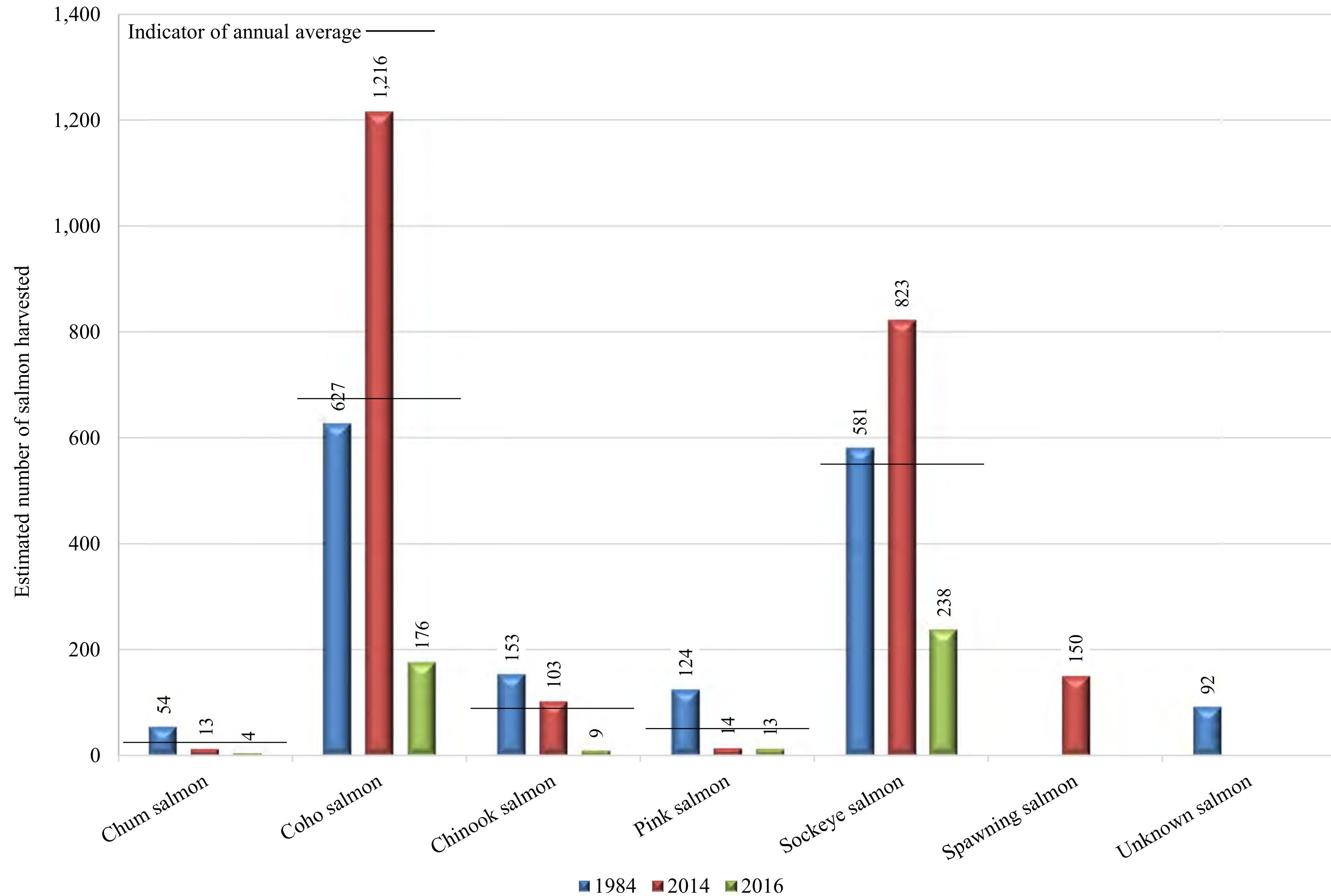
Similar to Port Heiden, fewer salmon harvest surveys have occurred in Egegik, especially in comparison to the study communities in the CMA. Both the 1984 and 2014 studies surveyed year-round Egegik households about their harvests and uses of natural resources over a calendar year: for the 1984 study, 60% of households were surveyed and for the 2014 study, 80% of households were surveyed (CSIS).

The estimated percentages of households using, fishing for, and harvesting salmon all decreased between the 1984 and 2016 study years; greater decreases were observed in the percentages of households fishing for and harvesting salmon than the percentage of households using salmon. In 1984, 92% of households harvested salmon; in 2014, 85% of households fished for and 75% of households harvested salmon but in 2016 these percentages were both just 45% of households (Table 2-52). The percentage of households using salmon, in comparison, changed from 96% in 1984 to 85% in 2014 to 80% in 2016. That the proportion of households using salmon appears more resistant to change is likely due to the importance of sharing in the community. Over the three study years, the proportion of households giving salmon or receiving salmon changed only slightly, fluctuating between a high of 56% of households in 1984 for both activities and a low of 45% of households receiving salmon in 2014 and 40% of households giving salmon in 2014 and 2016.

Table 2-52.–Comparison of estimated uses and harvests of salmon, Egegik, 1984, 2014, and 2016.

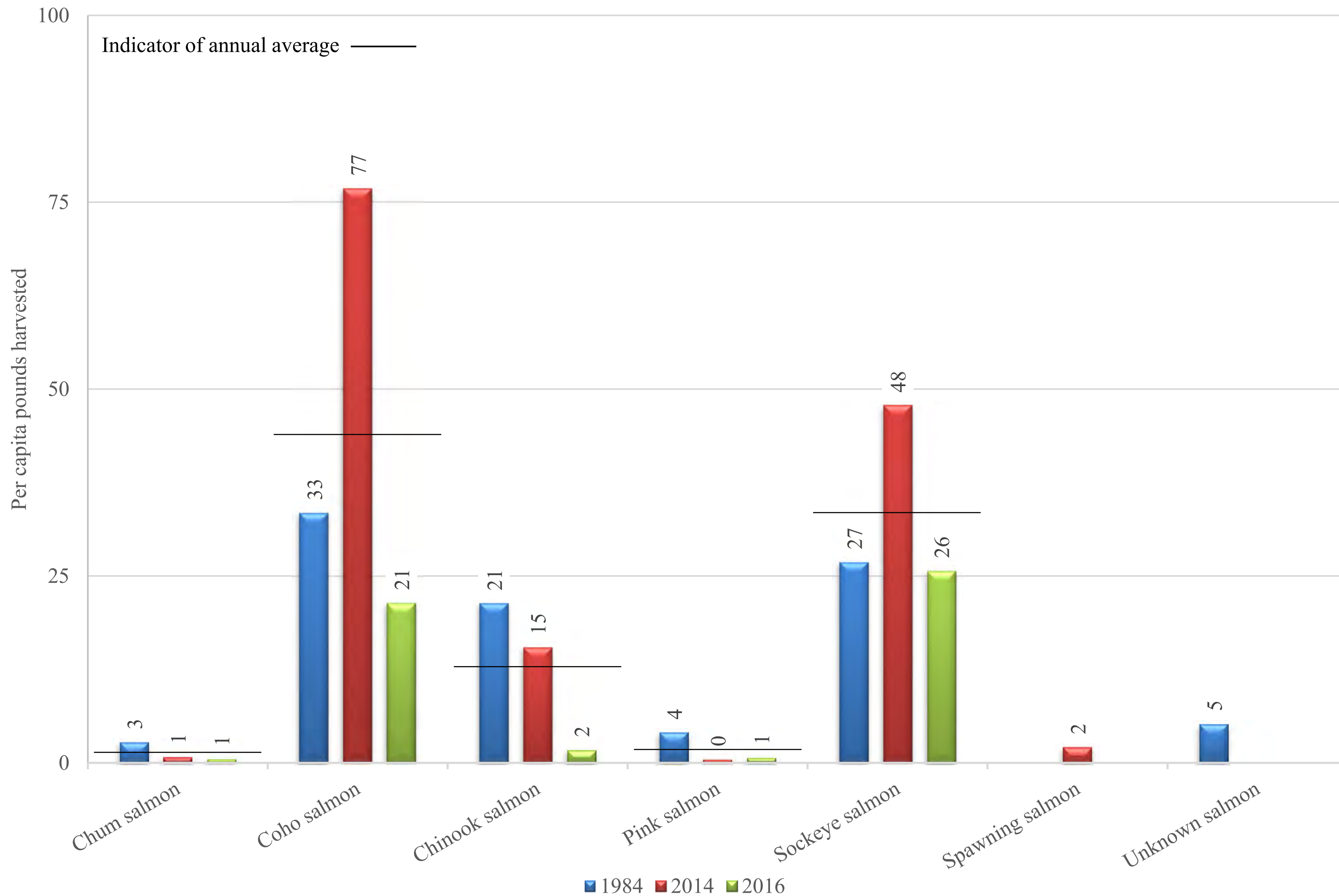
	Percentage of households					Estimated harvest			
Year	Using %	Attempting harvest %	Harvesting %	Receiving %	Giving %	Number	Total pounds	Pounds per household	Pounds per person
1984	96.0	92.0	92.0	56.0	56.0	1,631.0	9,128.0	217.3	93.7
2014	85.0	85.0	75.0	45.0	40.0	2,317.8	10,223.9	409.0	143.5
2016	80.0	45.0	45.0	50.0	40.0	441.0	1,944.5	92.6	50.1

Sources CSIS for 1984; ADF&G Division of Subsistence household surveys, 2015 and 2017.



Note Years in which the survey did not ask about spawning salmon have no data label; similarly, there is no data label for years in which no survey respondents identified harvests of unknown salmon.

Figure 2-72.–Historical estimated salmon harvests, by species and individual fish, Egegik, 1984, 2014, and 2016.



Note Data labels were removed when the species harvest amount was zero (0), and a pounds per capita harvest that was less than one pound is labeled zero (0) in this chart.

Figure 2-73.–Historical estimated salmon harvests, by species and pounds per capita, Egegik, 1984, 2014, and 2016.

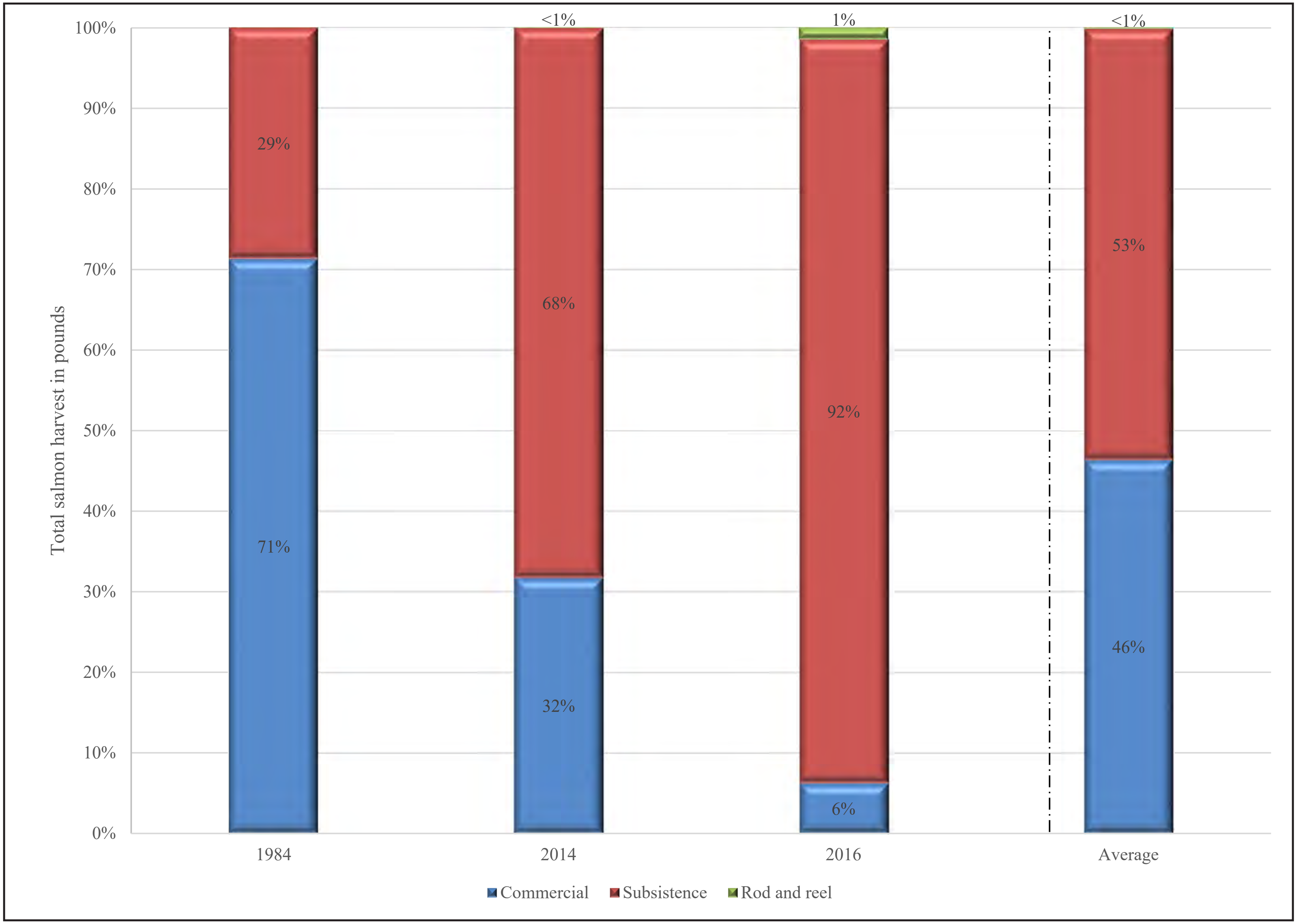


Figure 2-74.–Proportion of total salmon harvest, in pounds usable weight, harvested by gear type, Egegik, 1984, 2014, and 2016.

Table 2-53.–Estimated commercial salmon harvest retention, Egegik, 1984, 2014, and 2016.

	Estimated harvest					
	1984		2014		2016	
Resource	Number	Pounds	Number	Pounds	Number	Pounds
Chum salmon	45	227	5	23	0	0
Coho salmon	450	2,341	233	1,046	5	25
Chinook salmon	97	1,325	76	818	7	53
Pink salmon	124	398	0	0	0	0
Sockeye salmon	494	2,223	329	1,362	11	44

Sources CSIS, 1984 and 2014; ADF&G Division of Subsistence household surveys, 2017.

In 1984, 2014, and 2016, the salmon harvest was composed primarily of coho and sockeye salmon with smaller amounts of Chinook salmon contributing to the harvest (Figure 2-72). In all years there were also small amounts of pink and chum salmon harvested. After increasing between the 1984 and 2014 estimates, the 2016 per capita harvest is the lowest estimate (Figure 2-73; Table 2-52). Harvests of coho and sockeye salmon followed a similar pattern to salmon overall, but Egegik residents harvested smaller amounts of Chinook salmon than in the previous study year for each of the study years (Figure 2-72). The 2014 harvest estimate included a substantial increase in the harvest of coho salmon, from 33 lb per capita to 77 lb per capita, which then fell to the 2016 estimate of 21 lb per capita (Figure 2-73). Sockeye salmon harvests increased in 2014 and decreased in 2016 but by a smaller magnitude: from 27 lb per capita in 1984 to 48 lb in 2014 to 26 lb per capita in 2016. Salmon harvesting methods also changed over the three study years with a steady decrease in the amount of salmon being retained from commercial catches (Figure 2-74). Changes in residents' participation in commercial fisheries have affected how residents harvest fish to eat.

In 1984, commercial removals accounted for approximately 71% of the salmon harvest, in pounds usable weight, while in 2014 this method accounted for 32% of the harvest and only 6% of the harvest in 2016. This shift in harvest gear is seen in the changing harvests of sockeye and coho salmon but not Chinook salmon. Commercial removals brought in 85% of the sockeye salmon harvest, by individual fish, in 1984, but only 40% in 2014, and just 4% in 2016 (Table 2-53; Figure 2-72). In 1984, 72% of the coho salmon harvest was removed from commercial catches while in 2014 the coho salmon harvest by commercial removals changed to 19% and in 2016 it was an estimated 3% of the overall coho salmon harvest. The loss of commercial contributions of coho and sockeye salmon was offset to an extent by increased subsistence harvests, but overall harvest amounts still fell in 2016. Chinook salmon harvesting methods changed less, but more of the overall smaller Chinook salmon harvest comes from commercial retention: from 63% in 1984 to 74% in 2014 to 78% in 2016.

Large Land Mammals

Based on past division surveys, caribou, moose, and brown bear are the large land mammal species residents of the study communities most depend on. In addition to the comprehensive surveys detailed in the above salmon section, the division conducted research on the use of caribou, moose, and brown bear in all of the study communities in 1994, 1995, and 1996 (Krieg et al. 1996; 1998) and on the use of the Northern Alaska Peninsula caribou herd in Port Heiden for the 1991 regulatory year (Fall 1993). Results from all of the surveys are also published online in the CSIS.

Figures 2-75 through 2-80 show the estimated harvest of caribou, moose, and brown bear in the study communities for each study year. Harvests of large mammals in these communities generally trend downward over time, with several exceptions that will be discussed below.

Caribou harvests in every community have declined. Harvests were highest in all of these communities in the 1980s or early 1990s. This decrease likely can be traced to changes in the Northern Alaska Peninsula caribou herd, the local herd that residents of the study communities have historically depended on. The population of the herd peaked in 1984 and then began a steady decline (Harper and McCarthy 2015:4-1). By 1999, the population was of a small enough size that a Tier II hunt[29] was implemented, thus restricting eligibility of hunters to allow the most reliant subsistence users the opportunity to still hunt. By 2005, the herd was still in decline, and all state and federal hunts in Game Management Units 9C and 9E closed (Harper and McCarthy 2015:4-2). By the time of this study, the caribou herd had been growing and a Tier II hunt was again implemented in regulatory year 2016, which allowed residents some opportunity to harvest a caribou. However, respondents noted to researchers during surveys that the caribou in 2016 were mainly found near Port Heiden and not in the vicinity of the other study communities. Despite the physical distance, respondents of most of the study communities were able to take advantage of the opportunity and harvested caribou in 2016; Chignik Lagoon and Egegik were the only communities with no estimated caribou harvest. Despite low or no harvests, the use of caribou has remained strong over most of the study years, with 50% or more of households in every community using the resource; only in 2016 did use fall below 50% in Egegik, Chignik Lagoon, and Chignik Bay (CSIS). The change in use in Chignik Bay is surprising since several caribou were harvested during the study year.

Harvest trends over time for moose are more variable than for caribou. Residents overall prefer caribou but appreciate moose when they can get it (Fall et al. 1995; Morris 1987). In one-half of the communities (Egegik, Chignik Lagoon, and Port Heiden), estimated harvests of moose have decreased and the 2016 harvest estimate is the lowest, or equal to the lowest, in each of these communities. In the other three communities, harvest trends are steady or slightly increasing. In Chignik Lake and Chignik Bay, local respondents interviewed in 2016 noted that habitat for moose is increasing in the area; recent warmer weather has prevented local lakes from freezing, shrubs are getting larger, there is more beaver activity in the area, and Black Lake—above Chignik Lake—is gradually widening and becoming shallower over time. Use of moose remains widespread across the communities and through time; only Egegik and Chignik Bay did not exceed 50% of households using moose during the study years (CSIS). Interestingly, Chignik Lake households showed a marked decrease in the use of moose during the 2016 study year despite the estimated harvest remaining average. Moose availability is generally affected by predation, hunting, weather, and habitat change. It is likely that habitat change in the region is one cause of the reported increase in the use and sharing of moose by the study communities. For example, another recent study found that over the last decade Bristol Bay hunters have begun to rely increasingly on moose for subsistence harvests and they attribute this to large-scale improvements in moose habitat. Moose primarily feed on willow shrubs and climate warming has led to increasing density and growth of willows in riparian areas across the Bristol Bay region. Local hunters report significantly increasing moose hunting opportunities as a result (Van Lanen et al. 2018:182–201).

29. State Tier II hunts are held when there is not enough of a game population with customary and traditional uses to provide a reasonable opportunity for subsistence uses. Hunters must answer questions on an application concerning their dependence on the game for their livelihood and availability of alternative resources. Applications are scored based on responses to the questionnaire and permits are issued to those with the highest scores.

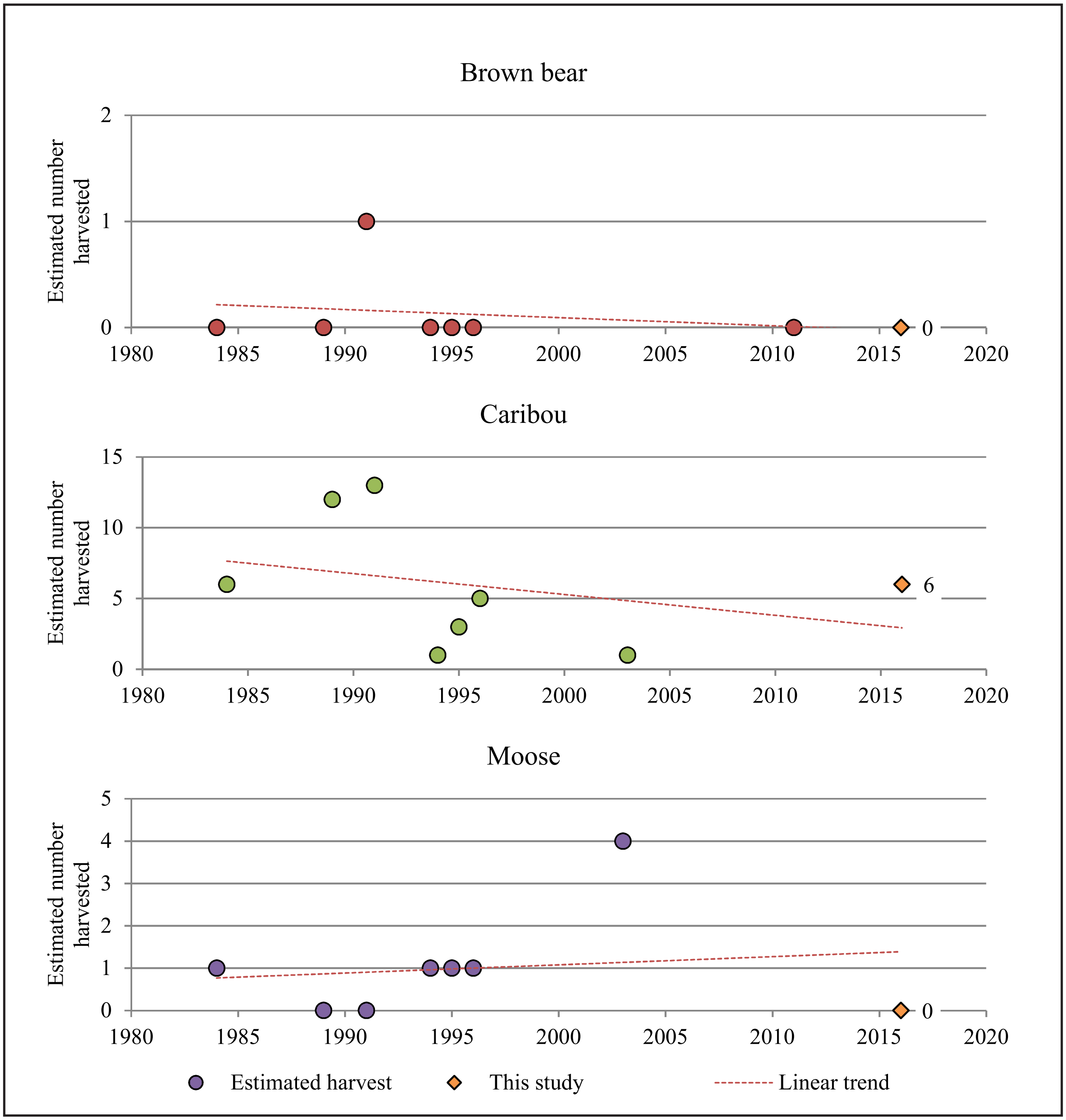


Figure 2-75.–Estimated number of brown bear, caribou, and moose harvested, Chignik Bay, 1984, 1989, 1991, 1994–1996, 2003, 2011, and 2016.

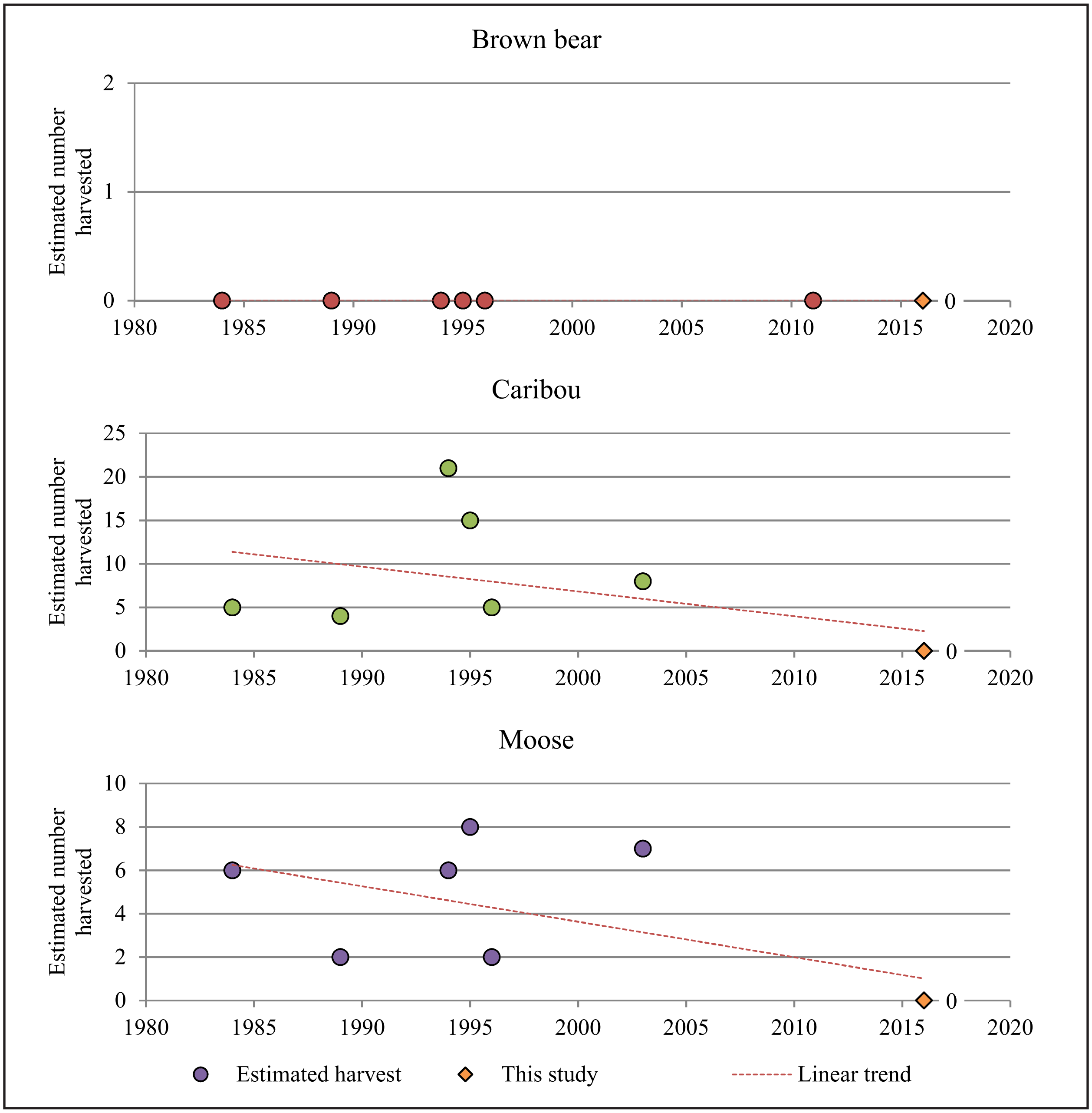


Figure 2-76.–Estimated number of brown bear, caribou, and moose harvested, Chignik Lagoon, 1984, 1989, 1994–1996, 2003, 2011, and 2016.

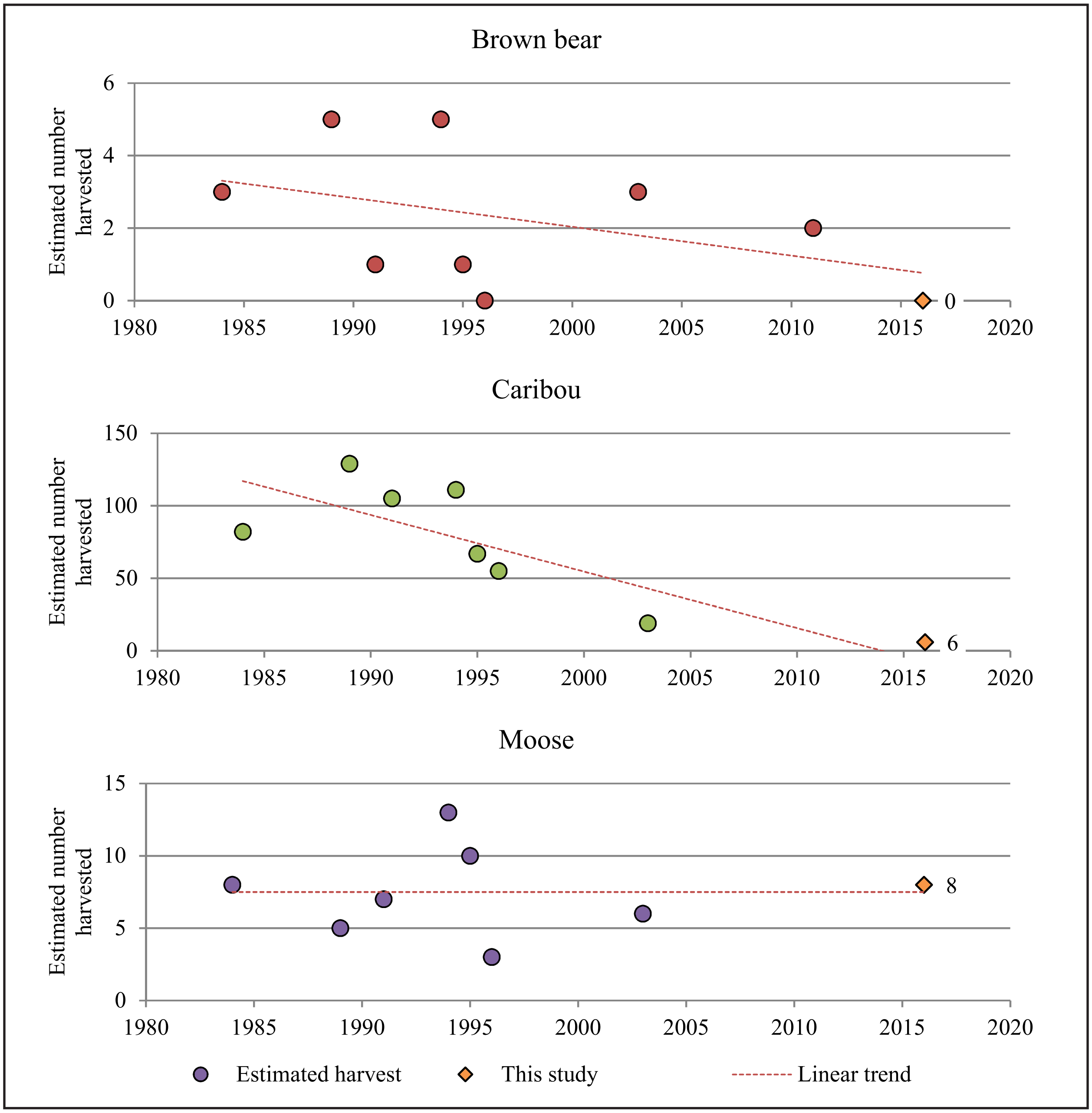


Figure 2-77.–Estimated number of brown bear, caribou, and moose harvested, Chignik Lake, 1984, 1989, 1991, 1994–1996, 2003, 2011, and 2016.

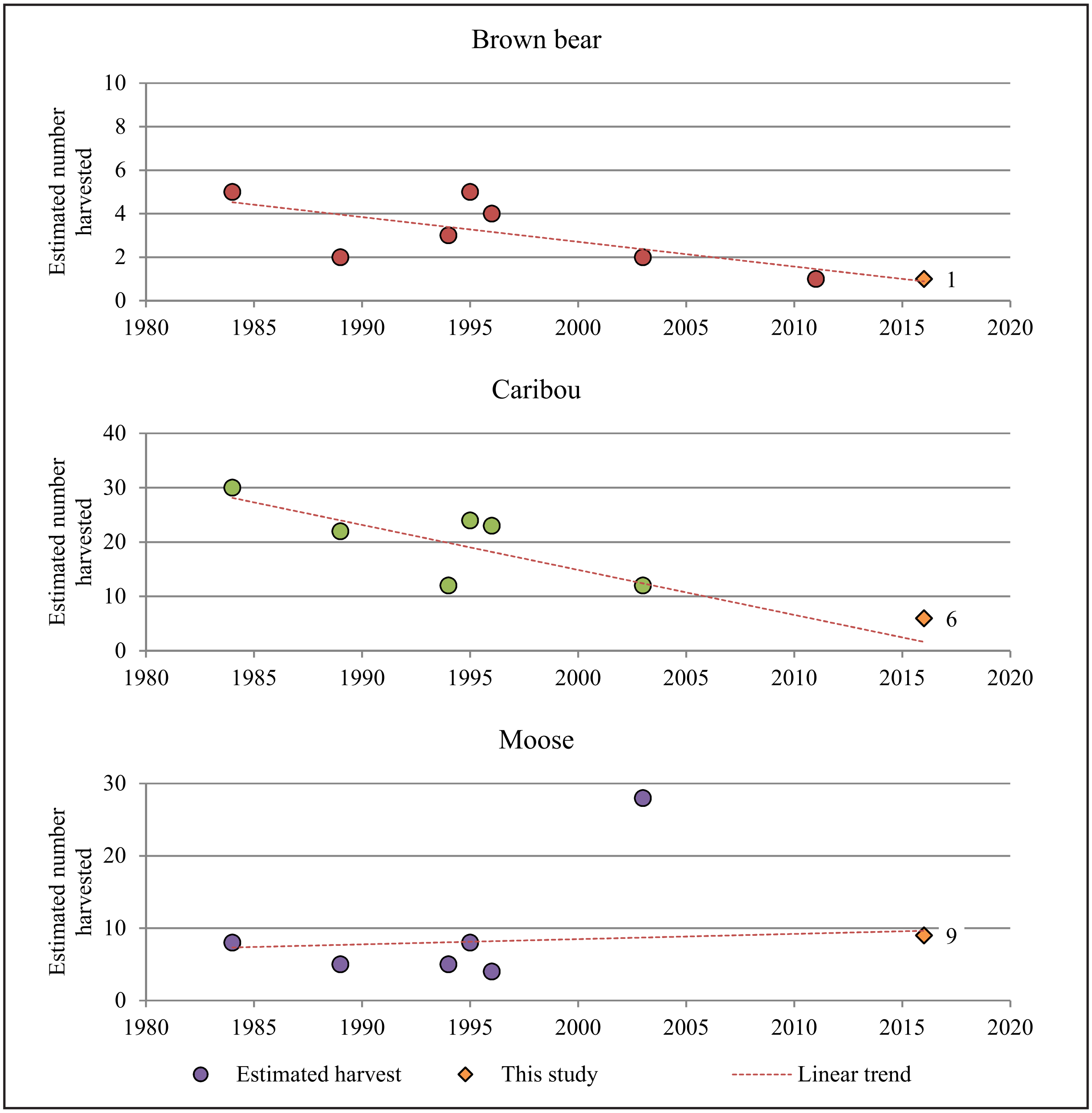


Figure 2-78.–Estimated number of brown bear, caribou, and moose harvested, Perryville, 1984, 1989, 1994–1996, 2003, 2011, and 2016.

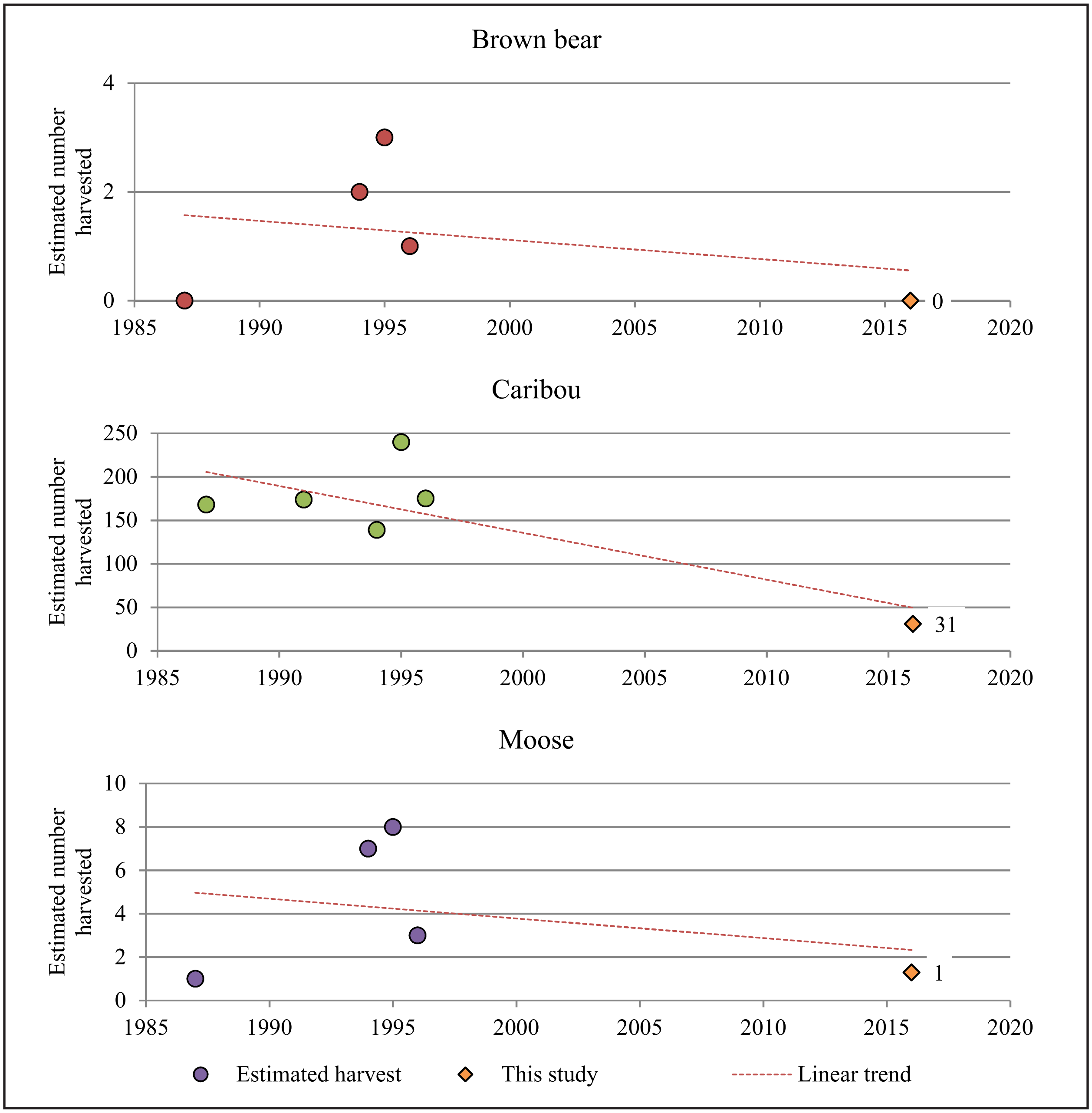


Figure 2-79.–Estimated number of brown bear, caribou, and moose harvested, Port Heiden, 1987, 1991, 1994–1996, and 2016.

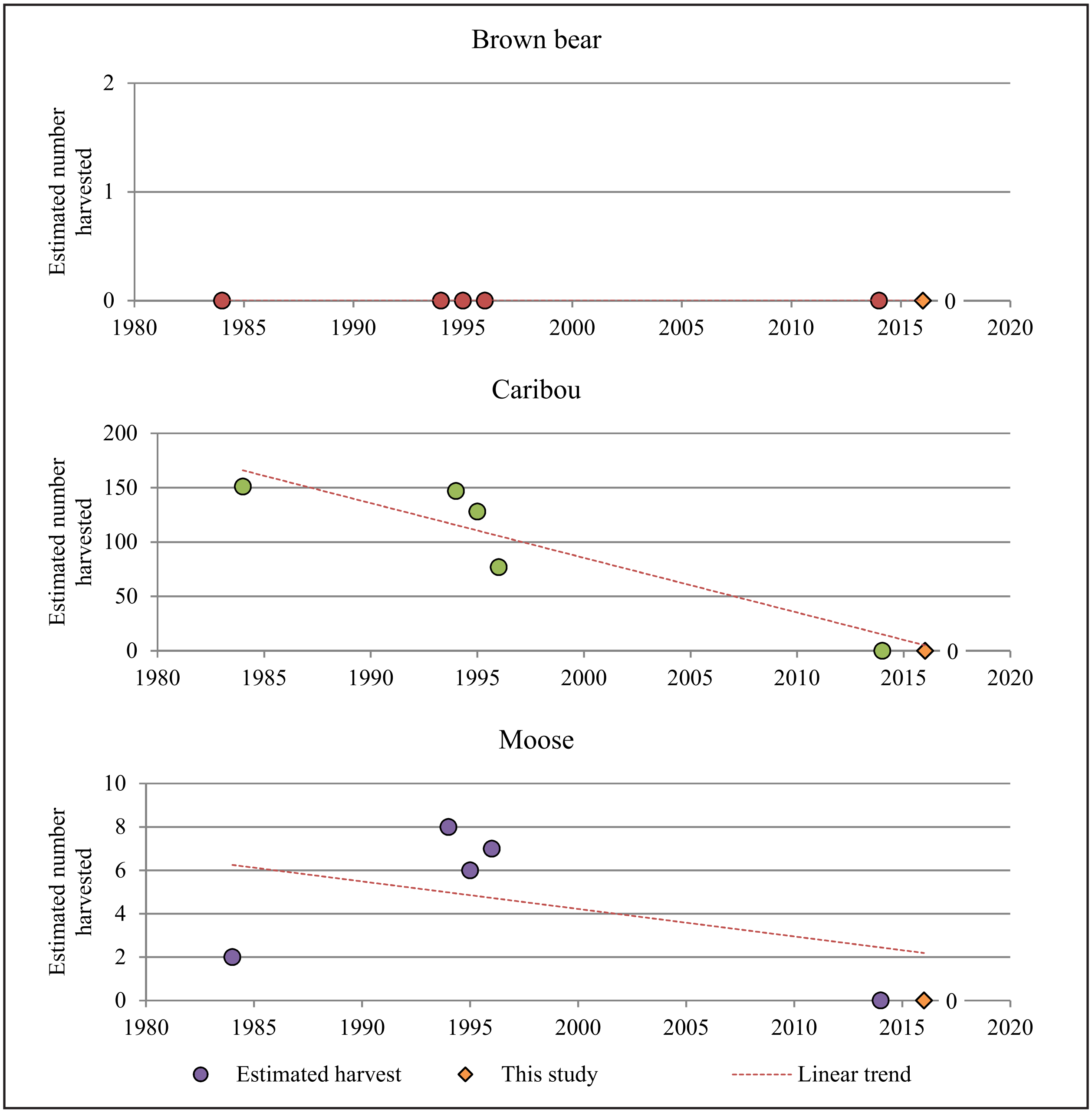


Figure 2-80.–Estimated number of brown bear, caribou, and moose harvested, Egegik, 1984, 1994–1996, 2014, and 2016.

In the study communities, brown bear is generally the least harvested and used resource of these large land mammal species (CSIS). Only residents of Chignik Lake, Perryville, and Port Heiden harvested brown bears in most of the study years—between one and five bears per year. While harvests have been variable, the trend has been decreasing with the 2016 harvest estimate among the lowest in each community. In Chignik Lake, past research has documented the value of brown bear as a subsistence resource. Brown bear hunters have reported that the meat and fat of bears are used, but not the hides, and much of the bear harvested by the hunter is given away (Fall et al. 1995; Morris 1987). A local hunter interviewed in 2011 said that there are fewer bear hunters and warmer winters have made it more difficult to travel to the areas where bears are, especially when hunting spring bears. This hunter also indicated that there are fewer elders and many of the younger residents have not developed a liking for bear. Like Chignik Lake, Perryville has always hunted brown bear for meat and fat. A Perryville hunter in 2011 indicated during an interview that it is mostly elders who want bear and the number of elders is decreasing. However, researchers noted during an interview that the community continues to hunt bear to continue to teach younger hunters how to obtain this resource.

Chapter Discussion

Although the study communities are in the same region of the state and have important shared historical events and reliance on salmon, there are few trends that encompass all of the study communities. Despite that, one commonality among the study communities is the importance of the commercial fishing industry in shaping demographic and subsistence harvesting trends. In terms of population changes, the communities demonstrate a range of trends since 1980. Some communities, such as Port Heiden and Perryville, show a relatively stable population while the population of other communities fluctuated more dramatically. Chignik Lagoon shows a marked population increase in 2000 before declining to its current population, which is still higher than the 1980 census. Chignik Bay, Chignik Lake, and Egegik underwent dramatic population declines: Chignik Bay in the decade between 1990 and 2000, Chignik Lake a decade later, and Egegik more recently, since 2010. While Chignik Bay's population may have leveled out since that initial decline and Chignik Lagoon's population increased in the subsequent decade, Egegik appears to still be in the middle of the decline. Changes in the commercial fishing industry and support services as well as resource changes likely drive a lot of this population change. In Egegik, the closure of the school in 2014 is probably exacerbating its current population decline. In Chignik Bay, the 2008 Trident cannery fire along with declining salmon runs to the Chignik area have caused the city's loss in tax revenue that has done harm to the community. The reduced value of Chignik permits and gross earnings from the Chignik salmon fishery, reduction of younger people getting into the fishery, and declining sockeye salmon runs since 2013 likely have also contributed significantly toward the population declines in the Chignik communities through 2016 (Gho 2019:4–15).

Other characteristics of the communities likely reflecting the history and continued importance of commercial fishing are age and gender of community residents. In general, these communities are slightly skewed toward a higher male population than female and are young. In four of the six communities, 40% or more of the population is 24 years old or younger and the average age in three of those is 29 (Chignik Lake, Perryville, and Port Heiden; in Chignik Bay the average age is 32). In Chignik Lagoon, 54% of the population is still under 39 years old. Only in Egegik does the population skew toward being older with an average age of 43 and the most residents in the 45–74 age range.

Use and harvest of salmon remain widespread in all study communities: except for Egegik, more than 60% of community households harvested salmon during the study year. Unsurprisingly, given the relative population status of the targeted species, more households fished for salmon than hunted large land mammals during the study year. In general, residents of the region harvest their salmon through subsistence methods. The only exceptions to this are Chignik Bay—where 69% of the salmon harvest weight was retained from commercial harvests—and Chignik Lagoon—where 39% was home pack. Communities like Egegik that used to have greater local resident participation in the commercial fisheries have experienced a dramatic change in harvest methods. For example, in Egegik, 71% of all the salmon harvest weight was retained from commercial catches in 1984, which changed to hardly any (6%) in 2016. In general, there has been a decline in home pack, except in Chignik Bay, where an increase in sourcing salmon from home pack occurred while harvests by rod and reel decreased.

For salmon harvests overall, no clear trend is exhibited through all the communities. In general, there was a relatively high harvest estimated in the first decade of the 2000s, with a decrease following for the study year. In one-half of the communities, the 2016 estimated harvest is the lowest on record, in Chignik Bay it is the second lowest, but for Port Heiden and Chignik Lagoon it is one of the highest. Salmon production in this region has fluctuated dramatically, and “the species and number of salmon harvested for subsistence [varies] considerably among communities” (Fox et al. 2018:12). Harvest fluctuations may be most tightly associated with changes in run abundance, fish size, and timing.

3. HOUSEHOLD SURVEY RESULTS: ASSESSMENTS

Assessments of Use

Researchers asked respondents to assess their own use of resources in two ways: whether they used more, less, or about the same amount of resources in 2016 as in the past five years, and whether they "got enough" of the resources to use for their own household's needs, either through their own harvest efforts or sharing. In all six study communities for 2016, both question series were asked about the following resources: sockeye salmon, Chinook salmon, other salmon (chum, coho, and pink salmon combined), and also large land mammals in general. Note that respondents in Port Heiden and Egegik were asked about sockeye salmon overall, but in Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville, respondents were asked about early-run sockeye salmon and late-run sockeye salmon. In the Chignik Management Area, there are two genetically distinct sockeye salmon runs: the early run (Black Lake) and the late run (Chignik Lake) in the Chignik River watershed. The runs overlap during late June and July (Templin et al. 1999). Each of these runs has an established escapement goal (Wilburn and Stumpf 2017). Subsistence fishers obtain salmon from each of these salmon runs, and, based on the run from which sockeye salmon are harvested, these fishers have distinct subsistence patterns. For example, sockeye salmon harvested from the early run are often caught early in the summer in Chignik Lagoon or Chignik Lake. Sockeye salmon caught from the late run are commonly harvested in the fall in the Chignik River, Chignik Lake, and Clark River when the fish are still silver, when they are turning red (known as "redfish"), or have already spawned (known as "spawn-outs"). Additionally, how harvests are processed can be dependent upon from which run the fish were harvested and the fish spawning condition. Early-run sockeye salmon are usually processed by smoking, jarring, or freezing. How late-run sockeye salmon are processed depends on their condition when harvested. When still silver, late-run sockeye salmon are processed much the same as the early run fish. Redfish and spawn-outs are processed by drying when the flesh has turned white, the weather has turned cold, and flies that can ruin the drying fish have died off. Waiting until the flesh has turned white is an indication that the fish has lost its fat content, which reduces spoilage when drying and changes the flavor of the fish. Dryfish (also called dried salmon by Chignik area residents) is considered a delicacy. Because of the distinct subsistence patterns for the two different runs, researchers believed it was important when assessing these communities' subsistence salmon uses to ask about each of these runs separately.

Respondents also were asked to provide reasons if their resource use was different or if they were unable to get enough resources. 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 their household need annually, and whether they did anything differently (such as supplement with store-bought food or switch to a different subsistence resource) because their household did not get enough. 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 both assessment question series, households could give more than one reason for changes to resource use and for not having enough resources. The following sections present discussions of the tables and figures depicting responses to those questions for the salmon resources and then for large land mammals in general.

Salmon

Chignik Bay

In 2016, early-run sockeye salmon was the only resource for which household use was about the same for at least one-half (58%) of the responding households in Chignik Bay (Figure 3-1). Of the responding households, 7 (29%) used fewer early-run sockeye salmon in 2016 than in the recent last 5 years, 14 (58%) used the same amount, and 2 (8%) used more (Table 3-1). For late-run sockeye salmon in 2016, one-quarter (25%) of the responding households used the same amount, 4 (17%) reported less use, no respondents indicated increased use, and 14 households (58%) did not use late-run sockeye salmon. Of the seven households reporting that they used fewer early-run sockeye salmon, the specific reasons provided for why included: family/personal reasons (three responses), resources less available (two responses), lack of equipment (one response), lack of effort (one response), weather/environment (one response), and working/no time (one response) (Table 3-2). Only two households reported using more early-run sockeye salmon and the reasons provided for more use were that the household received more (one response) and affordability (store-bought food too expensive) (one response) (Table 3-3). Reasons provided for why use of late-run sockeye salmon was less included: resources less available (two responses), family/personal reasons (one response), less sharing (one response), and working/no time (one response) (Table 3-2).

In 2016, one-half of 24 sampled households in Chignik Bay used Chinook salmon (Table 3-1). Overall, five households (21%) used fewer Chinook salmon, six households (25%) used the same amount, and one household (4%) used more compared to recent previous years. All five households that used fewer Chinook salmon provided a reason for why: 40% indicated less sharing was the reason for less use (Table 3-2). The remaining responses were each cited by one household: resources less available, working/no time, and resources were small/diseased. Only one household reported using more Chinook salmon than in recent years and provided as a reason that more Chinook salmon were needed (Table 3-3).

When asked to compare use of other salmon, 20 out of 24 sampled households in Chignik Bay provided a response: 10 households (50%) used at least one or more of these species of salmon (Table 3-1). Eight responding households (40%) used fewer other salmon and two households (10%) used the same amount in 2016 compared to recent years; no respondents used more other salmon. Reasons households gave for using fewer other salmon included: resources less available (two responses), weather/environment (two responses), personal reasons (one response), unsuccessful harvest effort (one response), used other resources (one response), and did not need other salmon (one response) (Table 3-2).

For each salmon resource, more sampled households had enough salmon than did not have enough (Figure 3-2). Of the 23 households that used sockeye salmon from the early run, 8 households (35%) did not get enough to meet their needs (Table 3-4). One household said the impact of not getting enough was severe, three reported a major impact to the household, two a minor impact, one indicated it was not noticeable, and one did not provide an impact severity assessment. These eight households were asked to identify what they did differently as a result of not getting enough early-run sockeye salmon in 2016, and out of five responses, one household used other subsistence foods, one household asked others for help, one household made do without, and two households ate elsewhere (Table 3-5). Of the 10 households that used late-run sockeye salmon in the study year, 2 said they did not get enough to meet their needs; both households said they experienced a major impact and that they had to buy more commercial foods to make up for not having enough of this resource (Table 3-4; Table 3-5).

For Chinook salmon, 5 out of 12 households that used the resource did not get enough to meet their needs, of which 2 households said the impact was major, 2 said the impact was minor, and 1 said the impact was not noticeable (Table 3-4). As a result of not getting enough Chinook salmon, two households said that they used more commercial foods and the third said the household made do without (Table 3-5).

In the 2016 study year, 9 households (38%) out of 24 sampled households provided an assessment about having enough other salmon, of which 3 households (33%) said they did not get enough to meet their needs (Table 3-4). Two households said the impact of not getting enough other salmon was major and one household said the impact was not noticeable. What households did differently as a result of not getting enough other salmon included using more commercial foods (three responses) and asking others for help (one response) (Table 3-5).

Salmon needed by all responding households that did not get enough ranged from 44 Chinook salmon (9 salmon per household in need) to 368 early-run sockeye salmon (53 salmon per household in need); an average of 55 fish were needed by the 2 households that did not have enough late-run sockeye salmon (Table 3-6).

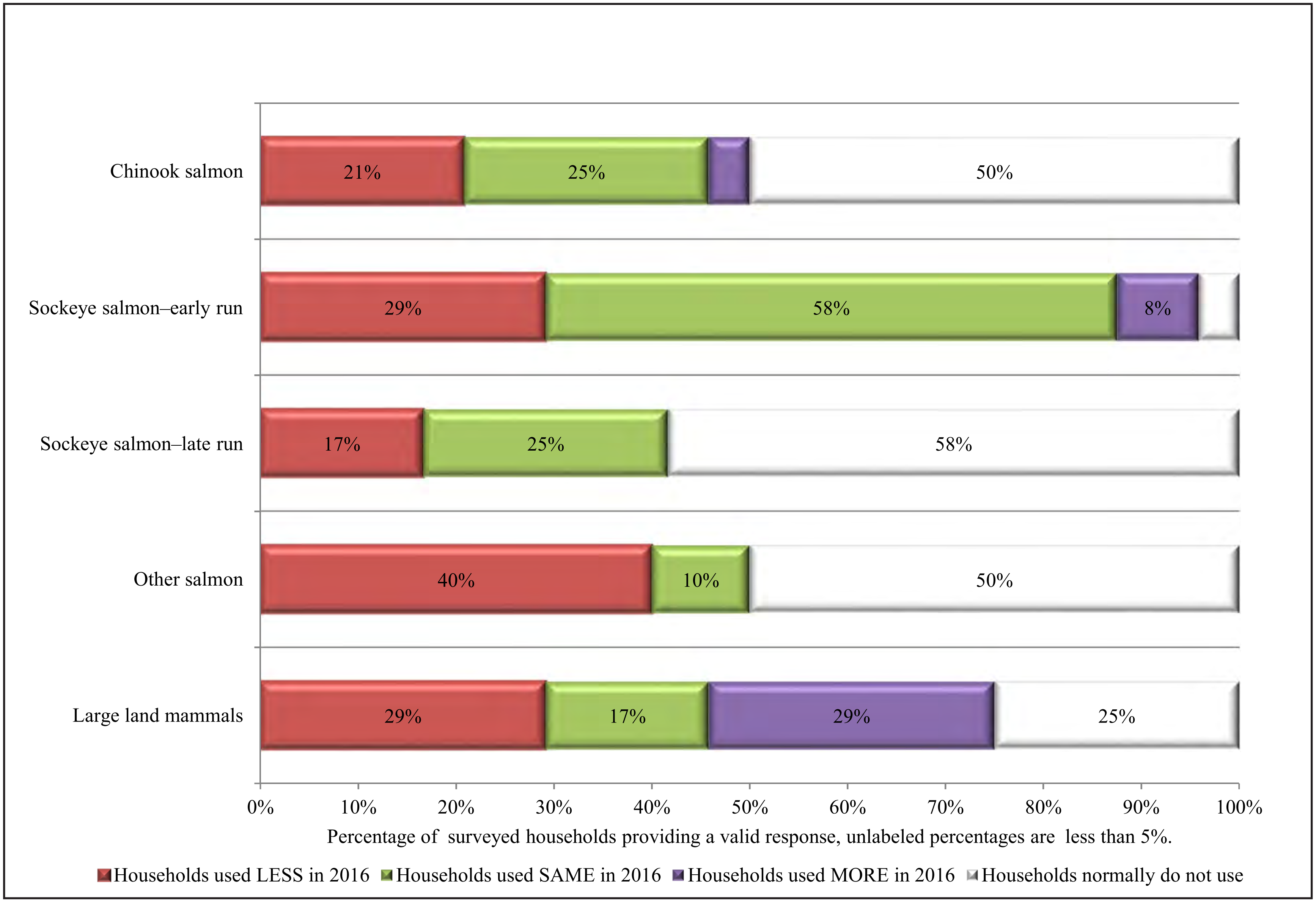


Figure 3-1.–Changes in household uses of resources compared to recent years, Chignik Bay, 2016.

Table 3-1.–Changes in household uses of resources compared to recent years, Chignik Bay, 2016.

			Households reporting use								Households not using	
			Total households		Less		Same		More			
Resource	Sampled households	Valid responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	24	12	50.0%	5	20.8%	6	25.0%	1	4.2%	12	50.0%
Sockeye salmon–early run	24	24	23	95.8%	7	29.2%	14	58.3%	2	8.3%	1	4.2%
Sockeye salmon–late run	24	24	10	41.7%	4	16.7%	6	25.0%	0	0.0%	14	58.3%
Other salmon	24	20	10	50.0%	8	40.0%	2	10.0%	0	0.0%	10	50.0%
Large land mammals	24	24	18	75.0%	7	29.2%	4	16.7%	7	29.2%	6	25.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-2.–Reasons for less household uses of resources compared to recent years, Chignik Bay, 2016.

			Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
Resource	Valid responses[a]	Households reporting reasons for less use	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	5	0	0.0%	1	20%	0	0.0%	0	0%	2	40%	0	0%	0	0.0%	0	0.0%
Sockeye salmon–early run	24	7	3	42.9%	2	29%	0	0.0%	1	14%	0	0%	1	14%	0	0.0%	1	14.3%
Sockeye salmon–late run	24	4	1	25.0%	2	50%	0	0.0%	0	0%	1	25%	0	0%	0	0.0%	0	0.0%
Other salmon	20	8	1	12.5%	2	25%	0	0.0%	0	0%	0	0%	0	0%	1	12.5%	2	25.0%
Large land mammals	24	7	1	14.3%	1	14%	0	0.0%	0	0%	6	86%	1	14%	0	0.0%	1	14.3%

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Table 3-2.–Continued.

			Other reasons		Working/ no time		Regulations		Resource small or diseased		Did not need		Gas/equipment too expensive		Used other resources		Competition	
Resource	Valid responses[a]	Households reporting reasons for less use	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	5	0	0.0%	1	20%	0	0.0%	1	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	24	7	1	14.3%	1	14%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	24	4	0	0.0%	1	25%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	20	8	0	0.0%	0	0%	0	0.0%	0	0.0%	1	12.5%	0	0.0%	1	12.5%	0	0.0%
Large land mammals	24	7	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, 2017.

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

Table 3-3.–Reasons for more household uses of resources compared to recent years, Chignik Bay, 2016.

Resource	Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Weather		Received more		Needed more		Increased effort		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	24	2	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	24	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	20	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	24	7	0	0.0%	0	0.0%	0	0.0%	2	28.6%	0	0.0%	0	0.0%	0	0.0%

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Table 3-3.–Continued.

Resource	Valid responses[a]	Households reporting reasons for more use	Regulations		Went farther		More success		Had more time		Store-bought too expensive		Got/fixed equipment		Substitute for unavaialable resource(s)	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	24	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	24	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	20	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	24	7	4	57.1%	0	0.0%	1	14.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

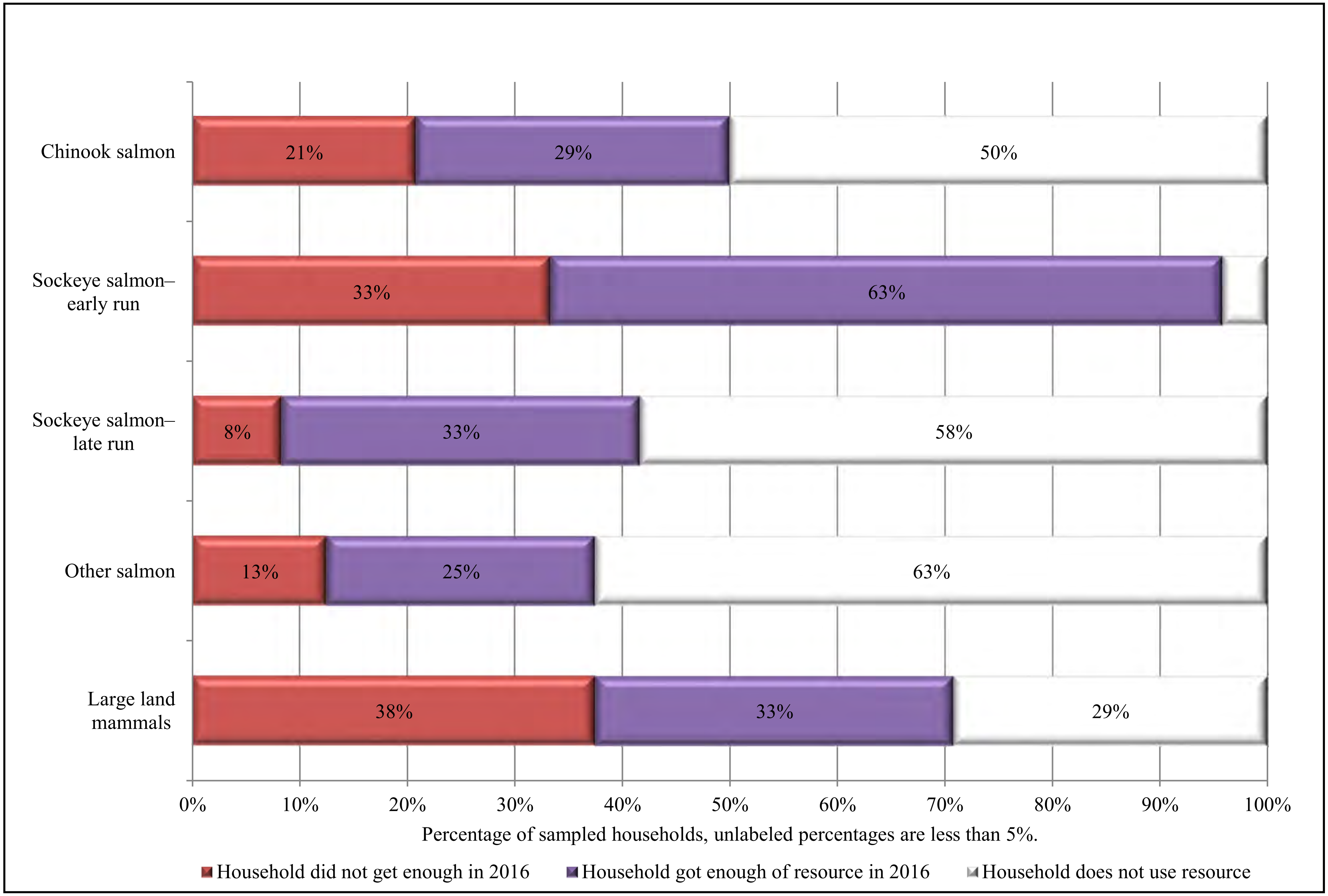

Figure 3-2.–Percentage of sampled households reporting whether they had enough resources, Chignik Bay, 2016.

Table 3-4.–Reported impact to households reporting that they did not get enough of a type of resource, Chignik Bay, 2016.

		Households not getting enough _______ .				Impact to those not getting enough _______ .									
	Sampled	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
Resource	households	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	12	50.0%	5	41.7%	0	0.0%	1	20.0%	2	40.0%	2	40.0%	0	0.0%
Sockeye salmon–early run	24	23	95.8%	8	34.8%	1	12.5%	1	12.5%	2	25.0%	3	37.5%	1	12.5%
Sockeye salmon–late run	24	10	41.7%	2	20.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%
Other salmon	24	9	37.5%	3	33.3%	0	0.0%	1	33.3%	0	0.0%	2	66.7%	0	0.0%
Large land mammals	24	17	70.8%	9	52.9%	0	0.0%	4	44.4%	1	11.1%	3	33.3%	1	11.1%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-5.–Things households reported doing differently as the result of not getting enough of a resource, Chignik Bay, 2016.

	Valid	Bought/bartered		Used more commercial foods		Used other subsistence foods		Asked others for help		Increased effort	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	0	0.0%	2	66.7%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	5	0	0.0%	0	0.0%	1	20.0%	1	20.0%	0	0.0%
Sockeye salmon–late run	2	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	3	0	0.0%	3	100.0%	0	0.0%	1	33.3%	0	0.0%
Large land mammals	8	0	0.0%	6	75.0%	2	25.0%	0	0.0%	0	0.0%

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Table 3-5.–Continued.

	Valid	Made do without		Ate elsewhere		Got public assistance		Got a job		Other	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	5	1	20.0%	2	40.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	8	1	12.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

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

Table 3-6.–Salmon resources that sampled households reported needing, Chignik Bay, 2016.

Resource	Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
Chinook salmon	5	44.0	8.8
Sockeye salmon–early run	7	368.0	52.6
Sockeye salmon–late run	2	110.0	55.0
Other salmon	2	27.0	13.5

Source ADF&G Division of Subsistence household surveys, 2017.

Chignik Lagoon

In 2016, a pronounced proportion of sampled households, all of which answered questions about changes to salmon use for Chinook and early-run sockeye salmon, used less of these salmon resources compared to the recent past five years: only 20% and about one-third (30%) of responding households used the same amount of Chinook and early-run sockeye salmon, respectively (Figure 3-3). Of 20 sampled households in Chignik Lagoon, 85% (17 households) reported using early-run sockeye salmon and 75% (15 households) used late-run sockeye salmon in 2016 (Table 3-7). Approximately one-third of sampled households indicated using the same amount of early-run and late-run sockeye salmon (30% and 35%, respectively). In 2016, 45% of households (nine) used fewer early-run sockeye salmon than in the previous five years and 10% of households (two) used more. For late-run sockeye salmon, 20% of households (four) used fewer fish and 20% of households (four) used more than in recent years. Most households (56%) that used fewer early-run sockeye salmon cited working/no time as the reason why (Table 3-8). Additionally, two households cited personal/family reasons, and the following reasons were each cited by one household: lack of equipment, lack of effort, unsuccessful, did not need, and competition. The reasons given for increased use by the two households using more early-run sockeye salmon were needed more (one response) and had more time (one response) (Table 3-9). There were three households that reported a reason for using fewer late-run sockeye salmon than in recent years, which included: working or no time (two responses), lack of effort (one response), and another or unspecified reason (one response) (Table 3-8). All four households that used more late-run sockeye salmon provided a reason why, which included: increased effort (two responses), needed more (one response), and had more time (one response) (Table 3-9).

In 2016 in Chignik Lagoon, 15 (75%) out of 20 sampled households used Chinook salmon (Table 3-7). Overall, eight households (40%) used fewer fish, four (20%) used the same amount, and three (25%) used more compared to recent years. Of the households that used less of this resource, reasons why included: working/no time (three responses), did not need (two responses), and the following reasons were each cited by one respondent—family/personal reasons, too far to travel to get fish, unsuccessful, and another or unspecified reason (Table 3-8). Three households cited four reasons for using more Chinook salmon: increased availability of the resource, increased effort, had more time, and another/unspecified reason (Table 3-9).

In 2016 in Chignik Lagoon, 6 households used other salmon (Table 3-7). Four (21%) of these households reported using the same amount of salmon as recent years and two households (11%) used fewer other salmon. Reasons given for less use included lack of equipment and working/no time (Table 3-8).

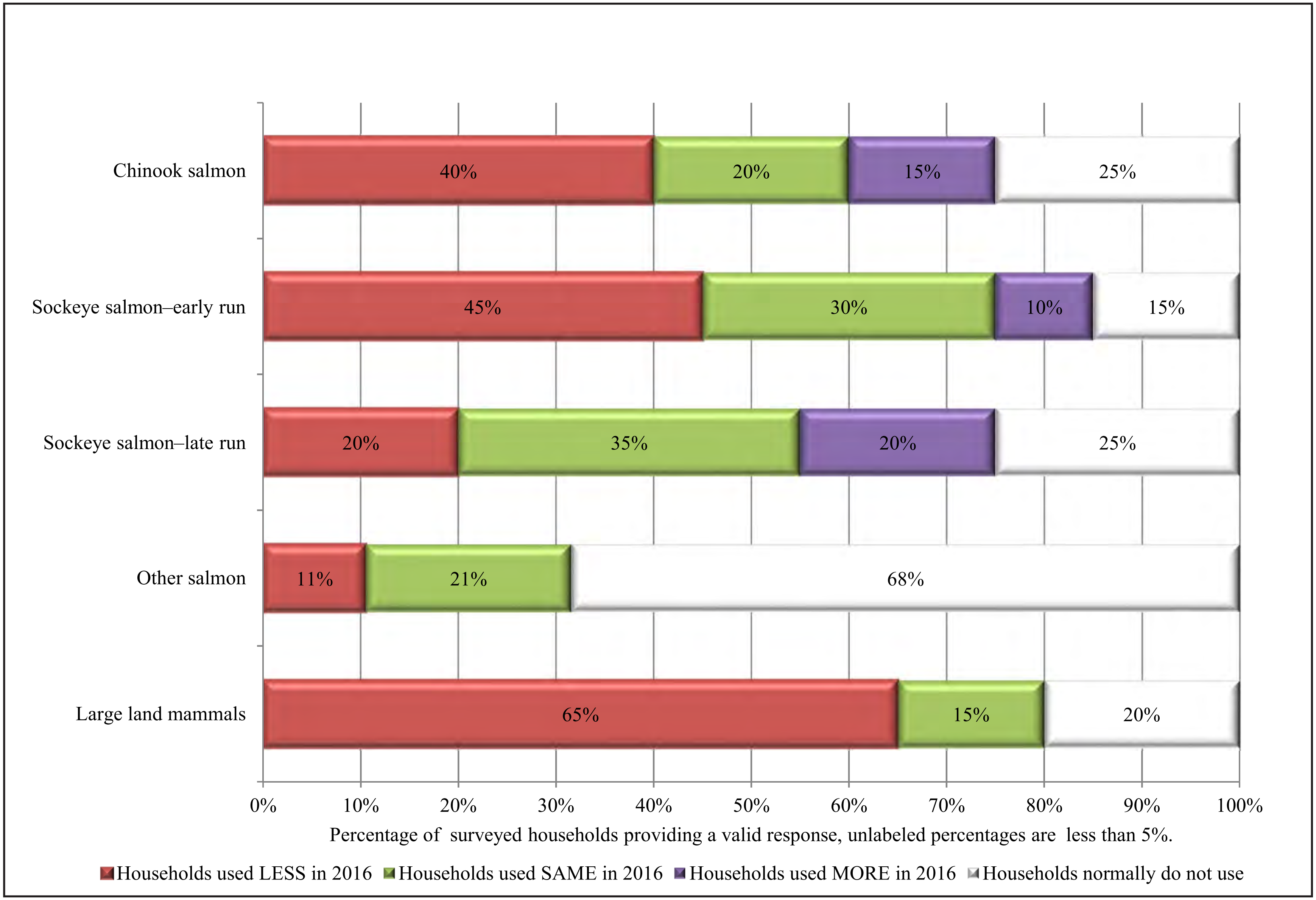

Figure 3-3.–Changes in household uses of resources compared to recent years, Chignik Lagoon, 2016.

Table 3-7.–Changes in household uses of resources compared to recent years, Chignik Lagoon, 2016.

			Households reporting use								Households not using	
			Total households		Less		Same		More			
Resource	Sampled households	Valid responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	20	15	75.0%	8	40.0%	4	20.0%	3	15.0%	5	25.0%
Sockeye salmon–early run	20	20	17	85.0%	9	45.0%	6	30.0%	2	10.0%	3	15.0%
Sockeye salmon–late run	20	20	15	75.0%	4	20.0%	7	35.0%	4	20.0%	5	25.0%
Other salmon	20	19	6	31.6%	2	10.5%	4	21.1%	0	0.0%	13	68.4%
Large land mammals	20	20	16	80.0%	13	65.0%	3	15.0%	0	0.0%	4	20.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-8.–Reasons for less household uses of resources compared to recent years, Chignik Lagoon, 2016.

			Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
Resource	Valid responses[a]	Households reporting reasons for less use	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	8	1	12.5%	0	0%	1	12.5%	0	0%	0	0%	0	0%	1	12.5%	0	0.0%
Sockeye salmon–early run	20	9	2	22.2%	0	0%	0	0.0%	1	11%	0	0%	1	11%	1	11.1%	0	0.0%
Sockeye salmon–late run	20	3	0	0.0%	0	0%	0	0.0%	0	0%	0	0%	1	33%	0	0.0%	0	0.0%
Other salmon	19	2	0	0.0%	0	0%	0	0.0%	1	50%	0	0%	0	0%	0	0.0%	0	0.0%
Large land mammals	20	13	1	7.7%	5	38%	0	0.0%	0	0%	4	31%	0	0%	3	23.1%	0	0.0%

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Table 3-8.–Continued.

			Other reasons		Working/ no time		Regulations		Resource small or diseased		Did not need		Gas/equipment too expensive		Used other resources		Competition	
Resource	Valid responses[a]	Households reporting reasons for less use	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	8	1	12.5%	3	38%	0	0.0%	0	0.0%	2	25.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	20	9	0	0.0%	5	56%	0	0.0%	0	0.0%	1	11.1%	0	0.0%	0	0.0%	1	11.1%
Sockeye salmon–late run	20	3	1	33.3%	2	67%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	19	2	0	0.0%	1	50%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	20	13	0	0.0%	1	8%	3	23.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-9.–Reasons for more household uses of resources compared to recent years, Chignik Lagoon, 2016.

Resource	Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Weather		Received more		Needed more		Increased effort		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	33.3%	1	33.3%
Sockeye salmon–early run	20	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	20	4	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	25.0%	2	50.0%	0	0.0%
Other salmon	19	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	20	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-9.–Continued.

Resource	Valid responses[a]	Households reporting reasons for more use	Regulations		Went farther		More success		Had more time		Store-bought too expensive		Got/fixed equipment		Substitute for unavaialable resource(s)	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	3	0	0.0%	0	0.0%	0	0.0%	1	33.3%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	20	2	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	20	4	0	0.0%	0	0.0%	0	0.0%	1	25.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	19	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	20	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, 2017.

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

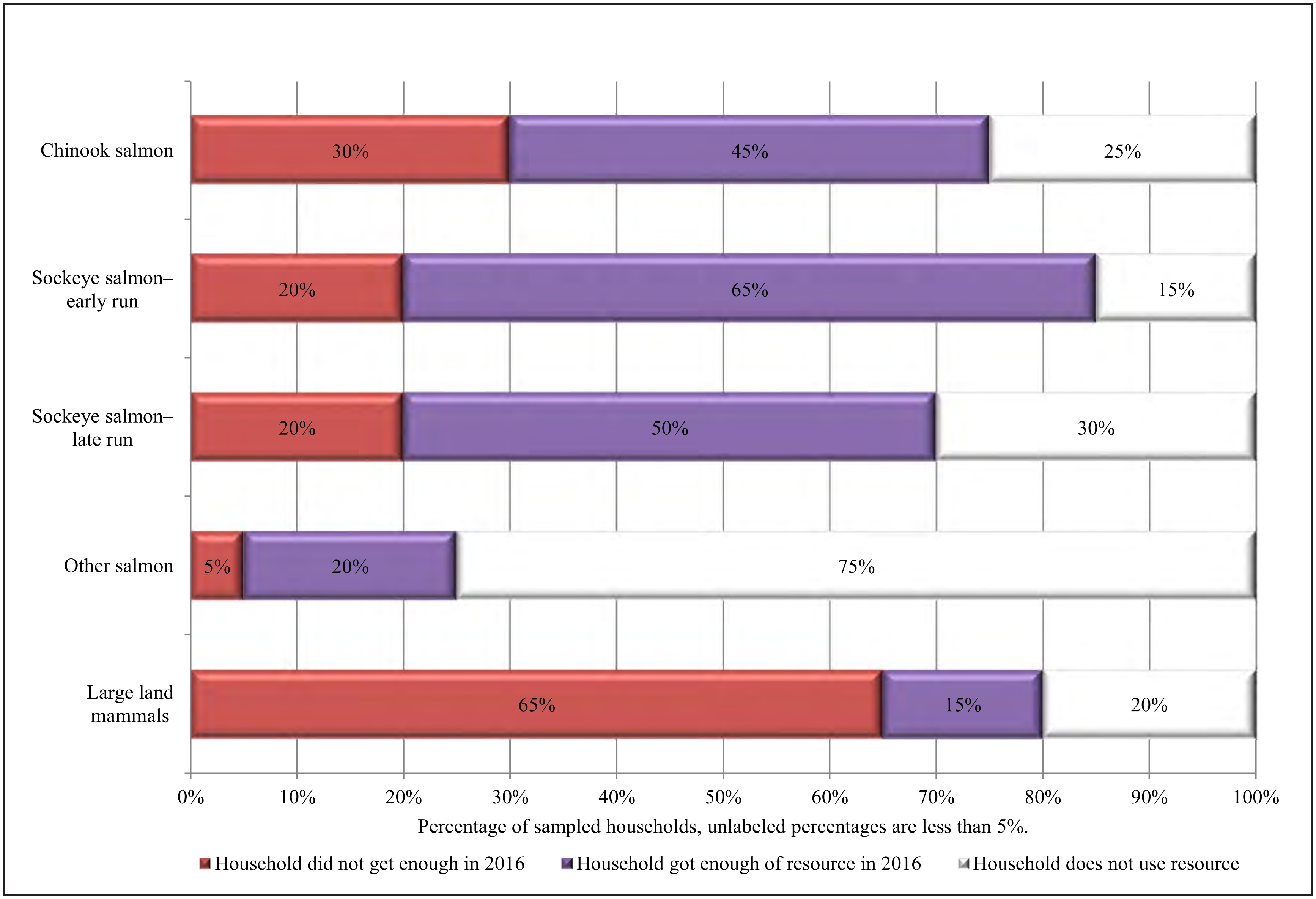

Figure 3-4.–Percentage of sampled households reporting whether they had enough resources, Chignik Lagoon, 2016.

Table 3-10.–Reported impact to households reporting that they did not get enough of a type of resource, Chignik Lagoon, 2016.

		Households not getting enough ________ .				Impact to those not getting enough _______ .									
	Sampled	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
Resource	households	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	15	75.0%	6	40.0%	0	0.0%	1	16.7%	4	66.7%	1	16.7%	0	0.0%
Sockeye salmon–early run	20	17	85.0%	4	23.5%	1	25.0%	1	25.0%	2	50.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	20	14	70.0%	4	28.6%	0	0.0%	0	0.0%	3	75.0%	1	25.0%	0	0.0%
Other salmon	20	5	25.0%	1	20.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Large land mammals	20	16	80.0%	13	81.3%	1	7.7%	0	0.0%	5	38.5%	6	46.2%	1	7.7%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-11.–Things households reported doing differently as the result of not getting enough of a resource, Chignik Lagoon, 2016.

	Valid	Bought/bartered		Used more commercial foods		Used other subsistence foods		Asked others for help		Increased effort	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	4	0	0.0%	0	0.0%	3	75.0%	1	25.0%	0	0.0%
Sockeye salmon–early run	3	0	0.0%	0	0.0%	2	66.7%	0	0.0%	1	33.3%
Sockeye salmon–late run	1	0	0.0%	1	100.0%	1	100.0%	0	0.0%	0	0.0%
Other salmon	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	11	0	0.0%	10	90.9%	3	27.3%	0	0.0%	0	0.0%

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Table 3-11.–Continued.

	Valid	Made do without		Ate elsewhere		Got public assistance		Got a job		Other	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	4	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	11	1	9.1%	0	0.0%	0	0.0%	0	0.0%	1	9.1%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

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

Table 3-12.–Salmon resources that sampled households reported needing, Chignik Lagoon, 2016.

Resource	Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
Chinook salmon	6	66.0	11.0
Sockeye salmon–early run	4	233.0	58.3
Sockeye salmon–late run	4	195.0	48.8
Other salmon	1	40.0	40.0

Source ADF&G Division of Subsistence household surveys, 2017.

For each salmon resource, the majority of sampled Chignik Lagoon households had enough or did not use the resource (Figure 3-4). All 17 households that used early-run sockeye salmon provided an assessment about having enough of this resource: 4 households did not get enough to meet their needs, and 2 households said the impact of not getting enough was minor while 1 household indicated it was not noticeable (Table 3-10). Three of the four households that assessed not having enough early-run sockeye salmon described what the household did as the result of not having enough of this resource: two households used other subsistence foods and one household increased harvest effort in 2016 (Table 3-11). Four households (29%) of 14 responding households did not get enough late-run sockeye salmon to meet their needs, and 1 household said the impact to the household was major while 3 households said the impact was minor (Table 3-10). One household indicated using more commercial foods and using other subsistence foods to help make up for lacking having enough late-run sockeye salmon in 2016 (Table 3-11).

Six households, or 40% of households that used Chinook salmon, did not have enough of this resource (Table 3-10). One household said the impact of not getting enough Chinook salmon was major, four said the impact was minor, and one said it was not noticeable. Four households indicated that they used other subsistence foods (three responses) and asked others for help (one response) because they did not get enough Chinook salmon (Table 3-11).

Five households provided an assessment about having enough other salmon to meet household needs (Table 3-10). Only one household (20%) did not have enough, but the impact of not getting enough was minor and the household provided no response about doing anything differently as a result (Table 3-10; Table 3-11).

Salmon needed by all households that did not get enough ranged from 66 Chinook salmon (11 salmon per household in need) to 233 early-run sockeye salmon (58 salmon per household in need) (Table 3-12).

Chignik Lake

In 2016, of households that answered questions regarding changes to salmon use, sockeye salmon was used more than any other salmon resource: only 22% of responding households did not use sockeye salmon (Figure 3-5). By comparison, of 27 responding households, only 6 households (22%) used Chinook salmon (Table 3-13; Figure 3-5). Assessments of use in 2016 compared to the previous five years were inversed for early-run and late-run sockeye salmon (Figure 3-5). Responses indicated 13 households (48%) used fewer early-run sockeye salmon and 8 households (30%) used the same amount, but 7 households (26%) used fewer late-run sockeye salmon, 12 households (44%) used the same amount, and 2 households (7%) used more of this resource (Table 3-13). Two reasons were both cited most frequently for less use of early-run and late-run sockeye salmon: resources less available and working/no time to harvest; these two reasons were cited by 33%–42% of households that used less of these resources and also provided a reason why (Table 3-14).

For the six households that used Chinook salmon in 2016, the assessments were evenly split: three households used fewer fish and three households used the same amount of this resource, which represents 11% of the responding households for each assessment (Table 3-13). All three households that used fewer Chinook salmon gave a reason for why: family/personal reasons, resources less available, lack of effort, and another or unspecified reason (one response each) (Table 3-14).

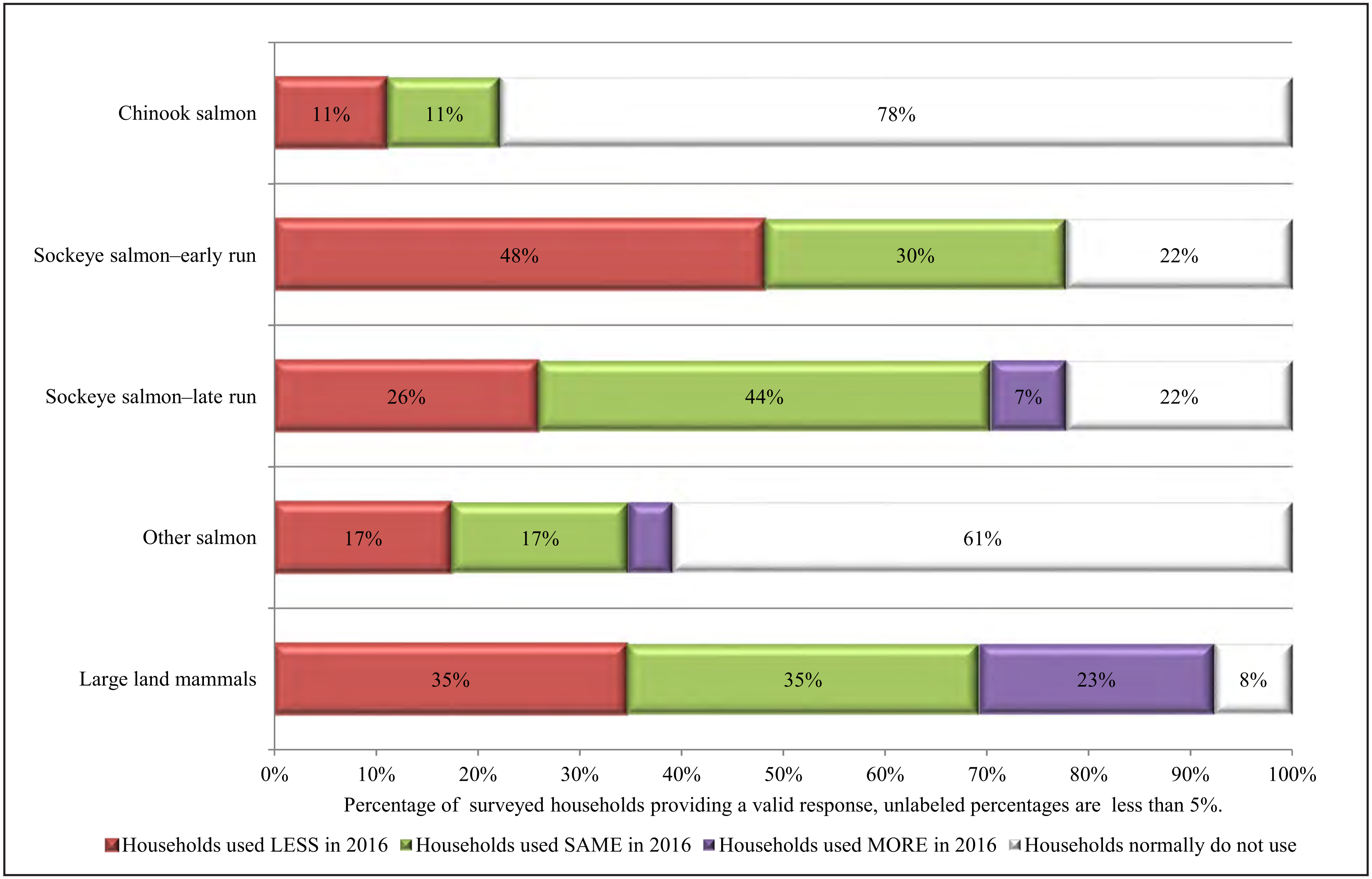

Figure 3-5.–Changes in household uses of resources compared to recent years, Chignik Lake, 2016.

Table 3-13.–Changes in household uses of resources compared to recent years, Chignik Lake, 2016.

Resource	Sampled households	Valid responses[a]	Households reporting use: Total households Number	Total households Percentage	Less Number	Less Percentage	Same Number	Same Percentage	More Number	More Percentage	Households not using Number	Households not using Percentage
Chinook salmon	28	27	6	22.2%	3	11.1%	3	11.1%	0	0.0%	21	77.8%
Sockeye salmon–early run	28	27	21	77.8%	13	48.1%	8	29.6%	0	0.0%	6	22.2%
Sockeye salmon–late run	28	27	21	77.8%	7	25.9%	12	44.4%	2	7.4%	6	22.2%
Other salmon	28	23	9	39.1%	4	17.4%	4	17.4%	1	4.3%	14	60.9%
Large land mammals	28	26	24	92.3%	9	34.6%	9	34.6%	6	23.1%	2	7.7%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-14.–Reasons for less household uses of resources compared to recent years, Chignik Lake, 2016.

Resource	Valid responses[a]	Households reporting reasons for less use	Family/personal Number	Family/personal Percentage	Resources less available Number	Resources less available Percentage	Too far to travel Number	Too far to travel Percentage	Lack of equipment Number	Lack of equipment Percentage	Less sharing Number	Less sharing Percentage	Lack of effort Number	Lack of effort Percentage	Unsuccessful Number	Unsuccessful Percentage	Weather/environment Number	Weather/environment Percentage
Chinook salmon	27	3	1	33.3%	1	33%	0	0.0%	0	0%	0	0%	1	33%	0	0.0%	0	0.0%
Sockeye salmon–early run	27	12	2	16.7%	5	42%	0	0.0%	1	8%	0	0%	1	8%	0	0.0%	1	8.3%
Sockeye salmon–late run	27	6	1	16.7%	2	33%	0	0.0%	0	0%	0	0%	0	0%	0	0.0%	1	16.7%
Other salmon	23	4	2	50.0%	1	25%	0	0.0%	1	25%	0	0%	1	25%	0	0.0%	0	0.0%
Large land mammals	26	9	3	33.3%	3	33%	0	0.0%	1	11%	1	11%	0	0%	1	11.1%	1	11.1%

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Table 3-14.–Continued.

Resource	Valid responses[a]	Households reporting reasons for less use	Other reasons Number	Other reasons Percentage	Working/no time Number	Working/no time Percentage	Regulations Number	Regulations Percentage	Resource small or diseased Number	Resource small or diseased Percentage	Did not need Number	Did not need Percentage	Gas/equipment too expensive Number	Gas/equipment too expensive Percentage	Used other resources Number	Used other resources Percentage	Competition Number	Competition Percentage
Chinook salmon	27	3	1	33.3%	0	0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	27	12	2	16.7%	4	33%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	27	6	2	33.3%	2	33%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	23	4	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	26	9	0	0.0%	0	0%	1	11.1%	0	0.0%	1	11.1%	1	11.1%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-15.–Reasons for more household uses of resources compared to recent years, Chignik Lake, 2016.

Resource	Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Weather		Received more		Needed more		Increased effort		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	27	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	27	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	27	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%
Other salmon	23	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Large land mammals	26	5	0	0.0%	0	0.0%	0	0.0%	1	20.0%	0	0.0%	2	40.0%	0	0.0%

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Table 3-15.–Continued.

Resource	Valid responses[a]	Households reporting reasons for more use	Regulations		Went farther		More success		Had more time		Store-bought too expensive		Got/fixed equipment		Substitute for unavaialable resource(s)	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	27	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	27	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	27	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%
Other salmon	23	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	26	5	1	20.0%	0	0.0%	0	0.0%	1	20.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

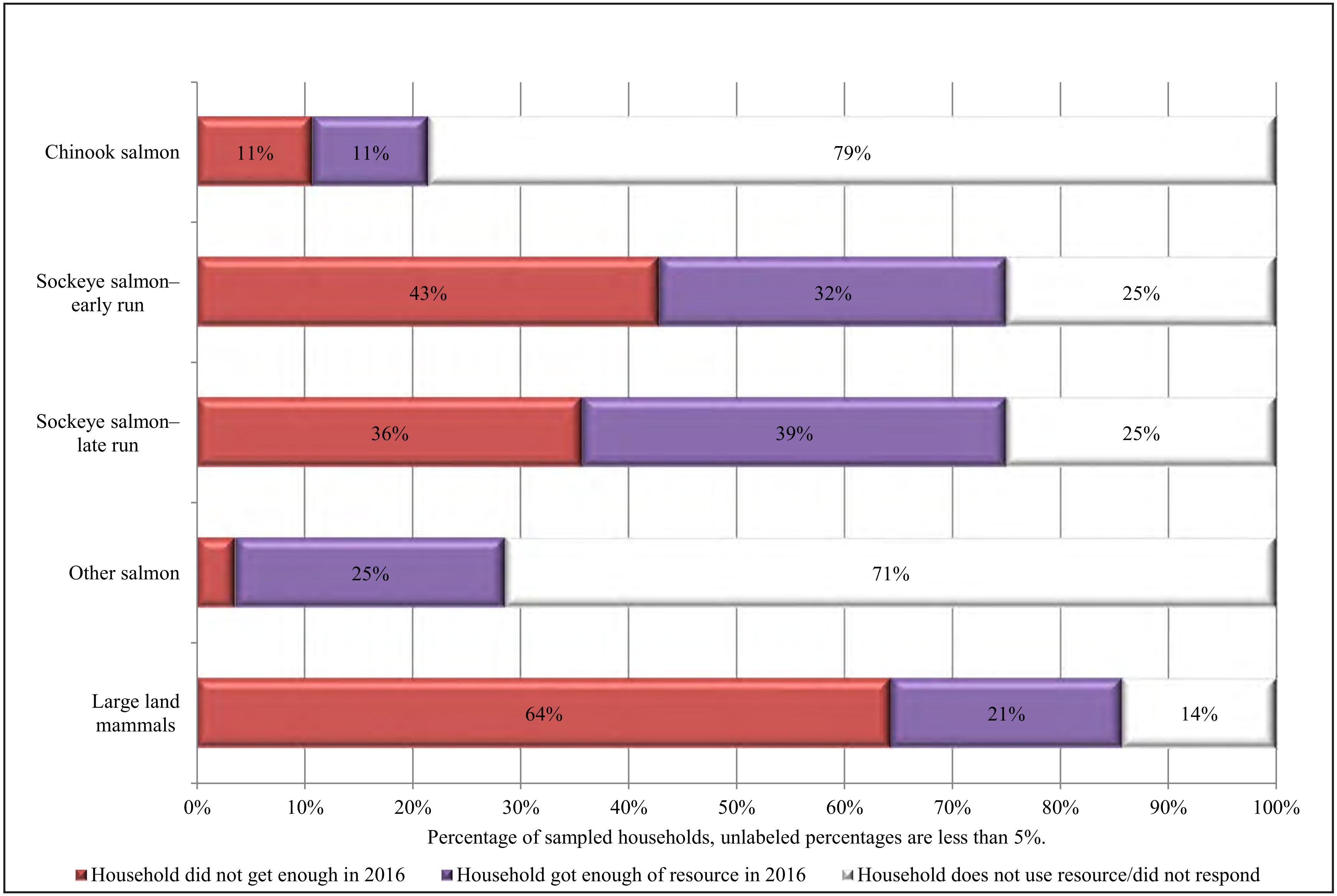

Figure 3-6.–Percentage of sampled households reporting whether they had enough resources, Chignik Lake, 2016.

Table 3-16.–Reported impact to households reporting that they did not get enough of a type of resource, Chignik Lake, 2016.

		Households not getting enough _______ .				Impact to those not getting enough ______ .										
	Sampled	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe		
Resource	households	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	
Chinook salmon	28	6	21.4%	3	50.0%	0	0.0%	0	0.0%	1	33.3%	2	66.7%	0	0.0%	
Sockeye salmon–early run	28	21	75.0%	12	57.1%	1	8.3%	2	16.7%	5	41.7%	4	33.3%	0	0.0%	
Sockeye salmon–late run	28	21	75.0%	10	47.6%	1	10.0%	0	0.0%	6	60.0%	3	30.0%	0	0.0%	
Other salmon	28	8	28.6%	1	12.5%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	
Large land mammals	28	24	85.7%	18	75.0%	2	11.1%	1	5.6%	4	22.2%	10	55.6%	1	5.6%	

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-17.–Things households reported doing differently as the result of not getting enough of a resource, Chignik Lake, 2016.

	Valid	Bought/bartered		Used more commercial foods		Used other subsistence foods		Asked others for help		Increased effort	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	0	0.0%	1	33.3%	1	33.3%	0	0.0%	0	0.0%
Sockeye salmon–early run	11	0	0.0%	4	36.4%	1	9.1%	2	18.2%	2	18.2%
Sockeye salmon–late run	7	0	0.0%	2	28.6%	0	0.0%	2	28.6%	0	0.0%
Other salmon	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	14	0	0.0%	12	85.7%	0	0.0%	1	7.1%	0	0.0%

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Table 3-17.–Continued.

	Valid	Made do without		Ate elsewhere		Got public assistance		Got a job		Other	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	11	2	18.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	7	3	42.9%	0	0.0%	0	0.0%	0	0.0%	1	14.3%
Other salmon	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	14	1	7.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

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

Table 3-18.–Salmon resources that sampled households reported needing, Chignik Lake, 2016.

Resource	Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
Chinook salmon	3	50.0	16.7
Sockeye salmon–early run	11	943.0	85.7
Sockeye salmon–late run	10	735.0	73.5
Other salmon	1	30.0	30.0

Source ADF&G Division of Subsistence household surveys, 2017.

Out of 23 households that answered questions about using other salmon, 9 households (39%) used other salmon (Table 3-13). Overall, four households used fewer fish, four used the same amount, and one household used more other salmon compared to the recent previous five years. Reasons for less use of other salmon included: family/personal reasons (two responses), resources less available (one response), lack of equipment (one response), and lack of effort (one response) (Table 3-14).

Few Chignik Lake households indicated increased use of any salmon resource: two used more late-run sockeye salmon and one used more other salmon (Table 3-13). All households that used more salmon provided a reason for why: two households needed more fish for both resources, and one household used more late-run sockeye salmon to substitute for another subsistence food that was not available (Table 3-15).

Overall, more than one-third of sampled households did not have enough of either early-run and late-run sockeye salmon (Figure 3-6). Of the households that used sockeye salmon from the early run, 12 households (57%) out of 21 did not get enough to meet their needs (Table 3-16). Four households said the impact of not getting enough early-run sockeye salmon was major, five households said the impact was minor, two households thought it was not noticeable, and one household did not give a response. As a result of not getting enough early-run sockeye salmon, these households used more commercial foods (four responses), asked others for help (two responses), increased effort (two responses), made do without (two responses), and used other subsistence foods (one response) (Table 3-17). Out of 21 households that used late-run sockeye salmon, 10 (48%) did not get enough to meet their needs (Table 3-16). Three households said that the impact of not getting enough of the resource was major, six said it was minor, and one gave no response. Some of the households described what they did differently as a result of not getting enough late-run sockeye salmon, which included: they made do without (three responses), used more commercial foods (two responses), asked others for help (two responses), and another or unspecified reason (one response) (Table 3-17).

Three of the six households that used Chinook salmon did not get enough; two households said the impact of not getting enough of this resource was major, and one household said the impact was minor (Table 3-16). Responses about how they handled not having enough Chinook salmon were split evenly among having used more commercial foods, used other subsistence foods, and made do without (one response each) (Table 3-17).

Only one responding household did not get enough other salmon, which had a minor impact on the household and this household used more commercial foods to make up for the lack of an adequate supply (Table 3-16; Table 3-17).

Households that did not get enough salmon were asked how many fish were needed and all but one household that needed a salmon resource offered an amount. Combined responses ranged from 30 other salmon to 943 early-run sockeye salmon (86 salmon per household in need) (Table 3-18).

Perryville

In 2016, similarly to Chignik Lake, sockeye salmon was used more than any other salmon resource by those Perryville households that answered questions regarding changes to salmon use (Figure 3-7; Figure 3-5). Of 26 sampled households in Perryville, 23 answered questions about changes to salmon use for both early-run and late-run sockeye salmon (Table 3-19). There were 23 households (100%) that used sockeye salmon from the first run, and 18 households (78%) used sockeye salmon from the second run. Of the households that used early-run sockeye salmon, 12 households (52%) used fewer salmon than in the last 5 years, 9 households (39%) used about the same amount, and 2 households (9%) used more early-run sockeye salmon in 2016. Out of the 23 respondents, 5 households (22%) used fewer late-run sockeye salmon, 11 households (48%) used the same amount, and 2 households (9%) used more. The two most frequently cited reasons provided for less use of early-run sockeye were working/no time (four respondents) and resource availability (three respondents); for less use of late-run sockeye, these same reasons were provided along with weather/environment conditions (Table 3-20). The two households that reported using more early-run sockeye salmon in 2016 provided these reasons for their increased use: increased effort (two responses) and needed more (one response) (Table 3-21). The two households that used more late-run sockeye salmon in 2016 indicated that more of the resource was needed (one response) and the household experienced more harvesting success (one response).

In 2016, out of 26 sampled households, 24 answered questions about changes to Chinook salmon use but only 9 households used this resource (Table 3-19). Two households (8%) used fewer Chinook salmon, seven households (29%) used the same amount, and no households used more of this resource compared to recent years. The two households that used fewer Chinook salmon said the reasons why were less sharing (one response) and lack of effort (one response) (Table 3-20).

Out of 26 sampled households, 24 answered questions about using other salmon, and nearly all the responding households (22; 92%) used other salmon (Table 3-19). Nearly one-half (46%) of responding households used fewer other salmon, and the most frequently cited reasons for less use were resource availability (five responses) and weather/environment conditions (three responses) (Table 3-20). No responding households indicated more use of other salmon (Table 3-19).

In Perryville in 2016, most sampled households had enough early-run and late-run sockeye salmon: 73% and 50%, respectively (Figure 3-8). Of the 23 households that used sockeye salmon from the early run, 4 (17%) did not get enough to meet household needs (Table 3-22). One household said the impact of not getting enough early-run sockeye salmon was major, two households said the impact was minor, and one gave no response. Three responding households cited using other subsistence foods (one response) and using more commercial foods (two responses) due to not having enough early-run sockeye salmon (Table 3-23). There were 17 households that responded to questions about having enough late-run sockeye salmon and 4 households did not get enough to meet their needs (Table 3-22). The assessments about the impact to households were evenly split among major, minor, and not noticeable, and one household did not provide that assessment. Only one household provided a description of what its members did differently as a result of not getting enough late-run sockeye salmon, which was increased harvest effort (Table 3-23).

Only one responding household did not get enough Chinook salmon, and the impact of not getting enough was minor and other subsistence foods were used to make up for the lack of Chinook salmon (Table 3-22; Table 3-23).

For other salmon, out of 22 respondents there were 5 (23%) that did not get enough (Table 3-22). The impact of not getting enough other salmon was major (two households), minor (two households), or not noticeable (one household). These five households that did not have enough other salmon in 2016 used other subsistence foods (three responses), used more commercial foods (two responses), and increased harvest effort (one response) (Table 3-23).

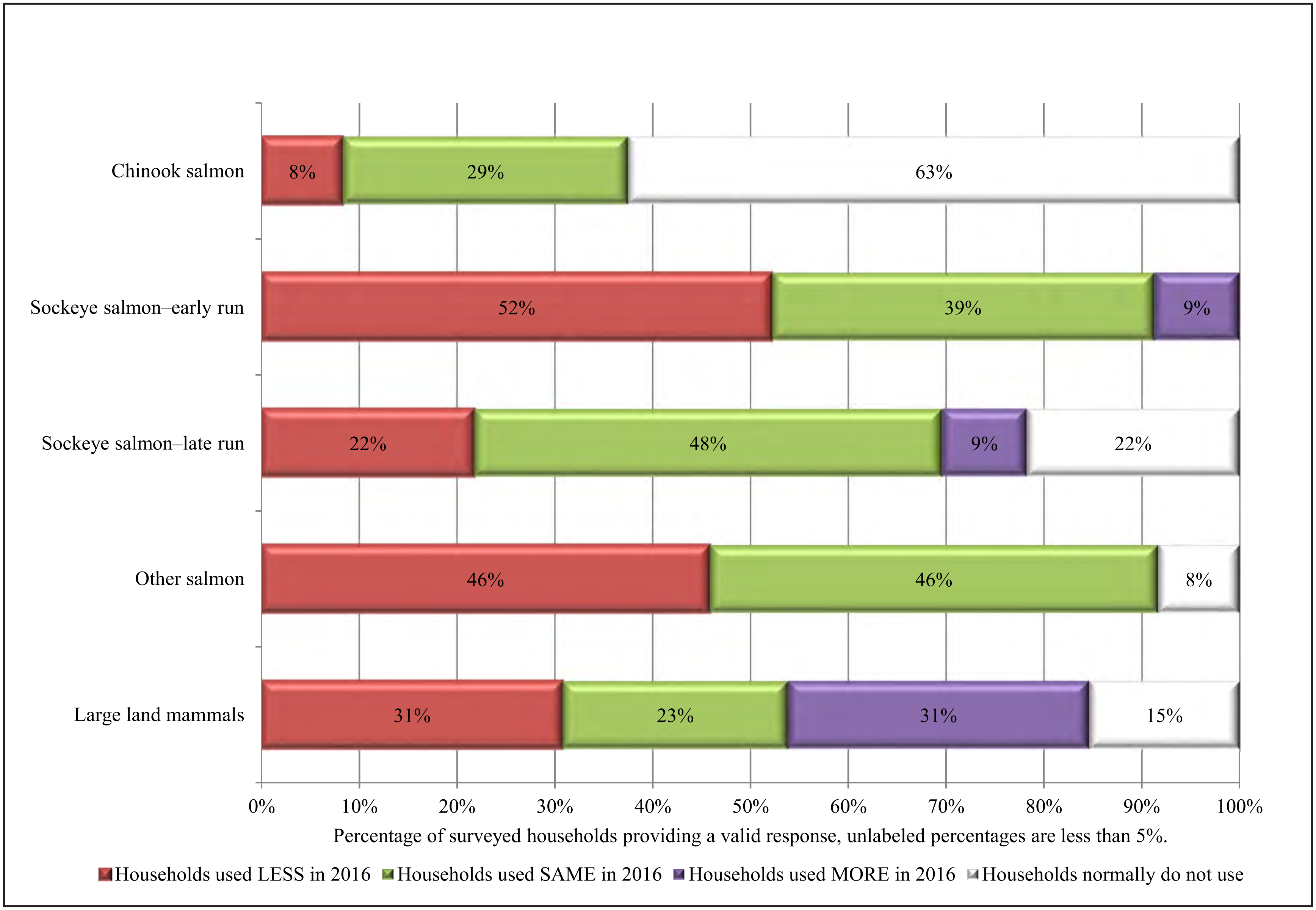

Figure 3-7.–Changes in household uses of resources compared to recent years, Perryville, 2016.

Table 3-19.–Changes in household uses of resources compared to recent years, Perryville, 2016.

Resource	Sampled households	Valid responses[a]	Households reporting use: Total households Number	Total households Percentage	Less Number	Less Percentage	Same Number	Same Percentage	More Number	More Percentage	Households not using Number	Households not using Percentage
Chinook salmon	26	24	9	37.5%	2	8.3%	7	29.2%	0	0.0%	15	62.5%
Sockeye salmon–early run	26	23	23	100.0%	12	52.2%	9	39.1%	2	8.7%	0	0.0%
Sockeye salmon–late run	26	23	18	78.3%	5	21.7%	11	47.8%	2	8.7%	5	21.7%
Other salmon	26	24	22	91.7%	11	45.8%	11	45.8%	0	0.0%	2	8.3%
Large land mammals	26	26	22	84.6%	8	30.8%	6	23.1%	8	30.8%	4	15.4%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-20.–Reasons for less household uses of resources compared to recent years, Perryville, 2016.

Resource	Valid responses[a]	Households reporting reasons for less use	Family/ personal Number	Family/ personal Percentage	Resources less available Number	Resources less available Percentage	Too far to travel Number	Too far to travel Percentage	Lack of equipment Number	Lack of equipment Percentage	Less sharing Number	Less sharing Percentage	Lack of effort Number	Lack of effort Percentage	Unsuccessful Number	Unsuccessful Percentage	Weather/ environment Number	Weather/ environment Percentage
Chinook salmon	24	2	0	0.0%	0	0%	0	0.0%	0	0%	1	50%	1	50%	0	0.0%	0	0.0%
Sockeye salmon–early run	23	11	0	0.0%	3	27%	0	0.0%	0	0%	1	9%	1	9%	0	0.0%	1	9.1%
Sockeye salmon–late run	23	4	0	0.0%	2	50%	0	0.0%	0	0%	0	0%	0	0%	0	0.0%	1	25.0%
Other salmon	24	11	0	0.0%	5	45%	0	0.0%	0	0%	2	18%	0	0%	1	9.1%	3	27.3%
Large land mammals	26	8	0	0.0%	0	0%	0	0.0%	0	0%	2	25%	0	0%	2	25.0%	0	0.0%

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Table 3-20.–Continued.

Resource	Valid responses[a]	Households reporting reasons for less use	Other reasons Number	Other reasons Percentage	Working/ no time Number	Working/ no time Percentage	Regulations Number	Regulations Percentage	Resource small or diseased Number	Resource small or diseased Percentage	Did not need Number	Did not need Percentage	Gas/equipment too expensive Number	Gas/equipment too expensive Percentage	Used other resources Number	Used other resources Percentage	Competition Number	Competition Percentage
Chinook salmon	24	2	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	23	11	1	9.1%	4	36%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	23	4	0	0.0%	1	25%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	24	11	0	0.0%	1	9%	0	0.0%	0	0.0%	1	9.1%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	26	8	1	12.5%	2	25%	3	37.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-21.–Reasons for more household uses of resources compared to recent years, Perryville, 2016.

Resource	Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Weather		Received more		Needed more		Increased effort		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	23	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	2	100.0%	0	0.0%
Sockeye salmon–late run	23	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%
Other salmon	24	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	26	8	0	0.0%	0	0.0%	0	0.0%	1	12.5%	1	12.5%	0	0.0%	0	0.0%

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Table 3-21.–Continued.

Resource	Valid responses[a]	Households reporting reasons for more use	Regulations		Went farther		More success		Had more time		Store-bought too expensive		Got/fixed equipment		Substitute for unavaialable resource(s)	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	23	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	23	2	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	24	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	26	8	6	75.0%	0	0.0%	1	12.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

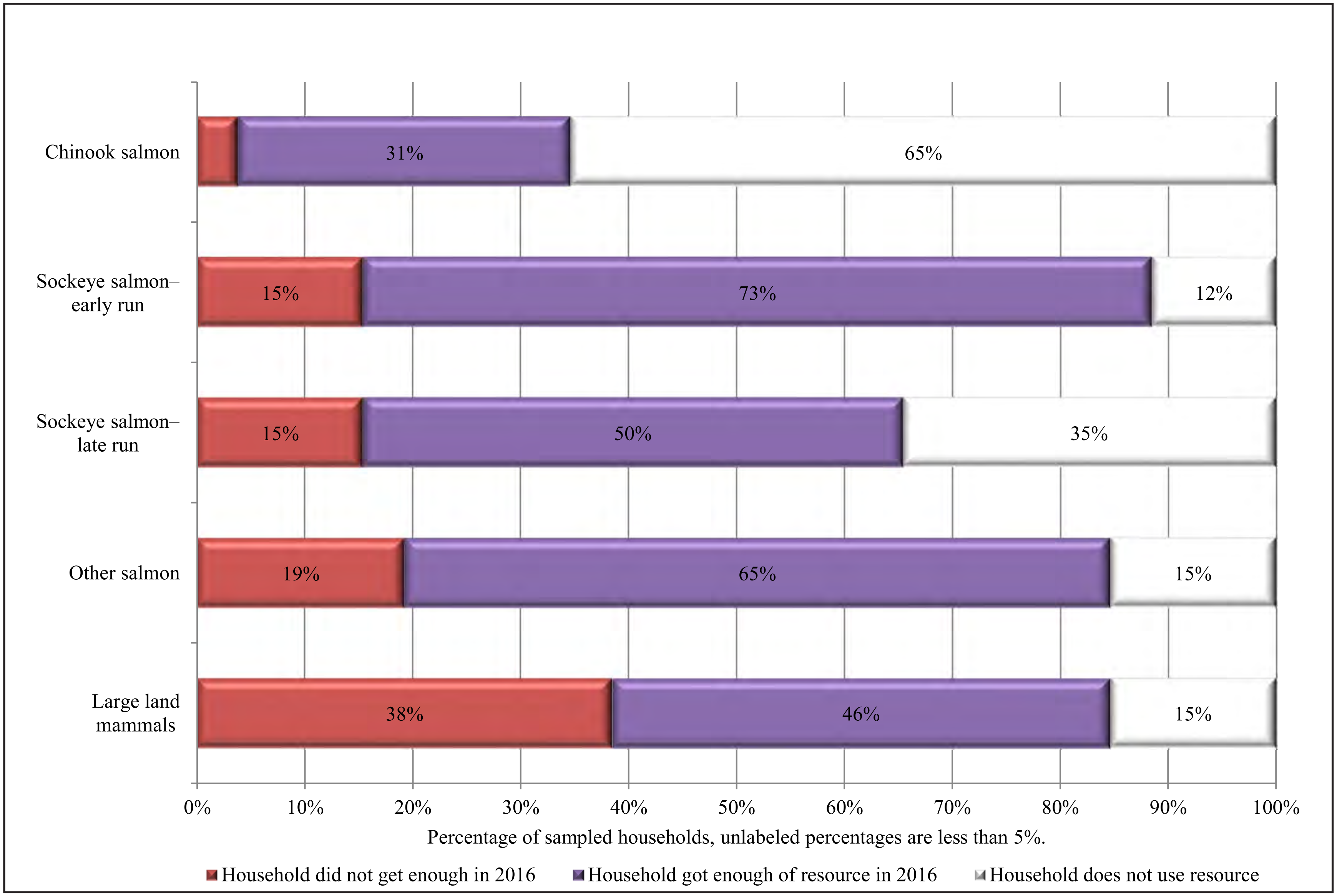

Figure 3-8.–Percentage of sampled households reporting whether they had enough resources, Perryville, 2016.

Table 3-22.–Reported impact to households reporting that they did not get enough of a type of resource, Perryville, 2016.

		Households not getting enough _______ .				Impact to those not getting enough ______ .									
	Sampled	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
Resource	households	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	26	9	34.6%	1	11.1%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	26	23	88.5%	4	17.4%	1	25.0%	0	0.0%	2	50.0%	1	25.0%	0	0.0%
Sockeye salmon–late run	26	17	65.4%	4	23.5%	1	25.0%	1	25.0%	1	25.0%	1	25.0%	0	0.0%
Other salmon	26	22	84.6%	5	22.7%	0	0.0%	1	20.0%	2	40.0%	2	40.0%	0	0.0%
Large land mammals	26	22	84.6%	10	45.5%	0	0.0%	1	10.0%	4	40.0%	2	20.0%	3	30.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-23.–Things households reported doing differently as the result of not getting enough of a resource, Perryville, 2016.

	Valid	Bought/bartered		Used more commercial foods		Used other subsistence foods		Asked others for help		Increased effort	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	1	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	3	0	0.0%	2	66.7%	1	33.3%	0	0.0%	0	0.0%
Sockeye salmon–late run	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
Other salmon	5	0	0.0%	2	40.0%	3	60.0%	0	0.0%	1	20.0%
Large land mammals	7	0	0.0%	7	100.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-23.–Continued.

	Valid	Made do without		Ate elsewhere		Got public assistance		Got a job		Other	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	5	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	7	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

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

Table 3-24.–Salmon resources that sampled households reported needing, Perryville, 2016.

Resource	Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
Chinook salmon	1	10.0	10.0
Sockeye salmon–early run	3	430.0	143.3
Sockeye salmon–late run	3	172.0	57.3
Other salmon	5	525.0	105.0

Source ADF&G Division of Subsistence household surveys, 2017.

Salmon needed by responding households that did not get enough ranged from 10 Chinook salmon (10 salmon for the household in need) to 430 early-run sockeye salmon (143 salmon per household in need) (Table 3-24).

Port Heiden

Approximately one-third (29%–35%) of the Port Heiden households that answered questions about changes to use of salmon resources in 2016 indicated less use of each species in the study year compared to the previous five years, but about one-third (30%) of households that provided an assessment about using other salmon indicated more use of those species (Figure 3-9). Sockeye salmon use was reported by 23 households out of 28 that answered the assessment questions: 8 responding households (29%) used fewer fish compared to recent years, 11 (39%) used the same amount, 4 (14%) used more, and 5 (18%) did not use the resource (Table 3-25). The top three reasons for less use of sockeye salmon were less resource availability (two responses), working/no time (two responses), and did not need the resource (two responses) (Table 3-26). Reported reasons for using more sockeye salmon were increased availability, needed more, received/fixed equipment, and another or unspecified reason (one response each) (Table 3-27).

For 2016, there were 26 households that provided assessments about using Chinook salmon, of which 9 (35%) used less of this resource, 8 (31%) used the same amount, and 2 (8%) used more compared to recent years (Table 3-25). Twenty-seven percent of responding households did not use the resource. Of the households that used less, the top three reasons why included: resources less available (three responses), working/no time (two responses), and lack of effort (two responses) (Table 3-26). Other reasons included less sharing, regulations, did not need, and other or unspecified reason (one response each). Two households said they used more Chinook salmon in 2016, and provided reasons why included that the household received more (one response) and received/fixed equipment (one response) (Table 3-27).

In Port Heiden, 22 (82%) of 27 responding households used other salmon (Table 3-25). Of the households that provided assessments, nine (33%) used fewer fish, five (19%) used the same amount, and eight (30%) used more than in recent years. All nine households that reported less use provided a reason why, and the top reasons included: lack of equipment (four responses) and working/no time (three responses) (Table 3-26). All eight households that used more other salmon provided a reason why, and the most cited reason was increased effort (four responses) (Table 3-27).

With the exception of Chinook salmon, the majority of sampled Port Heiden households had enough salmon resources in 2016 (Figure 3-10). About one-third (31%) of the sampled households did not have enough Chinook salmon and one-third (34%) had enough Chinook salmon. The impact on the households that did not have enough sockeye salmon was major (one response) or minor (two responses) (Table 3-28). Those three households that did not have enough sockeye salmon used more commercial foods (two responses), used other subsistence foods (one response), asked others for help (one response), and made do without (one response) (Table 3-29).

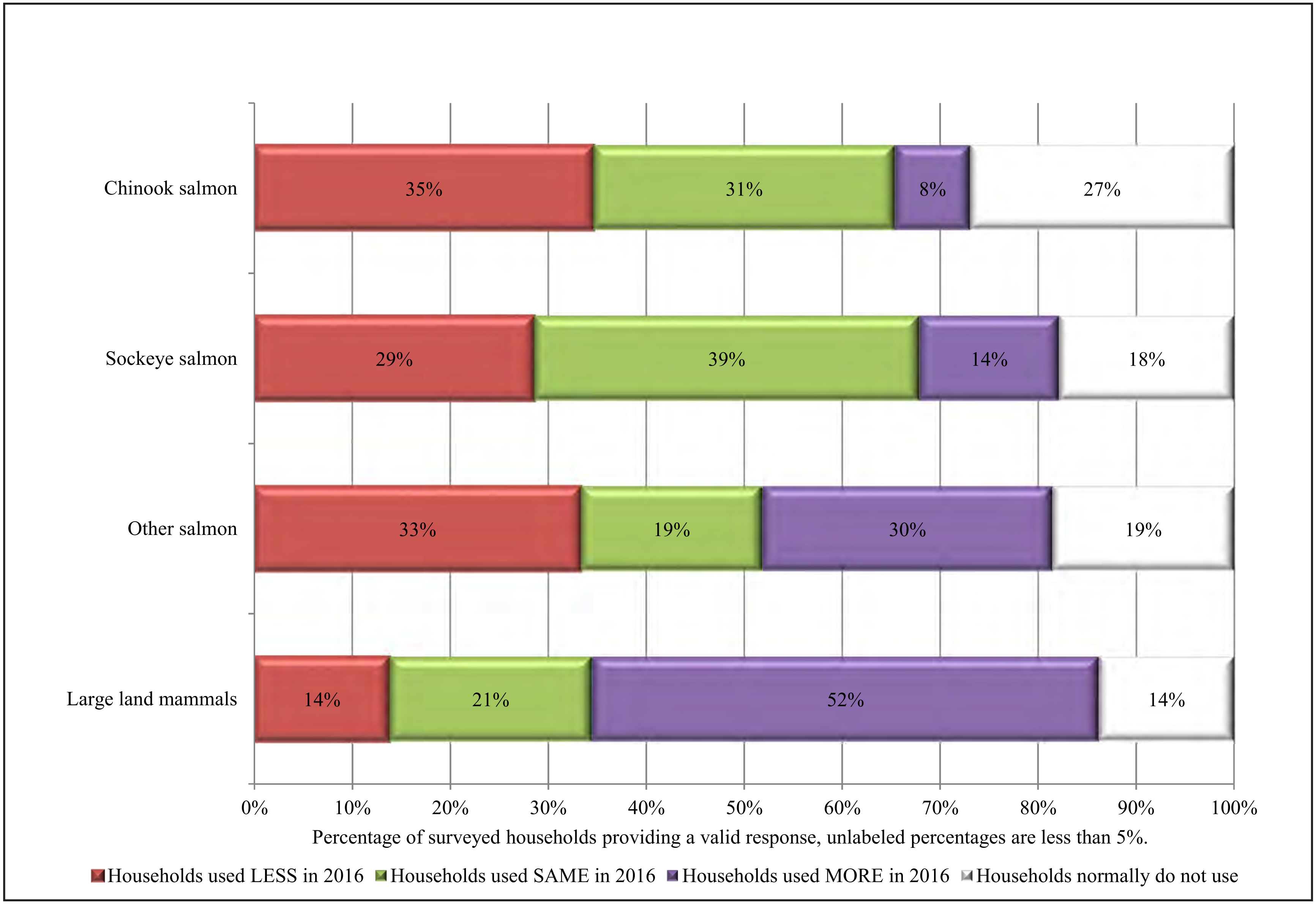

Figure 3-9.–Changes in household uses of resources compared to recent years, Port Heiden, 2016.

Table 3-25.–Changes in household uses of resources compared to recent years, Port Heiden, 2016.

			Households reporting use								Households not using	
	Sampled	Valid	Total households		Less		Same		More			
Resource	households	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	29	26	19	73.1%	9	34.6%	8	30.8%	2	7.7%	7	26.9%
Sockeye salmon	29	28	23	82.1%	8	28.6%	11	39.3%	4	14.3%	5	17.9%
Other salmon	29	27	22	81.5%	9	33.3%	5	18.5%	8	29.6%	5	18.5%
Large land mammals	29	29	25	86.2%	4	13.8%	6	20.7%	15	51.7%	4	13.8%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-26.–Reasons for less household uses of resources compared to recent years, Port Heiden, 2016.

	Valid	Households reporting reasons for	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
Resource	responses[a]	less use	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	26	9	0	0.0%	3	33%	0	0.0%	0	0%	1	11%	2	22%	0	0.0%	0	0.0%
Sockeye salmon	28	7	1	14.3%	2	29%	0	0.0%	0	0%	0	0%	1	14%	0	0.0%	1	14.3%
Other salmon	27	9	0	0.0%	1	11%	0	0.0%	4	44%	1	11%	0	0%	0	0.0%	0	0.0%
Large land mammals	29	4	0	0.0%	0	0%	1	25.0%	0	0%	1	25%	0	0%	1	25.0%	0	0.0%

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Table 3-26.–Continued.

	Valid	Households reporting reasons for	Other reasons		Working/ no time		Regulations		Resource small or diseased		Did not need		Gas/equipment too expensive		Used other resources		Competition	
Resource	responses[a]	less use	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	26	9	1	11.1%	2	22%	1	11.1%	0	0.0%	1	11.1%	0	0.0%	**0**	0.0%	0	0.0%
Sockeye salmon	28	7	0	0.0%	2	29%	0	0.0%	0	0.0%	2	28.6%	0	0.0%	**0**	0.0%	0	0.0%
Other salmon	27	9	0	0.0%	3	33%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	11.1%	0	0.0%
Large land mammals	29	4	0	0.0%	0	0%	1	25.0%	1	25.0%	1	25.0%	0	0.0%	**0**	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-27.–Reasons for more household uses of resources compared to recent years, Port Heiden, 2016.

Resource	Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Weather		Received more		Needed more		Increased effort		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	26	2	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	28	4	1	25.0%	0	0.0%	0	0.0%	0	0.0%	1	25.0%	0	0.0%	1	25.0%
Other salmon	27	8	1	12.5%	2	25.0%	0	0.0%	0	0.0%	0	0.0%	4	50.0%	1	12.5%
Large land mammals	29	15	0	0.0%	0	0.0%	0	0.0%	4	26.7%	0	0.0%	0	0.0%	0	0.0%

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Table 3-27.–Continued.

Resource	Valid responses[a]	Households reporting reasons for more use	Regulations		Went farther		More success		Had more time		Store-bought too expensive		Got/fixed equipment		Substitute for unavaialable resource(s)	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	26	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Sockeye salmon	28	4	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	25.0%	0	0.0%
Other salmon	27	8	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	29	15	11	73.3%	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, 2017.

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

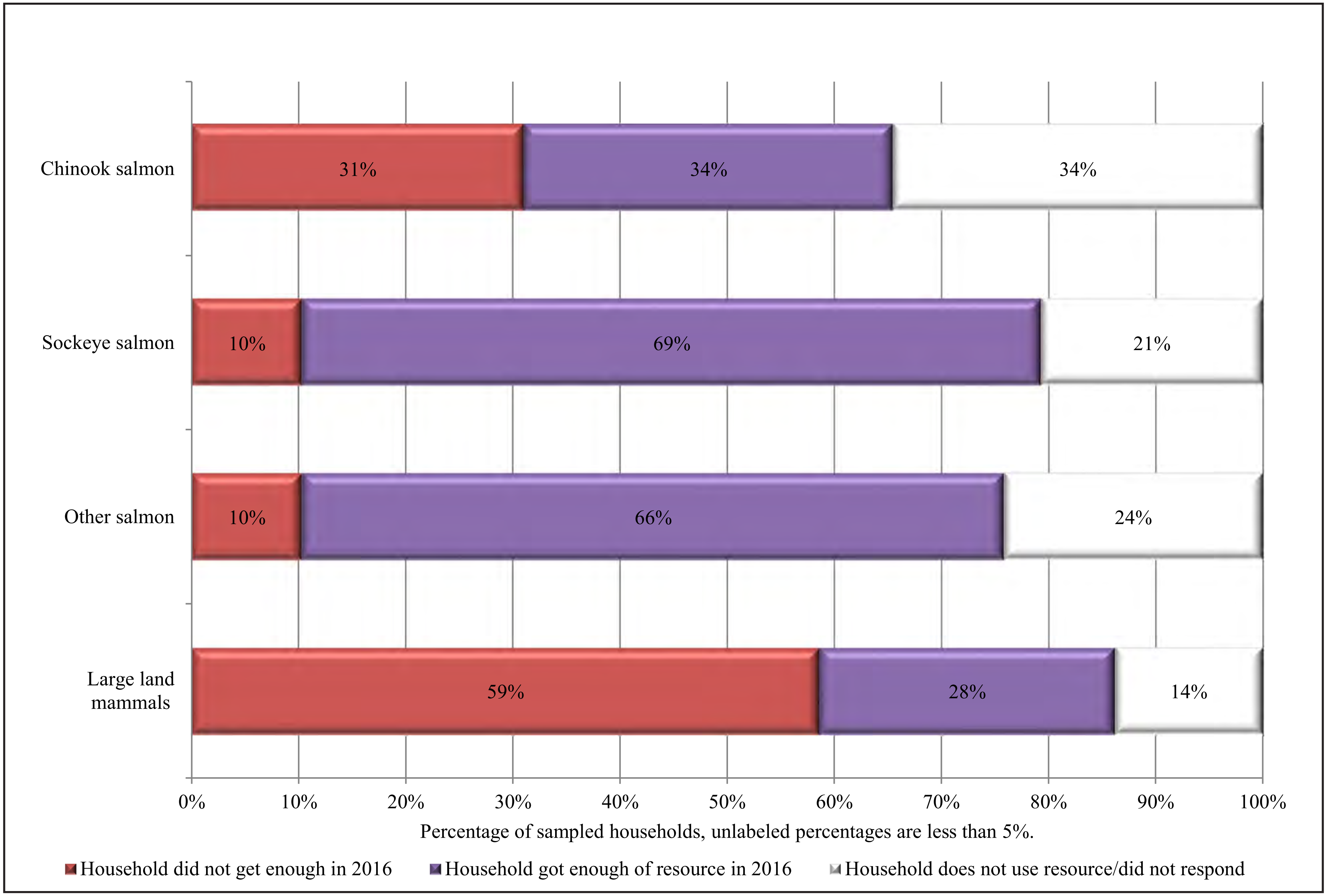

Figure 3-10.–Percentage of sampled households reporting whether they had enough resources, Port Heiden, 2016.

Table 3-28.–Reported impact to households reporting that they did not get enough of a type of resource, Port Heiden, 2016.

		Households not getting enough _______ .				Impact to those not getting enough ______ .									
	Sampled	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
Resource	households	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	29	19	65.5%	9	47.4%	1	11.1%	1	11.1%	4	44.4%	3	33.3%	0	0.0%
Sockeye salmon	29	23	79.3%	3	13.0%	0	0.0%	0	0.0%	2	66.7%	1	33.3%	0	0.0%
Other salmon	29	22	75.9%	3	13.6%	0	0.0%	1	33.3%	2	66.7%	0	0.0%	0	0.0%
Large land mammals	29	25	86.2%	17	68.0%	1	5.9%	1	5.9%	6	35.3%	8	47.1%	1	5.9%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-29.–Things households reported doing differently as the result of not getting enough of a resource, Port Heiden, 2016.

	Valid	Bought/bartered		Used more commercial foods		Used other subsistence foods		Asked others for help		Increased effort	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	7	0	0.0%	3	42.9%	6	85.7%	0	0.0%	0	0.0%
Sockeye salmon	3	0	0.0%	2	66.7%	1	33.3%	1	33.3%	0	0.0%
Other salmon	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	16	0	0.0%	10	62.5%	5	31.3%	0	0.0%	0	0.0%

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Table 3-29.–Continued.

	Valid	Made do without		Ate elsewhere		Got public assistance		Got a job		Other	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	7	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	16	2	12.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

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

Table 3-30.–Salmon resources that sampled households reported needing, Port Heiden, 2016.

Resource	Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
Chinook salmon	9	170.0	18.9
Sockeye salmon	3	260.0	86.7
Other salmon	3	79.0	26.3

Source ADF&G Division of Subsistence household surveys, 2017.

Out of 19 responding households, 9 households reported that they did not get enough Chinook salmon in 2016 (Table 3-28). Three households said the impact of not getting enough Chinook salmon was major, four indicated the impact was minor, and one household indicated it was not noticeable. Seven households explained that they used other subsistence foods (six responses) and used more commercial foods (three responses) as a result of not getting enough Chinook salmon (Table 3-29).

Two households reported that the impact of not having enough other salmon was minor, and one household indicated it was not noticeable (Table 3-28). Due to not getting enough of the other salmon species, one household used more commercial foods (Table 3-29).

The amount of sockeye salmon needed averaged 87 fish by three households in need of this resource (Table 3-30). On average 19 Chinook salmon were needed by 9 households, and 26 other salmon were needed on average, as indicated by 3 households.

Egegik

In 2016, of the Egegik households that answered questions about changes to salmon use, a higher proportion (28%–44%) used the same amount of the salmon resources compared to the previous five years than the proportion (17%–22%) that used less of the salmon resources (Figure 3-11). Few responding households used more of any salmon resource. Of the five species of salmon harvested by Egegik households, sockeye salmon was harvested by the most households (Table 2-24). Forty-four percent of responding households explained that they used the same amount of sockeye salmon in 2016 as they did in previous years, 17% reported that they used less, and 6% used more (Table 3-31). Fewer households reported using Chinook salmon, but of the 18 households that responded to the question, 28% indicated they used the same amount of Chinook salmon, 22% explained that they used less, and no households said that they used more. While coho salmon was one of the most harvested species in Egegik, survey respondents were asked about their use of other salmon—coho, chum, and pink salmon together. In 2016, 33% of responding households used the same amount of other salmon as in previous years, 22% indicated that they used less, and 6% explained that they used more. When asked why they used the salmon resources less, respondents provided several reasons. One-third of respondents who used fewer sockeye salmon indicated it was due to less sharing, no need for the resource, family or personal reasons, or other reasons (Table 3-32). Households that used fewer Chinook salmon gave similar reasons: one-quarter of households indicated it was due to less sharing, no need for the resource, resources less available, or other reasons. For respondents who used fewer other salmon, 75% indicated it was due to a lack of effort and 25% responded it was because they were working/had no time. For those two households that used more salmon in the study year, indicated reasons for increased use were that the household had more time (sockeye salmon) and increased harvest effort (other salmon) (Table 3-33).

In Egegik, 5% of sampled respondents stated that they did not get enough sockeye salmon, 15% said they did not get enough other salmon, and 20% stated that they did not get enough Chinook salmon (Figure 3-12). The household that did not get enough sockeye salmon indicated no noticeable impact to the household (Table 3-34). For the four households that did not have enough Chinook salmon, 25% said it was not noticeable, that there was a minor impact, or that there was a major impact, and 25% did not provide this assessment. Households that did not get enough other salmon described the impact as not noticeable

(33%) or major (33%), and 33% of households did not provide this assessment. When asked what they did differently as a result of not getting enough fish, households' responses were either that they used more commercial foods (100% for the household not getting enough sockeye salmon and 50% of households that answered the question for other salmon) or that they used other subsistence foods (100% of households that answered the question for Chinook salmon and 100% of households that answered the question for other salmon) (Table 3-35). Combined responses from households that provided a response when asked how many fish were needed ranged from 23 Chinook salmon (8 salmon per household in need) to 40 sockeye salmon (40 for 1 household in need) to 435 other salmon (218 fish per household in need) (Table 3-36).

Large Land Mammals

The context within which households provided assessments regarding changes to use of large land mammals is important to note alongside the following results from the survey questions, particularly in relation to households citing regulations as a reason for changes to use of large land mammals. In the decade prior to 2016, caribou hunting in Game Management Unit (GMU) 9E—the area accessible to all of the study communities—was closed for hunting due to low numbers of caribou during these years (Harper and McCarthy 2015:4-2). By the 2016–2017 regulatory year, the herd had grown sufficiently for the Alaska Board of Game to authorize a Tier II permit subsistence caribou hunt in GMUs 9E and 9C, and 198 permits were issued in the 2016–2017 regulatory year.[1] More information about caribou hunting regulations in this GMU was provided in Chapter 2 (see "Comparing Harvests and Uses in 2016 with Previous Years, Harvest Data, Large Land Mammals").

Chignik Bay

All 24 surveyed Chignik Bay households answered questions about changes to use of large land mammals, although one-quarter (25%) indicated these resources were not used (Figure 3-1). In 2016, 17% of responding households (four responses) explained that they used the same amount of large land mammals as they did in recent previous years, 29% (seven) reported less use, and also 29% (seven) used more (Table 3-1). When asked why household use was less, most responding households (86%) indicated it was due to less sharing (or they did not receive as much as they had in recent years) (Table 3-2). In addition, there was one response (14%) for each of the following reasons why use was less: family or personal reasons, resources less available, lack of effort, and weather or environmental factors. Seven households reported reasons for more use of large land mammals and 57% of respondents cited regulations, 29% said they received more, and 14% claimed more success (Table 3-3). In Chignik Bay, 38% of sampled respondents did not get enough large land mammals (Figure 3-2). When nine households that did not get enough large land mammals were asked to evaluate the impact of not getting enough, 44% described it as not noticeable, 11% described the impact as minor, 33% explained that not getting enough had a major effect on the household, and 11% stated that the impact was severe (Table 3-4). Households that did not get enough large land mammals compensated by using more commercial foods (75% of responding households), using other subsistence foods (25%), and making do without these resources (13%) (Table 3-5).

1. *Caribou Hunting in Alaska: Harvest Statistics*, s.v. "[Year] 2016; [Hunt] Tier II; Hunt # TC505" (by Alaska Department of Fish and Game), http://www.adfg.alaska.gov/index.cfm?adfg=caribouhunting.harvest (accessed November 2019).

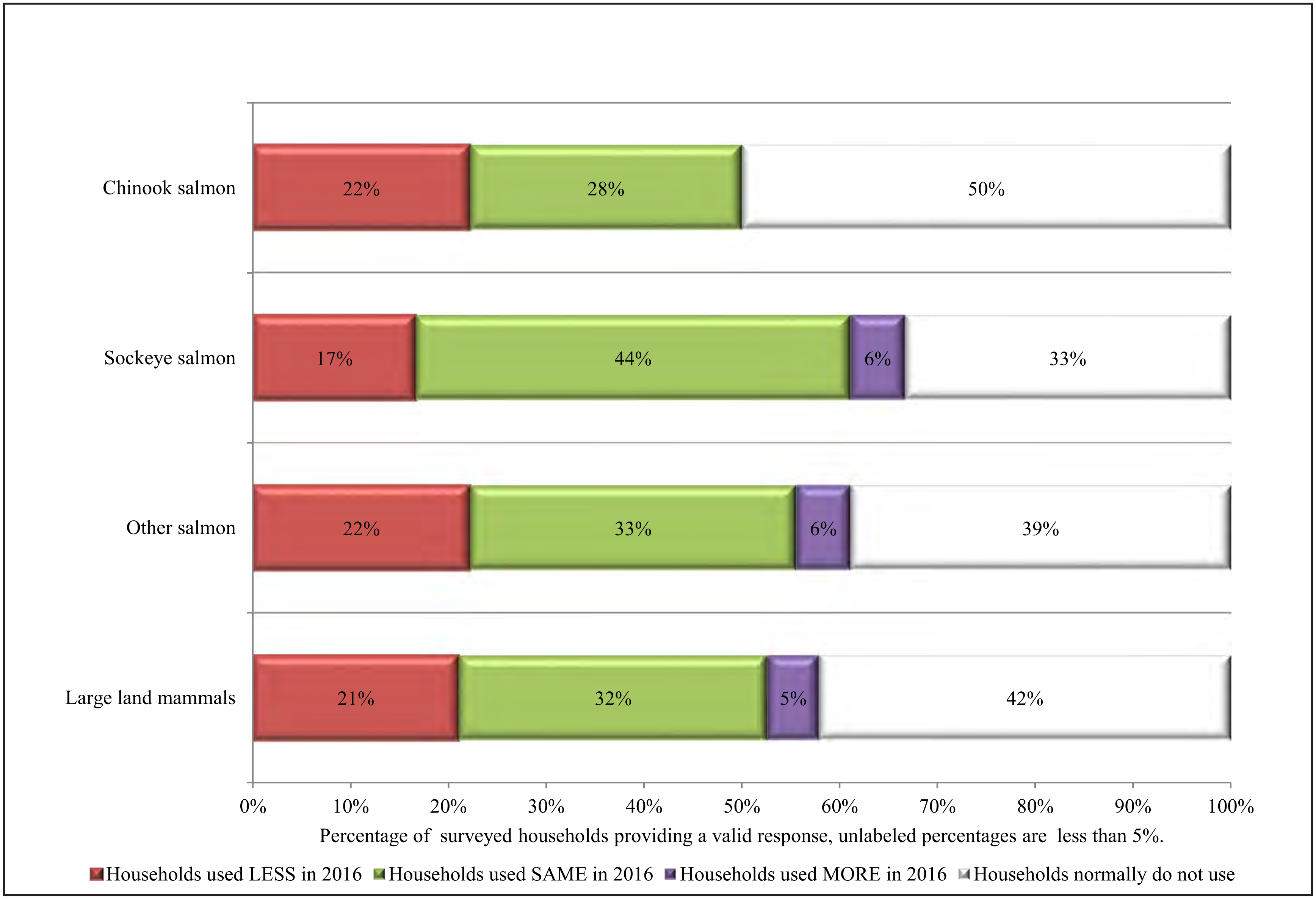

Figure 3-11.–Changes in household uses of resources compared to recent years, Egegik, 2016.

Table 3-31.–Changes in household uses of resources compared to recent years, Egegik, 2016.

			Households reporting use								Households not using	
			Total households		Less		Same		More			
Resource	Sampled households	Valid responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	18	9	50.0%	4	22.2%	5	27.8%	0	0.0%	9	50.0%
Sockeye salmon	20	18	12	66.7%	3	16.7%	8	44.4%	1	5.6%	6	33.3%
Other salmon	20	18	11	61.1%	4	22.2%	6	33.3%	1	5.6%	7	38.9%
Large land mammals	20	19	11	57.9%	4	21.1%	6	31.6%	1	5.3%	8	42.1%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-32.–Reasons for less household uses of resources compared to recent years, Egegik, 2016.

			Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
Resource	Valid responses[a]	Households reporting reasons for less use	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	18	4	0	0.0%	1	25%	0	0.0%	0	0%	1	25%	0	0%	0	0.0%	0	0.0%
Sockeye salmon	18	3	1	33.3%	0	0%	0	0.0%	0	0%	1	33%	0	0%	0	0.0%	0	0.0%
Other salmon	18	4	0	0.0%	0	0%	0	0.0%	0	0%	0	0%	3	75%	0	0.0%	0	0.0%
Large land mammals	19	3	0	0.0%	2	67%	0	0.0%	1	33%	1	33%	0	0%	1	33.3%	0	0.0%

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Table 3-32.–Continued.

			Other reasons		Working/ no time		Regulations		Resource small or diseased		Did not need		Gas/equipment too expensive		Used other resources		Competition	
Resource	Valid responses[a]	Households reporting reasons for less use	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	18	4	1	25.0%	0	0%	0	0.0%	0	0.0%	1	25.0%	0	0.0%	**0**	0.0%	0	0.0%
Sockeye salmon	18	3	1	33.3%	0	0%	0	0.0%	0	0.0%	1	33.3%	0	0.0%	**0**	0.0%	0	0.0%
Other salmon	18	4	0	0.0%	1	25%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**0**	0.0%	0	0.0%
Large land mammals	19	3	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, 2017.

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

Table 3-33.–Reasons for more household uses of resources compared to recent years, Egegik, 2016.

Resource	Valid responses[a]	Households reporting reasons for more use	Increased availability		Used other resources		Weather		Received more		Needed more		Increased effort		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	18	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	18	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	18	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Large land mammals	19	1	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-33.–Continued.

Resource	Valid responses[a]	Households reporting reasons for more use	Regulations		Went farther		More success		Had more time		Store-bought too expensive		Got/fixed equipment		Substitute for unavaialable resource(s)	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	18	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	18	1	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	18	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	19	1	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, 2017.

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

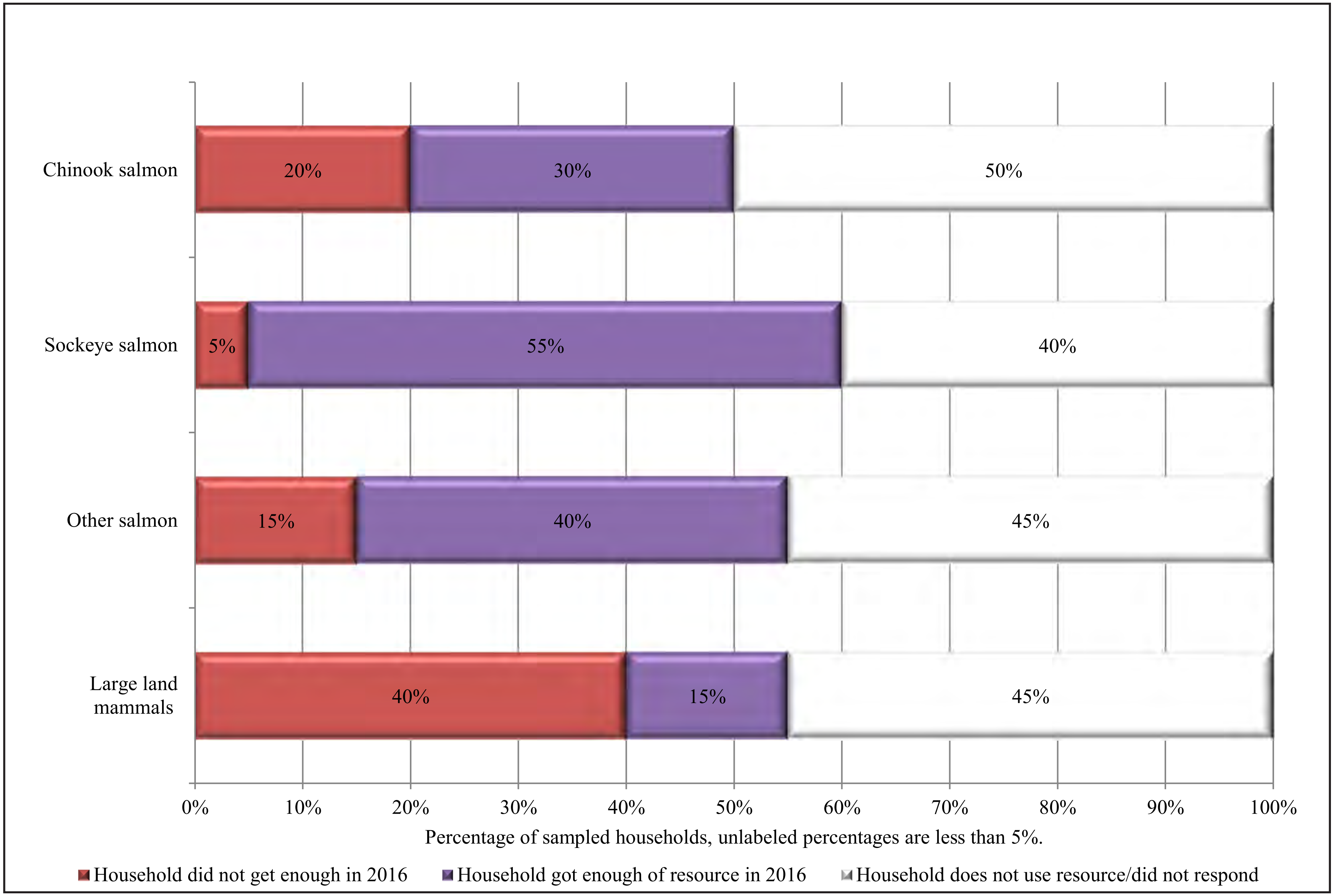

Figure 3-12.–Percentage of sampled households reporting whether they had enough resources, Egegik, 2016.

Table 3-34.–Reported impact to households reporting that they did not get enough of a type of resource, Egegik, 2016.

		Households not getting enough ______ .				Impact to those not getting enough ______ .									
	Sampled	Valid responses[a]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
Resource	households	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	10	50.0%	4	40.0%	1	25.0%	1	25.0%	1	25.0%	1	25.0%	0	0.0%
Sockeye salmon	20	12	60.0%	1	8.3%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	20	11	55.0%	3	27.3%	1	33.3%	1	33.3%	0	0.0%	1	33.3%	0	0.0%
Large land mammals	20	11	55.0%	8	72.7%	0	0.0%	2	25.0%	3	37.5%	1	12.5%	2	25.0%

Source ADF&G Division of Subsistence household surveys, 2017.

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

Table 3-35.–Things households reported doing differently as the result of not getting enough of a resource, Egegik, 2016.

	Valid	Bought/bartered		Used more commercial foods		Used other subsistence foods		Asked others for help		Increased effort	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	0	0.0%	0	0.0%	3	100.0%	0	0.0%	0	0.0%
Sockeye salmon	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	2	0	0.0%	1	50.0%	2	100.0%	0	0.0%	0	0.0%
Large land mammals	7	0	0.0%	5	71.4%	1	14.3%	0	0.0%	0	0.0%

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Table 3-35.–Continued.

	Valid	Made do without		Ate elsewhere		Got public assistance		Got a job		Other	
Resource	responses[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	7	1	14.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

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

Table 3-36.–Salmon resources that sampled households reported needing, Egegik, 2016.

Resource	Households needing	Total amount needed (Number of fish)	Average amount needed (Number of fish)
Chinook salmon	3	23.0	7.7
Sockeye salmon	1	40.0	40.0
Other salmon	2	435.0	217.5

Source ADF&G Division of Subsistence household surveys, 2017.

Chignik Lagoon

In Chignik Lagoon, 65% of responding households (13 responses) explained that in 2016 their use of large land mammals was reduced compared to recent previous years, 15% (3) reported using the same amount, and no respondents said they used more (Figure 3-3; Table 3-7). All households that indicated less use of these resources provided at least one reason why: more respondents (38%) said it was due to resources being less available compared to any other cited reason (Table 3-8). Also, 31% of respondents cited less sharing, 23% said they were unsuccessful or attributed less use to restrictive regulations, and 8% said they used less due to working/no time to harvest or a family/personal situation. In Chignik Lagoon, 65% of sampled respondents did not get enough large land mammals (Figure 3-4). When 13 households that did not get enough large land mammals were asked to evaluate the impact of not getting enough, 46% described it as major, 39% described it as minor, 8% indicated the impact was severe, and 8% said it was not noticeable (Table 3-10). Households that did not get enough large land mammals compensated by using more commercial foods (91% of responding households), using other subsistence foods (27%), and 9% said they made do without or gave another or unspecified response (Table 3-11).

Chignik Lake

For 2016, less use of large land mammals compared to recent previous years was indicated by 35% of responding Chignik Lake households (nine responses), 35% (nine responses) reported using the same amount, and 23% (six responses) said they used more (Figure 3-5; Table 3-13). There were nine households that provided reasons for less use of large land mammals and the top two reasons were each cited by 33% of respondents: resources were less available and family/personal situation (Table 3-14). Also, a variety of other reasons were each cited by 11% of respondents: lack of equipment, less sharing, unsuccessful harvest effort, weather/environment, regulations, fuel and supplies were too expensive, and did not need large land mammals. Five households reported reasons for why they used more large land mammals in 2016 compared to recent prior years, and reasons provided included: increased effort (40%), received more (20%), regulations (20%), and had more time available to hunt (20%) (Table 3-15). In Chignik Lake, 64% of sampled respondents did not get enough large land mammals (Figure 3-6). Out of 18 households that did not get enough large land mammals, 56% described the impact as major, 22% described it as minor, 6% indicated it was severe, and 6% indicated that not having enough large land mammals was not noticeable (Table 3-16). Most (86%) of the responding households said they compensated by using more commercial foods, 7% said they made do without, and 7% said they asked others for help (Table 3-17).

Perryville

Of those Perryville households that provided an assessment about changes to their use of large land mammals, 31% (eight responses) reported less use in 2016, and, conversely, 31% (eight responses) said they used more; also, 23% (six responses) said they used about the same amount as in recent years (Figure 3-7; Table 3-19). Out of eight households, more (38%) said less use was due to regulations than any other reason; also, 25% said less sharing, 25% indicated unsuccessful hunting, and 25% said working/no time was the reason, and 13% gave another or unspecified reason (Table 3-20). Six out of eight households (75%) reported the main reason for more use of large land mammals was due to regulations (Table 3-21).

Other reasons—each cited by one respondent (13%)—for increased use included: received more, needed more, and more success. When households that did not get enough large land mammals were asked to evaluate the impact to their household of not getting enough, 30% (three responses) described it as severe, 20% (two responses) described the impact as major, 20% (two responses) indicated it was minor, and 10% (one response) said it was not noticeable (Table 3-22). There were seven households that described what they did after not having enough large land mammals: all respondents (100%) said they compensated by using more commercial foods (Table 3-23).

Port Heiden

Twenty-nine responses about large land mammal use in Port Heiden indicated that 14% of households (4 responses) experienced less use of large land mammals compared to recent years, 21% (6 responses) used the same amount, 52% (15 responses) used more, and 14% (4 responses) did not use large land mammals (Figure 3-9; Table 3-25). Cited reasons for why use was less, provided by four households, were equally distributed among too far to travel, less sharing, unsuccessful harvest effort, regulations, resource too small or diseased, and did not need the resource (one response each) (Table 3-26). Regulations was by far the biggest reason for more large land mammals use: 73% (11 responses) that used more indicated this reason (Table 3-27). More sharing was the other reason for increased use of large land mammals (four responses). Households were asked if they got enough large land mammals to meet their needs and the majority of sampled Port Heiden households did not have enough (Figure 3-10). Out of 25 responding households, there were 17 (68%) that responded that they did not get enough, of which 1 household indicated the impact of not getting enough was severe, 8 indicated the impact was major, 6 characterized the impact as minor, and 1 said there was no noticeable impact (Table 3-28). Sixteen of the households that did not have enough large land mammals used more commercial food (10 responses), used other subsistence foods (5 responses), and made do without (2 responses) (Table 3-29).

Egegik

Despite no households harvesting large land mammals in 2016, one-half of the households in Egegik still used the resource (Table 2-24). Of the responding households, 32% explained that they used the same amount of large land mammals in 2016 as they did in recent previous years, 21% reported less use, and 5% used more (Figure 3-11; Table 3-31). Of the three responding households, 67% indicated that their use of large land mammals was less in 2016 due to the resources being less available; also, one-third (33%) each cited lack of equipment, less sharing, and unsuccessful hunting (Table 3-32). Receiving more shared resources was the only reason cited for increased use of large land mammals (Table 3-33). In Egegik, 40% of sampled respondents did not get enough large land mammals (Figure 3-12). The households that did not have enough large land mammals described the impact of the situation as not noticeable (25%), minor (38%), major (13%), or severe (Table 3-34). Households that did not get enough large land mammals compensated by using more commercial foods (71% of responding households), using other subsistence foods (14%), and making do without the resource (14%) (Table 3-35).

Other Assessments

Households were asked to assess whether their salmon fishing efforts or locations changed during the study years compared to usual activities, and also to share observations about local salmon stocks in terms of health, abundance, behavior, and escapement sufficiency. This section discusses responses to those questions. Note that 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.

Changes to Salmon Fishing Efforts and Locations

Households that fished for salmon were asked to identify what is their usual method for harvesting salmon resources, and if rod and reel was included in a household's response, an additional question asked why the household uses rod and reel. Fishing households were also asked whether they worked harder (e.g., spent more time fishing or took more trips to fish) than usual to get salmon resources, or traveled further than usual, or traveled to different locations. Depending on the assessment topic and study community, households were asked to provide these assessments about a variety of the following resources: sockeye salmon, early-run sockeye salmon, late-run sockeye salmon, spawning sockeye salmon, Chinook salmon, and other salmon (chum, coho, and pink salmon combined). Note that due to the significance of the two distinct sockeye salmon runs in the Chignik River watershed used by the study communities of Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville, as well as the importance of spawning sockeye salmon in these communities, some assessment questions asked about sockeye salmon in more detail to obtain distinct assessments for the sockeye salmon early run, sockeye salmon late run, or spawning sockeye salmon. Note that households could give more than one reason for increased effort or use of rod and reel, and could also cite multiple usual harvest methods.

Chignik Bay

Responding Chignik Bay households overall said seine is the most usual method used for harvesting all species of salmon: 8 of 13 households (62%) that fished for early-run and late-run sockeye salmon, and one-half of households (50%) that fished for Chinook salmon and other salmon, usually fish using a seine (Table 3-37). Few households that fished for spawning sockeye salmon answered the question, but seine was cited most. One household that usually harvests Chinook salmon by rod and reel indicated this gear type is easy to use (Table 3-37; Table 3-38).

Some households in Chignik Bay said they needed to work harder than usual in 2016 to get the salmon that they needed. Five households said that they had to work harder to get late-run sockeye salmon; also, there were two households that worked harder to harvest early-run sockeye salmon or Chinook salmon (Table 3-39). Of the households that had to work harder to get early-run sockeye salmon, resource availability and another or unspecified reason were the only explanations provided. For late-run sockeye salmon, reasons provided for working harder at harvesting included: resource availability (two responses), had to spend more time to harvest (two responses), and unfavorable weather (one response). One household reported traveling further, and one household went to different locations, to get enough early-run sockeye salmon (Table 3-40). Also, two households traveled further, and two households went to different locations, to get enough sockeye salmon from the late run.

Chignik Lagoon

Responding Chignik Lagoon fishing households overall said seine is their usual method for harvesting all salmon resources except for spawning sockeye salmon (Table 3-41). By resource, these are the percentages of fishing households that identified seine as the usual harvest method: Chinook salmon (91%), early-run sockeye salmon (71%), late-run sockeye salmon (59%), and other salmon (33%). Seine (12%), gillnet (12%), and rod and reel (12%) were identified equally as commonly used methods to fish for spawning sockeye salmon, or redfish. Chinook salmon is the species that garnered the most responses (46% of fishing households) indicating rod and reel fishing is a usual harvest method. All five responding households indicated a variety of reasons for using rod and reel to harvest Chinook salmon: 60% said it was for fun or for harvest selectivity, 40% indicated rod and reel fishing is easy, and 20% indicated gillnet mesh was too small so rod and reel is used (Table 3-42).

Most households in Chignik Lagoon said they did not need to work harder than usual in 2016 to get the salmon that they needed; however, a few said they did work harder to harvest early-run sockeye salmon (one household), late-run sockeye salmon (two households), and Chinook salmon (two households) (Table 3-43). For early-run sockeye salmon, one household had to put in more time fishing to get what they harvested. For late-run sockeye salmon, one household worked harder due to family or personal reasons and needed more time fishing. For Chinook salmon, one household needed more time fishing, and one household provided another or unspecified reason. In general, responding households did not travel further or to different locations to harvest salmon (Table 3-44).

Table 3-37.–Usual household harvest methods, salmon resources, Chignik Bay, 2016.

Resource	Households harvesting, or attempting to harvest	Remove from commercial catches		Seine		Gillnet		Rod and reel		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	6	1	16.7%	3	50.0%	1	16.7%	1	16.7%	0	0.0%
Sockeye salmon–early run	13	2	15.4%	8	61.5%	2	15.4%	0	0.0%	0	0.0%
Sockeye salmon–late run	13	0	0.0%	8	61.5%	0	0.0%	0	0.0%	1	7.7%
Spawning sockeye salmon	13	0	0.0%	2	15.4%	1	7.7%	0	0.0%	1	7.7%
Other salmon	4	0	0.0%	2	50.0%	0	0.0%	0	0.0%	1	25.0%

Source ADF&G Division of Subsistence household surveys, 2017.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-38.–Reasons for using a rod and reel or handline to harvest salmon, Chignik Bay, 2016.

Resource	Households using rod and reel	Households using handline	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	1	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
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%
Other salmon	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, 2017.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-39.–Households reporting that they worked harder to harvest salmon resources, Chignik Bay, 2016.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Family/personal		Resource availability		Unsuccessful		More time needed		Needed more of resource	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	5	3	2	0	0.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%
Sockeye salmon–early run	24	12	10	2	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	24	9	4	5	0	0.0%	2	40.0%	0	0.0%	2	40.0%	0	0.0%
Other salmon	24	3	3	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-39.–Continued.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Unfavorable weather		Small or diseased resources		Other reasons		No response	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	5	3	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	24	12	10	2	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Sockeye salmon–late run	24	9	4	5	1	20.0%	0	0.0%	0	0.0%	1	20.0%
Other salmon	24	3	3	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-40.–Households reporting that they traveled further or to different locations to fish for salmon resources, Chignik Bay, 2016.

Resource	Sampled households	Valid responses	Households reporting that they traveled further	Households reporting that they traveled to different locations
Chinook salmon	24	5	0	0
Sockeye salmon–early run	24	12	1	1
Sockeye salmon–late run	24	9	2	2
Other salmon	24	3	0	0

Source ADF&G Division of Subsistence household surveys, 2017.

Table 3-41.–Usual household harvest methods, salmon resources, Chignik Lagoon, 2016.

Resource	Households harvesting, or attempting to harvest	Remove from commercial catches		Seine		Gillnet		Rod and reel		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	11	2	18.2%	10	90.9%	2	18.2%	5	45.5%	0	0.0%
Sockeye salmon–early run	17	1	5.9%	12	70.6%	8	47.1%	0	0.0%	0	0.0%
Sockeye salmon–late run	17	0	0.0%	10	58.8%	4	23.5%	1	5.9%	0	0.0%
Spawning sockeye salmon	17	0	0.0%	2	11.8%	2	11.8%	2	11.8%	0	0.0%
Other salmon	6	1	16.7%	2	33.3%	1	16.7%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-42.–Reasons for using a rod and reel or handline to harvest salmon, Chignik Lagoon, 2016.

Resource	Households using rod and reel	Households using handline	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	5	0	0	0.0%	3	60.0%	1	20.0%	0	0.0%	2	40.0%	3	60.0%	0	0.0%
Sockeye salmon–early run	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	1	0	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Spawning sockeye salmon	2	0	0	0.0%	1	50.0%	0	0.0%	1	50.0%	1	50.0%	1	50.0%	1	50.0%
Other salmon	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, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-43.–Households reporting that they worked harder to harvest salmon resources, Chignik Lagoon, 2016.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Family/personal		Resource availability		Unsuccessful		More time needed		Needed more of resource	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	12	10	2	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Sockeye salmon–early run	20	15	14	1	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Sockeye salmon–late run	20	13	11	2	1	50.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Other salmon	20	4	4	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-43.–Continued.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Unfavorable weather		Small or diseased resources		Other reasons		No response	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	12	10	2	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Sockeye salmon–early run	20	15	14	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	20	13	11	2	0	0.0%	0	0.0%	0	0.0%	1	50.0%
Other salmon	20	4	4	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.
Note The sum of percentages may not be 100% because households were able to provide more than one answer.

Table 3-44.–Households reporting that they traveled further or to different locations to fish for salmon resources, Chignik Lagoon, 2016.

Resource	Sampled households	Valid responses	Households reporting that they traveled further	Households reporting that they traveled to different locations
Chinook salmon	20	12	0	0
Sockeye salmon–early run	20	15	0	1
Sockeye salmon–late run	20	13	1	1
Other salmon	20	4	0	0

Source ADF&G Division of Subsistence household surveys, 2017.

Chignik Lake

Fishing households in Chignik Lake overall said gillnet was their usual method for harvesting early-run (57%) and late-run (38%) sockeye salmon (Table 3-45). For spawning salmon, or redfish, the most usual harvest method identified by fishing households was divided between seine (5%) and gillnet (5%). For households that fished for Chinook salmon, 67% usually use a rod and reel; for other salmon, home pack (33%) and seine (33%) were equally identified as common harvest methods used. The majority of households using rod and reel or handline indicated those gear types are easy to use; following that reason, selectivity, conservation, fun, and tradition were the other reasons identified for using rod and reel or handline (Table 3-46).

Most households in Chignik Lake said they did not need to work harder than usual in 2016 to get the salmon that they needed; however, for early-run and late-run sockeye salmon, five households for each resource said they worked harder in 2016 (Table 3-47). Households that had to work harder to get early-run sockeye salmon said it was due to resource availability (three responses) and unfavorable weather (one response). The households that had to work harder to get late-run sockeye salmon provided the following explanations: needed to spend more time fishing (two responses), resource availability (one response), and another or unspecified reason (one response). Three households reported that they had to travel further, and five households had to travel to different locations to get the early-run sockeye salmon that they needed (Table 3-48). Also, six households said they had to travel further, and six households needed to travel to different locations, to get the late-run sockeye salmon that they needed. For harvesting other salmon, one household had to travel to different locations than usual.

Perryville

Fishing households in Perryville overall said gillnet was their usual method for harvesting early-run (63%) and late-run (37%) sockeye salmon, spawning sockeye salmon (21%), and other salmon (100%) (Table 3-49). For households that fished for Chinook salmon, usual methods of harvest were equally divided: commercial removal (43%), gillnet (43%), and rod and reel (43%). Seine use is usual mostly only for sockeye salmon resources: 21% of fishing households usually use seine to harvest both early-run and late-run sockeye salmon, and 11% use seine to harvest spawning sockeye salmon. Rod and reel is usually used to harvest all salmon species by less than one-half of fishing households. Use of rod and reel or handline was generally attributed to the fun of it, although one or two households also cited tradition, ease, and selectivity as reasons for pursuing varied salmon resources with rod and reel or handline (Table 3-50).

Six households said that they had had to work harder to get early-run sockeye salmon and, when asked why, most households (five) said they needed to spend more time getting the fish, and one household said the availability of early-run sockeye salmon was reduced (Table 3-51). Two households also reported having difficulty getting late-run sockeye salmon: one household had to spend more time fishing and the other household was unsuccessful when fishing. Also, six households said that they had to work harder to get other salmon. Most (three households) responded that they had to spend more time than normal to get these resources; also, two households said the weather was unfavorable, and one said resource availability was the reason for working harder to get other salmon in 2016. One household had to travel to different locations than usual to get early-run sockeye salmon, and one household needed to travel further to get late-run sockeye salmon (Table 3-52). In addition, two Perryville households reported that they had to travel further and two reported fishing in different locations in order to get enough other salmon in 2016.

Port Heiden

Forty percent or more of the Port Heiden households that fished for or harvested each salmon resource usually use gillnet as a harvest method, and no households usually use seine to harvest salmon (Table 3-53). The other gear category was noted as “hands” on the household surveys, and for several resources this was identified as a usual harvest method: Chinook salmon (six responses), spawning sockeye salmon (two responses), and other salmon (two responses). Sockeye salmon was the only species for which it is usual to bring harvests home from commercial catches for home use. Comparatively, rod and reel is usually used for harvesting other salmon more so than other methods. Households do not usually harvest Chinook salmon using rod and reel, but a few indicated generally fishing for sockeye salmon (three responses) and spawning sockeye salmon (four responses) using rod and reel. When asked why a household uses rod and reel to harvest salmon, the biggest reason cited for sockeye, spawning sockeye, and other salmon was fun (2, 3, and 11 responses, respectively) followed by ease and then other reasons, which included keeping children occupied, according to survey respondents (Table 3-54).

For each resource—Chinook, sockeye, and other salmon—the majority of the responding households that answered the assessment questions did not work harder than usual to harvest salmon (Table 3-55). Chinook salmon was the one resource for which more households had to expend increased harvest effort: 6 of 12 responding households worked harder and attributed the need to do so to resource availability (3 households) and more time needed for harvesting activities (2 households). Additionally, four responding households worked harder to get sockeye salmon due to more time needed for harvesting activities (three households) and needing more sockeye salmon (one household). Finally, one responding household worked harder to get other salmon and cited two reasons for why: resource availability and needed more time. Lastly, for Chinook and sockeye salmon, one household reported needing to travel further to harvest each resource, two households reported needing to go to different locations for harvesting Chinook salmon, and one household each reported the need to fish in different locations for sockeye and other salmon (Table 3-56).

Egegik

Gillnets are the usual method of harvesting salmon for Egegik households (Table 3-57). For sockeye salmon, of the households that fished, 86%—or all of the responding households—said gillnet was a usual harvest method. For harvesting other salmon, 50% of fishing households usually use a gillnet. Other usual methods offered by households that fished for other salmon included commercial retention (25%) and other methods—likely caught by hand (13%). All households that fished for Chinook salmon usually take the fish home from their commercial catches.

Most households in Egegik did not need to work harder than usual in 2016 to get the salmon that they needed (Table 3-58). No household reported working harder to get Chinook salmon, one household had to work harder to get enough sockeye salmon, and two households had to work harder to get enough other salmon. The household that had to work harder to get sockeye salmon did not provide a specific reason for why or how. For other salmon, one household indicated spending more time fishing and one household needed to work harder because the resources were small or diseased. Although only a few sampled households answered the question, none reported having to travel further or to different locations than usual to harvest the salmon they needed (Table 3-59).

Table 3-45.–Usual household harvest methods, salmon resources, Chignik Lake, 2016.

Resource	Households harvesting, or attempting to harvest	Remove from commercial catches		Seine		Gillnet		Rod and reel		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	1	33.3%	0	0.0%	0	0.0%	2	66.7%	1	33.3%
Sockeye salmon–early run	21	2	9.5%	5	23.8%	12	57.1%	0	0.0%	0	0.0%
Sockeye salmon–late run	21	0	0.0%	7	33.3%	8	38.1%	1	4.8%	0	0.0%
Spawning sockeye salmon	21	0	0.0%	1	4.8%	1	4.8%	0	0.0%	0	0.0%
Other salmon	3	1	33.3%	1	33.3%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-46.–Reasons for using a rod and reel or handline to harvest salmon, Chignik Lake, 2016.

Resource	Households using rod and reel	Households using handline	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	2	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Sockeye salmon–early run	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	1	6	1	14.3%	4	57.1%	0	0.0%	0	0.0%	4	57.1%	1	14.3%	0	0.0%
Spawning sockeye salmon	0	11	3	27.3%	4	36.4%	0	0.0%	1	9.1%	8	72.7%	0	0.0%	0	0.0%
Other salmon	0	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-47.–Households reporting that they worked harder to harvest salmon resources, Chignik Lake, 2016.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Family/personal		Resource availability		Unsuccessful		More time needed		Needed more of resource	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	28	4	4	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	28	17	12	5	0	0.0%	3	60.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	28	20	15	5	0	0.0%	1	20.0%	0	0.0%	2	40.0%	0	0.0%
Other salmon	28	4	4	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-47.–Continued.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Unfavorable weather		Small or diseased resources		Other reasons		No response	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	28	4	4	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	28	17	12	5	1	20.0%	0	0.0%	0	0.0%	2	40.0%
Sockeye salmon–late run	28	20	15	5	0	0.0%	0	0.0%	1	20.0%	1	20.0%
Other salmon	28	4	4	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-48.–Households reporting that they traveled further or to different locations to fish for salmon resources, Chignik Lake, 2016.

Resource	Sampled households	Valid responses	Households reporting that they traveled further	Households reporting that they traveled to different locations
Chinook salmon	28	4	0	0
Sockeye salmon–early run	28	17	3	5
Sockeye salmon–late run	28	20	6	6
Other salmon	28	4	0	1

Source ADF&G Division of Subsistence household surveys, 2017.

Table 3-49.–Usual household harvest methods, salmon resources, Perryville, 2016.

Resource	Households harvesting, or attempting to harvest	Remove from commercial catches		Seine		Gillnet		Rod and reel		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	7	3	42.9%	1	14.3%	3	42.9%	3	42.9%	0	0.0%
Sockeye salmon–early run	19	4	21.1%	4	21.1%	12	63.2%	5	26.3%	0	0.0%
Sockeye salmon–late run	19	1	5.3%	4	21.1%	7	36.8%	2	10.5%	0	0.0%
Spawning sockeye salmon	19	0	0.0%	2	10.5%	4	21.1%	2	10.5%	0	0.0%
Other salmon	18	0	0.0%	0	0.0%	18	100.0%	8	44.4%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-50.–Reasons for using a rod and reel or handline to harvest salmon, Perryville, 2016.

Resource	Households using rod and reel	Households using handline	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3	100.0%	0	0.0%
Sockeye salmon–early run	5	0	0	0.0%	1	20.0%	0	0.0%	0	0.0%	1	20.0%	4	80.0%	1	20.0%
Sockeye salmon–late run	2	2	0	0.0%	1	25.0%	0	0.0%	2	50.0%	2	50.0%	1	25.0%	0	0.0%
Spawning sockeye salmon	2	1	0	0.0%	1	33.3%	0	0.0%	2	66.7%	0	0.0%	1	33.3%	0	0.0%
Other salmon	8	3	0	0.0%	1	9.1%	0	0.0%	2	18.2%	2	18.2%	6	54.5%	2	18.2%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-51.–Households reporting that they worked harder to harvest salmon resources, Perryville, 2016.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Family/Personal		Resource availability		Unsuccessful		More time needed		Needed more	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	26	8	8	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	26	20	14	6	0	0.0%	1	16.7%	0	0.0%	5	83.3%	0	0.0%
Sockeye salmon–late run	26	13	11	2	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Other salmon	26	19	13	6	0	0.0%	1	16.7%	0	0.0%	3	50.0%	0	0.0%

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Table 3-51.–Continued.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Unfavorable weather		Small or diseased resources		Other reasons		No response	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	26	8	8	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	26	20	14	6	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	26	13	11	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	26	19	13	6	2	33.3%	0	0.0%	1	16.7%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to provide more than one answer.

Table 3-52.–Households reporting that they traveled further or to different locations to fish for salmon resources, Perryville, 2016.

Resource	Sampled households	Valid responses	Households reporting that they traveled further	Households reporting that they traveled to different locations
Chinook salmon	26	8	0	0
Sockeye salmon–early run	26	20	0	1
Sockeye salmon–late run	26	13	1	0
Other salmon	26	19	2	2

Source ADF&G Division of Subsistence household surveys, 2017.

Table 3-53.–Usual household harvest methods, salmon resources, Port Heiden, 2016.

Resource	Households harvesting, or attempting to harvest	Remove from commercial catches		Seine		Gillnet		Rod and reel		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	10	0	0.0%	0	0.0%	7	70.0%	0	0.0%	6	60.0%
Sockeye salmon	20	1	5.0%	0	0.0%	17	85.0%	3	15.0%	0	0.0%
Spawning sockeye salmon	20	0	0.0%	0	0.0%	8	40.0%	4	20.0%	2	10.0%
Other salmon	23	0	0.0%	0	0.0%	10	43.5%	17	73.9%	2	8.7%

Source ADF&G Division of Subsistence household surveys, 2017.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-54.–Reasons for using a rod and reel or handline to harvest salmon, Port Heiden, 2016.

Resource	Households using rod and reel	Households using handline	Conservation		Selectivity		Gillnet mesh too small		Tradition		Ease		Fun		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	3	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	33.3%	2	66.7%	1	33.3%
Spawning sockeye salmon	4	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	50.0%	3	75.0%	1	25.0%
Other salmon	17	0	0	0.0%	0	0.0%	0	0.0%	1	5.9%	5	29.4%	11	64.7%	3	17.6%

Source ADF&G Division of Subsistence household surveys, 2017.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-55.–Households reporting that they worked harder to harvest salmon resources, Port Heiden, 2016.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Family/personal		Resource availability		Unsuccessful		More time needed		Needed more of resource	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	29	12	6	6	0	0.0%	3	50.0%	0	0.0%	2	33.3%	0	0.0%
Sockeye salmon	29	20	16	4	0	0.0%	0	0.0%	0	0.0%	3	75.0%	1	25.0%
Other salmon	29	20	19	1	0	0.0%	1	100.0%	0	0.0%	1	100.0%	0	0.0%

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Table 3-55.–Continued.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Unfavorable weather		Small or diseased resources		Other reasons		No response	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	29	12	6	6	0	0.0%	0	0.0%	0	0.0%	1	16.7%
Sockeye salmon	29	20	16	4	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	29	20	19	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to provide more than one answer.

Table 3-56.–Households reporting that they traveled further or to different locations to fish for salmon resources, Port Heiden, 2016.

Resource	Sampled households	Valid responses	Households reporting that they traveled further	Households reporting that they traveled to different locations
Chinook salmon	29	12	1	2
Sockeye salmon	29	20	1	1
Other salmon	29	20	0	1

Source ADF&G Division of Subsistence household surveys, 2017.

Table 3-57.–Usual household harvest methods, salmon resources, Egegik, 2016.

Resource	Households harvesting, or attempting to harvest	Remove from commercial catches		Seine		Gillnet		Rod and reel		Other	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	4	4	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	7	0	0.0%	0	0.0%	6	85.7%	0	0.0%	0	0.0%
Other salmon	8	2	25.0%	0	0.0%	4	50.0%	0	0.0%	1	12.5%

Source ADF&G Division of Subsistence household surveys, 2017.
Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-58.–Households reporting that they worked harder to harvest salmon resources, Egegik, 2016.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Family/personal		Resource availability		Unsuccessful		More time needed		Needed more of resource	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	5	5	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	20	6	5	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	20	6	4	2	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%

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Table 3-58.–Continued.

Resource	Sampled households	Valid responses	Households reporting that they did not work harder than usual	Households reporting that they worked harder than usual	Unfavorable weather		Small or diseased resources		Other reasons		No response	
					Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	5	5	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	20	6	5	1	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Other salmon	20	6	4	2	0	0.0%	1	50.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.
Note The sum of percentages may not be 100% because households were able to provide more than one answer.

Table 3-59.–Households reporting that they traveled further or to different locations to fish for salmon resources, Egegik, 2016.

Resource	Sampled households	Valid responses	Households reporting that they traveled further	Households reporting that they traveled to different locations
Chinook salmon	20	5	0	0
Sockeye salmon	20	6	0	0
Other salmon	20	6	0	0

Source ADF&G Division of Subsistence household surveys, 2017.

Changes to Local Salmon Stocks

Households in all study communities that harvested or attempted to harvest salmon were asked to comment if they noticed any changes or irregularities with the fish they harvested, including changes in the quality (i.e., condition, appearance, size), abundance, and run behavior of salmon, and all sampled households were asked about observed changes in escapement in the local river systems. Fishing households were asked to comment separately about sockeye salmon (in the three Chignik communities and Perryville households were asked about early-run and late-run sockeye salmon), Chinook salmon, and other salmon (coho, pink, and chum salmon combined). Note that fishers of any of the three species composing the other salmon resources that were asked about on the survey form were asked to comment on any observed changes, but respondents were not asked to specify to which species they were referring. Assessment summaries for other salmon are not likely reflective of all three species; however, because in every study community coho salmon are more commonly harvested than pink and chum salmon, the assessments of other salmon are more likely representative of coho salmon rather than pink or chum salmon, but not entirely. Also, occasionally a household that did not harvest a resource provided an assessment because the respondent might have had knowledge about the resource from other experience than subsistence fishing; for example, the respondent might have helped another household process subsistence fish or commercial fished.

Chignik Bay

There were Chignik Bay fishing households that observed changes in the quality of each species of salmon in 2016; but, the most changes noted were for early-run sockeye salmon where 12 out of 13 fishing or harvesting households assessed a change in the resource (Table 3-60). Fifty-eight percent of households that made an assessment of change said that early-run sockeye salmon were smaller than usual, but—conversely—25% felt that the fish were larger than usual; 17% noticed some fish that were diseased; and 8% noticed fish were watermarked or had spots (most Chignik Bay households fished for early-run sockeye salmon in salt water). About one-half of the households (8 of 13) that fished for late-run sockeye salmon reported a change in salmon quality: 38% said the fish were diseased, 38% gave other general observations, 25% said fish were watermarked, 13% reported fish were smaller, and 13% reported fish were larger. Four of the six households attempting to harvest or harvesting Chinook salmon indicated changes to the stock: one-half (50%) indicated fish were smaller in size, and one-quarter (25%) said fish were diseased or gave other general observations. Out of five households that fished for other salmon and indicated changes to these salmon stocks, 60% indicated fish were larger, 20% noted the fish were smaller, 20% observed diseased fish, 20% indicated fish were watermarked, and 20% noted other observations.

Several households that harvested salmon in 2016 also said that they noticed a change in resource abundance for all species of salmon (Table 3-61). Eight of 13 households that harvested or fished for early-run sockeye salmon reported a change in abundance and all (100%) said that this resource was less abundant than usual; likewise, 7 of 13 households reported the late run of sockeye salmon was less abundant. Seven households reported a change in abundance of Chinook salmon, and five of those households (71%) said they were less abundant; conversely, two households (29%) said Chinook salmon were more abundant than usual. Out of 18 households that fished for other salmon, 7 reported a change in abundance of these species, and all (100%) said that these resources (one or more species) were less abundant.

Thirteen Chignik Bay households fished for or harvested sockeye salmon from the early run; the same number of households fished for or harvested from the late run of sockeye salmon in 2016 (Table 3-62). Out of seven fishing households that reported a change in the behavior of early-run sockeye salmon, 29% said the run arrived earlier than normal, yet 29% said it was later than normal; 14% noted that fish were swimming deeper than normal; and 29% provided other observations. When seven households that noticed run changes to the late run were asked to describe those changes, 43% said the run was later than normal, 14% said the run was earlier than normal, and 29% cited other observations. Two out of six households that fished for or harvested Chinook salmon noted a change in the behavior of the run: 50% said the run was early and 50% cited some other observation. Five of 18 households that fished for other salmon commented that runs had changed: either the run was early (20%), the run was late (20%), or there were other observations (40%). Because assessments of other salmon encompass observations about several species combined, these seemingly opposite viewpoints could be held about different populations of fish.

In Chignik Bay, there were more households (54%) that thought there was inadequate escapement of early-run sockeye salmon than those that thought escapement was adequate (17%) and other households did not know or did not respond (Table 3-63). In addition, 13% of households thought that the sockeye salmon late run escapement was adequate, whereas 38% thought it was inadequate, and the remaining households did not know or did not respond. Households were more closely divided on assessing Chinook salmon escapement with 21% indicating there was inadequate escapement and 29% stating that there was adequate escapement. In comparison to responses regarding Chinook salmon, for other salmon, households were more unequally divided. Overall, 29% of households indicated that escapement was adequate for other salmon and 13% felt it was inadequate.

Chignik Lagoon

There were Chignik Lagoon households that observed changes in the quality of each species of salmon in 2016; but, the most changes noted were for early-run sockeye salmon. Twelve out of 17 households that fished for early-run sockeye salmon assessed a change in the resource: 58% said that the fish were smaller than usual, and 33% indicated fish were larger in size (Table 3-64). Six of the 17 fishing households reported noticing changes in the quality of late-run sockeye salmon: 33% cited the fish were smaller than usual, but, conversely, 33% said the fish were larger than usual; 17% noticed the fish were watermarked; and 17% noted other conditions. Three out of 11 households attempting to harvest or harvesting Chinook salmon indicated the stock had changed: all 3 households said that harvested fish were smaller in size. Three out of 18 fishing households commented that at least 1 of the other salmon species they harvested was larger than normal.

Seven out of 17 households that fished for or harvested early-run sockeye salmon reported that fish were less abundant than usual (Table 3-65). Seven out of 17 households that fished for or harvested sockeye salmon from the late run noticed a change in the run abundance: 6 (86%) cited this resource was less abundant, and 1 household (14%) said the run was larger than normal. Eight out of 11 households reported a change in Chinook salmon abundance: 6 households (75%) said this species was less abundant but, conversely, 2 households (25%) said this species was more abundant than usual. Out of nine households that reported a change to the abundance of other salmon, most—eight households (89%)—reported that these resources were less abundant and one household (11%) said that these resources were more abundant.

Seventeen Chignik Lagoon households fished for or harvested sockeye salmon from the early run; the same number of households fished for or harvested from the late run in 2016 (Table 3-66). Nine of the households reported a change in the behavior of the early run: 56% said the run came in earlier than normal. Six households noted a change in the behavior of the sockeye salmon late run, and there were a variety of observations, including the run was early (17%), the run was late (17%), the run was sporadic (17%), and other general observations (50%). Four out of 11 households that fished for Chinook salmon noted a change in the run behavior: 25% said the run was early and 50% cited other observations. Two households reported a change to other salmon and commented that the run (likely the coho salmon run, which is the most harvested of the three species) was early (50%) and 50% gave some other observation.

There were more sampled households (45%) in Chignik Lagoon that thought there was inadequate escapement of the early run of sockeye salmon than those that thought escapement was adequate (25%), and the remaining households did not know or did not respond (Table 3-67). Also, more households (40%) thought that the sockeye salmon late run escapement was inadequate, whereas 10% thought it was adequate. When asked if they thought that the escapement of Chinook salmon was adequate, 35% of sampled households said yes it was, and 10% said it was not; most households (55%) did not know or did not provide an answer. By comparison, for other salmon escapement assessments, household responses were more equally divided: 25% thought escapement was adequate, 20% said it was inadequate, and most (55%) did not know or did not provide a response.

Chignik Lake

There were Chignik Lake households that observed changes in the quality of all species of salmon in 2016; but, the most changes noted were for early-run sockeye salmon where 12 out of 21 fishing households assessed a change in the resource (Table 3-68). Most (92%) said that the fish were smaller than usual and 8% said they noticed more early-run sockeye salmon that they believed were hatchery fish; this conclusion was based on respondents noting that fish had their adipose fin clipped, and they believed that these fish were hatchery fish from British Columbia. Also, respondents noted that some of the sockeye salmon harvested looked different and were larger-sized than normal fish from the Chignik Management Area runs and believed those fish were of Cook Inlet origin. Seven of the 21 households that fished for or harvested late-run sockeye salmon reported noticing changes in the quality of salmon: 57% noted fish were smaller, 43% said there were diseased fish, and 14% said there were more females. All three households attempting to harvest Chinook salmon said that the fish were smaller in size. Only two households that fished for other salmon commented that they noticed a change: one said fish were smaller and one said fish were larger, though the specific species they were referring to was not noted.

For all salmon resources, there were fishing or harvesting households that noticed a change in resource abundance in 2016 (Table 3-69). Nine households out of 21 that fished for early-run sockeye salmon all thought there were fewer fish. Likewise, of the 11 households that reported an abundance change observation for late-run sockeye salmon, most households (10; 91%) thought the sockeye salmon late run was less abundant than usual, and 1 household (9%) said the run was larger than normal. There were four households that reported a change in Chinook salmon abundance and all described the run as less abundant. One-half of the 20 households that fished for other salmon provided an abundance assessment: 10 (100%) reported that other salmon were less abundant, and 1 (10%) said other salmon were more abundant. Survey notes indicate that one household provided two responses for other salmon and reported more chum salmon but fewer pink salmon.

There were 21 Chignik Lake households that fished for or harvested sockeye salmon from the early run; the same number of households fished and harvested from the sockeye salmon late run in 2016 (Table 3-70). Five of the fishing households reported changes to the early run: 40% said the run came in later than normal, 20% thought the run was earlier than usual, and 40% provided other observations. Fewer households (4 of 21) noted a change in the behavior of the late run in 2016, but only one (25%) said the run was early, 50% gave other observations, and the fourth household did not provide a description. Two out of three fishing households said they noted a change with Chinook salmon, but no specific observation was described. Only a few households (three) that fished for other salmon noticed any run behavior changes: 33% said the run was late (again, most likely in reference to coho salmon), and the remaining assessing households (68%) gave other general observations.

More sampled households (39%) in Chignik Lake thought there was inadequate escapement of early-run sockeye salmon than thought escapement was adequate (21%) and other households did not know or did not respond (Table 3-71). Even more households (50%) indicated that the escapement of late-run sockeye salmon was inadequate, whereas 21% thought it was adequate and the rest of the sampled households did not know or did not respond. When asked if they thought that the escapement of Chinook salmon was adequate, most households (79%) did not know or did not provide an evaluation, though 14% said the escapement was inadequate in 2016 and 7% thought escapement was adequate. Similar responses were given when asked about other salmon: most households (65%) did not have an opinion or did not respond, but 25% said escapement was inadequate and 11% said escapement was adequate for other salmon.

Perryville

Perryville households observed changes in the quality of all species of salmon in 2016; however, the most changes noted were for early-run sockeye salmon where 8 out of 19 households that fished for or harvested this resource assessed a change: 63% said that the fish were smaller than usual and 38% said they noticed diseased fish (Table 3-72). Fewer households (3 of 19) that fished for late-run sockeye salmon reported noticing changes in the quality of this resource: 33% noted fish were smaller, 33% said there were diseased fish, and 33% provided another observation. Only one household out of seven noticed a change in quality for Chinook salmon: the observation was that the fish were larger. When asked about the other salmon species combined, three out of 23 fishing households noticed a change in quality: 67% said fish were larger than usual, and 33% provided another observation.

Eleven out of 19 fishing households noticed a change in the abundance of early-run sockeye salmon (Table 3-73). Six households (55%) said early-run sockeye salmon were less abundant, two households (18%) indicated increased abundance, and the other three households (27%) did not provide an assessment or provided another description. Out of four assessing households, three households (75%) said the sockeye salmon late run was less abundant than usual. One out of seven households that fished for Chinook salmon thought that there were fewer Chinook salmon in 2016 than usual. Six out of 23 households that fished for other salmon provided an assessment: 5 households (83%) reported that one or more of these other salmon species were less abundant.

Nineteen Perryville households fished for or harvested sockeye salmon from the early run; the same number of households fished for or harvested from the sockeye salmon late run in 2016 (Table 3-74). Seven of the fishing households reported a change in the behavior of the early run with mixed observations provided: 29% said the run was early, 29% thought the run was late, and 29% provided other observations. Fewer households (4 of 19) noted a change in the behavior of the late run: 75% said the run came in late and 25% provided other observations. Only one household commented on noticing a change in the behavior of Chinook salmon, but the household did not provide a description. Five out of 23 households said they noted a change with other salmon: 80% said the run of one or more of these species was late, and 20% said a run or runs were early.

Out of 26 sampled households in Perryville, 54% thought escapement of early-run sockeye salmon was inadequate, and 12% said it was adequate, and the rest did not know or did not respond to the question (Table 3-75). When asked about the late sockeye salmon run, again, more households (35%) thought the escapement was inadequate compared to the proportion (27%) that thought escapement was adequate. When asked about Chinook salmon, most sampled households (65%) did not know or respond, but 19% thought escapement was enough, and 15% said it was not adequate. For other salmon, 54% of sampled households thought the escapement of one or more of these species was inadequate, and 12% thought escapement was adequate.

Because only chum, pink, and coho salmon spawn in the rivers near Perryville, there is a higher probability that most households would have had more opportunity to observe coho, chum, and pink salmon and develop observations about escapements. But, unless respondents are involved in commercial salmon fishing, or have other reasons to be in any of the Chignik communities, it is likely that many Perryville residents might not have had the opportunity to observe escapement of sockeye and Chinook salmon, which primarily spawn in the Chignik watershed.

Port Heiden

Out of eight Port Heiden households that harvested or attempted to harvest Chinook salmon, five reported a change in fish quality (Table 3-76). The specifically identified change was that Chinook salmon were smaller in size (60%). Seven responses out of 13 identified varied observations generally indicating sockeye salmon health declines, including smaller fish size and diseased salmon as the shared top cited concerns (2 responses each, or 29%), followed by skinnier fish (1 response), watermarked/spots (1 response), and other (1 response). However, one response indicated sockeye salmon were larger in size. Only 1 household out of 21 reported a change in the quality of other salmon but no specified observation was described.

Ten Port Heiden households reported change to Chinook salmon abundance, and all 10 respondents indicated the species was less abundant (Table 3-77). For sockeye salmon, out of 13 fishing and harvesting households, 11 households reported a change in abundance, with 9 (82%) indicating the species was less abundant, 2 (18%) reported increased abundance, and 2 (18%) indicated other descriptions. Nine households provided an assessment about run abundance out of 21 that harvested or attempted to harvest the other salmon species: 7 responses (78%) indicated that other salmon runs were more abundant, and 3 responses (33%) indicated decreased abundance. Because other salmon encompasses several species, these seemingly opposite viewpoints could be held about different populations of fish.

In terms of changes to salmon behavior, sockeye salmon was the species for which Port Heiden households gave the most responses indicating behavior changes (Table 3-78). Eight households out of 13 indicated changes to sockeye salmon: 5 responses (63%) indicated a late run, 3 responses (38%) noted other changes, and 1 response (13%) indicated a sporadic run. For Chinook and other salmon, the households that assessed a change to salmon behavior described the change as a late run or other/unspecified changes.

Out of 29 sampled households, only 6 (21%) provided a response of adequate escapement for Chinook salmon and 7 (24%) observed inadequate escapement, but the majority (55%) of sampled households either did not respond (48%) or could not decide on how to characterize escapement (7%) (Table 3-79). Twelve households (41%) cited adequate escapement for sockeye salmon, five households (17%) indicated it was inadequate, and four (14%) did not know how to assess escapement. Lastly, out of 29 sampled households, other salmon had 14 responses (48%) of adequate escapement and 6 responses (21%) of inadequate escapement.

Egegik

Few observations of changes in the quality of salmon species in 2016 were documented by Egegik respondents (Table 3-80). The most changes were observed in Chinook salmon where all four households that fished for or harvested the resource noted differences in 2016: 75% said that the fish were smaller than usual, but, conversely, 25% thought that the fish were larger than usual. Two of the 18 households that fished for other salmon reported observations that the fish appeared to be diseased. One household commented on the observed smaller size of sockeye salmon. Similarly, few responses were offered in terms of observed changes in abundance (Table 3-81). The only change noted was a decrease in abundance of Chinook salmon (by 3 of 4 fishing households) and other salmon populations (by 1 of 18 fishing households).

Slightly more changes in run behavior were observed, especially for sockeye salmon (Table 3-82). Five of the seven fishing households reported a change in the behavior of sockeye salmon: 20% said the run was earlier than normal, 60% said it was later than normal, and 20% noted that the run was more sporadic than usual. Of the 18 households that fished for other salmon, 2 households reported a change; however, because the assessments may have been in reference to different populations of fish, respondents were split on whether the run of one or more species was early (50%) or late (50%). Only one of the four Chinook salmon fishers reported a behavioral change, namely that Chinook salmon have been present at unusual times, which was noted on the survey form. Finally, of the households that provided an assessment, more indicated that there was adequate escapement of each salmon resource than not (Table 3-83). Forty-five percent of households did not have a response to this question for any resource and between 15%–20% of sampled households did not know whether escapement was adequate or not. Households were most divided on assessing Chinook salmon with 20% indicating there was adequate escapement and 15% observing that there was inadequate escapement. In contrast, all households that had an opinion about sockeye salmon thought that escapement was adequate. For other salmon, 25% of sampled households thought that escapement was adequate and 10% thought it was inadequate.

Table 3-60.–Observed changes in quality of salmon species, Chignik Bay, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	Smaller size of fish		Larger size of fish		Skinnier fish		Increased amount of females		Watermarked/spots	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	6	4	2	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	13	12	7	58.3%	3	25.0%	0	0.0%	0	0.0%	1	8.3%
Sockeye salmon–late run	13	8	1	12.5%	1	12.5%	0	0.0%	0	0.0%	2	25.0%
Other salmon	18	5	1	20.0%	3	60.0%	0	0.0%	0	0.0%	1	20.0%

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Table 3-60.–Continued.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	More hatchery fish		Diseased		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	6	4	0	0.0%	1	25.0%	1	25.0%	0	0.0%
Sockeye salmon–early run	13	12	0	0.0%	2	16.7%	1	8.3%	0	0.0%
Sockeye salmon–late run	13	8	0	0.0%	3	37.5%	3	37.5%	0	0.0%
Other salmon	18	5	0	0.0%	1	20.0%	1	20.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-61.–Observed changes in abundance of salmon species, Chignik Bay, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting change in abundance[a]	Species less abundant		Species more abundant		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	6	7	5	71.4%	2	28.6%	0	0.0%	0	0.0%
Sockeye salmon–early run	13	8	8	100.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	13	7	7	100.0%	0	0.0%	1	14.3%	0	0.0%
Other salmon	18	7	7	100.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

a. Occasionally, respondents that did not attempt harvest or harvest a resource was asked to provide an assessment; those responses have been included in the table.

Table 3-62.–Observed changes in behavior of salmon species, Chignik Bay, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in behavior	Early run		Late run		Sporadic run		Fish swimming deeper		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	6	2	1	50.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Sockeye salmon–early run	13	7	2	28.6%	2	28.6%	0	0.0%	1	14.3%	2	28.6%	0	0.0%
Sockeye salmon–late run	13	7	1	14.3%	3	42.9%	0	0.0%	0	0.0%	2	28.6%	1	14.3%
Other salmon	18	5	1	20.0%	1	20.0%	0	0.0%	0	0.0%	2	40.0%	1	20.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-63.–Observations on salmon escapement in the local river systems, Chignik Bay, 2016.

Resource	Sampled households	Adequate escapement		Inadequate escapement		Do not know		No response	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	24	7	29.2%	5	20.8%	2	8.3%	10	41.7%
Sockeye salmon–early run	24	4	16.7%	13	54.2%	3	12.5%	4	16.7%
Sockeye salmon–late run	24	3	12.5%	9	37.5%	4	16.7%	8	33.3%
Other salmon	24	7	29.2%	3	12.5%	3	12.5%	11	45.8%

Source ADF&G Division of Subsistence household surveys, 2017.

Table 3-64.–Observed changes in quality of salmon species, Chignik Lagoon, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	Smaller size of fish		Larger size of fish		Skinnier fish		Increased amount of females		Watermarked/spots	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	11	3	3	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	17	12	7	58.3%	4	33.3%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	17	6	2	33.3%	2	33.3%	0	0.0%	0	0.0%	1	16.7%
Other salmon	18	3	0	0.0%	3	100.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-64.–Continued.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	More hatchery fish		Diseased		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	11	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	17	12	0	0.0%	0	0.0%	1	8.3%	0	0.0%
Sockeye salmon–late run	17	6	0	0.0%	0	0.0%	1	16.7%	0	0.0%
Other salmon	18	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-65.–Observed changes in abundance of salmon species, Chignik Lagoon, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting change in abundance	Species less abundant		Species more abundant		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	11	8	6	75.0%	2	25.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	17	8	7	87.5%	0	0.0%	1	12.5%	0	0.0%
Sockeye salmon–late run	17	7	6	85.7%	1	14.3%	0	0.0%	0	0.0%
Other salmon	18	9	8	88.9%	1	11.1%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-66.–Observed changes in behavior of salmon species, Chignik Lagoon, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in behavior	Early run		Late run		Sporadic run		Fish swimming deeper		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	11	4	1	25.0%	0	0.0%	0	0.0%	0	0.0%	2	50.0%	1	25.0%
Sockeye salmon–early run	17	9	5	55.6%	1	11.1%	0	0.0%	0	0.0%	3	33.3%	0	0.0%
Sockeye salmon–late run	17	6	1	16.7%	1	16.7%	1	16.7%	0	0.0%	3	50.0%	0	0.0%
Other salmon	18	2	0	0.0%	1	50.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-67.–Observations on salmon escapement in the local river systems, Chignik Lagoon, 2016.

Resource	Sampled households	Adequate escapement		Inadequate escapement		Do not know		No response	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	7	35.0%	2	10.0%	3	15.0%	8	40.0%
Sockeye salmon–early run	20	5	25.0%	9	45.0%	2	10.0%	4	20.0%
Sockeye salmon–late run	20	2	10.0%	8	40.0%	3	15.0%	7	35.0%
Other salmon	20	5	25.0%	4	20.0%	2	10.0%	9	45.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Table 3-68.–Observed changes in quality of salmon species, Chignik Lake, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	Smaller size of fish		Larger size of fish		Skinnier fish		Increased amount of females		Watermarked/spots		More hatchery fish		Diseased		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	3	3	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	21	12	11	91.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	8.3%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	21	7	4	57.1%	0	0.0%	0	0.0%	1	14.3%	0	0.0%	0	0.0%	3	42.9%	0	0.0%	0	0.0%
Other salmon	20	2	1	50.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-68.–Continued.

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-69.–Observed changes in abundance of salmon species, Chignik Lake, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting change in abundance[a]	Species less abundant		Species more abundant		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	4	4	100.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	21	9	9	100.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	21	11	10	90.9%	1	9.1%	0	0.0%	0	0.0%
Other salmon	20	10	10	100.0%	1	10.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

a. Occasionally, respondents that did not attempt harvest or harvest a resource was asked to provide an assessment; those responses have been included in the table.

Table 3-70.–Observed changes in behavior of salmon species, Chignik Lake, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in behavior	Early run		Late run		Sporadic run		Fish swimming deeper		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	3	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%
Sockeye salmon–early run	21	5	1	20.0%	2	40.0%	0	0.0%	0	0.0%	2	40.0%	0	0.0%
Sockeye salmon–late run	21	4	1	25.0%	0	0.0%	0	0.0%	0	0.0%	2	50.0%	1	25.0%
Other salmon	20	3	0	0.0%	1	33.3%	0	0.0%	0	0.0%	2	66.7%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-71.–Observations on salmon escapement in the local river systems, Chignik Lake, 2016.

Resource	Sampled households	Adequate escapement		Inadequate escapement		Do not know		No response	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	28	2	7.1%	4	14.3%	1	3.6%	21	75.0%
Sockeye salmon–early run	28	6	21.4%	11	39.3%	2	7.1%	9	32.1%
Sockeye salmon–late run	28	6	21.4%	14	50.0%	1	3.6%	7	25.0%
Other salmon	28	3	10.7%	7	25.0%	1	3.6%	17	60.7%

Source ADF&G Division of Subsistence household surveys, 2017.

Table 3-72.–Observed changes in quality of salmon species, Perryville, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	Smaller size of fish		Larger size of fish		Skinnier fish		Increased amount of females		Watermarked/spots	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	7	1	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	19	8	5	62.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–late run	19	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	23	3	0	0.0%	2	66.7%	0	0.0%	0	0.0%	0	0.0%

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Table 3-72.–Continued.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	More hatchery fish		Diseased		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	7	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	19	8	0	0.0%	3	37.5%	0	0.0%	0	0.0%
Sockeye salmon–late run	19	3	0	0.0%	1	33.3%	1	33.3%	0	0.0%
Other salmon	23	3	0	0.0%	0	0.0%	1	33.3%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-73.–Observed changes in abundance of salmon species, Perryville, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting change in abundance	Species less abundant		Species more abundant		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	7	1	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon–early run	19	11	6	54.5%	2	18.2%	1	9.1%	2	18.2%
Sockeye salmon–late run	19	4	3	75.0%	0	0.0%	0	0.0%	1	25.0%
Other salmon	23	6	5	83.3%	0	0.0%	0	0.0%	1	16.7%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-74.–Observed changes in behavior of salmon species, Perryville, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in behavior	Early run		Late run		Sporadic run		Fish swimming deeper		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	7	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
Sockeye salmon–early run	19	7	2	28.6%	2	28.6%	0	0.0%	0	0.0%	2	28.6%	1	14.3%
Sockeye salmon–late run	19	4	0	0.0%	3	75.0%	0	0.0%	0	0.0%	1	25.0%	0	0.0%
Other salmon	23	5	1	20.0%	4	80.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-75.–Observations on salmon escapement in the local river systems, Perryville, 2016.

Resource	Sampled households	Adequate escapement		Inadequate escapement		Do not know		No response	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	26	5	19.2%	4	15.4%	6	23.1%	11	42.3%
Sockeye salmon–early run	26	3	11.5%	14	53.8%	4	15.4%	5	19.2%
Sockeye salmon–late run	26	7	26.9%	9	34.6%	2	7.7%	8	30.8%
Other salmon	26	3	11.5%	14	53.8%	5	19.2%	4	15.4%

Source ADF&G Division of Subsistence household surveys, 2017.

Table 3-76.–Observed changes in quality of salmon species, Port Heiden, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	Smaller size of fish		Larger size of fish		Skinnier fish		Increased amount of females		Watermarked/spots	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	8	5	3	60.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	13	7	2	28.6%	1	14.3%	1	14.3%	0	0.0%	1	14.3%
Other salmon	21	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-76.–Continued.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	More hatchery fish		Diseased		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	8	5	0	0.0%	0	0.0%	2	40.0%	0	0.0%
Sockeye salmon	13	7	0	0.0%	2	28.6%	1	14.3%	0	0.0%
Other salmon	21	1	0	0.0%	0	0.0%	1	100.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-77.–Observed changes in abundance of salmon species, Port Heiden, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting change in abundance[a]	Species less abundant		Species more abundant		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	8	10	10	100.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	13	11	9	81.8%	2	18.2%	2	18.2%	0	0.0%
Other salmon	21	9	3	33.3%	7	77.8%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

a. Occasionally, respondents that did not attempt harvest or harvest a resource was asked to provide an assessment; those responses have been included in the table.

Table 3-78.–Observed changes in behavior of salmon species, Port Heiden, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in behavior	Early run		Late run		Sporadic run		Fish swimming deeper		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	8	5	0	0.0%	3	60.0%	0	0.0%	0	0.0%	1	20.0%	1	20.0%
Sockeye salmon	13	8	0	0.0%	5	62.5%	1	12.5%	0	0.0%	3	37.5%	0	0.0%
Other salmon	21	3	0	0.0%	2	66.7%	0	0.0%	0	0.0%	1	33.3%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-79.–Observations on salmon escapement in the local river systems, Port Heiden, 2016.

Resource	Sampled households	Adequate escapement		Inadequate escapement		Do not know		No response	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	29	6	20.7%	7	24.1%	2	6.9%	14	48.3%
Sockeye salmon	29	12	41.4%	5	17.2%	4	13.8%	8	27.6%
Other salmon	29	14	48.3%	6	20.7%	0	0.0%	9	31.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Table 3-80.–Observed changes in quality of salmon species, Egegik, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	Smaller size of fish		Larger size of fish		Skinnier fish		Increased amount of females		Watermarked/spots	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	4	4	3	75.0%	1	25.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	7	1	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	18	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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Table 3-80.–Continued.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in salmon quality	More hatchery fish		Diseased		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	4	4	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	7	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	18	2	0	0.0%	2	100.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-81.–Observed changes in abundance of salmon species, Egegik, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting change in abundance	Species less abundant		Species more abundant		Smaller first run		Larger first run	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	4	3	3	100.0%	0	0.0%	0	0.0%	0	0.0%
Sockeye salmon	7	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	18	1	1	100.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-82.–Observed changes in behavior of salmon species, Egegik, 2016.

Resource	Households harvesting, or attempting to harvest	Households reporting a change in behavior	Early run		Late run		Sporadic run		Fish swimming deeper		Other		No response	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	4	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Sockeye salmon	7	5	1	20.0%	3	60.0%	1	20.0%	0	0.0%	0	0.0%	0	0.0%
Other salmon	18	2	1	50.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Note The sum of percentages may not be 100% because households were able to give more than one answer.

Table 3-83.–Observations on salmon escapement in the local river systems, Egegik, 2016.

Resource	Sampled households	Adequate escapement		Inadequate escapement		Do not know		No response	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chinook salmon	20	4	20.0%	3	15.0%	4	20.0%	9	45.0%
Sockeye salmon	20	8	40.0%	0	0.0%	3	15.0%	9	45.0%
Other salmon	20	5	25.0%	2	10.0%	4	20.0%	9	45.0%

Source ADF&G Division of Subsistence household surveys, 2017.

Local Comments and Concerns

Following is a summary of local observations of wild resource populations and trends, cultural patterns, habitat changes, and harvesting opportunities that were recorded during the surveys. 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 during the community project scoping meetings and the community review meetings of preliminary data. These concerns have been included in the summary.

Chignik Bay

Intersection of Subsistence and Commercial Fisheries

Chignik Bay residents engage in the seasonal practice of harvesting salmon in the subsistence fishery with commercial seine boats prior to commercial fishing periods for their own use as well as to provide salmon to members of the community broadly. Chignik Bay commercial fishermen also retain fish from their commercial catch to use or give away. While these two harvest methods are clearly distinct in regulations, this distinction is not always so clearly defined in the language used by the fishermen who often use the term “home pack” for both types of harvests. Some respondents, and community members during scoping meetings, voiced concerns that the commercially retained harvests are not being well-documented on commercial fish tickets and that the subsistence harvests are not being well-documented on the subsistence permits, despite reporting requirements (see 5 AAC 39.010 and 5 AAC 01.480). The concern about reporting is greatest for Chinook salmon because of the recent poor performance of the Chinook salmon run.

Additionally, since commercial seine boats are used for both subsistence fishing and commercial fishing, it is noteworthy that the two fisheries have different residency requirements for participation with subsistence harvests being limited to Alaska residents only. Some respondents spoke to the concern that non-resident commercial crew members were being used for harvesting activities under subsistence regulations. However, others in the community maintained that the subsistence permit holder could share subsistence-caught salmon with other crew members, regardless of their residency, as a benefit of employment.

A final concern noted had to do with the practice of the commercial fish processors allowing commercial fishermen to use the facility to freeze their salmon harvested, under commercial or subsistence regulations, and store the fish until after the commercial season closed. Some respondents were concerned that some fish are not claimed at the end of the season by the fishermen, so the processors end up discarding these frozen fish because they cannot be sold by the processor.

Sociocultural Observations

Throughout the surveys and interviews, respondents acknowledged the importance of sharing to maintaining cultural values. Residents also noted the value in documenting all harvests and sharing to gain an understanding of the relationship between food security and a diverse resource harvest, and that community wellbeing is strengthened through social cohesion developed during subsistence activities. Some residents noted that the decrease in population (see historical population information for each community in Chapter 2) has resulted in a decrease in sharing; however, multiple other responses highlighted the feeling that there have been no changes to the harvest and distribution of salmon in the past two generations.

Ecological Observations

After the *Exxon Valdez* oil spill in 1989, there was a community concern that oil had contaminated shellfish, resulting in decreased harvest rates (Fall et al. 1995). That concern has largely been replaced by concerns about paralytic shellfish poisoning due to algae blooms. This study did not collect information on shellfish harvests to determine if this concern has contributed to further declines in harvest rates.

Chignik Lagoon

Sociocultural Observations

Chignik Lagoon respondents voiced concerns that the community is socializing less in general due to increased use of digital communication technologies such as smartphones and internet devices. However, it is noted that the advancement of information and communication technology infrastructure in the region has much broader implications. As discussed further in Chapter 5, general socialization is important for observing indices of wellbeing among community members and to identify unmet needs for subsistence foods. In addition, increased participation in the market economy has led to increased spending on the capital-driven activities and devices mentioned above. This may be resulting in a decreased reliance on others to meet the needs of daily living and an increase in the number of isolated individuals and families within the community.

The development of a short-lived cooperative commercial fishing enterprise during the early 2000s led to a period of communal rift (Hutchinson-Scarbrough et al. 2016:180–182; Knapp 2008:340–342). Survey comments indicate this commercial endeavor engendered many differing opinions that resulted in an overall communal division and conflict between some households. That these divisions were not as apparent in the subsistence resource harvest and distribution in 2016 reflects that the subsistence harvest in the community is still highly cooperative. However, the intraregional migration of fishing families, specifically from Perryville and Chignik Lake, engaged in both commercial and subsistence activities was much reduced during the cooperative years. The level of sharing labor and equipment within the geographic lagoon were distinctly reduced, both by the reduction of up to 150 commercial crewing jobs, and the absence of the families' congregating near Columbia Wards Fishery (CWF). The closure of the CWF cannery and general store at that time was also influential (Hutchinson-Scarbrough et al. 2016; Knapp 2007).

In terms of the community's reliance on subsistence resources, some residents described subsistence fishing as being just for fun and suggested there is less reliance now on salmon as a dietary staple than there has been in the past. Others emphasized the importance of halibut, clams, and other resources, in addition to salmon, in meeting their subsistence needs.

Ecological Observations

Respondents expressed many concerns and viewpoints regarding population monitoring and sustainable harvests of multiple species managed by fisheries managers in the Chignik and Alaska Peninsula management areas. Additionally, respondents continued to express concerns about the negative cumulative ecological effects of the *Exxon Valdez* oil spill, citing declines of shrimp, cod, Pacific halibut, and crab populations locally. There is a perception among community members that ecosystem shifts have caused changes in the local abundance of certain species. Some residents reported concerns that all populations of fish and shellfish resources are trending downward.

A decrease in snowfall accumulation has been observed during the lifespan of respondents, altering the type of flora and the rate of tree growth and cover on the landscape.

Chignik Lake

Sociocultural Observations

Respondents in Chignik Lake voiced general concerns about how youth and young adults are spending their time, as well as more specific concerns about youth attentiveness to subsistence activities, skill development, and vocational learning. In that these concerns were mentioned within the context of a discussion on sharing subsistence salmon harvests suggests a concern about changes in daily activities leading to intergenerational changes to sociocultural systems. As in other communities, a respondent noted that casual social interactions provide information to determine others' welfare; communication can be made based on non-verbal cues and needs signaling.

As transportation technologies have increased efficiency to operation costs and rate of travel, respondents observed a decrease in time spent by youth on upriver camping outings for spearing fish and resource-gathering activities.

Ecological Observations

Some residents have observed an increase in beaver populations and attribute this to a decrease in trapping activity and ecological shifts that have increased flora and habitat used by beavers. There is a concern that the increased abundance of beaver, and the resulting changes to habitat, may be reducing the production and abundance of salmon and caribou.

Perryville

Sociocultural Observations

During surveys and interviews, Perryville respondents identified the use of digital communication devices as barriers to learning vocational and subsistence skills. A theme that pervaded these concerns was that advanced communication technologies facilitated exposure to urban worldviews, which may be influencing the sociocultural values of youth and young adults. An example provided was generally spending less time out on picnics or in the surrounding wilderness. As in other communities, some respondents expressed fear that advances in communication technology were hindering learning and developing traditional and contemporary vocational skills.

During survey sessions, many respondents expressed joy in knowing and sharing a very wide array of preparation techniques for salmon and other locally harvested foods. Many preparation techniques require the harvest of multiple resources, such as specific types of wood for skewering salmon and other types for producing the desired flavor and preservation through smoking. Some people harvest seals and process them to render oil as a complement to some types of salmon products. Depending on the type of salmon, because of particular characteristics such as oil content and texture, respondents identified multiple preservation techniques and recipes, distinctly categorized by name. Respondents highlighted the importance of, and their concern for, the intergenerational transmission and maintenance of these knowledge systems through active engagement in subsistence activities.

While all the study communities face transportation challenges because of their remote locations, Perryville is the furthest study community from the regional hub of King Salmon. The increasing dependence on store-bought food, and the increasing cost and logistics of transporting it, were identified as sources of psycho-social stress on households.

Ecological Observations

Households shared general concerns regarding changing weather patterns and animal adaptations to a shifting climate. Respondents shared observations of changes to water temperature, stream flow, sediment, and erosion and expressed concerns that these changes may have long-term negative effects on local salmon stocks.

Some residents of Perryville noted increased numbers of lynx in trapping activities. Others observed poor health conditions of caribou, such as low body weight and fat content, and suggested they were a smaller, different type of caribou than they were familiar with. Multiple respondents observed unknown types of birds throughout the year.

Port Heiden

Intersection of Commercial and Subsistence Fishing

A recurring comment from surveys in Port Heiden indicated the perception that subsistence catches slow down during periods of commercial fishing. Additionally, some respondents voiced concerns for personal safety when non-local commercial fishermen come to shore. Port Heiden residents currently commercial fish in districts not adjacent to their community, therefore many of the working-age men and the fishing vessels from Port Heiden spend the summer months fishing in the Ugashik, Egegik, and Naknek/Kvichak areas.

Respondents voiced the perception that commercial fisheries and fisheries management have had a negative effect on subsistence fisheries through effectively eliminating the local commercial fleet. This, in effect, decreased salmon retention from commercial catches and reduced available labor and gear to harvest and process subsistence salmon during the commercial season. Traditionally, Port Heiden commercial fishermen fished for Chinook and coho salmon in the Inner Port Heiden section; they also fished for sockeye salmon in the Outer Port Heiden section between 1986 and 1989 (Johnson and Murphy 2019:36–41). However, because of regulatory closures to protect migrating salmon, no commercial fishing occurred in the Outer Port Heiden section from 1990 to 2006. From 2007 on, the Outer Port Heiden section has been open, but Port Heiden residents are no longer able to fish there with the type of permits they own.[2] Due to changes in market conditions, little fishing has occurred in the Inner Port Heiden section since 1997 (Johnson and Murphy 2019:2). The effect has been to reduce the number of fishing vessels owned by Port Heiden residents that were fishing in proximity to the community, and reduce local commercial harvests retained for subsistence needs. These observations were corroborated by the survey data depicted in Figure 2-71.

Resource Management Concerns

Respondents expressed some dissatisfaction with the current subsistence salmon management program being based out of Kodiak. Some respondents suggested subsistence permits be administered from the King Salmon or Dillingham ADF&G offices. "The subsistence card process is intimidating. It doesn't make sense to work with Kodiak, we're in Bristol Bay," said a Port Heiden resident.

Some comments received during the surveys also conveyed that wildlife managers did not heed local knowledge or past input in resource management decisions. Some residents felt that this resulted in caribou and moose population declines.

Egegik

Intersection of Commercial and Subsistence Fisheries

For some Egegik households, commercial and subsistence harvesting activities are embedded into one enterprise. The commercial fishing district surrounds the town and commercial sites fill the shoreline. A benefit of fishing in one location for both commercial and subsistence activities is employing entire families through various divisions of labor. Entitlement to many fishing sites and commercial permits that have historically been held by local families has been lost, either through sale of the permit/site, or because the local family has moved away and retained the permit/site. Year-round residents not engaged in commercial fishing activities may not have access to subsistence fishing locations near their homes.

Some year-round residents have highlighted intimidation in the form of verbal and non-verbal harassment as major reasons for not using the fishing sites near town. Additionally, the sites upriver of the commercial district were not preferred by some households since they require a powered boat to gain access and due to decreased tidal influence the fishing period is shorter.

Sociocultural Observations

Respondents commented on an increasing trend of residents relying on commercial operations to supplement subsistence and store-bought food. The temporal length of this trend was not identified. Some households receive processed and frozen salmon from the lodges at the end of the sport season when generators and freezers are shut down. Households also sometimes receive processed and frozen salmon from the commercial fish processors at the end of the commercial season if there is not enough salmon to profitably export to market. Interviews with local processors and lodges were not available to contextualize these comments.

Salmon is not the only species received from commercial operations: moose is also sometimes received from local sport hunting lodges. Some respondents said they are thankful to receive and distribute this moose meat and others voiced concerns about the practice and indicated the received meat was less welcomed because of the methods of harvest; specifically, concerns were that not all of the animal was salvaged during the hunt and that non-local hunters were creating competition for space to hunt for moose.

2. *CFEC Public Search Application*, s.v. "Zip code: 99549" (by Commercial Fisheries Entry Commission, State of Alaska), https://www.cfec.state.ak.us/plook/#permits (accessed December 2019).

Respondents addressed the very low harvest effort of caribou compared to the past, explaining that it is now considered normal after many years of non-participation, due to resource scarcity and regulatory change. During community scoping and review meetings, participants shared that the local exchange of information surrounding harvests of subsistence resources is linked to maintaining cultural values.

Chapter Discussion

Assessments of Use Summary

Generally, a high proportion of sampled households in all of the study communities answered the question concerning if use of resources was less, same, or more than in recent previous years. Sockeye salmon (sockeye salmon in general, or early-run and late-run sockeye salmon) are important resources to every community based on the proportion of households using those resources combined with the high response rate for this use assessment: a range of 67%–100% of responding households used these resources with the exception of late-run sockeye salmon being used by 42% of responding households in Chignik Bay (although 96% of households used early-run sockeye salmon). Looking at the figures showing whether use was less, same, or more for responding households, it is apparent that across the study communities use of sockeye salmon resources was reduced in 2016 compared to recent previous years. An average of nearly one-third (28%) of responding households using sockeye salmon resources in all the communities combined used less in 2016: a range of 17%–52% of responding households assessed less use of a sockeye salmon resource. However, looking at all sampled households in all the communities combined, generally households had enough sockeye salmon resources in 2016: there were 55%–73% of sampled households that had enough sockeye salmon or early-run sockeye salmon in five of the six communities. Chignik Lake was the one community that had the fewest sampled households having enough sockeye salmon resources: only 39% and 32% of sampled households had enough late-run and early-run sockeye salmon, respectively. Assessments of having enough late-run sockeye salmon were lower in Chignik Bay, Chignik Lagoon, and Perryville (33%–55%) than assessments of having enough early-run sockeye salmon in those communities (63%–73%).

Other Assessments Summary

In Chignik Bay, Perryville, and Port Heiden, more households offered observations on changes in abundance of sockeye salmon specifically; note that in Perryville and Chignik Bay, where the sockeye salmon early and late runs were asked about, more change observations were provided for early-run sockeye salmon. Chignik Lake and Chignik Lagoon households also offered observations, but Egegik offered no observations. In most communities, assessments were offered that the sockeye run (or early run) was less abundant; only in Perryville (two households) and Port Heiden (two households) did any households observe that the run was more abundant. Except in Egegik, more households had observations about the quality of sockeye salmon than any other species. In Port Heiden, Chignik Bay, and Chignik Lagoon, some households said that sockeye salmon were smaller while other households offered that they were larger. In the other three communities, households only reported the observation that sockeye salmon were smaller. All communities except Chignik Lagoon reported that there were diseased salmon (not limited just to sockeye salmon).

Not many households commented on whether the salmon runs were later or earlier than usual, but among those households that did make such observations, there was little agreement. Port Heiden is the exception: all species of salmon were reported to be later than usual in 2016. In terms of escapement, generally more households offered their observations on whether there was adequate or inadequate escapement of salmon by resource compared to how many responses were garnered for assessing salmon quality, abundance, or run behavior. But, again, there was little agreement within or among communities. For sockeye salmon, observations tended toward characterizing escapement as inadequate, except in Port Heiden and Egegik.

In 2016, subsistence gillnet was the identified generally used harvest method for sockeye salmon in Egegik, Port Heiden, Chignik Lake, and Perryville, but subsistence seine was identified as most commonly used in Chignik Lagoon and Chignik Bay. For Chinook salmon, usual harvest methods were varied among the communities: seine is the usual source of Chinook salmon in Chignik Lagoon and Chignik Bay, in Port

Heiden gillnet is the usual harvest method followed closely by an unspecified other method, and in Egegik all respondents indicated Chinook salmon usually come from commercial home pack. Few respondents in Chignik Lake provided information, but rod and reel is usually used to harvest Chinook salmon, and in Perryville the responses were evenly split among gillnet, rod and reel, and home pack as the usual sources for Chinook salmon. For harvesting other salmon, there were clear dominant usual fishing methods in Port Heiden (rod and reel), Perryville and Egegik (gillnet), and Chignik Bay (seine). The few responses from Chignik Lake indicate an even split in usual methods between home pack and seine while in Chignik Lagoon seine is the usual method for more households but gillnet and home pack were also specified. Most households in the region said they did not have to work harder (e.g., spend more time fishing or take more trips to fish) than usual to get the salmon they needed in 2016. Overall for all salmon resources combined, Perryville, Port Heiden, Chignik Lake, and Chignik Bay had the most households that indicated they did have to work harder; specifically, more Chignik Lake and Perryville households worked harder for harvests of sockeye salmon in 2016.

4. SHARING NETWORKS RESULTS

This chapter describes the quantitative social network analysis (SNA) of data collected for this project for the communities of Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, Port Heiden, and Egegik for the 2016 study year. After a brief primer on SNA concepts[1] used in this analysis, the types of network data collected for this project are described. The analysis results first depict summary visualizations and tables for the combined sample of study communities, followed by separate results for each study community. The chapter concludes with a brief summary of key results and a discussion.

SNA Primer

Social networks are composed of two basic building blocks: (1) social actors, and (2) social relations. A social actor could be a person, a household, an entire community, or any other entity that engages in social relations with other actors, depending on the research context and questions. Similarly, social relations can be defined in a variety of ways to represent interactions among social actors. In SNA, actors and relations are referred to by a variety of terms. In this chapter, the term "node" will be used to refer to social actors and the term "tie" will be used to refer to social relations.

The first step of SNA is to define nodes and ties, collect data, and represent the network. Visual representations of a network usually depict nodes as shapes (e.g., circles) and ties as lines connecting those shapes. Mathematical representations of a network often use a matrix, where each node has both a row and a column, and the ties are indicated in the cells where a row and column intersect. Mathematical representations underlie most quantitative analysis of social networks, while visual representations are useful for understanding and interpreting social networks. The second step of SNA is to use descriptive and inferential statistics to describe and interpret the network. Of the many ways social networks can be analyzed, this report focuses on two levels of analysis: network level and actor level.

At the network level, social networks are described according to the number of nodes, the number of ties, and several measures calculated from these, including density, components, reciprocity, and transitivity. The density of a network represents the number of ties that exist in a network relative to the number of possible ties that could exist among all actors in the network. Increased density values reflect networks where many possible ties exist, providing a basic measure of how well-connected actors are within a network. The number of components in a network is equal to the number of distinct groups, where each actor in a group is connected by a direct or indirect tie to every other actor in the group. This is a basic measure of connection within a network that can be used to examine the network's structure, including identifying sub-groups within the network and examining the potential for flow across ties in the network. Reciprocity is an important concept for networks where ties are directed from one actor to another. When ties exist in both directions between a pair of actors, the relationship is considered reciprocal. Reciprocity is measured at the network level as the proportion of reciprocal ties in the network, and this measure is often used to identify fundamental social dynamics between individuals that give structure to the network as a whole. Whereas reciprocity focuses on ties between pairs of actors or "dyads," transitivity focuses on groups of three actors or "triads." A triad is transitive when ties connect all three actors in the triad. For example, if actor A and B work together to catch salmon and actor B and C do the same, the relations between A and B and between B and C might help compel actors A and C to work together, creating a transitive "triangle." At the network level, transitivity increases along with the number of transitive triangles, indicating the extent that relationships between a pair of actors overlap with ties among other actors. Like reciprocity, transitivity can be used to identify how interactions among small sets of individuals can influence the structure of the entire network.

At the actor level, the goal is to describe the position of actors within the network, starting with an actor (ego) and its direct ties to other actors (alters) and branching out to include indirect ties among alters and

1. Consult Robins (2015) and Wasserman and Faust (1994) for more background about social network analysis.

other actors in the network. One of the most common ways of defining an actor's position in the network is called "centrality," a concept that can be measured in several different ways. The simplest measure of centrality, known as "degree," represents the number of connections between an ego and its alters. When ties among actors are directed, degree is broken down into the number of direct incoming ties ("indegree") and the number of direct outgoing ties ("outdegree"). Measures of degree centrality are often used to indicate how active an actor is in the social relations that define ties in a network. Measures of degree centrality can be combined with information about the actors in the network to investigate whether certain combinations of actor traits are more or less common when actors are connected or disconnected. These analyses can also be aggregated to the network level by calculating centrality measures for actors with different traits or pairs of actors with combinations of traits and comparing these across networks.

The decision to analyze a social network at the network level or at the actor level depends in part on how the network is defined, how data were collected, and the questions that drive the analysis. In most cases, a network-level analysis is appropriate when the boundaries of the network are clearly defined: the network includes the complete set of actors and ties, and research questions focus on the structure of the network and the processes that shape it. When these conditions are met, an actor level of analysis is also appropriate, particularly when the questions focus on an actor's position within the network and how actor traits affect tie formation. Actor-level analysis can also be useful when the boundaries of the network are less clearly defined or the data set is missing actors or ties. In those circumstances, a network-level analysis may be limited because key measures often assume a clear boundary and complete set of actors and ties. For example, a survey documenting food sharing networks between households in a single rural community that includes only one-half of the households can provide accurate measures of degree centrality at the individual level for households included in the sample, but network-level measures like density will be inaccurate due to missing data for actors and the ties they would have reported if they had been included in the sample.

Bristol Bay Sharing Networks

The survey for the 2016 study year included three modules designed to document networks of social relationships involved in the production and distribution of subsistence salmon harvests. The first module—local networks—represented connections among households within a study community, including households that harvested and processed salmon together as well as households that shared salmon with one another. The second module—non-local networks—represented connections between households in a study community and people who reside outside the study community, focusing on salmon shared. The third module—trade networks—represented instances where households in the study communities engaged in non-commercial exchanges of salmon for other commodities (barter[2]) or limited amounts of cash (customary trade[3]) either with other people in their community or people living outside their community. Together, these three modules documented different kinds of social relationships that occurred at multiple spatial scales, linking subsistence salmon harvest practices among individuals within a household, among households within a community, and between individuals and households across many different communities in Alaska and beyond.

Additional details about the methods used for each module are included in the following sections, along with an overview of project results, followed by results for each study community.

Local Networks

This project adopted a local networks module that has been used frequently in previous subsistence harvest surveys by ADF&G. Each participating household in the six study communities was first asked, "During the

2. Alaska Statute (AS 16.05.940(2)) defines barter as the exchange of fish or game for other fish or game resources, or for other food or nonedible items other than money. Barter is also understood to include exchange of fish and game for noncommercial services—including physical work or transportation.
3. Alaska Statute (AS 16.05.940(8)) defines customary trade as the noncommercial exchange of fish or game for limited amounts of cash.

last year, did anyone in ANOTHER HOUSEHOLD in [your community] fish for, cut, or share salmon with members of your household?" For all households that responded "Yes," three follow-up questions asked them to list all households who (Q1) "CAUGHT the salmon your household used," (Q2) "CUT the salmon your household used," and (Q3) "GAVE salmon to your household." Households named for each question response were recorded using identification numbers from the community household roster. Households eligible to participate in the survey were defined as those living within the community for at least three months in 2016 and present during survey administration in the late winter months. Although it is common in the study communities for some people to live in the community for only part of the year, exchanges with those people were considered part of non-local networks for the purposes of this study. Because researchers attempted to interview each household in the study communities, local networks were composed of directed ties. In other words, connections could be recorded in both directions between two households, depending on how each household responded to survey questions. For example: when households A and B both report ties to one another, this results in two directed ties, one from A to B and one from B to A. However, when household A reports a tie with C, but household C does not report a tie with A, this results in a single directed tie from C to A.

The local networks module documents three distinct relationships involved in subsistence salmon harvest production (Q1, Q2) and distribution (Q3). In some cases, it is useful to examine these relationships separately. In other cases, it is important to combine multiple relationships to pursue a more holistic analysis of subsistence harvest networks. When reporting results in subsequent sections of this report, the following typology indicates the network used in analysis:

A. Harvesting network (Q1);

B. Processing network (Q2);

C. Sharing network (Q3);

D. Combined network–binary (Q1+Q2+Q3: tie = 1 if SUM (Q1+Q2+Q3) >=1, else =0); and

E. Combined network–valued (Q1+Q2+Q3: tie = SUM (Q1+Q2+Q3)).

Different relationships can be examined as separate networks, where "A." represents the harvesting network, "B." represents the processing network, and "C." represents the sharing network. Additionally, these relationships can be aggregated to generate networks that represent the ways subsistence harvest practices combine both production and distribution (Q1+Q2+Q3: combined network). This is done by combining the responses to multiple questions and defining a connection between two households whenever at least one kind of relationship is reported for the pair ("D.," or combined network–binary). The presence of multiple relationships connecting a pair of households can also be represented by adding a value to each tie, equal to the number of relationships reported by the pair of households ("E.," or combined network–valued). For example, if households A and B report working together to harvest and to process salmon, a tie between the pair would take a value = two. This distinction matters because many of the measures of network structure and actor position described in the SNA primer will differ, depending on whether the network is binary (D.) or valued (E.).

Project Results Overview

Across all 6 study communities, the survey documented 559 connections among 176 total households, including 171 harvesting ties (Q1), 173 processing ties (Q2), and 215 sharing ties (Q3). These results are reported for each study community in Table 4-1. This table also includes several measures of network structure: density, components, reciprocity, and transitivity. These measures are calculated on the combined network–binary (D.). Visualizations of these community networks appear in Figure 4-1, where circles represent households and lines represent relationships of harvesting, processing, and/or sharing.

While the number of households in each network is comparable across all study communities, ranging from a low of 22 in Egegik to a high of 38 in Port Heiden, there is more variation in connections among households (Table 4-1). For example, there were 10 documented connections among households in Egegik and 293 in Port Heiden. Networks with a large number of ties indicate higher levels of coordination between households within the community in the contexts of harvesting, processing, and sharing salmon. Networks with fewer ties suggest households are acting independently or with people outside the community to produce and circulate subsistence salmon harvests. Measures of network structure can be used to explore this variation across the study communities in greater detail. However, it is important to keep the following caveat in mind—because some measures of network structure are fundamentally linked to the number of actors (nodes) in a network (e.g., density and components), these comparisons will be most meaningful when communities have similar numbers of households. Other measures of network structure (e.g., reciprocity and transitivity) are less sensitive to differences in the numbers of actors in a network, so comparisons across communities are easier.

Density

A network's density is defined as the proportion of connections that exist in a network in relation to the total possible connections that could exist in the network. For example, when all households in a community are connected with all other households, the network density equals one, while a network with no connections among any households has a network density of zero. In the 2016 study communities, network density ranged from 0.020 (Egegik) to 0.100 (Port Heiden) (Table 4-1). While these numbers may seem low, they should be interpreted in relation to the social context of subsistence salmon harvests. For practical reasons, a typical household in the study community is unlikely to work with more than a few other households to harvest or process salmon, so only a small proportion of all the possible connections are likely to exist in these networks. In other words, there are limits on the number of connections any household can maintain in the context of subsistence salmon harvests, so as the number of households in a community increases, this limits the density of the networks likely to be observed. Because all of the 2016 study communities were similar in size, it is possible to compare network densities across communities to better understand the role of social relationships in subsistence harvests. Lower densities may indicate households that are relatively more independent, working individually, or coordinating with a few other households; conversely, higher densities may indicate higher levels of inter-dependence among households, with connections formed through harvesting and circulating salmon creating a cohesive fabric that pulls the community together.

Components

Because local networks in the study communities exhibit low levels of density, it is possible for the network to become divided among groups of households that are not directly or indirectly connected to one another. These disconnected groups are called "components." All households that belong to a component are connected directly or indirectly. Conversely, households that belong to different components are not connected either directly or indirectly. Components that include only one household are called "isolates." The number of components in the local networks of the study communities provides a simple measure of cohesion in subsistence salmon harvests for each community. For example, in Figure 4-1, the local network for Port Heiden included a single component, where all households are connected either directly or indirectly. In Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville, there is one large component, plus a few small groups of disconnected households. Local networks in Egegik are less connected, having several components composed of a few households and many isolates. If indirect relationships are important in the context of subsistence salmon harvest networks, households in a community with fewer components may find it easier to access labor, resources, food, and information through some combination of direct and indirect ties.

Reciprocity

The local networks in the study communities are composed of directed ties. This means it is possible for a tie to exist from household A to B as well as a tie from household B to A. Reciprocity is measured in the networks as the proportion of ties that are reciprocated by a tie in the opposite direction. For example, if households A and B report ties to C, but household C reports a tie only to A, then the result is one reciprocated tie (A–C) and one unreciprocated tie (B–C). For combined networks in the study communities, reciprocity values range from lows in Egegik and Perryville, where only a small proportion of ties were reciprocated, to highs in other communities, where one-quarter (Chignik Bay and Chignik Lake) to one-half (Chignik Lagoon and Port Heiden) of ties were reciprocated (Table 4-1). Reciprocal ties may indicate connections between households that coordinate by working together to harvest, process, and/or share salmon, while unreciprocated ties might indicate relationships where one household depends on the labor or resources provided by the other. Even in study communities with the highest levels of reciprocity, at least one-half of all connections were unreciprocated. This suggests that one important role of social relationships in subsistence salmon harvests may be for households that are active harvesters to provide much-needed access to labor and resources to households that are less active and may not be able to reciprocate in kind, though they may reciprocate with other subsistence resources and/or labor during seasonal rounds of harvest.

Transitivity

While reciprocity focuses on pairs of households, the connections between any pair are likely driven by the broader social context in which the pair is embedded. Researchers can begin to examine social context by extending data analysis from pairs of two households to triads of three households. For example, if households A and B both work with household C to harvest and process salmon, that shared connection to household C may make it more likely that households A and B also work together. When connections exist among all three households in a triad, this is called "transitivity." There are several ways to measure transitivity, and these measures differ if the ties in the network are directed or undirected. For this report, researchers generated undirected measures of transitivity using the "transitivity correlation" method from Dekker et al. (2017) as implemented in the R "sna" package (Butts 2008). This measure indicates the propensity for a transitive triad to form given the number of nodes, the density, and the levels of reciprocity in a network. When transitive connections are common, a network may exhibit high levels of clustering, which is where sub-groups within the network are highly connected, distinguishing them from other parts of the network. In this study, there was substantial variation in the clustering of local networks, ranging from low levels in Chignik Bay (0.02) and Egegik (-0.02) to high levels in Chignik Lagoon (0.54) and Port Heiden (0.60) (Table 4-1). Interestingly, clustering differed in Chignik Bay and Chignik Lake (0.21) despite the fact that both networks showed similar levels of reciprocity and density. This suggests that while the proportion of ties and tendency to reciprocate ties in both places were similar, households in Chignik Lake show tighter clustering and are embedded in social contexts where multiple households work with one another to produce and circulate salmon. In contrast, lower levels of transitivity in Chignik Bay suggest that connections among households have less overlap when moving from one pair of households to the next.

Summary

As depicted in the network visualizations (Figure 4-1) and descriptive statistics (Table 4-1), each study community features a unique constellation of social relations underlying subsistence salmon harvests. This variation can be assessed qualitatively by examining the structure of network visualizations, and it can be assessed quantitatively by comparing various measures of network structure, such as density, reciprocity, and transitivity. Later sections in this chapter will examine each community's local network separately. Here, the report offers a few general observations across the community networks. First, while most of the study communities had similar numbers of households, the number of connections within a community varied much more widely. This suggests that each community has its own unique social context underlying the role of social relationships in subsistence salmon harvests. Second, variation in the number of components and levels of reciprocity and transitivity may indicate variation among communities in terms of the level of cohesion and interconnectedness among households, at least in the context of subsistence salmon harvests. Third, the structure of local networks differed between relationships that support the production (harvesting, processing) of salmon and relationships that support the distribution of salmon (sharing). While harvesting and processing networks were generally less dense, with small numbers of households clustered together but disconnected from households in other parts of the network, sharing networks connected these household clusters, bringing most or all households in the community into a single, large component of the network.

When drawing conclusions, it is important to keep in mind the fact that the depicted networks represent interactions across a single year for a single resource category (salmon), but social relationships in the context of subsistence in general, and subsistence salmon specifically, unfold across many resources and on the scale of entire lifetimes and across generations. The networks underlying subsistence are dynamic and responsive to changing social and ecological conditions, so readers should consider this when drawing conclusions from a snapshot of these networks at a single point in time.

Non-Local Networks

This project developed a new module not previously used in ADF&G research to document the distribution of subsistence salmon harvests between households in the study communities and people living in other communities throughout Alaska and beyond. The primary goal was to address an issue that frequently arises when collecting data on sharing relationships with a local networks module similar to the one described above (Q3: "who GAVE salmon to your household"). While the local networks module focuses on sharing among households within a study community, participants frequently report sharing salmon with people living outside their community. Typically, these responses are recorded using the location of the non-local sharing partner, but no additional information is collected systematically. As a result, depictions of local networks in previous studies by ADF&G often include ties to Anchorage, Fairbanks, and other places throughout Alaska, but little is known about these connections.

This project included a non-local networks module that was designed to distinguish these relationships from the local network and document them in further detail. The survey module used for documenting non-local networks generated data on the number of sharing ties and the amount of salmon sent to and received from outside a study community. Researchers asked each participating household, "During the last year, did anyone living in your household give salmon to or receive salmon from someone in another community?" Because the roster of community households included only people who lived in a study community for three months and were present during survey administration in the late winter months, exchanges with people who spent part of the year in a study community were considered part of the non-local network. This means that some of the salmon shared through non-local networks may actually be harvested within the study community itself, so the term "non-local" in the context of these results refers primarily to the location of sharing partners, rather than the place where salmon were harvested. For each sharing tie reported, follow-up questions documented whether the participant gave or received salmon, where the sharing partner lived, how the participant and sharing partner were related, where the exchange occurred, how much was exchanged (including preservation method, units, and amounts), and how many identical exchanges occurred with this sharing partner in the 2016 study year. Participants were also asked to characterize the exchange as "sharing," a "share for helping," or some other kind of exchange. Additional instructions specifically excluded exchanges where salmon were exchanged through barter or customary trade, since these exchanges were recorded in a separate network module (see "Trade Networks" in this chapter).

There is one important difference between non-local networks and local networks in the study that shaped project data analysis: while the local networks include clear boundaries and a nearly complete sample of households and ties, non-local networks have less clearly defined boundaries, and there are surely missing actors and ties from what would be the complete network. For example, two households may report giving salmon to a friend in Anchorage, but there is no way of knowing if they shared with the same person or two different people. Similarly, researchers did not complete surveys with exchange partners living outside the study communities, so the survey results do not have full information on the ties that connect them to other people, either in the locations where they reside or in other communities throughout Alaska. As a result, researchers conducted analysis of non-local networks at the actor level.

Project Results Overview

The analysis of non-local networks focused on two key aspects of these connections: (1) the locations of exchange partners, and (2) the relationship between exchange partners. By examining the locations of exchange partners, researchers can document the geographic scope of subsistence salmon networks as they extend beyond the study communities. Documenting the geographic scope of salmon sharing in non-local networks can help to better understand the importance of salmon harvests for people living outside the communities where salmon are harvested. It can also lead to better estimates of the full scope of salmon harvests from a survey that includes only a few communities, as was the case for this project's survey effort. Although sharing salmon is often seen as a fundamental cultural practice in communities throughout rural Alaska, this practice is maintained as people migrate for education, employment, and other factors. These connections are an important part of material and emotional support for people living throughout Alaska, not just in rural communities. These connections are also central to broader aspects of cultural identity for many people in the study communities. By examining these relations in greater detail, researchers can start to identify patterns in non-local networks and relate these to patterns in local networks. Specifically, researchers focused on exchanges among close family, extended family, and other social relations using ADF&G's standard coding guidelines for analysis for relations. The majority of sharing ties included in the "other relationship" category in the data set occurred among people considered "friends," so the two terms are used interchangeably throughout the report. Together, analysis of the locations of exchange partners and relationship between exchange partners provide a starting point for examining non-local networks in similar detail as the division's more established approach to examining local networks.

The method for documenting non-local networks included identifying the number of exchanges between partners, as well as the amount of salmon (in pounds) exchanged. Researchers analyzed each aspect of exchange for both locations and relations. Across all study communities, surveys documented 388 sharing ties in non-local networks, with a total of 9,108 lb of salmon circulating through these networks (Table 4-2). This includes 300 sharing ties and 6,815 lb of salmon given from the study communities to people living outside their community, as well as 88 sharing ties and 2,293 lb of salmon received by the study communities from people living outside their community. Figure 4-2 visualizes this network and the flow of salmon to and from study communities to other parts of Alaska and beyond.

Locations

Table 4-3 shows results for salmon given to and received from people living outside the study communities in 2016, including the number of exchanges and weight of salmon exchanged for each location, and figures 4-3 through 4-6 visualize the same results to highlight the most prominent patterns. Overall, the study communities reported exchanging salmon with people living in 29 other communities throughout Alaska. Additionally, salmon were exchanged with communities outside Alaska in other states and another country, and there were also two total ties with unidentified locations and one tie described generically as "statewide." Anchorage is by far the most frequent location involved in non-local sharing ties overall: this location accounted for 41% of all exchanges and 37% of the total pounds exchanged in the overall non-local network (Table 4-3). Non-local exchanges among the study communities were also common, with 21% of all exchanges and 22% of the total weight of shared salmon flowing between study communities, particularly Chignik Lake. Finally, exchanges with people living outside Alaska in other states or another country were nearly as common as exchanges among the study communities: 16% of the total number of non-local sharing ties and 15% of the total pounds of salmon exchanged involved households from outside Alaska.

The balance between salmon given to and salmon received from people living outside the study communities varied by location. Households from study communities gave salmon 19 times more frequently to people living in Anchorage than they received salmon from Anchorage; also, 19 times more salmon (in pounds) were given from the study communities to Anchorage. Similarly, seven times as many pounds of salmon were shared by study communities to people living outside Alaska in nearly eight times more sharing connections compared to what study communities received from people located outside Alaska. Variations among study communities underlie these general patterns. Figures 4-7 through 4-10 show the locations of exchange partners for the non-local networks of each study community. These variations will be explored in more detail in the section "Community Profiles."

Table 4-1.–Descriptive statistics for local networks, by study community, 2016.

Community	Total households	Total ties	Number of ties ______ .			Density	Components	Reciprocity	Transitivity
			Harvesting	Processing	Sharing				
Chignik Bay	25	47	9	9	29	0.060	4	0.260	0.020
Chignik Lagoon	24	71	19	30	22	0.090	3	0.590	0.540
Chignik Lake	33	79	24	18	37	0.050	2	0.240	0.210
Perryville	34	59	16	16	27	0.040	5	0.050	0.160
Port Heiden	38	293	101	99	93	0.100	1	0.500	0.600
Egegik	22	10	2	1	7	0.020	12	0.000	-0.020

Source ADF&G Division of Subsistence household surveys, 2017.

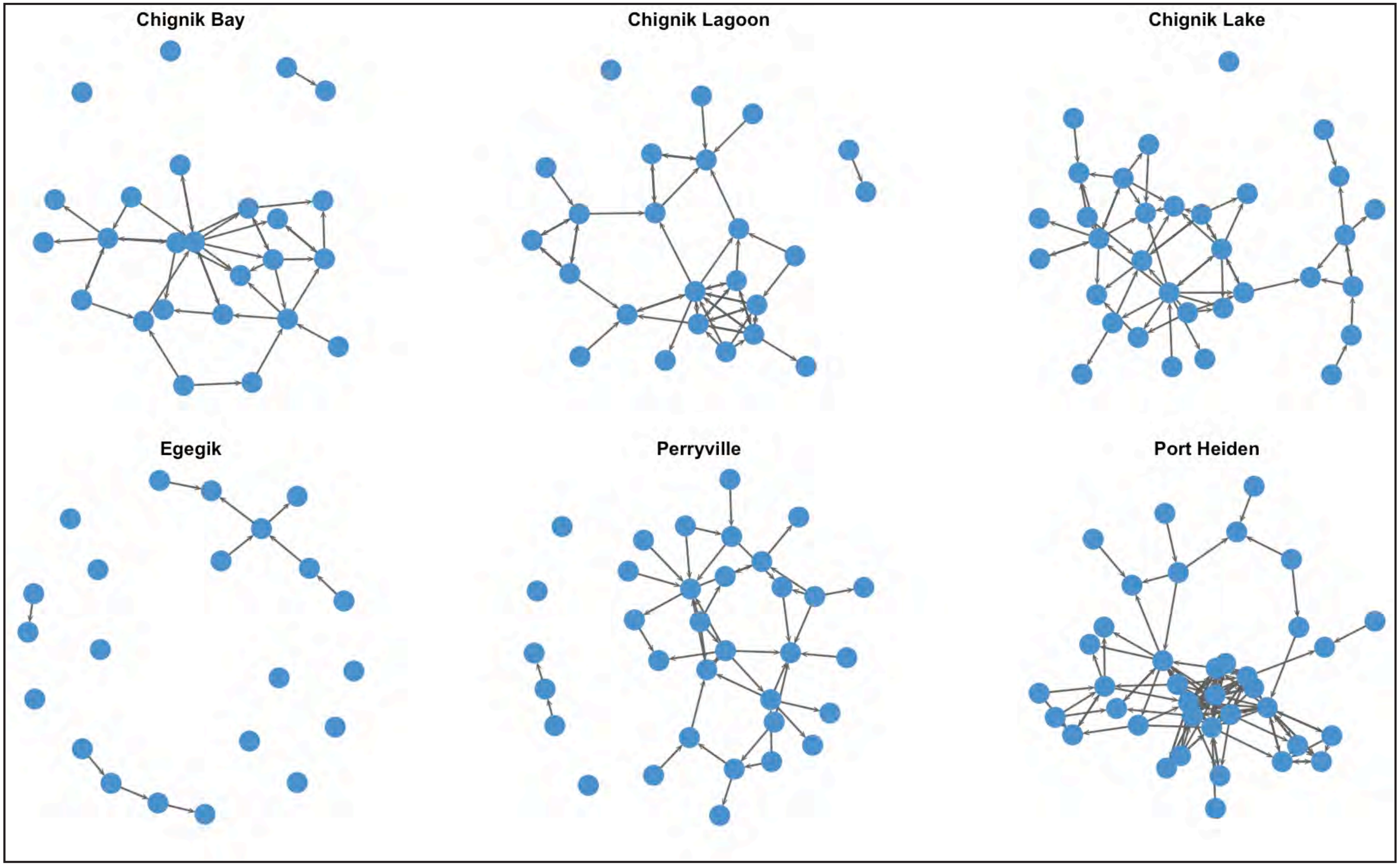

Figure 4-1.–Visualizations of local networks, by study community, 2016.

Table 4-2.–Descriptive statistics for non-local networks, by study community, 2016.

	Giving overall			Receiving overall			Total		
Community	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Chignik Bay	43	1,440	34	19	394	21	62	1,834	30
Chignik Lagoon	60	1,783	30	8	334	42	68	2,117	31
Chignik Lake	89	2,158	24	11	159	14	100	2,317	23
Perryville	31	557	18	16	531	33	47	1,088	23
Port Heiden	55	371	7	25	567	23	80	938	12
Egegik	22	506	23	9	308	34	31	814	26

Source ADF&G Division of Subsistence household surveys, 2017.

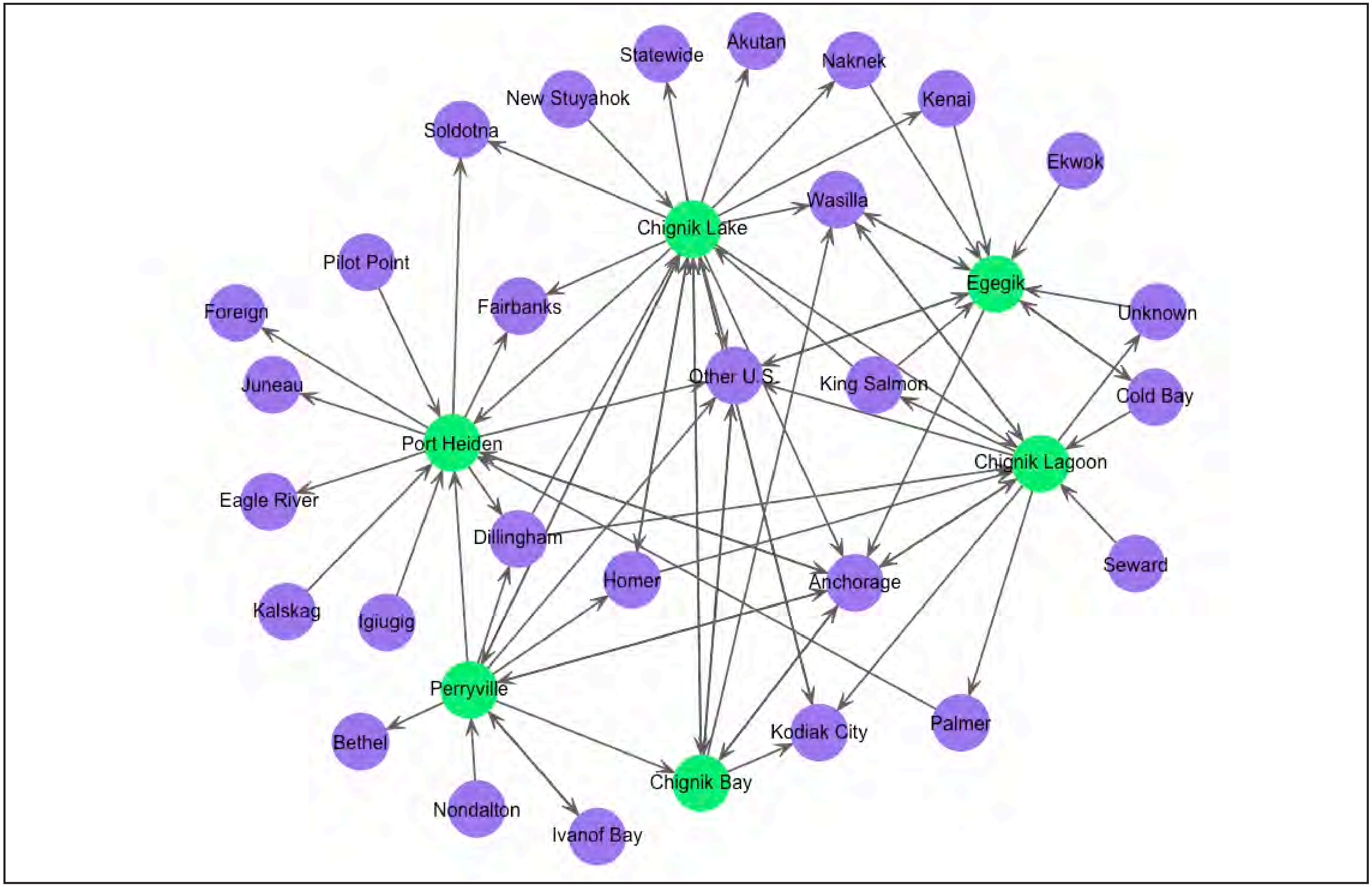

Figure 4-2.–Non-local networks depicting exchanges between households in study communities (green) and people living outside study communities (purple), 2016.

Table 4-3.–Descriptive statistics for non-local networks, by location, all study communities, 2016.

Location	Giving to Ties	Giving to Pounds	Giving to Average	Receiving from Ties	Receiving from Pounds	Receiving from Average	Total Ties	Total Pounds	Total Average
Akutan	3	40	13				3	40	13
Anchorage	151	3,202	21	8	170	21	159	3,372	21
Bethel	2	55	27				2	55	27
Chignik Bay	4	77	19	5	364	73	9	441	49
Chignik Lagoon	8	44	6	4	141	35	12	185	16
Chignik Lake	17	228	13	29	702	24	46	930	20
Cold Bay	1	9	9	2	5	3	3	14	5
Dillingham	3	51	17	3	22	7	6	73	12
Eagle River	1	2	2				1	2	2
Ekwok				1	3	3	1	3	3
Fairbanks	3	10	4				3	10	4
Foreign	1	3	3				1	3	3
Homer	8	353	44	3	53	18	11	406	37
Igiugig				1	3	3	1	3	3
Ivanof Bay	3	109	36	2	73	36	5	182	36
Juneau	1	2	2				1	2	2
Kalskag				4	72	18	4	72	18
Kenai	2	44	22	1	88	88	3	132	44
King Salmon	1	9	9	2	13	7	3	22	7
Kodiak City	10	417	42	3	89	30	13	506	39
Naknek	3	36	12	1	9	9	4	45	11
New Stuyahok				1	6	6	1	6	6
Nondalton				2	8	4	2	8	4
Other U.S.	52	1,233	151	7	168	72	59	1,401	158
Palmer	3	21	7	1	4	4	4	25	6
Perryville	8	280	35	3	24	8	11	304	28
Pilot Point				1	5	5	1	5	5
Port Heiden	4	148	37				4	148	37
Seward				1	80	80	1	80	80
Soldotna	2	30	15				2	30	15
Statewide	1	286	286				1	286	286
Unknown	1	3	3	1	88	88	2	91	91
Wasilla	7	124	18	2	102	51	9	226	25

Source ADF&G Division of Subsistence household surveys, 2017.

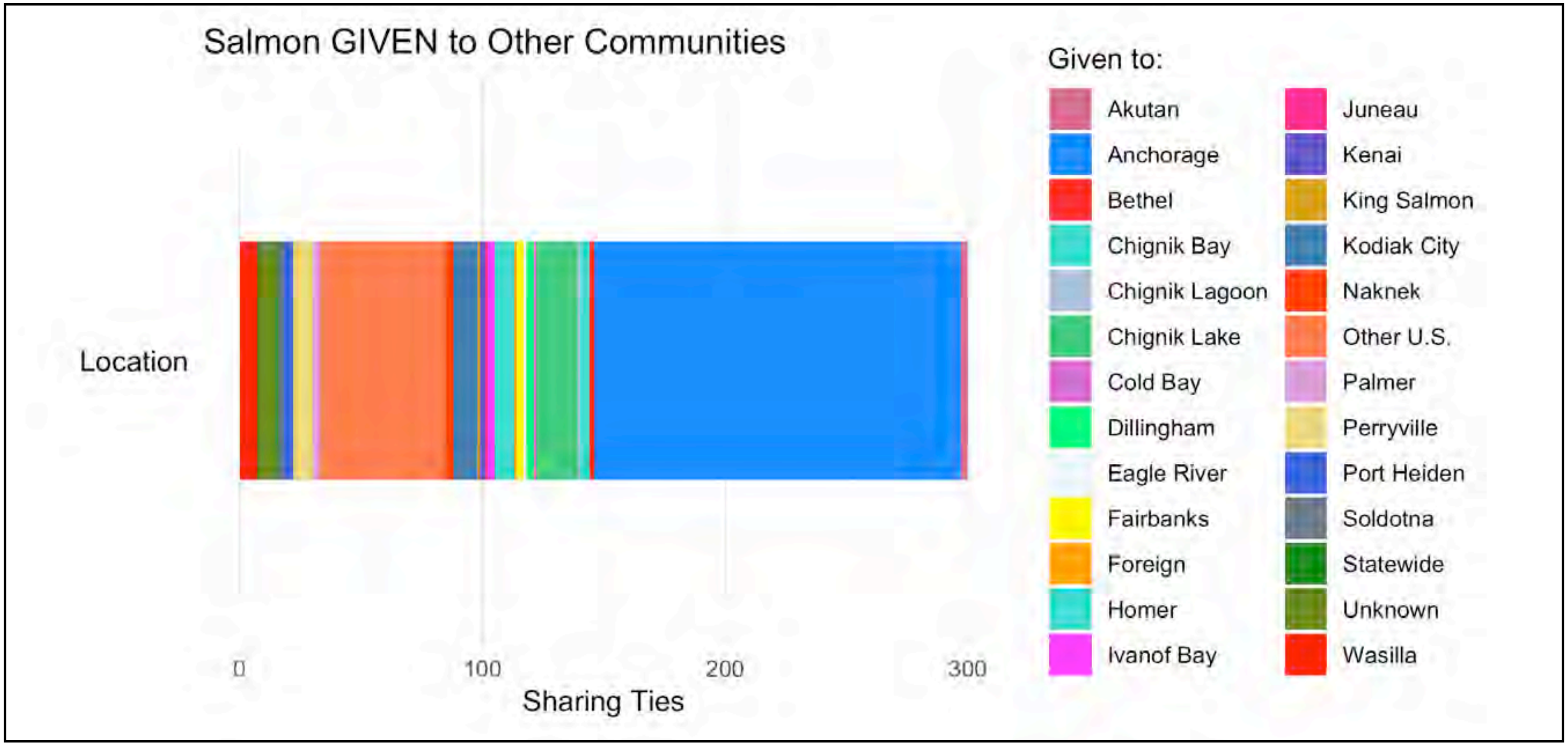

Figure 4-3.–Number of sharing ties based on salmon given to people living outside study communities, all study communities, 2016.

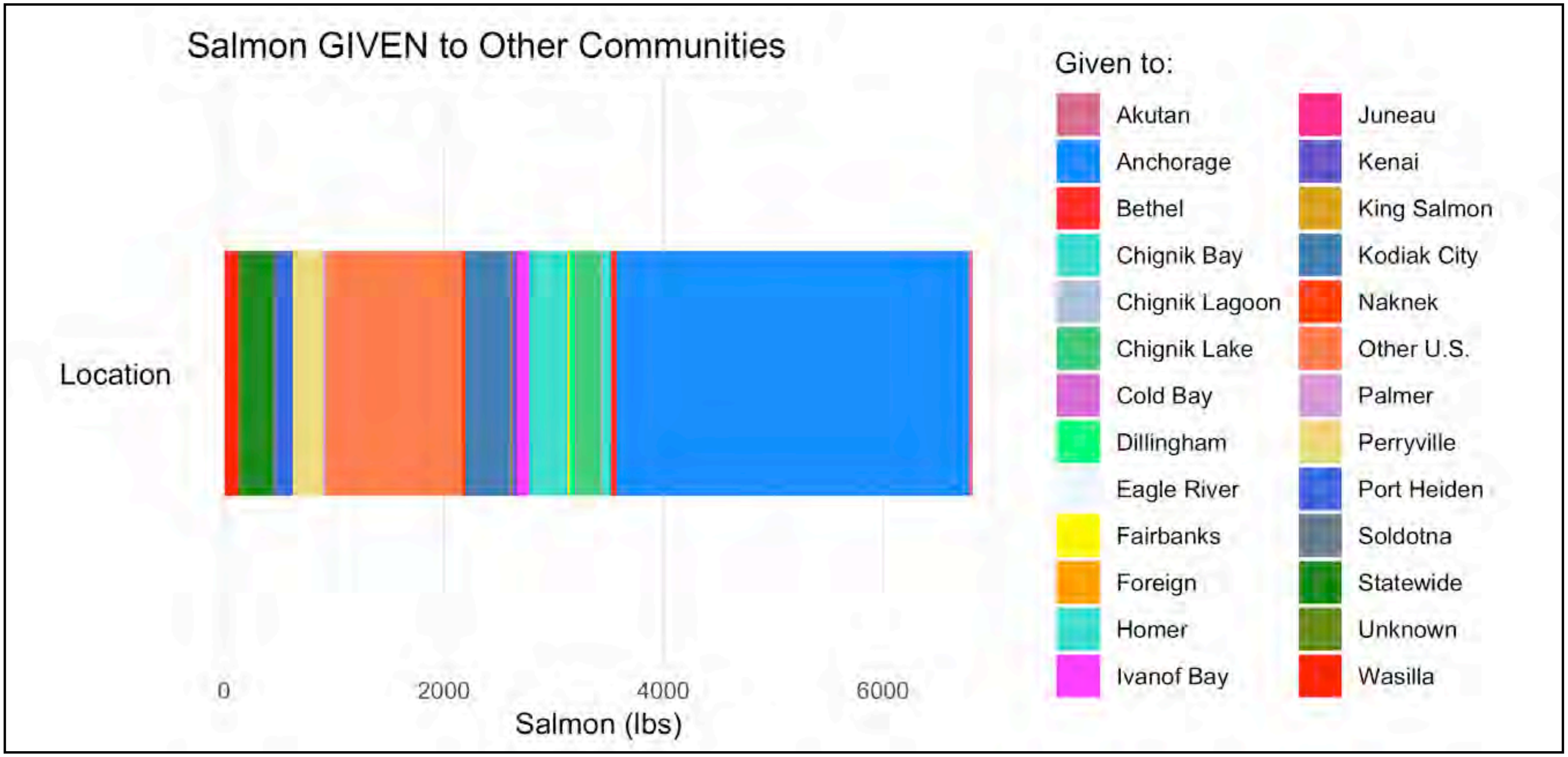

Figure 4-4.–Pounds of salmon given to people living outside study communities, all study communities, 2016.

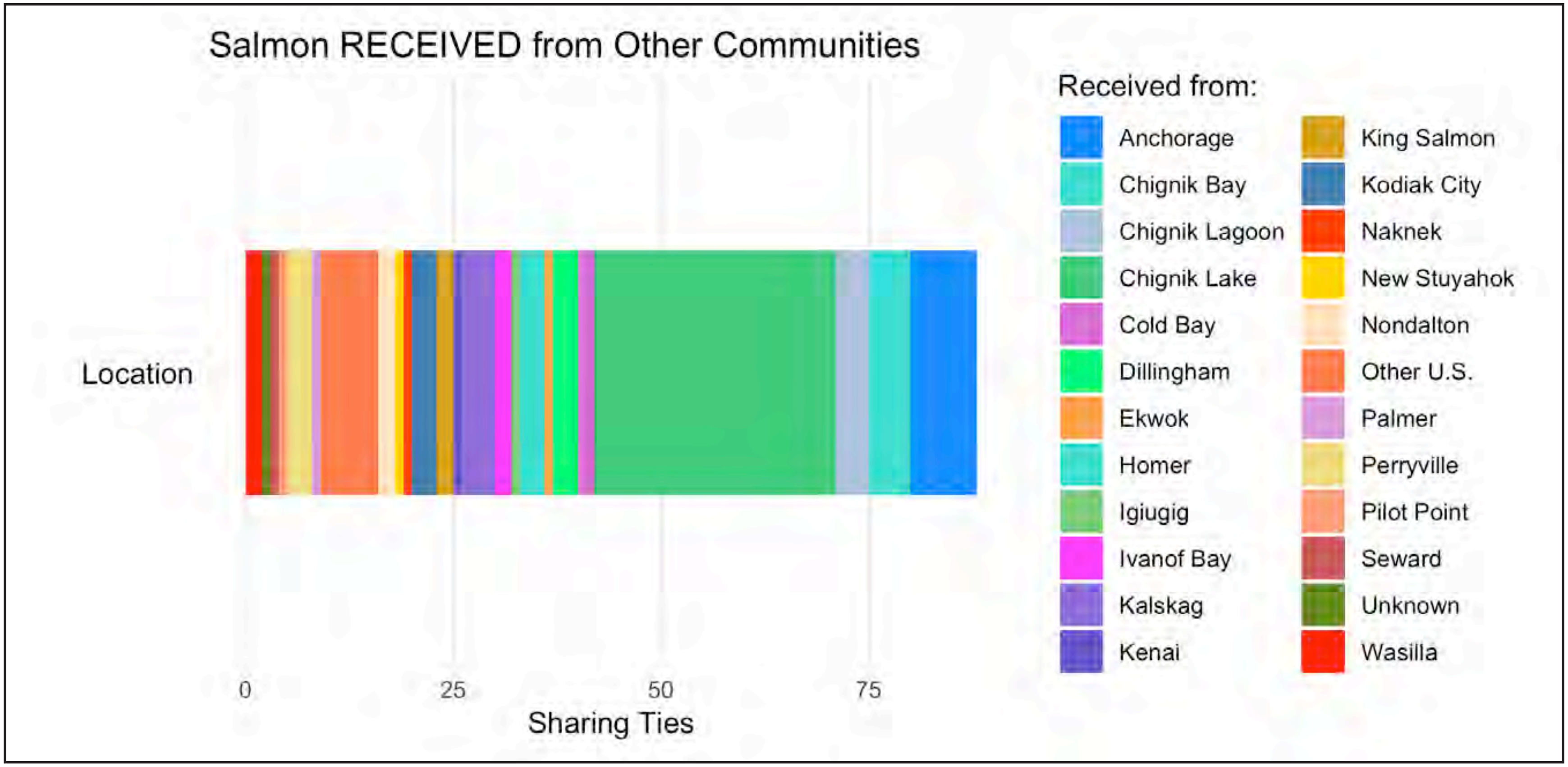

Figure 4-5.–Number of sharing ties based on salmon received from people living outside study communities, all study communities, 2016.

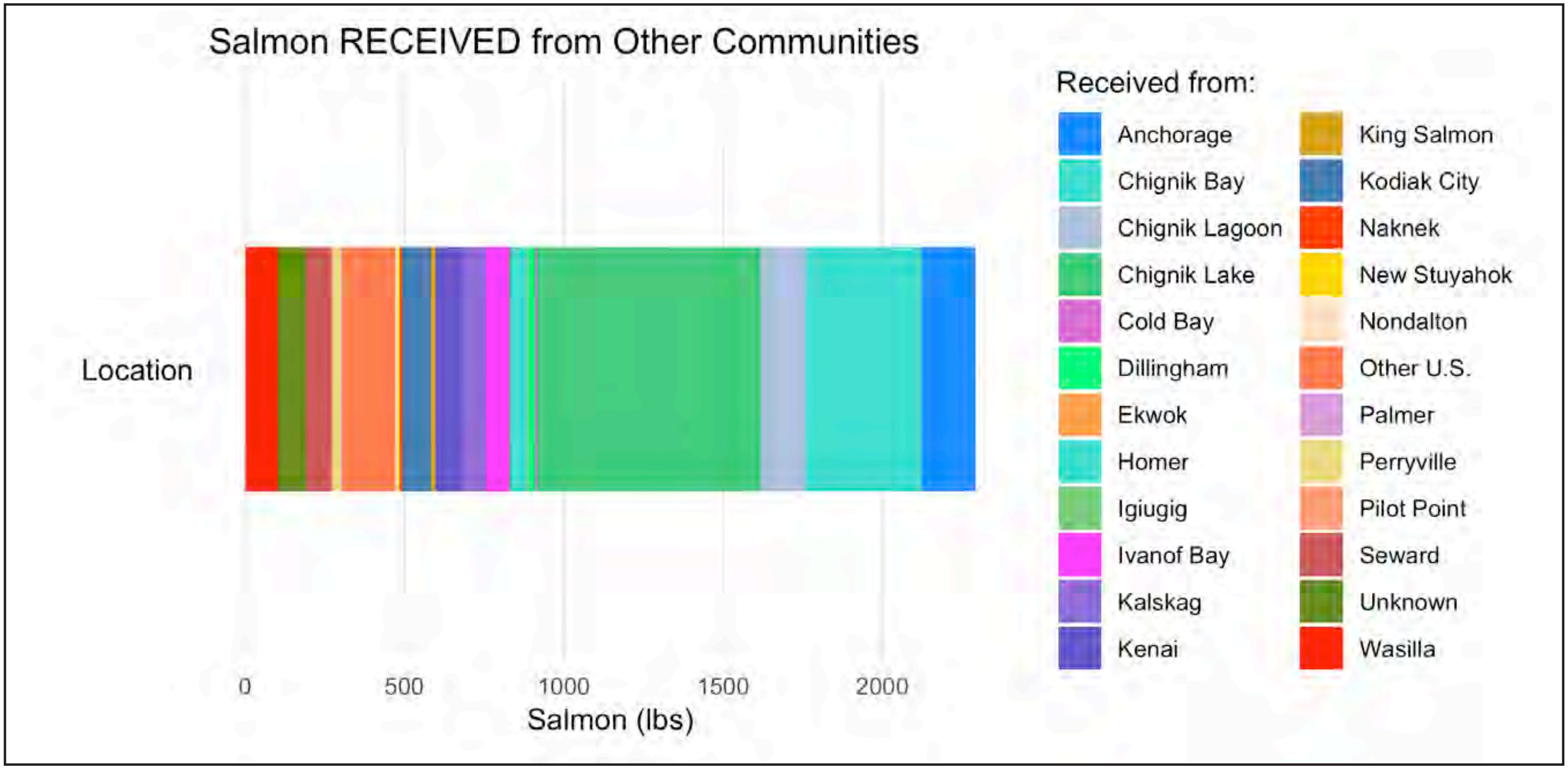

Figure 4-6.–Pounds of salmon received from people living outside study communities, all study communities, 2016.

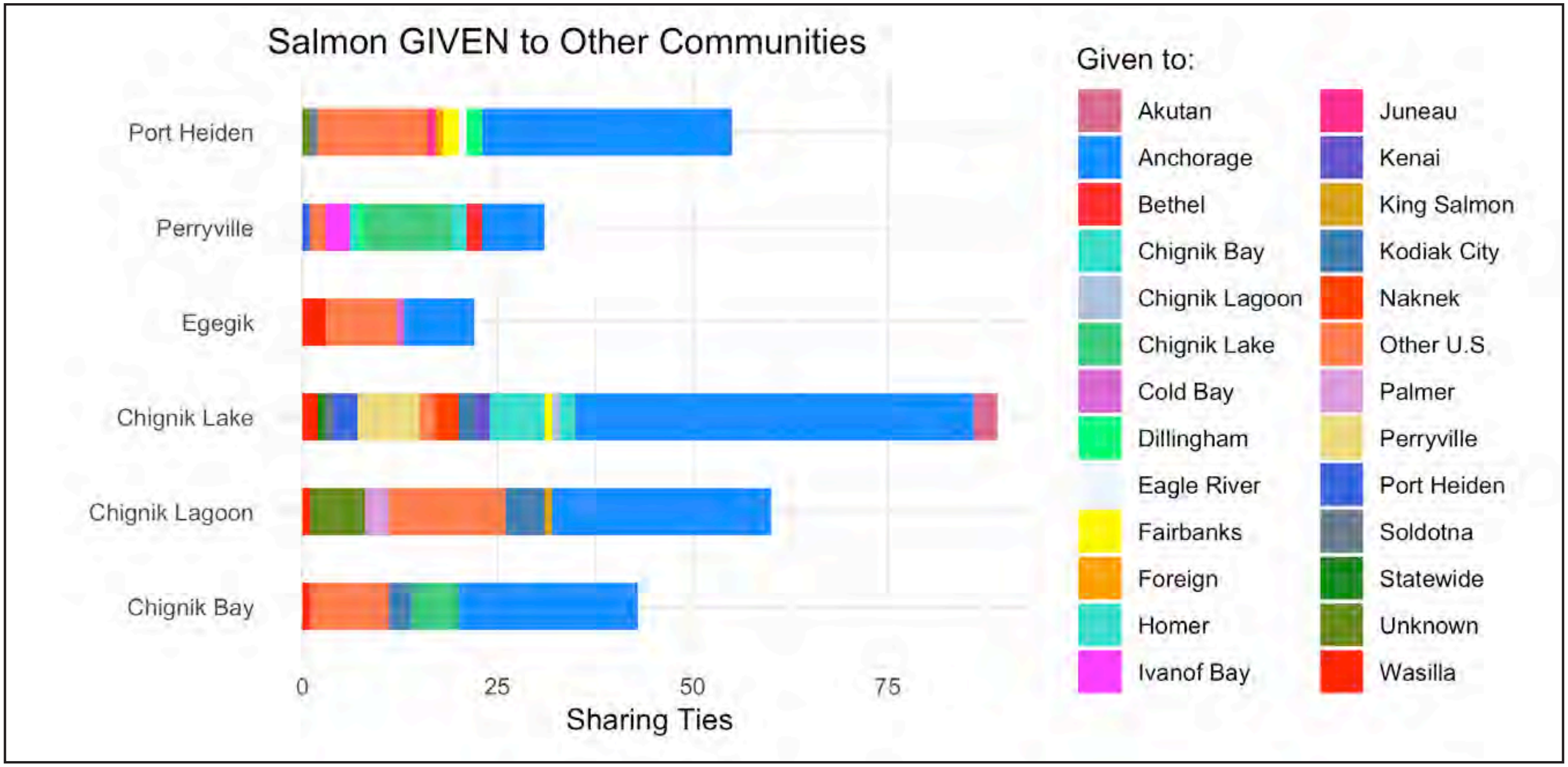

Figure 4-7.–Number of sharing ties based on salmon given to people living outside study communities, by study community, 2016.

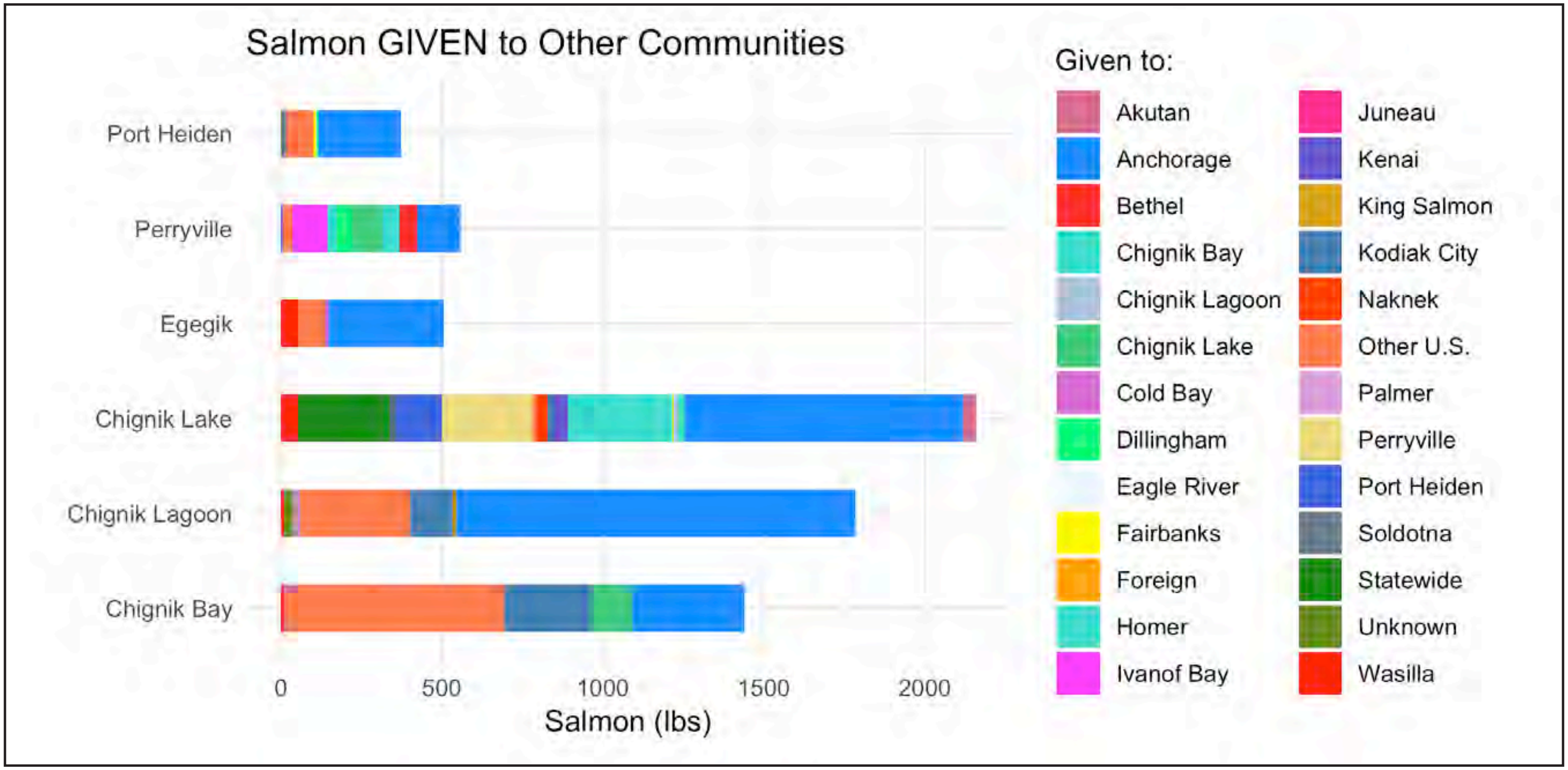

Figure 4-8.–Pounds of salmon given to people living outside study communities, by study community, 2016.

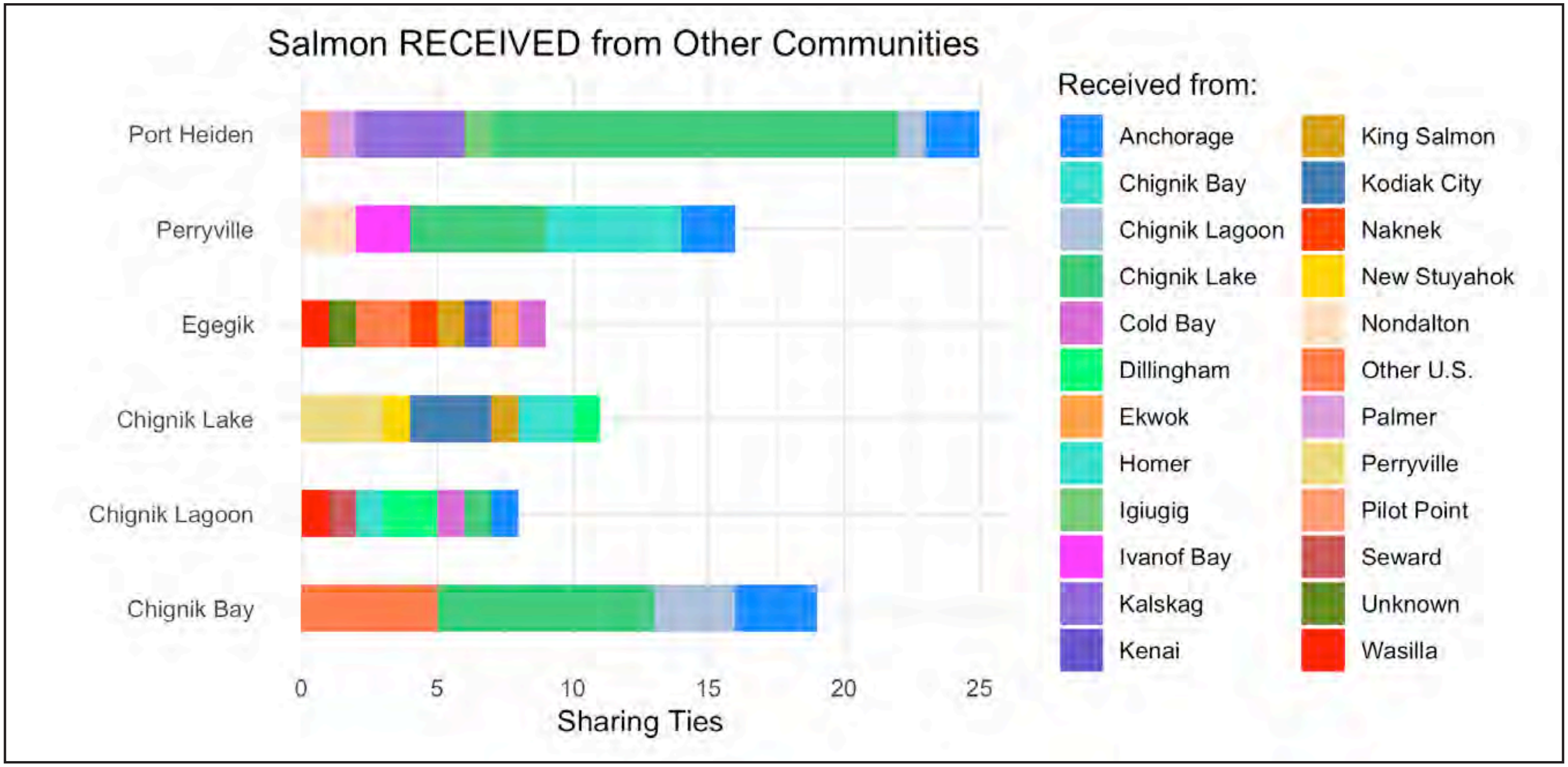

Figure 4-9.–Number of sharing ties based on salmon received from people living outside study communities, by study community, 2016.

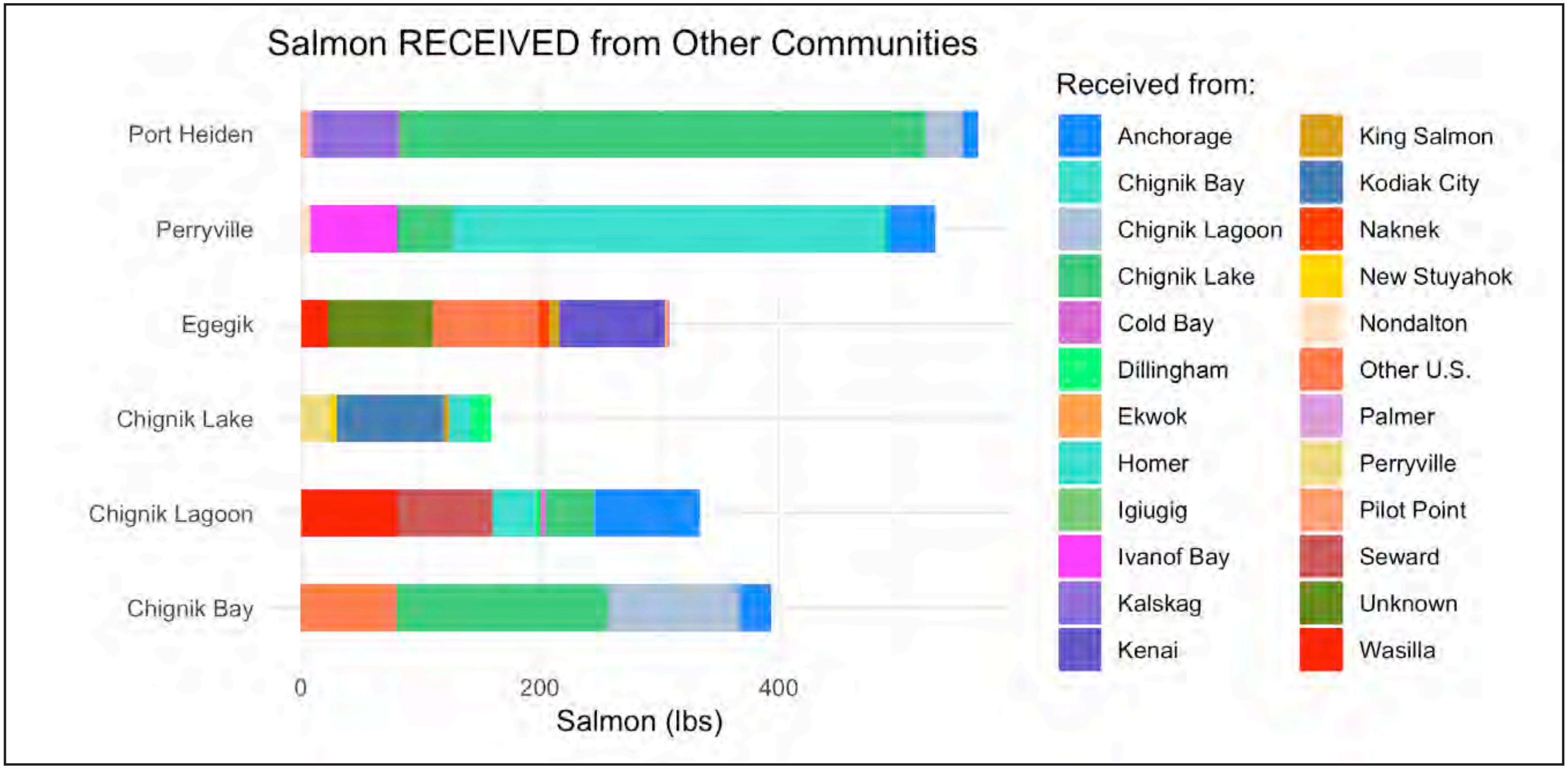

Figure 4-10.–Pounds of salmon received from people living outside study communities, by study community, 2016.

Relations

Table 4-4 shows results for salmon given to and received from people living outside the study communities for each type of relationship, including the number of sharing ties and amount of salmon exchanged in pounds. Figures 4-11 through 4-14 visualize these results to highlight some of the general patterns described below. Across all study communities, sharing ties were most frequent among close family, with 53% of ties (n=207) connected to parents, grandparents, children, grandchildren, and siblings (Table 4-4). Exchanges with extended family were less frequent, representing 14% of the total ties (n=55). Finally, almost one-third (31%) of exchanges occurred with "other relations" (n=122), a category that includes friends and close acquaintances. There was a similar pattern in the amount of salmon exchanged across different types of social relations. About 51% of the total pounds of salmon exchanged flowed through ties with close family, while about 14% was exchanged with extended family, and about 35% with friends and acquaintances. Interestingly, the balance between salmon given to and received from people outside the study communities differs according to the relationships that connect people. Salmon were given to close family nearly five times more frequently than salmon were received from close family, while the ratio between the number of ties that gave and received salmon was more balanced for friends. Other relations were given salmon from study communities nearly two times more frequently than they sent salmon. A similar contrast between close family and friends held for amounts of salmon exchanged, though the difference in ratios between salmon given to and received by close family (four times more given) and friends (nearly two times more given) was less pronounced. The balance between giving and receiving salmon for extended family showed the same pattern as for close family but was more pronounced, with salmon given 8 times more frequently by the study communities resulting in 10 times a greater amount of salmon received by extended-family households. Similar to the analysis of exchange partner locations by community, patterns of relations with exchange partners varied across communities; these patterns are visualized in figures 4-15 through 4-18. While these results reflect the overall patterns observed in non-local networks in this study, it is important to keep in mind that non-local networks in each community have unique features, and these are explored in the section "Community Profiles" that follows.

Trade Networks

This project included a new module designed to distinguish between exchanges where salmon is shared without expectation of any kind of return from exchanges where salmon is exchanged non-commercially for other commodities (barter) or small amounts of money (customary trade). The survey asked participants, "During the last year, did anyone living in your household buy, sell, or trade for subsistence-caught salmon?" The format of this module mirrored the non-local networks module, with similar follow-up questions asked to gather more information about the exchanges, including the type of exchange (bought, sold, traded) and items exchanged (type, units, amounts). However, the trade networks module included exchanges that occurred among people within a study community as well as exchanges that occurred with people living outside the study community.

Compared to local networks and non-local networks, the survey effort documented relatively few ties in trade networks for salmon. Across all study communities combined, survey results documented 21 exchanges of salmon for money, goods, or services, including 8 in Chignik Bay, 6 in Chignik Lagoon, 1 in Chignik Lake, 6 in Perryville, 0 in Port Heiden, and 0 in Egegik. Two-thirds of these exchanges occurred with people living outside study communities, including Anchorage, Kodiak, several other locations in Alaska, and other U.S. states, though most of these exchanges occurred in the study communities or through the mail. The majority of these exchanges occurred with people who were not family, but instead were coded as "other relationship," although researchers noted that respondents generally did not consider these people to be close friends. Items exchanged for salmon included other subsistence resources—such as sablefish, caribou, and salmonberries—as well as material objects (e.g., glass floats) and cash. Due to the limited number of data produced on trade networks, analysis was restricted to this basic description of the entire sample and did not examine trade networks separately for each community.

Table 4-4.–Descriptive statistics for non-local networks, by relationship, all study communities, 2016

	Giving to			Receiving from			Total		
Relation	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Children	51	1,786	35	9	139	16	60	1,925	32
Extended family	49	1,126	23	6	109	18	55	1,235	22
Grandchildren	10	187	19	3	19	6	13	206	16
Grandparent	3	235	78				3	235	78
Missing	3	35	12	1	9	9	4	44	11
Other relations	76	1,902	25	46	1,263	28	122	3,165	26
Parents	65	979	15	6	133	22	71	1,112	16
Siblings	43	565	13	17	620	36	60	1,185	20

Source ADF&G Division of Subsistence household surveys, 2017.

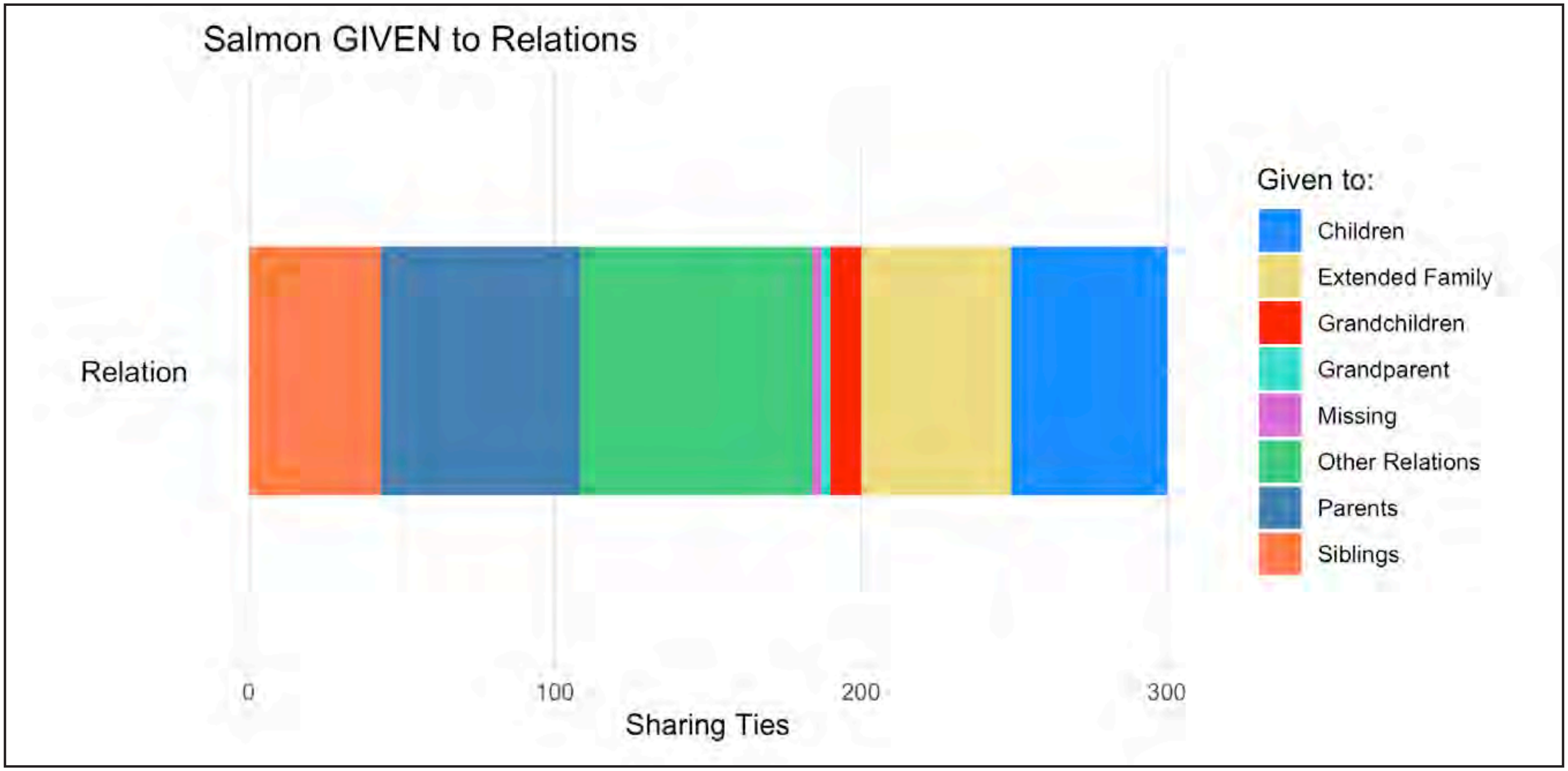

Figure 4-11.–Number of sharing ties based on salmon given to different relations living outside study communities, all study communities, 2016.

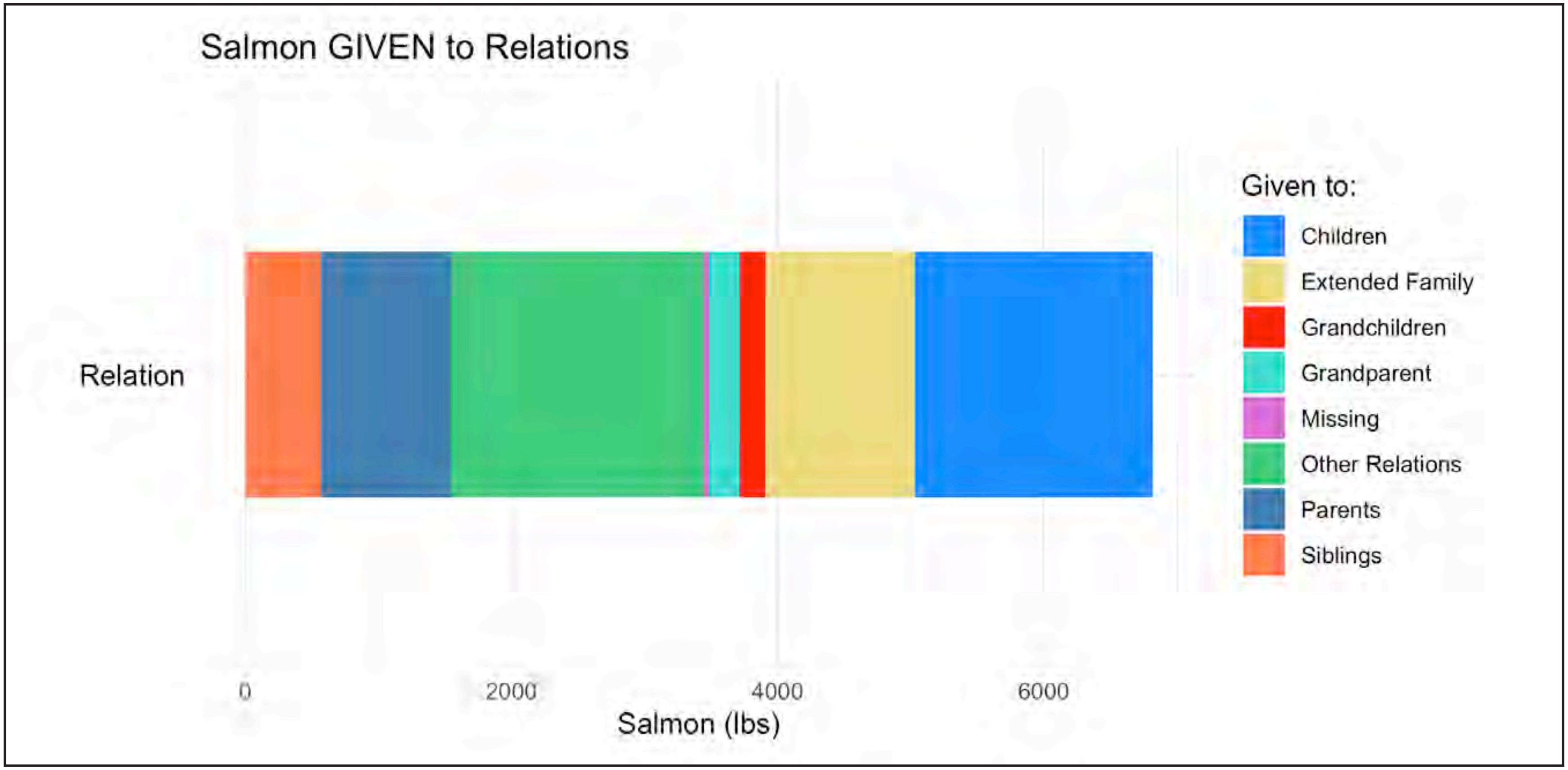

Figure 4-12.–Pounds of salmon given to different relations living outside study communities, all study communities, 2016.

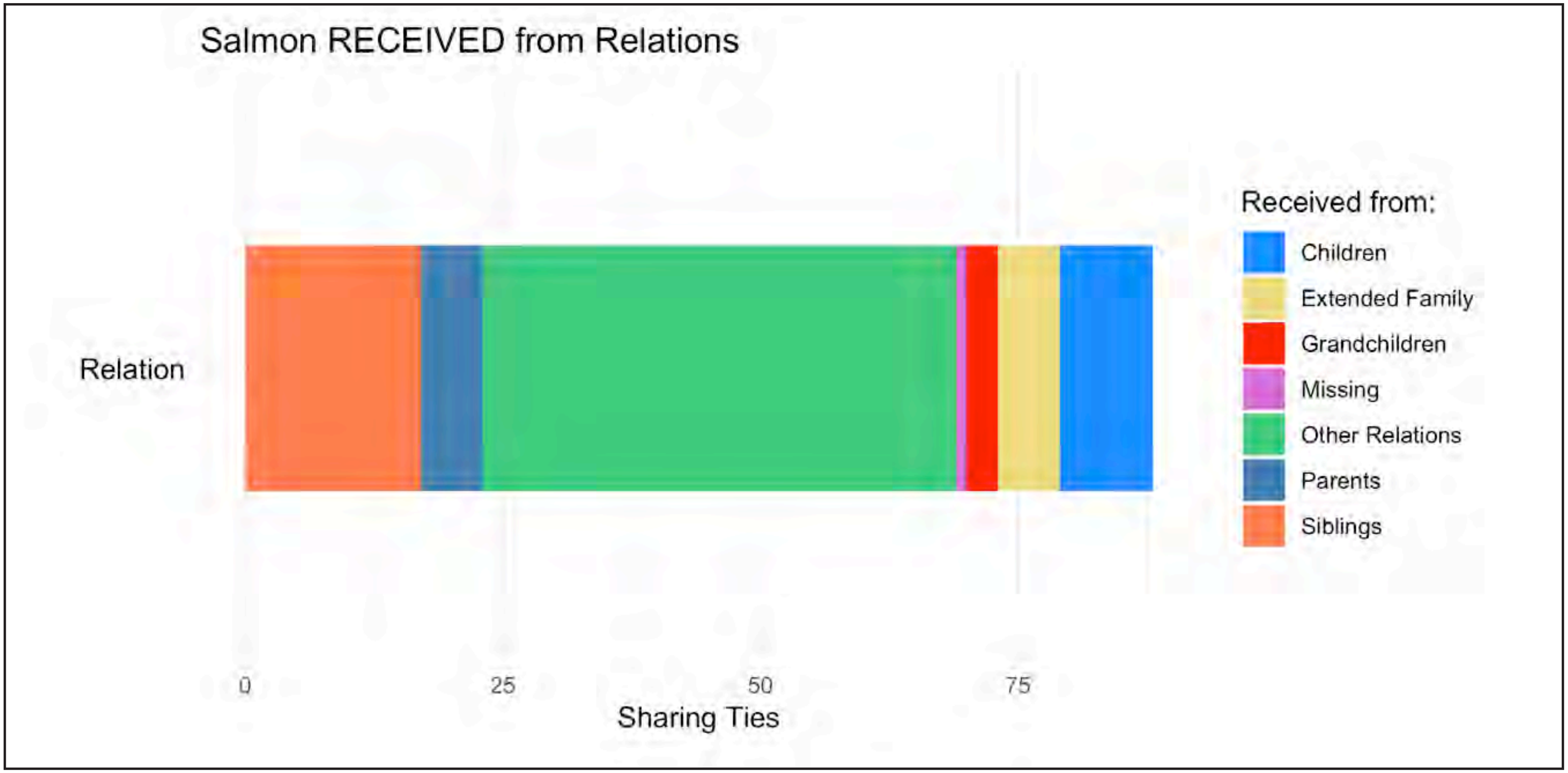

Figure 4-13.–Number of sharing ties based on salmon received from different relations living outside study communities, all study communities, 2016.

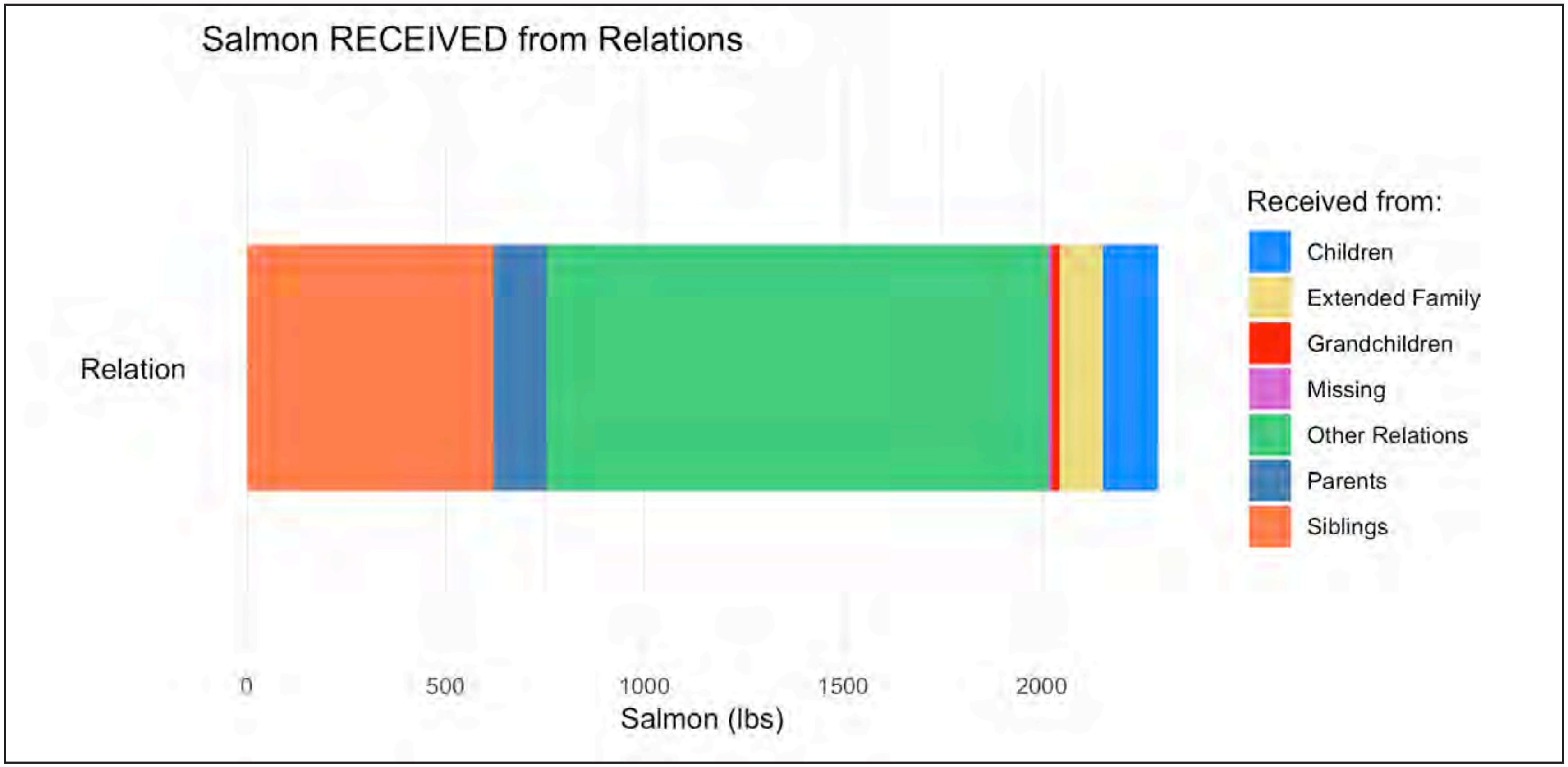

Figure 4-14.–Pounds of salmon received from different relations living outside study communities, all study communities, 2016.

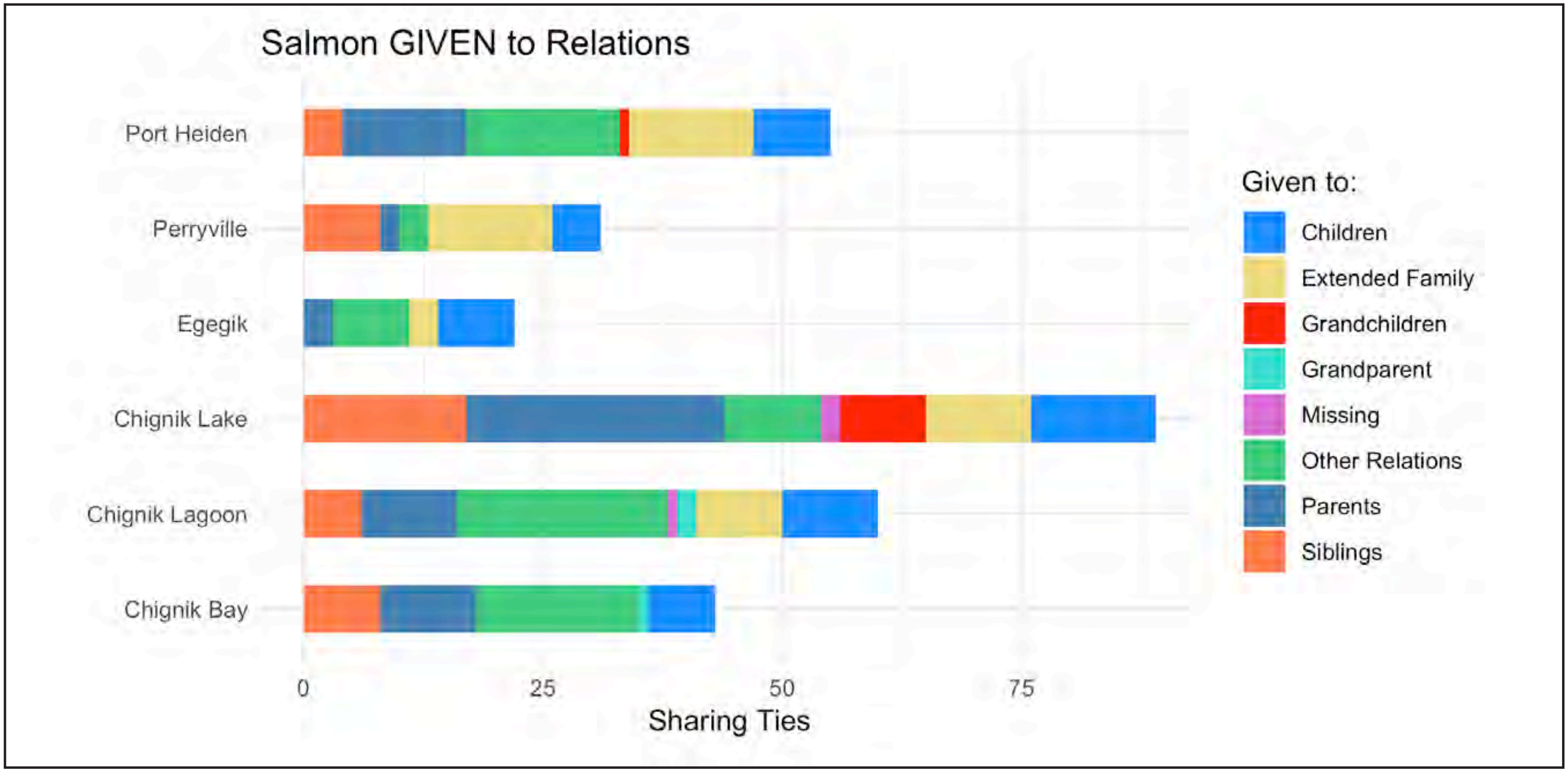

Figure 4-15.–Number of sharing ties based on salmon given to different relations living outside study communities, by study community, 2016.

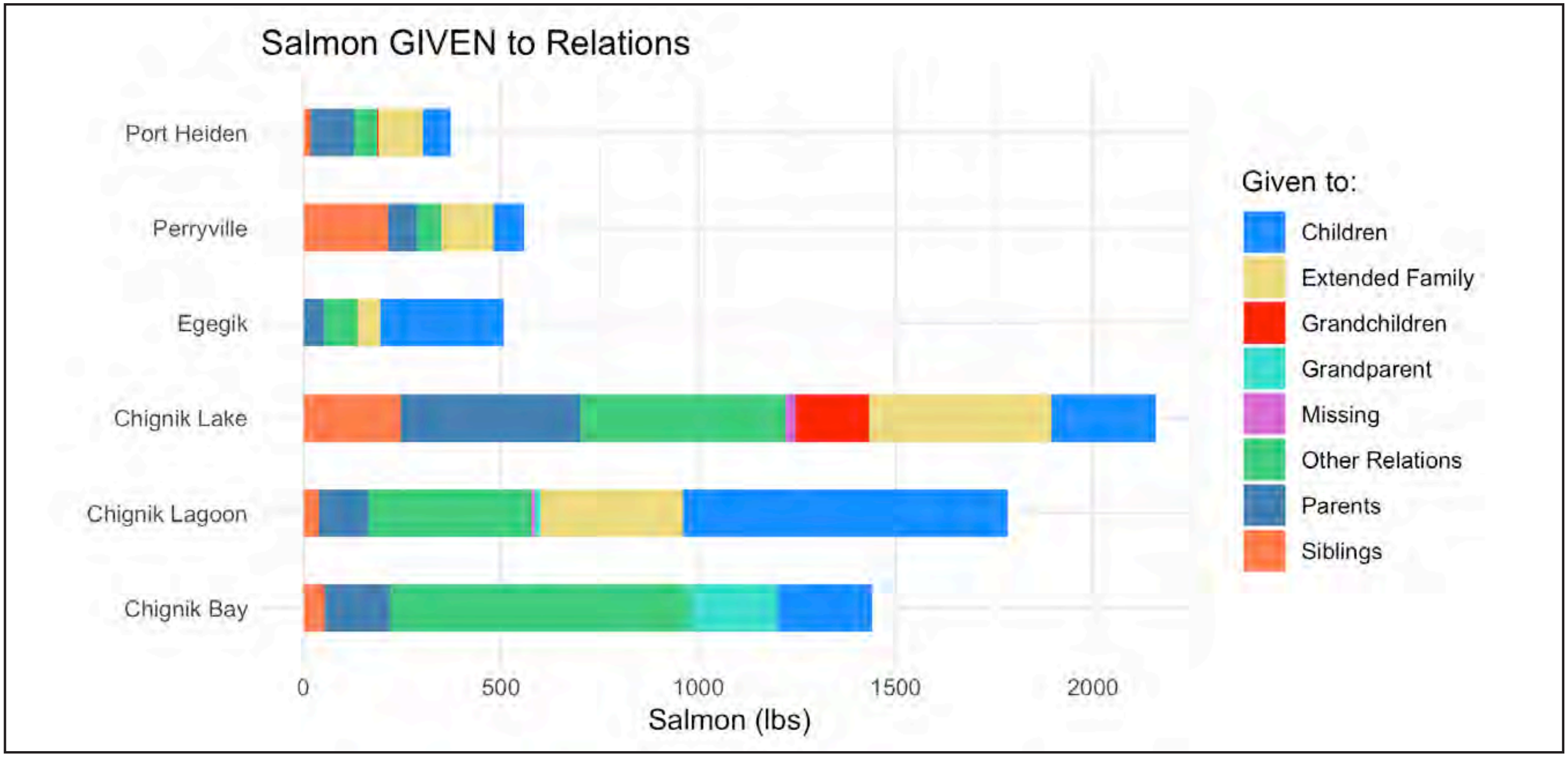

Figure 4-16.–Pounds of salmon given to different relations living outside study communities, by study community, 2016.

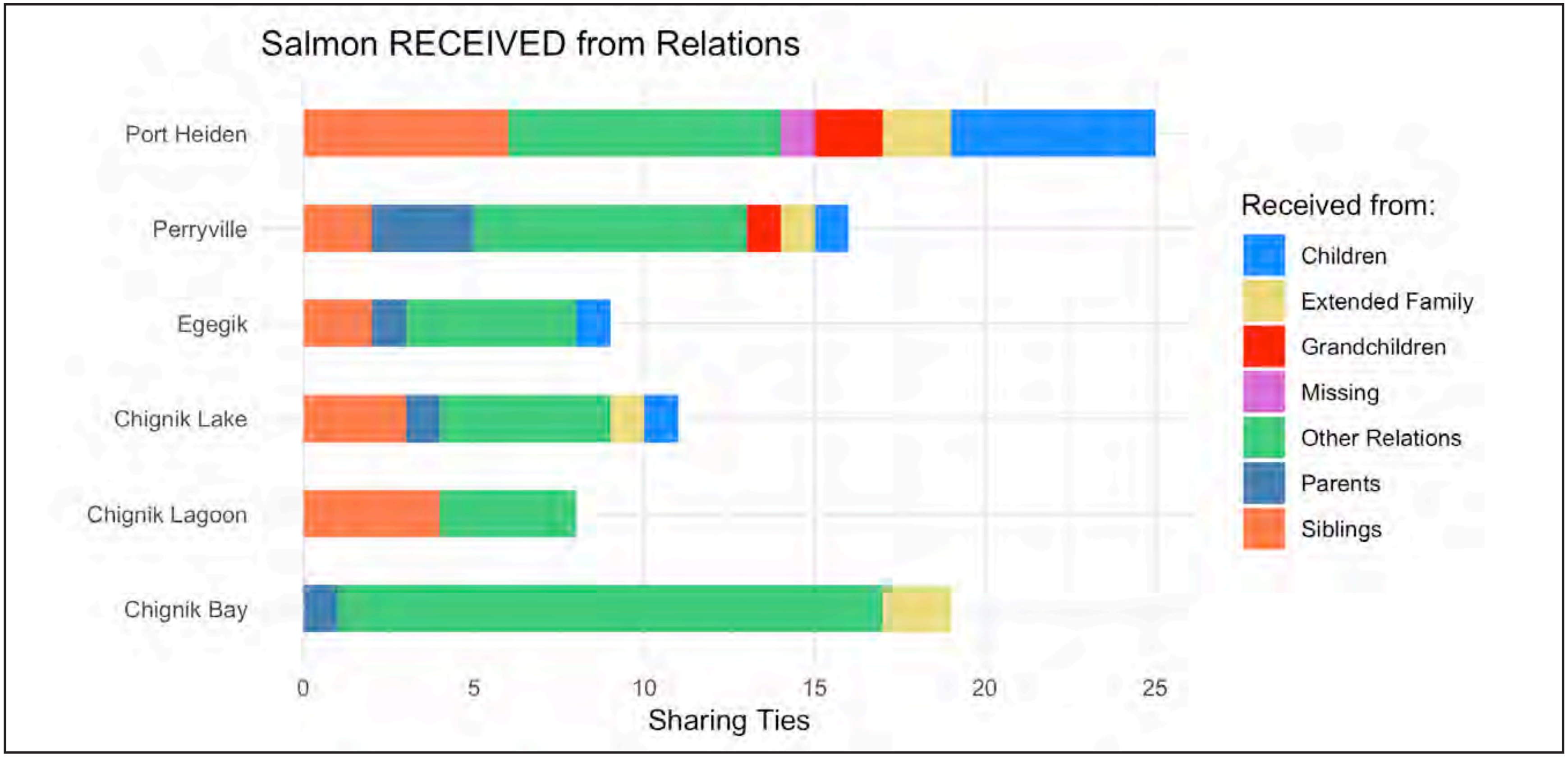

Figure 4-17.–Number of sharing ties based on salmon received from different relations living outside study communities, by study community, 2016.

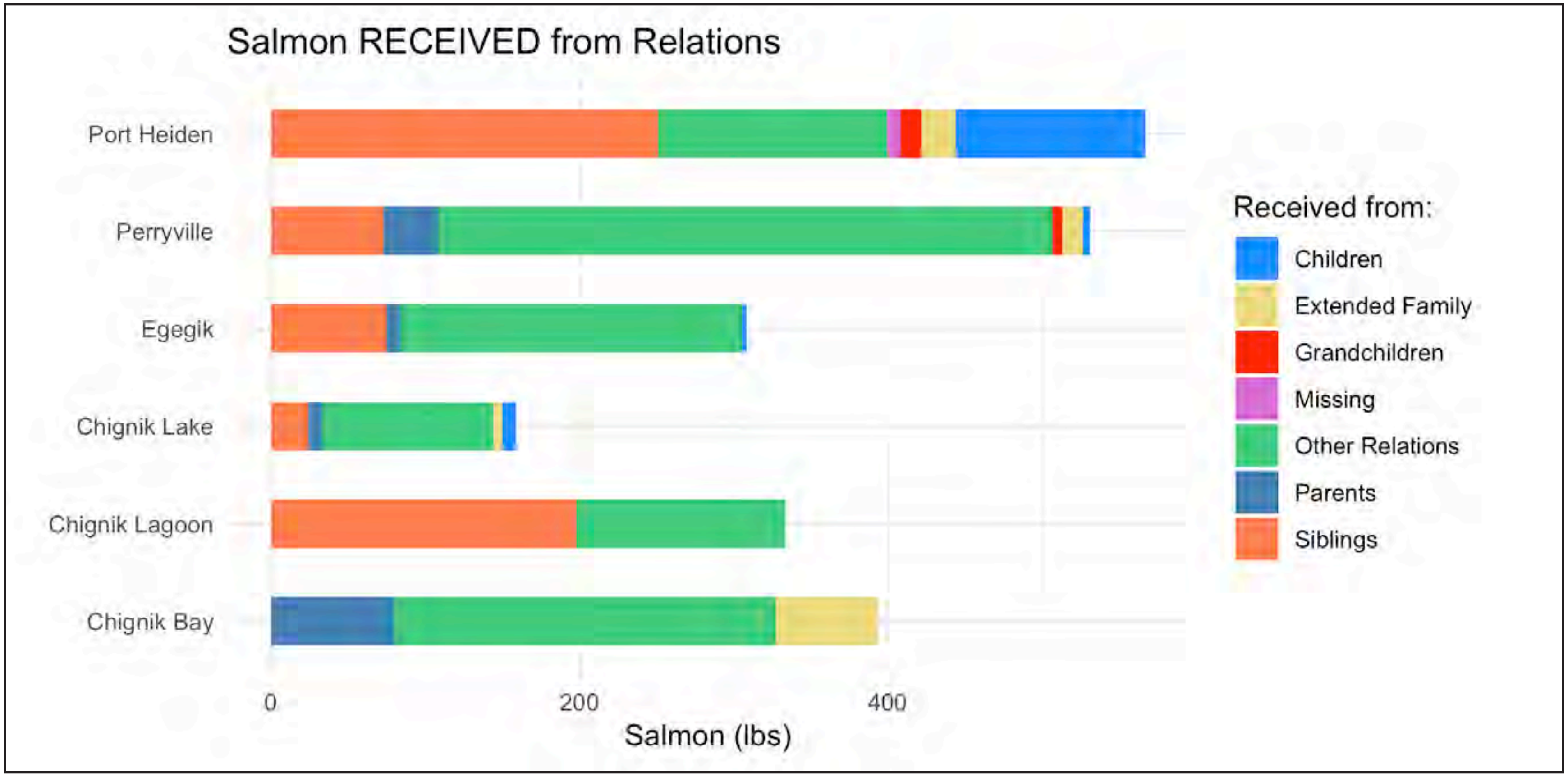

Figure 4-18.–Pounds of salmon received from different relations living outside study communities, by study community, 2016.

Community Profiles

Chignik Bay

Local Networks

In Chignik Bay, the local network featured 25 households, including 1 household that did not participate in the survey but was connected to at least 1 household that did (Figure 4-19). The survey documented 47 connections among these households, including 9 harvesting connections, 9 processing connections, and 29 sharing connections (Table 4-5; Figure 4-19). In the combined network, households averaged 3.1 ties, with a range of 0–11 ties.

As shown in the harvesting and processing networks, a relatively small number of households reported working with other households for subsistence salmon production (8 harvesting; 11 processing) (Table 4-5; Figure 4-19). Moreover, the connections among these households were generally disconnected. In the harvesting network, there was a large component of households, but it was composed mostly of pairs of households with few shared mutual ties, generating only one transitive triad. In the processing network, households were divided across four small components, with only one transitive triad in the largest component. This suggests that social relationships played a limited role in subsistence salmon production with small groups of households working together to produce salmon, leading to clusters of relatively disconnected households at the community level. Interestingly, the structure of the sharing network was quite different: 22 households were involved in sharing subsistence salmon, and all but 5 households were part of a single, large component encompassing almost the entire community. Still, there were only three transitive triads in the sharing network, suggesting that sharing connected different parts of the network rather than occurring within cohesive clusters of households. Comparing the harvesting, processing, and sharing networks suggests that while salmon production was achieved by relatively isolated groups of households, the distribution of salmon brought almost all the households in the community together. This is evident in the combined network, where a single, large component included all but five households in the community.

Non-Local Networks

In Chignik Bay, the survey documented a total of 62 instances of people giving salmon to or receiving salmon from outside the community, with a total of 1,833 lb of salmon flowing through these sharing ties (Table 4-6). Figure 4-20 visualizes this network and the flow of salmon to and from Chignik Bay and other parts of Alaska and places in other U.S. locations. Salmon given by residents of Chignik Bay to people living outside the community represented the majority of non-local sharing ties (69%) and weight of salmon exchanged (79%) (Table 4-6). This suggests that Chignik Bay was primarily a source of salmon for other communities, with salmon flowing out of the community more frequently and in greater amounts than salmon flowing into the community.

Location

Chignik Bay's non-local network included sharing ties that connected community members to neighboring study communities (Chignik Lake and Chignik Lagoon), a regional center (Kodiak), the Anchorage metro area (Anchorage and Wasilla), and beyond to other U.S. states (Table 4-6; Figure 4-20). In comparison to the other study communities, Chignik Bay had the fewest ties to other Alaska locations involved in total sharing ties. For salmon given to people outside Chignik Bay, the majority of sharing ties connected to people living in the Anchorage metro area or in other U.S. states; likewise, the majority of the salmon harvest weight shared from Chignik Bay went to those same locations (Figure 4-21; Figure 4-22). Salmon were given to neighboring study communities less frequently and in smaller amounts. Conversely, salmon were received by residents of Chignik Bay from outside the community more frequently from neighboring study communities and in larger amounts than from the Anchorage metro area and other U.S. states (Figure 4-23; Figure 4-24). Together, these results suggest that non-local networks in Chignik Bay primarily involved salmon flowing from the community to the Anchorage metro area and other U.S. states, with a secondary, more reciprocal flow of salmon that existed between Chignik Bay and neighboring study communities.

Relations

For salmon given to recipients from outside Chignik Bay, the majority of shared pounds of salmon was distributed to other relations (a category that included friends) followed by close family overall (parents, siblings, children, and grandparents); no extended family members were given salmon (Table 4-7; Figure 4-25; Figure 4-26). A similar pattern showing the importance of other relations holds for salmon received by residents of Chignik Bay from outside the community (Figure 4-27; Figure 4-28). There were fewer sharing ties and pounds of salmon received by Chignik Bay households from close family compared to the sharing characteristics for giving to close family relations who lived outside the study community; however, two sharing ties occurred with extended family that brought salmon to Chignik Bay. Together, these results suggest that friends play a primary role in non-local networks in Chignik Bay by being actively involved in sending salmon to and receiving salmon from Chignik Bay. Of note, as depicted in Table 4-7, almost the same number of sharing ties with other relations existed in Chignik Bay for giving (17) and receiving (16) salmon, although three times more pounds of salmon were sent from Chignik Bay to other relations than were returned. Close family also played an important role, but primarily as recipients of salmon.

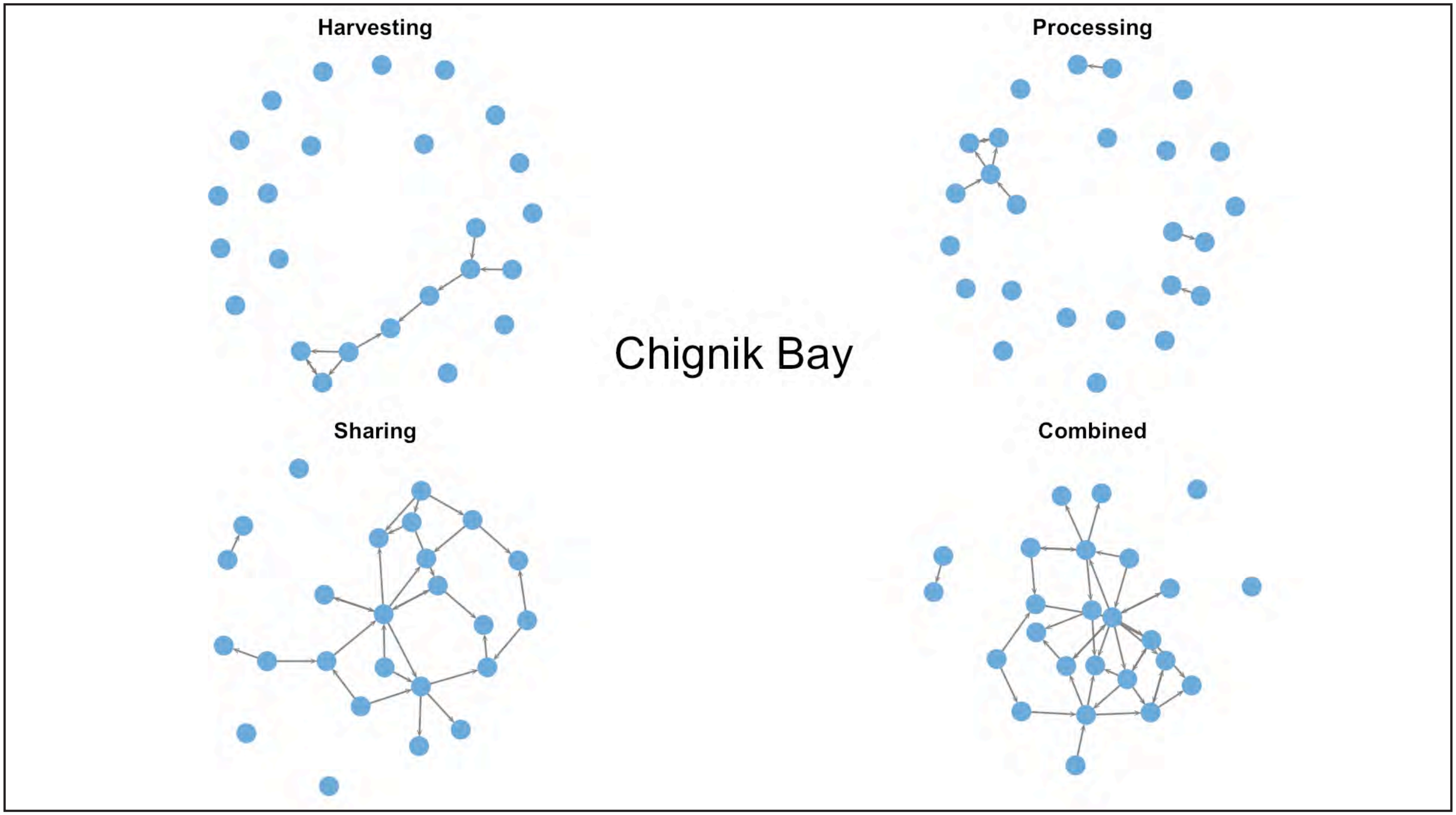

Figure 4-19.–Local networks: harvesting, processing, and sharing ties visualized as separate networks, and combined in a single network, Chignik Bay, 2016.

Table 4-5.–Descriptive statistics for local networks, Chignik Bay, 2016.

Network	Active households	Ties	Density	Components	Reciprocity	Transitivity
Combined	23	47	0.065	4	0.260	0.020
Harvesting	8	9	0.015	18	0.220	0.400
Processing	11	9	0.015	18	0.220	0.330
Sharing	22	29	0.048	5	0.140	0.050

Source ADF&G Division of Subsistence household surveys, 2017.

Table 4-6.–Descriptive statistics for non-local networks, by location, Chignik Bay, 2016.

	Giving to			Receiving from			Total		
Location	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Anchorage	23	348	15	3	27	9	26	375	14
Chignik Lagoon				3	110	37	3	110	37
Chignik Lake	6	133	22	8	177	22	14	310	22
Kodiak City	3	265	88				3	265	88
Other U.S.	10	684	68	5	80	16	15	764	51
Wasilla	1	9	9				1	9	9

Source ADF&G Division of Subsistence household surveys, 2017.

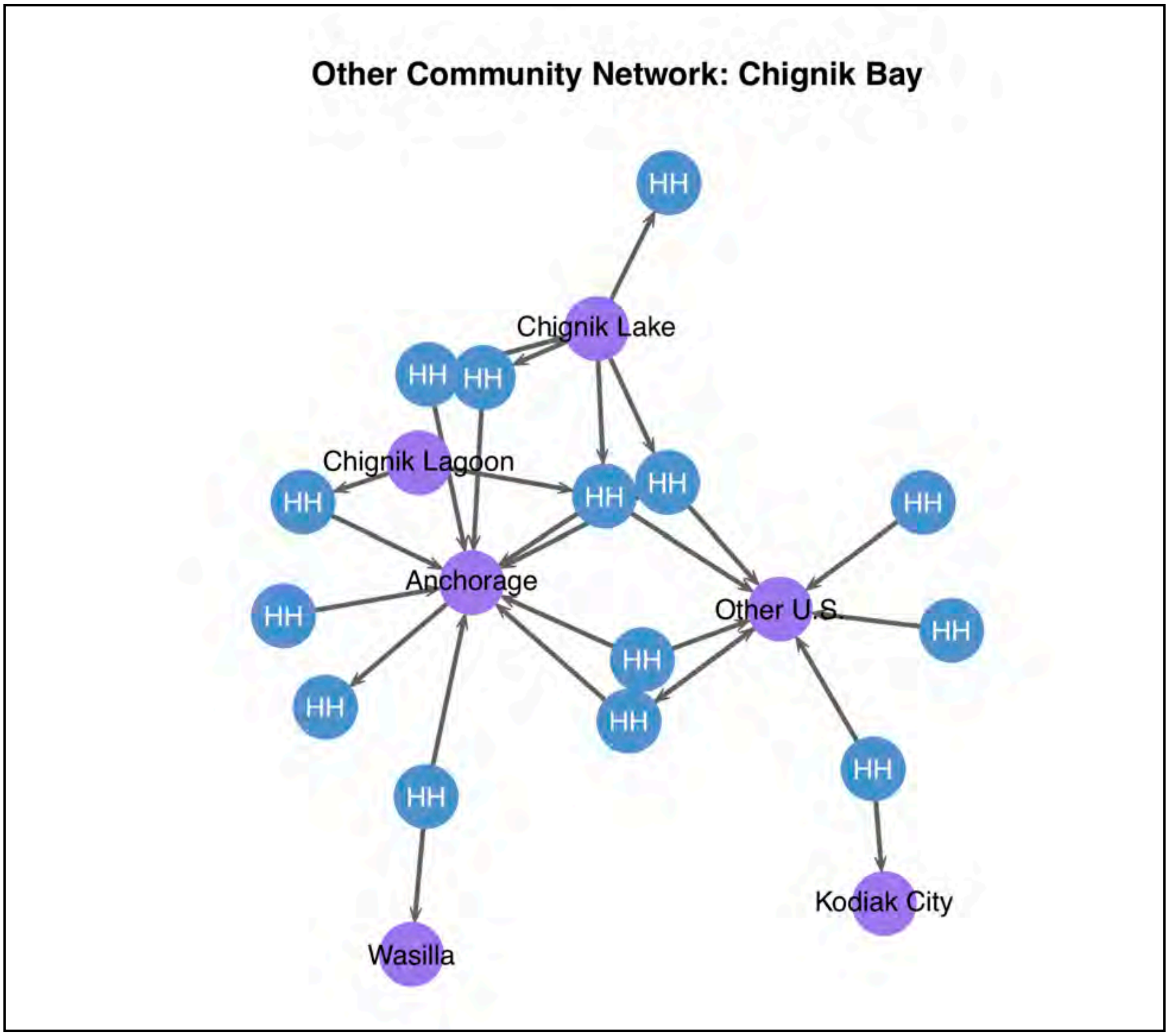

Figure 4-20.–Non-local networks: blue circles represent households in the community, purple circles represent locations of exchange partners, Chignik Bay, 2016.

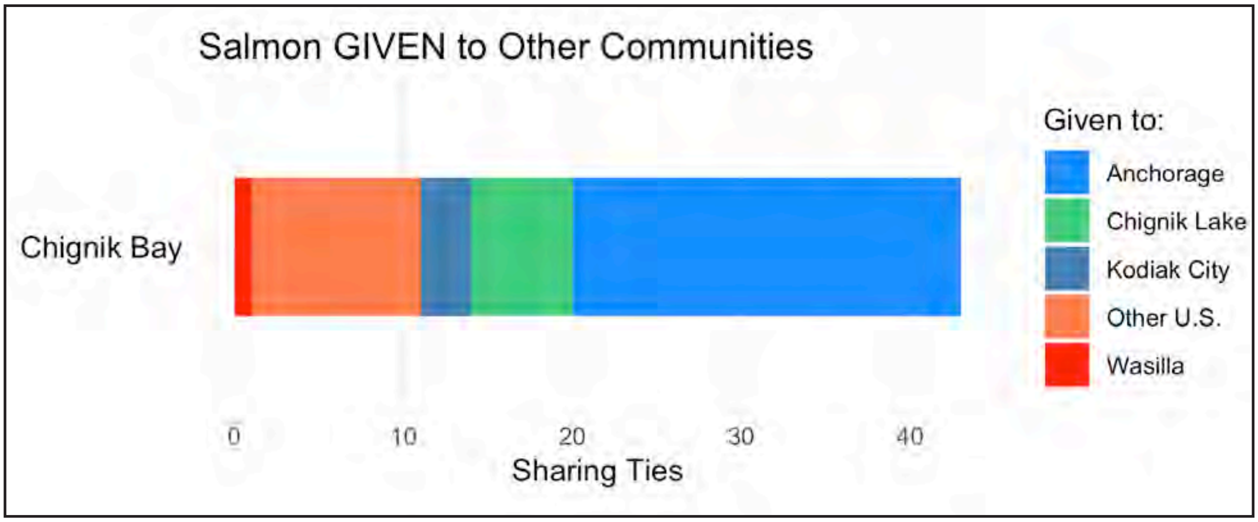

Figure 4-21.–Number of sharing ties based on salmon given to people outside the study community, Chignik Bay, 2016.

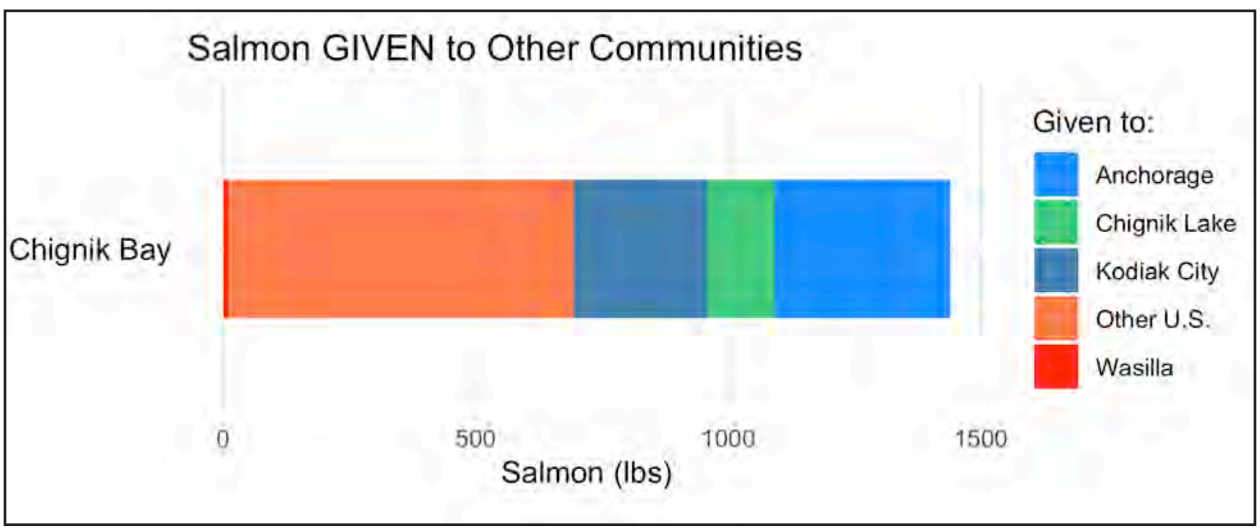

Figure 4-22.–Pounds of salmon given to people outside study community, Chignik Bay, 2016.

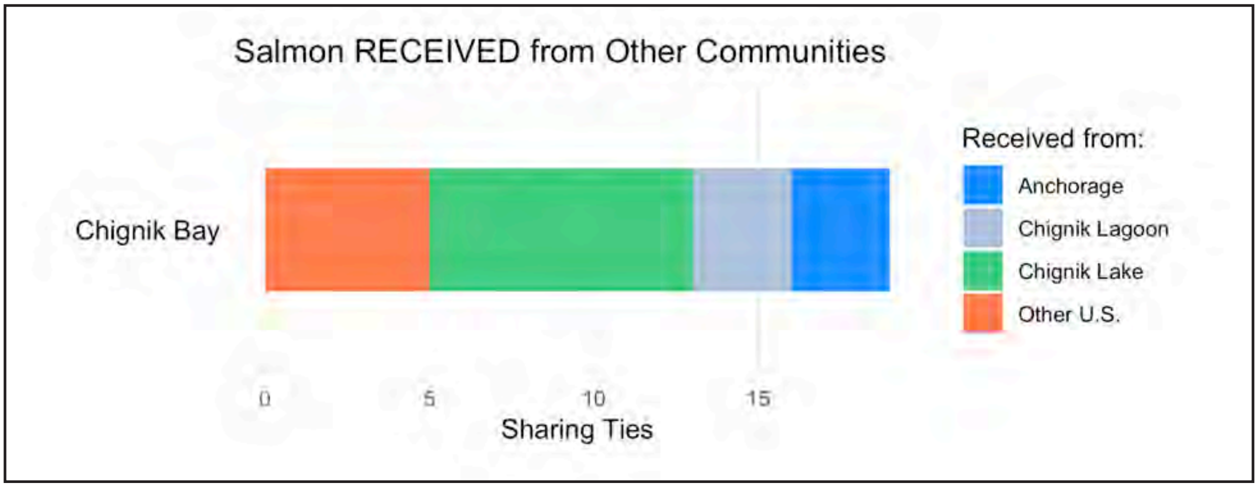

Figure 4-23.–Number of sharing ties based on salmon received from people outside the study community, Chignik Bay, 2016.

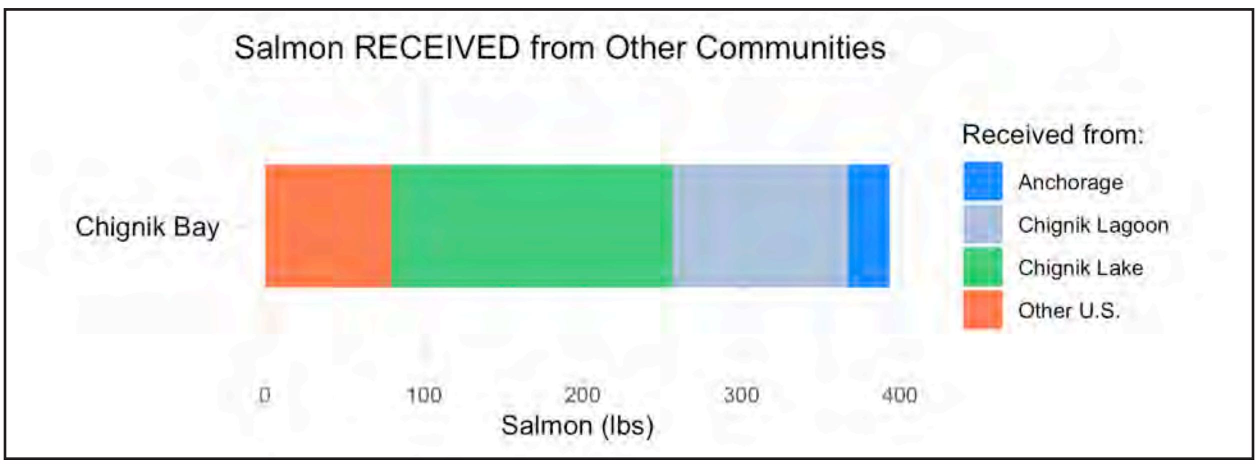

Figure 4-24.–Pounds of salmon received from people outside study community, Chignik Bay, 2016.

Table 4-7.–Descriptive statistics for non-local networks, by relationship, Chignik Bay, 2016.

	Giving to			Receiving from			Total		
Relation	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Children	7	239	34				7	239	34
Extended family				2	66	33	2	66	33
Grandparent	1	221	221				1	221	221
Other relations	17	761	45	16	248	16	33	1,009	31
Parents	10	166	17	1	80	80	11	246	22
Siblings	8	52	6				8	52	6

Source ADF&G Division of Subsistence household surveys, 2017.

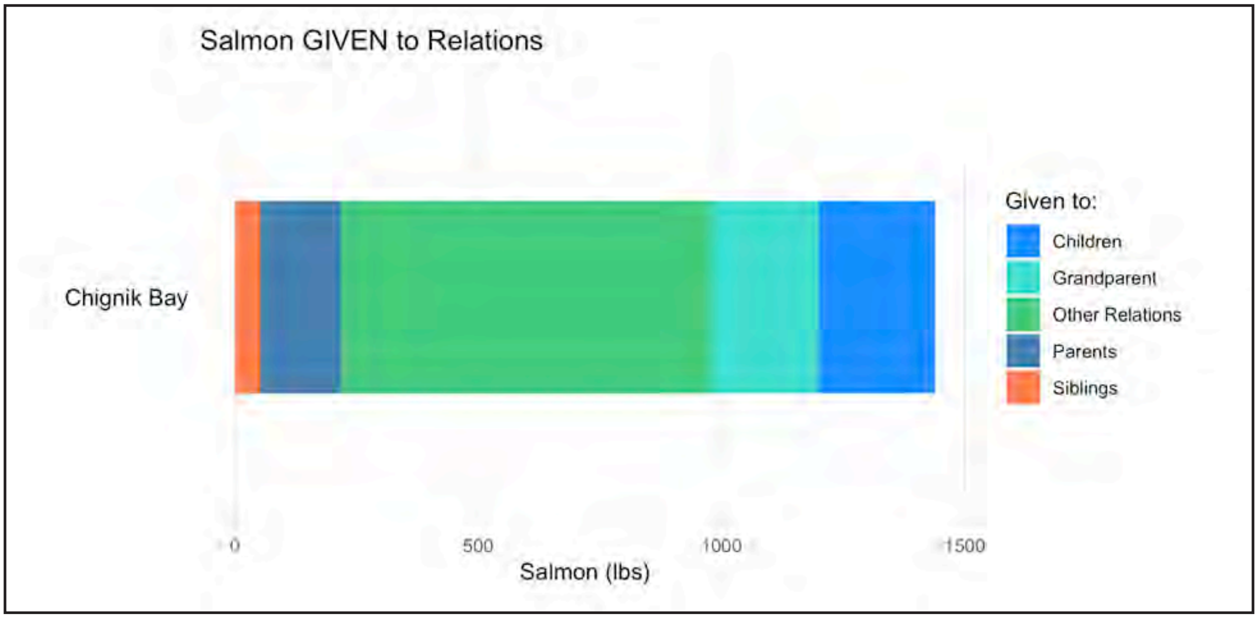

Figure 4-25.–Pounds of salmon given to different relations living outside the study community, Chignik Bay, 2016.

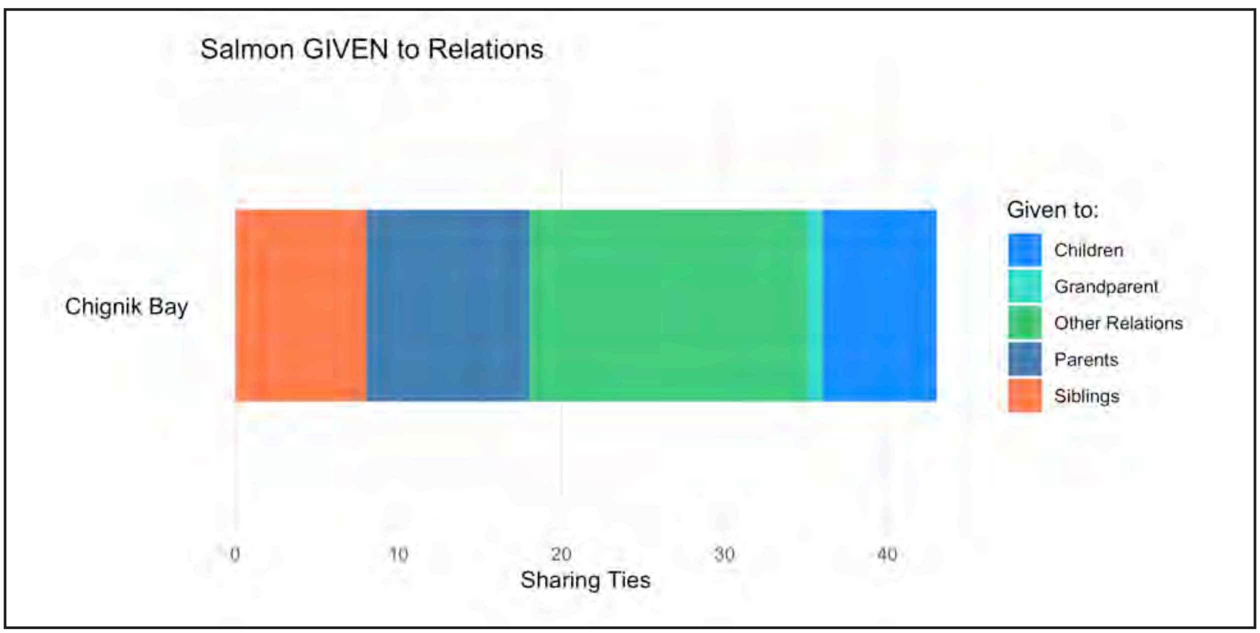

Figure 4-26.–Number of sharing ties based on salmon given to different relations living outside the study community, Chignik Bay, 2016.

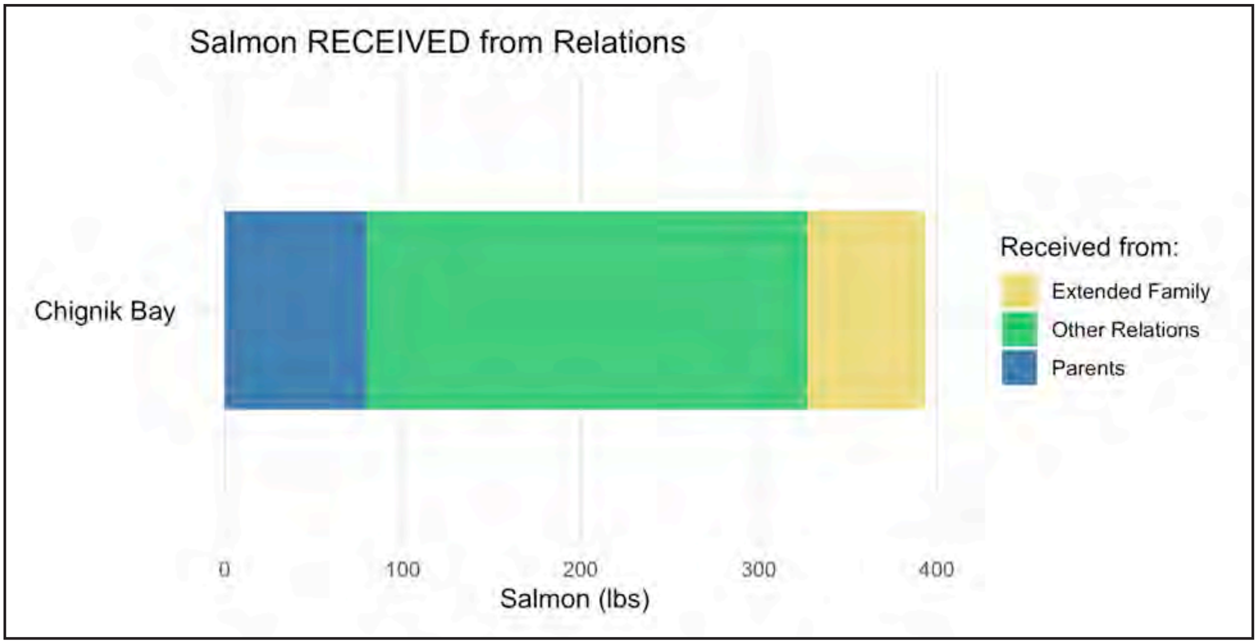

Figure 4-27.–Pounds of salmon received from different relations living outside the study community, Chignik Bay, 2016.

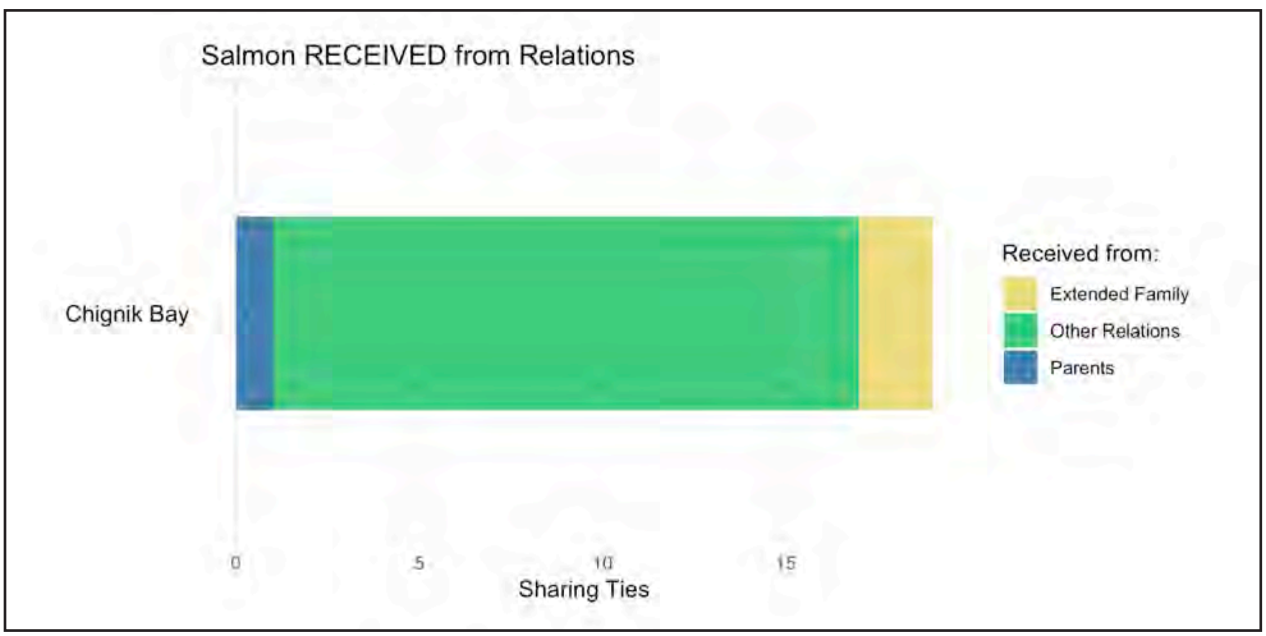

Figure 4-28.–Number of sharing ties based on salmon received from different relations living outside the study community, Chignik Bay, 2016.

Chignik Lagoon

Local Networks

In Chignik Lagoon, the local network featured 24 households, including 4 households that did not participate in the survey but were connected to at least 1 household that did (Figure 4-29). The survey documented 71 connections among these households, including 19 harvesting connections, 30 processing connections, and 22 sharing connections (Table 4-8; Figure 4-29). In the combined network, households averaged 4.2 connections, with a range of 0–14.

More than one-half of the households in Chignik Lagoon were involved in the harvesting and processing networks, and these networks shared the same structure: three clusters of households and transitive triads that indicate coordination through multiple, overlapping connections within each cluster (Table 4-8; Figure 4-29). A higher proportion of households (20 of 24) participated in the sharing network. The structure of the sharing network was also more cohesive than the production networks, with a single, large component connecting almost every household in the community directly or indirectly. However, transitivity was lower in the sharing network than the production networks, which is an indication that sharing relationships extended beyond the relatively more concentrated and overlapping relationships that underlie harvesting and processing.

Non-Local Networks

In Chignik Lagoon, the survey documented a total of 68 instances of people giving salmon to or receiving salmon from outside the community, with a total of 2,116 lb of salmon flowing through these sharing ties (Table 4-9). Figure 4-30 visualizes this network and the flow of salmon to and from Chignik Lagoon and other parts of Alaska and places in other U.S. locations. Salmon given by residents of Chignik Lagoon to people living outside the community represented the majority of total non-local sharing ties (88%) and salmon harvest weight exchanged (84%) (Table 4-9). This suggests that Chignik Lagoon was primarily a source of salmon for other communities, with salmon flowing out of the community more frequently and about five times as many pounds of salmon flowing out of the community than into the community.

Location

Chignik Lagoon's non-local network included sharing ties that connect community members to a neighboring study community (Chignik Lake), regional centers (Kodiak, Dillingham, and King Salmon), the Anchorage metro area (Anchorage, Palmer, and Wasilla), and beyond to other U.S. states (Table 4-9). For salmon given to people who lived outside Chignik Lagoon, the majority of sharing ties and shared pounds of salmon were connected to people living in the Anchorage metro area or in other U.S. states (Figure 4-31; Figure 4-32). Salmon was given to regional centers and other parts of Alaska less frequently and in smaller amounts: only 8% of the salmon harvest weight that was given away by Chignik Lagoon households went to an Alaska community that was not in the Anchorage metro area (Table 4-9). Conversely, as depicted in Figure 4-33 and Figure 4-34, there is no discernable pattern in the locations that send salmon to residents of Chignik Lagoon. In comparison to the number of Chignik Lagoon sharing ties stemming from salmon sent outside the community, there were relatively fewer sharing ties (8) and fewer pounds of salmon received by Chignik Lagoon households from residents of a variety of locations (Table 4-9). Together, these results indicate that non-local networks in Chignik Lagoon primarily involved salmon flowing from the community to the Anchorage metro area and other U.S. states. The secondary, more reciprocal flow of salmon among neighboring study communities that was observed in other study communities (e.g., Chignik Bay, Chignik Lake, Perryville, and Port Heiden) is not evident in the responses of survey participants in Chignik Lagoon.

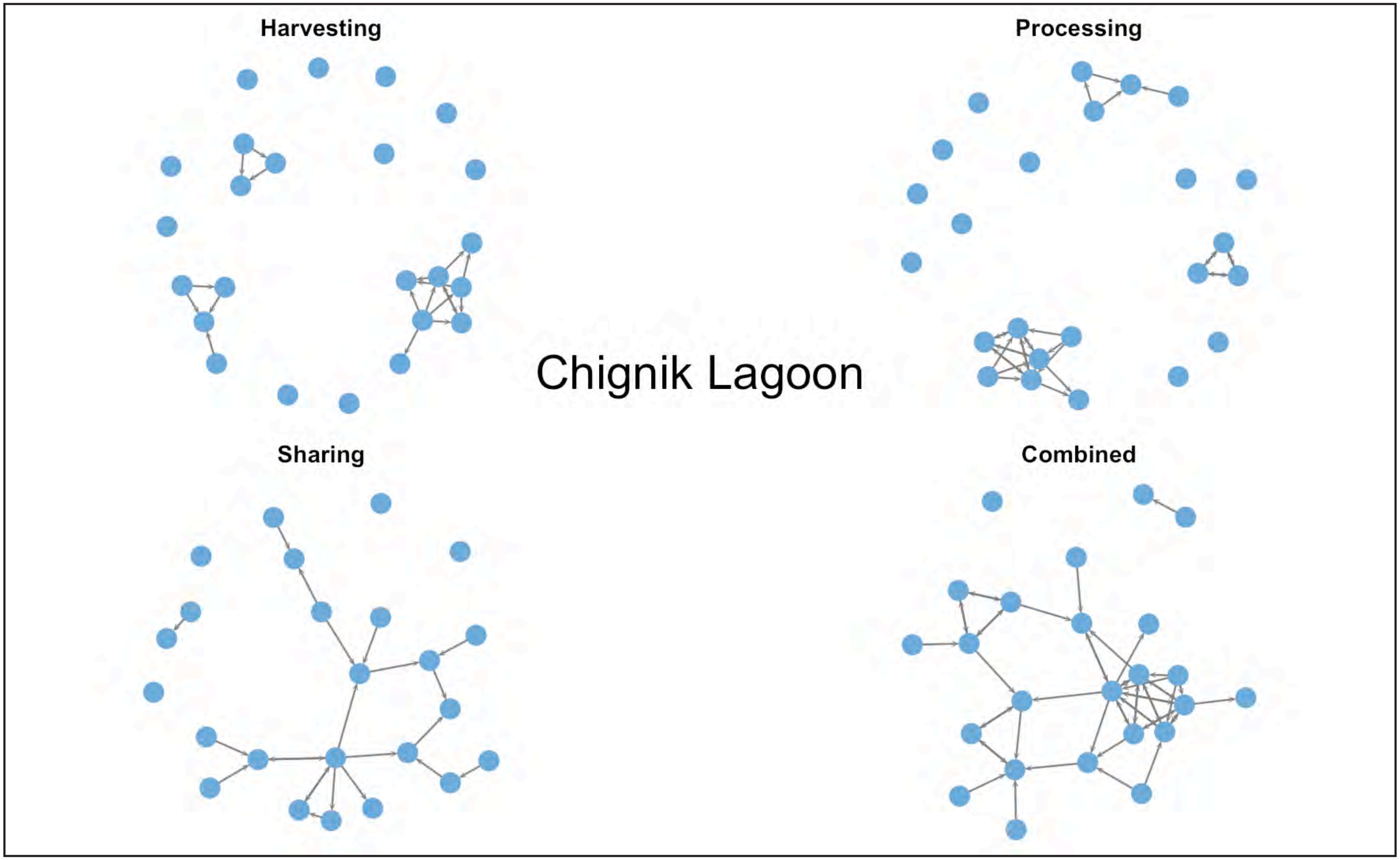

Figure 4-29.–Local networks: harvesting, processing, and sharing ties visualized as separate networks, and combined in a single network, Chignik Lagoon, 2016.

Table 4-8.–Descriptive statistics for local networks, Chignik Lagoon, 2016.

Network	Active households	Ties	Density	Components	Reciprocity	Transitivity
Combined	23	71	0.092	3	0.590	0.540
Harvesting	14	19	0.034	13	0.110	0.580
Processing	14	30	0.054	13	0.600	0.760
Sharing	20	22	0.040	6	0.180	0.050

Source ADF&G Division of Subsistence household surveys, 2017.

Table 4-9.–Descriptive statistics for non-local networks, by location, Chignik Lagoon, 2016.

	Giving to			Receiving from			Total		
Location	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Anchorage	28	1,240	44	1	89	89	29	1,329	46
Chignik Lake				1	40	40	1	40	40
Cold Bay				1	4	4	1	4	4
Dillingham				2	4	2	2	4	2
Homer				1	36	36	1	36	36
King Salmon	1	9	9				1	9	9
Kodiak City	5	134	27				5	134	27
Other U.S.	15	340	148				15	340	148
Palmer	3	21	7				3	21	7
Seward				1	80	80	1	80	80
Unknown	7	31	4				7	31	4
Wasilla	1	8	8	1	80	80	2	88	44

Source ADF&G Division of Subsistence household surveys, 2017.

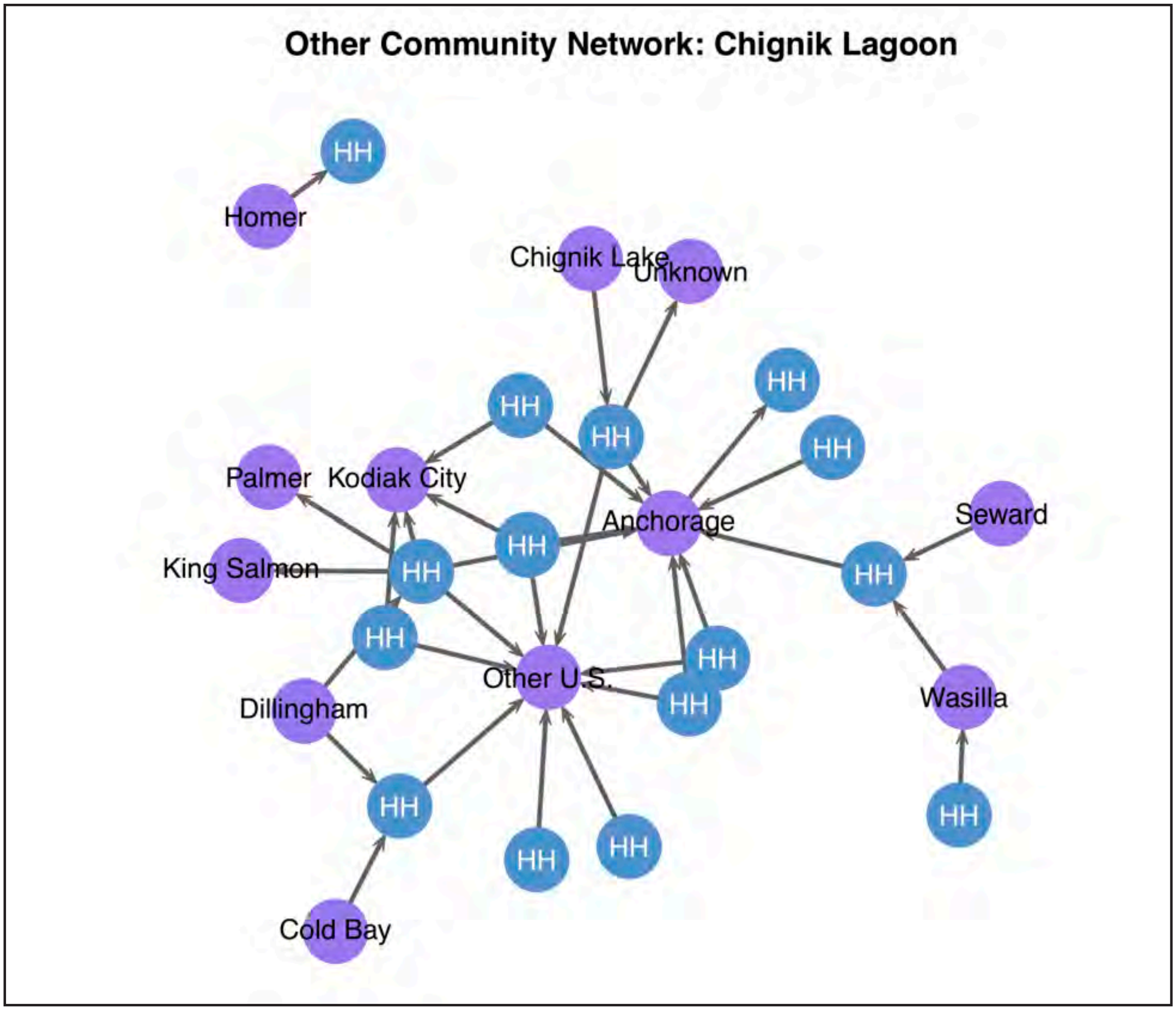

Figure 4-30.–Non-local networks: blue circles represent households in the community, purple circles represent locations of exchange partners, Chignik Lagoon, 2016.

Relations

For salmon given to locations outside Chignik Lagoon, the majority of sharing ties (47%) and pounds of shared salmon (56%) went to close family overall, followed by other relations (likely friends) and then extended family (Table 4-10). Extended family were given nearly the same shared salmon weight as other relations (361 lb and 414 lb, respectively), although the number of sharing ties to extended family was less than for other relations (9 ties and 22 ties, respectively) (Table 4-10; Figure 4-35; Figure 4-36). For salmon received by residents of Chignik Lagoon from outside the community, an equal number of sharing ties, and nearly equal total pounds of salmon, were received from friends and close family (siblings) (Figure 4-37; Figure 4-38). Together, these results suggest that friends played a primary role in non-local networks in Chignik Lagoon by being actively involved in sending salmon to and receiving salmon from Chignik Lagoon; note, however, that friends might be seasonal residents of the Chignik Area who are engaged in commercial fishing. Close family frequently received salmon from relatives in Chignik Lagoon, and in the case of siblings, sent large amounts to Chignik Lagoon, although not nearly by the same proportion as what was sent from the study community.

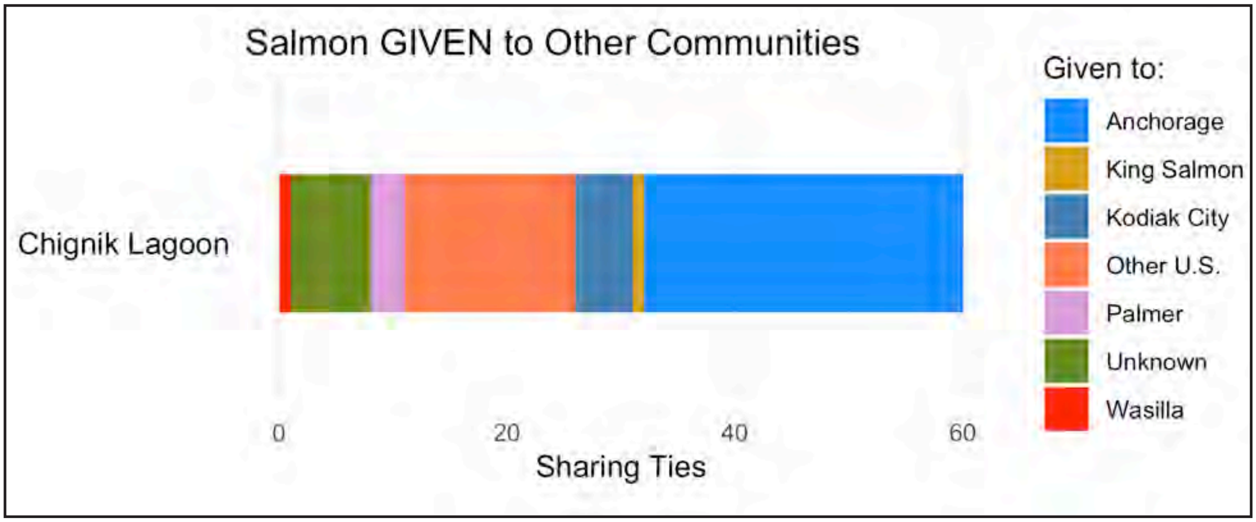

Figure 4-31.–Number of sharing ties based on salmon given to people outside the study community, Chignik Lagoon, 2016.

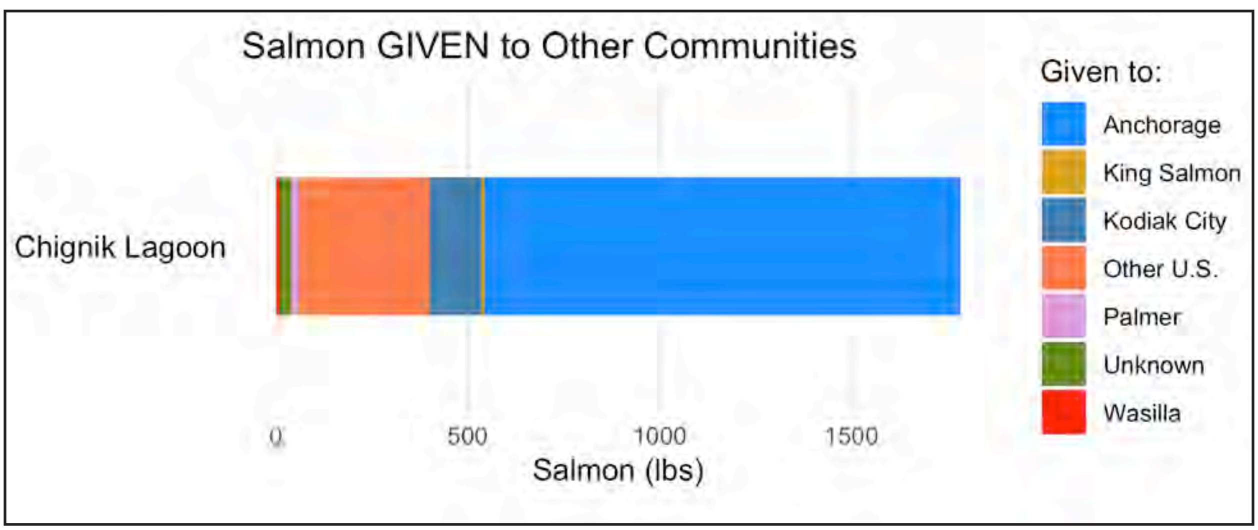

Figure 4-32.–Pounds of salmon given to people living outside the study community, Chignik Lagoon, 2016.

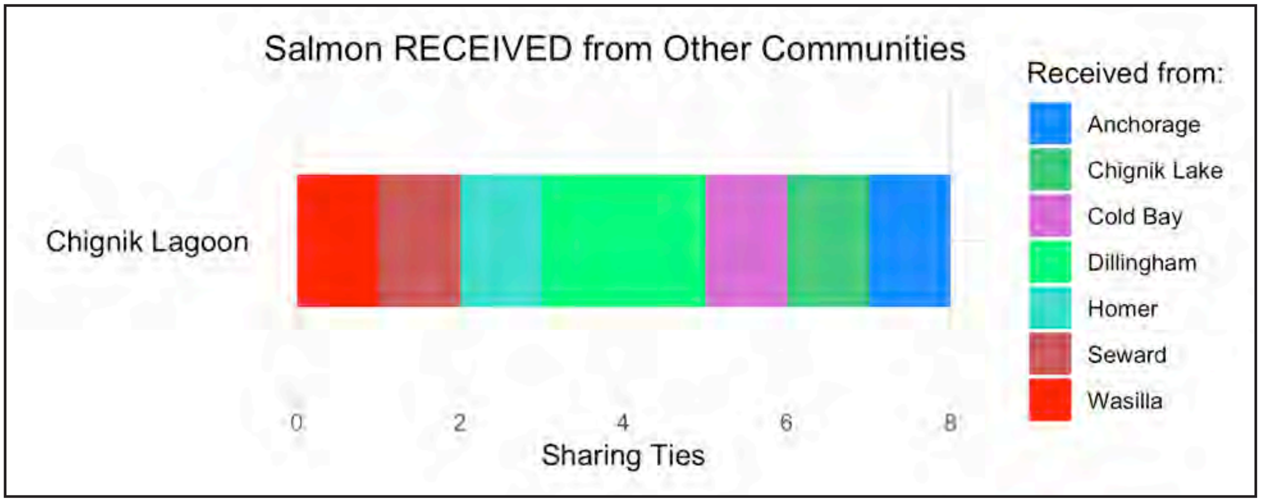

Figure 4-33.–Number of sharing ties based on salmon received from people outside the study community, Chignik Lagoon, 2016.

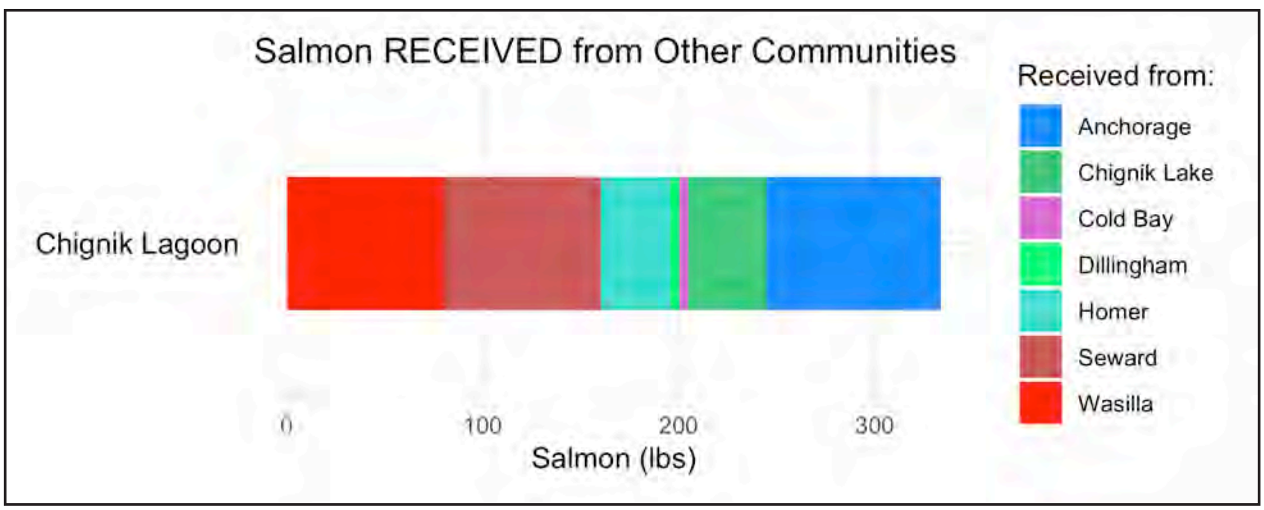

Figure 4-34.–Pounds of salmon received from people outside study community, Chignik Lagoon, 2016.

Table 4-10.–Descriptive statistics for non-local networks, by relationship, Chignik Lagoon, 2016.

	Giving to			Receiving from			Total		
Relation	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Children	10	822	82				10	822	82
Extended family	9	361	40				9	361	40
Grandparent	2	14	7				2	14	7
Missing	1	9	9				1	9	9
Other relations	22	414	19	4	136	34	26	550	21
Parents	10	125	12				10	125	12
Siblings	6	38	6	4	198	50	10	236	24

Source ADF&G Division of Subsistence household surveys, 2017.

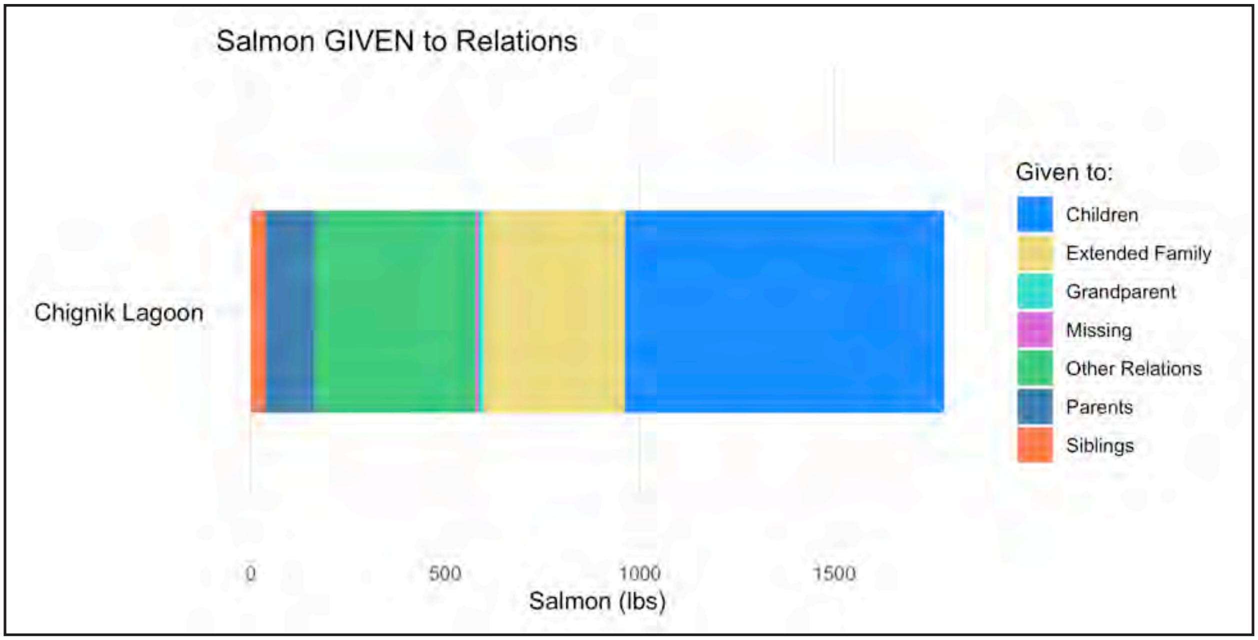

Figure 4-35.–Pounds of salmon given to different relations living outside the study community, Chignik Lagoon, 2016.

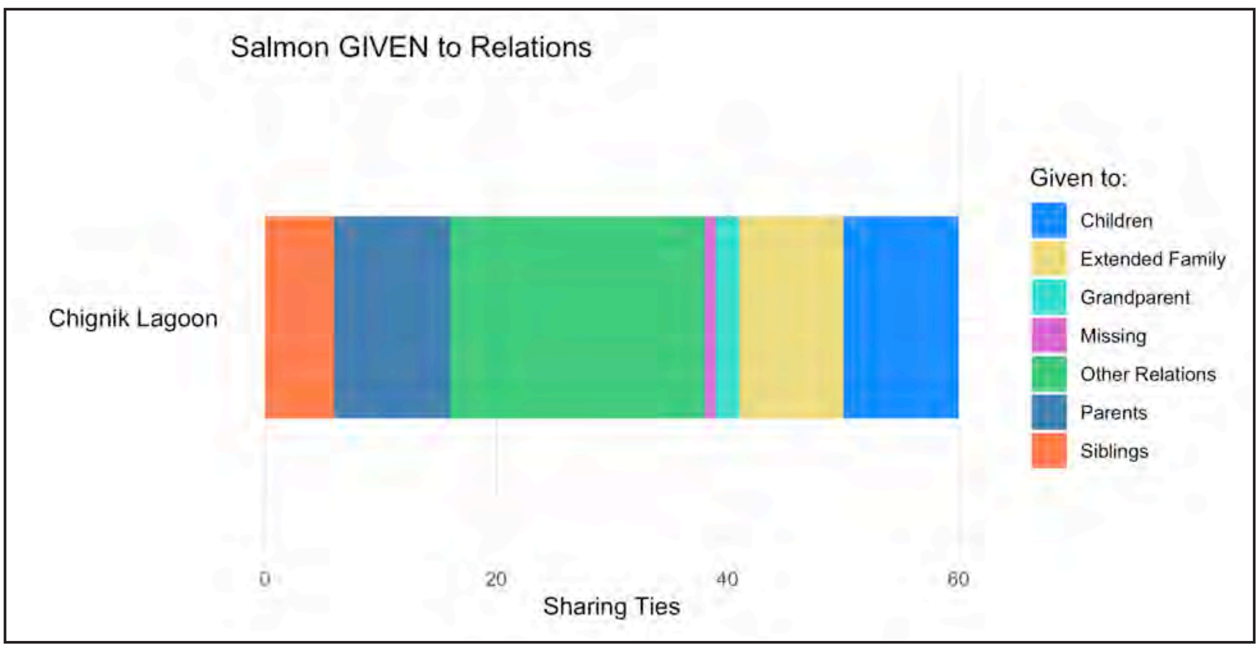

Figure 4-36.–Number of sharing ties based on salmon given to different relations living outside the study community, Chignik Lagoon, 2016.

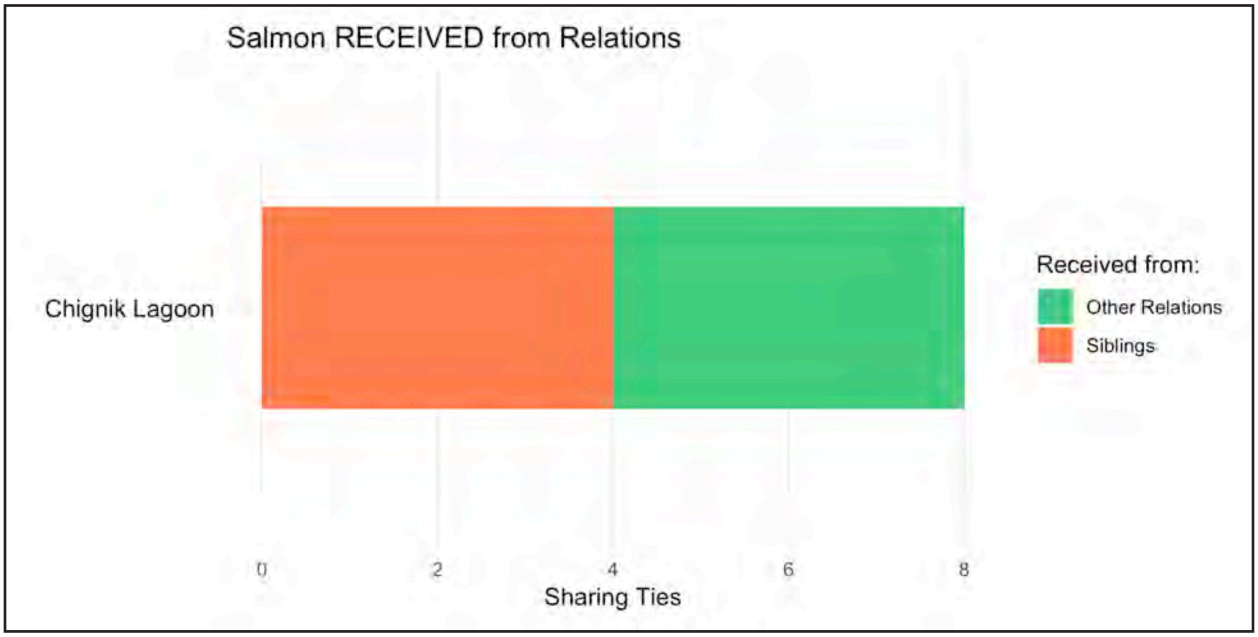

Figure 4-37.–Number of sharing ties based on salmon received from different relations living outside the study community, Chignik Lagoon, 2016.

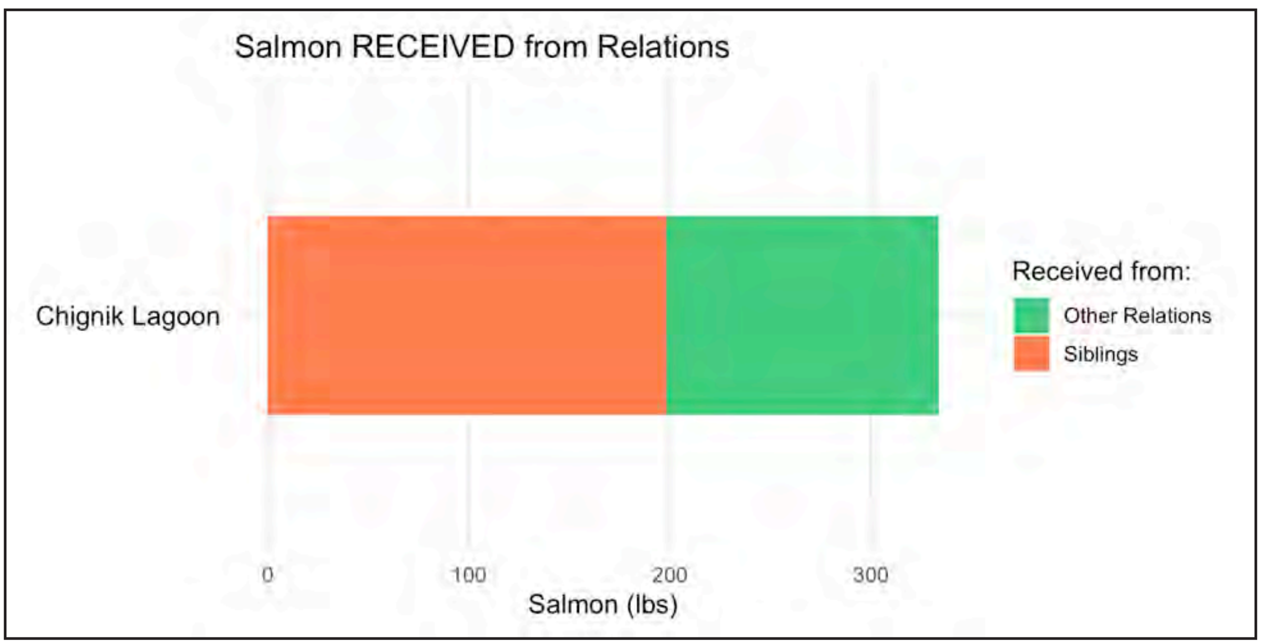

Figure 4-38.–Pounds of salmon received from different relations living outside the study community, Chignik Lagoon, 2016.

Chignik Lake

Local Networks

In Chignik Lake, the local network features 33 households, including 5 households that did not participate in the survey but were connected to at least 1 household that did (Figure 4-39). The survey documented 79 connections among these households, including 24 harvesting connections, 18 processing connections, and 37 sharing connections (Table 4-11; Figure 4-39). In the combined network, households averaged 3.5 connections, with a range of 0–10.

More than two-thirds of the households in Chignik Lake were involved in harvesting networks, and more than one-half were involved in processing networks, which suggests that coordination between households was important for subsistence salmon harvests in this community. As in other communities, households tended to work with a few other households to harvest and process salmon, though connections were sufficiently extensive to create several large components, including 6–11 households. There were few transitive triads in the harvesting and processing networks. As in other study communities, a large percentage of the households in this community (88%) were involved in the sharing network. There is one large component that includes the majority of households in the community, but there is also a second component of six households and a third component of two households that are disconnected from the main component. Yet, when harvesting, processing, and sharing relationships are combined, all but a single household in Chignik Lake was connected directly or indirectly to the subsistence salmon network. This combined network featured medium levels of reciprocity and transitivity compared with other study communities.

Non-Local Networks

In Chignik Lake, the survey documented a total of 100 instances of people giving salmon to or receiving salmon from outside the community, with a total of 2,317 lb of salmon flowing through these sharing ties (Table 4-12). Figure 4-40 visualizes this network and the flow of salmon to and from Chignik Lake and other parts of Alaska and places in other U.S. locations. Salmon given by residents of Chignik Lake to people living outside the community represented the majority of both the total sharing ties (89%) and total weight of salmon exchanged (93%) in 2016 (Table 4-12). This suggests that Chignik Lake was primarily a source of salmon for other communities, with salmon flowing out of the community more frequently and in greater amounts than salmon flowing into the community; in 2016, less than 200 lb of salmon went to Chignik Lake, but more than 2,000 lb went to people outside the study community.

Location

Chignik Lake's non-local network included sharing ties that connected community members to multiple neighboring study communities (Chignik Bay, Chignik Lagoon, Perryville, and Port Heiden), regional centers (Dillingham, King Salmon, and Kodiak), the Anchorage metro area (Anchorage and Wasilla), and beyond to other U.S. states (Table 4-12). Also, Chignik Lake reported ties to the most diverse set of Alaska communities—particularly those that are not part of the Anchorage metro area—than any other study community. For salmon given outside Chignik Lake, the majority of sharing ties connected to people living in the Anchorage metro area; also, more pounds of salmon were shared with people from the Anchorage metro area than with any other location (Figure 4-41; Figure 4-42). Salmon were given to neighboring study communities less frequently and in smaller amounts. Conversely, salmon were received by residents of Chignik Lake from outside the community more frequently and in larger amounts from neighboring study communities and other Alaska communities (including regional centers) than from the Anchorage metro area, which returned no salmon to Chignik Lake (Figure 4-43; Figure 4-44). Together, these results illustrate that non-local networks in Chignik Lake primarily involve salmon flowing from the community to the Anchorage metro area, while a secondary, more reciprocal flow of salmon occurred between Chignik Lake and neighboring study communities and regional centers.

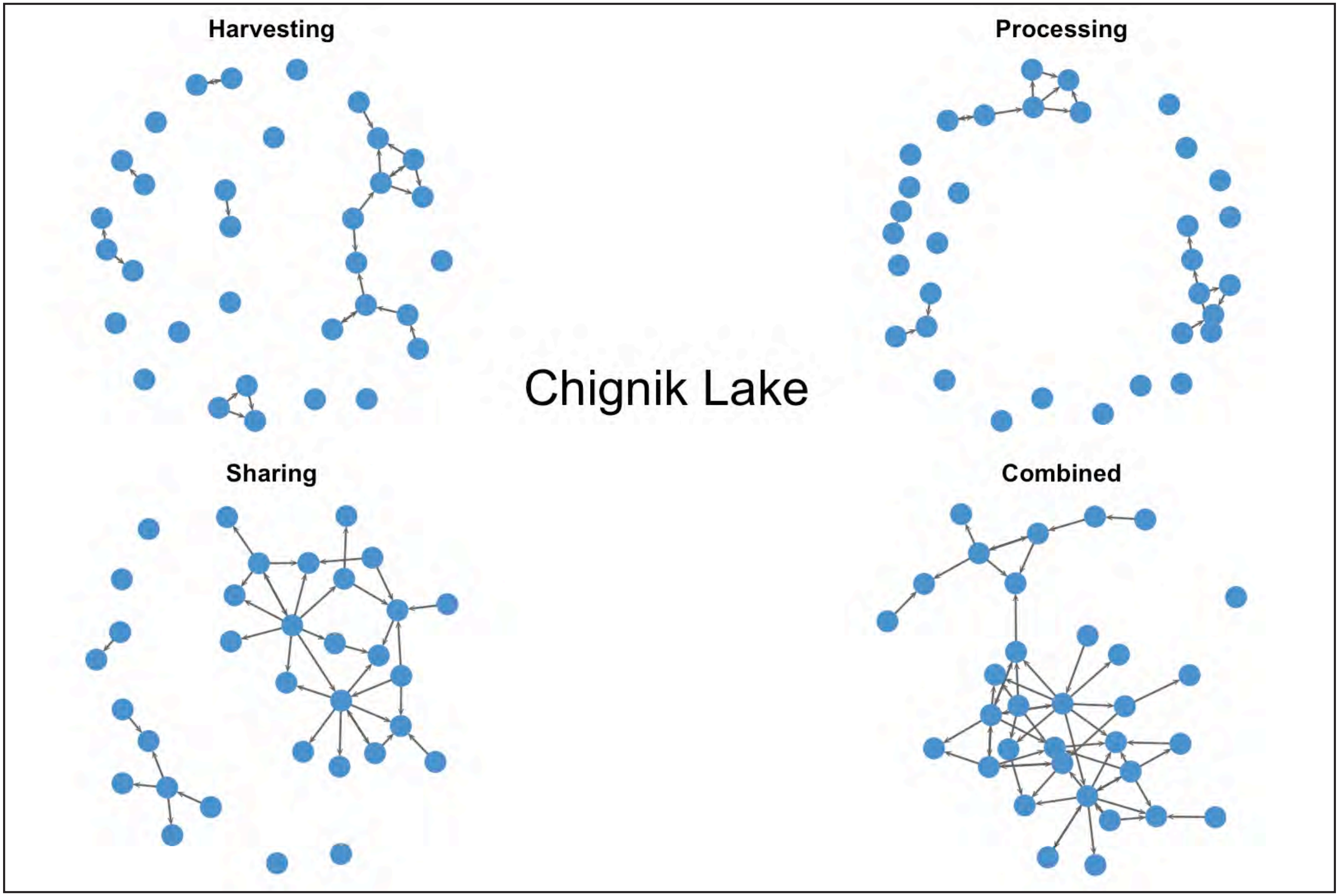

Figure 4-39.–Local networks: harvesting, processing, and sharing ties visualized as separate networks, and combined in a single network, Chignik Lagoon, 2016.

Table 4-11.–Descriptive statistics for local networks, Chignik Lake, 2016.

Network	Active households	Ties	Density	Components	Reciprocity	Transitivity
Combined	32	79	0.055	2	0.240	0.210
Harvesting	23	24	0.022	16	0.260	0.420
Processing	18	18	0.016	19	0.120	0.250
Sharing	29	37	0.035	7	0.110	0.210

Source ADF&G Division of Subsistence household surveys, 2017.

Table 4-12.–Descriptive statistics for non-local networks, Chignik Lake, 2016.

	Giving to			Receiving from			Total		
Location	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Akutan	3	40	13				3	40	13
Anchorage	51	863	17				51	863	17
Chignik Bay	2	22	11				2	22	11
Chignik Lagoon	1	13	13				1	13	13
Dillingham				1	18	18	1	18	18
Fairbanks	1	4	4				1	4	4
Homer	7	325	46	2	18	9	9	343	38
Kenai	2	44	22				2	44	22
King Salmon				1	4	4	1	4	4
Kodiak City	2	18	9	3	89	30	5	107	21
Naknek	3	36	12				3	36	12
New Stuyahok				1	6	6	1	6	6
Other U.S.	2	12	6				2	12	6
Perryville	8	280	35	3	24	8	11	304	28
Port Heiden	3	144	48				3	144	48
Soldotna	1	18	18				1	18	18
Statewide	1	286	286				1	286	286
Wasilla	2	53	26				2	53	26

Source ADF&G Division of Subsistence household surveys, 2017.

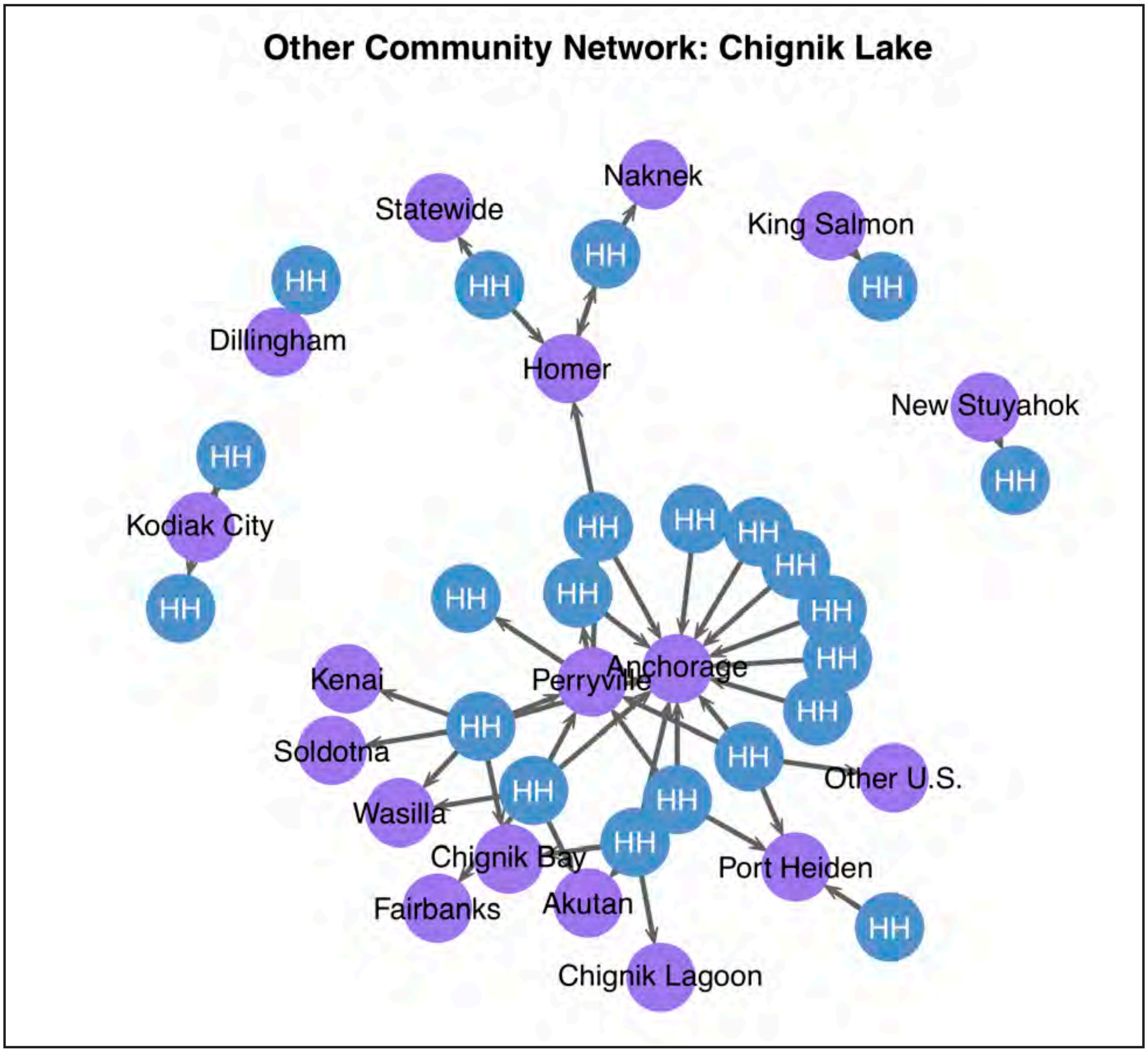

Figure 4-40.–Non-local networks: blue circles represent households in the community, purple circles represent locations of exchange partners, Chignik Lake, 2016.

Relations

For salmon given to households that were outside Chignik Lake, the majority of sharing ties was to close family, and the majority of shared salmon weight also was given to close family (Table 4-13). The proportion of ties with and pounds shared to extended family and other relations (likely close friends) were both close: 462 lb went to extended family in 11 connections, but more salmon (521 lb) were sent to other relations in only 10 connections (Figure 4-45; Figure 4-46; Table 4-13). For salmon received by residents of Chignik Lake from outside the community, an equal number of sharing ties were connected to friends and close family, though more pounds of salmon were received from friends (Figure 4-47; Figure 4-48). Together, these results suggest that close family play a primary role in non-local networks in Chignik Lake by being actively involved in sending salmon to and receiving salmon from Chignik Lake. Exchanges between Chignik Lake and friends living outside the community were reciprocal, though more sharing ties for giving salmon and pounds of salmon were given to friends than received from friends. Compared to other study communities, the role of extended family in Chignik Lake's non-local network was greater, particularly in terms of salmon given from the study community to people living outside the community.

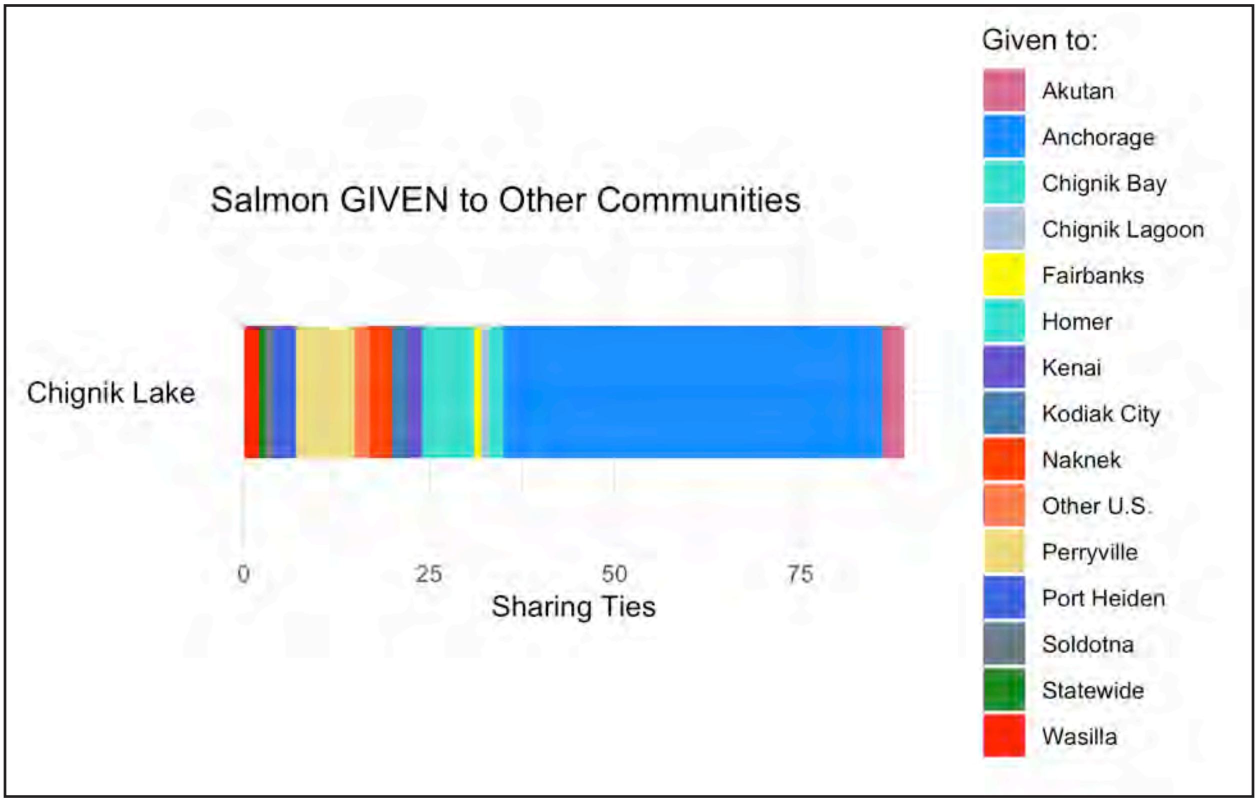

Figure 4-41.–Number of sharing ties based on salmon given to people outside the study community, Chignik Lake, 2016.

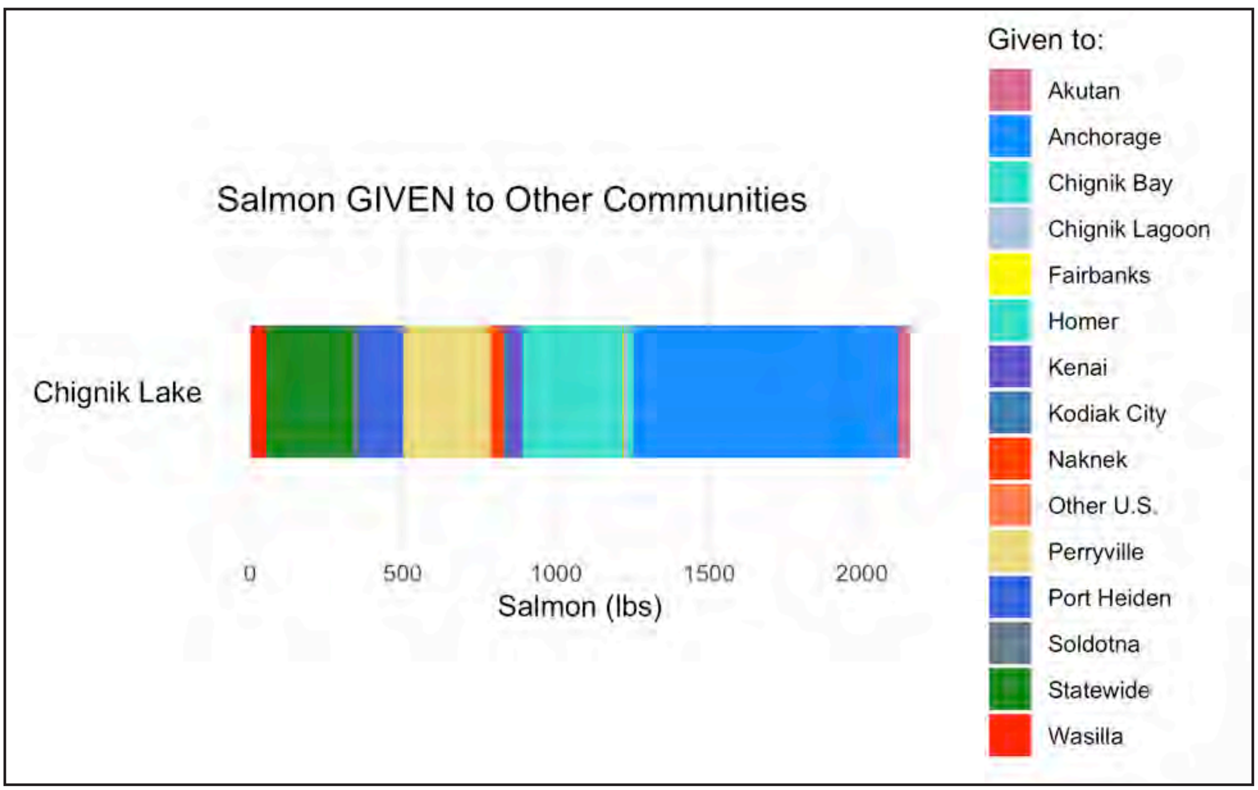

Figure 4-42.–Pounds of salmon given to people living outside the study community, Chignik Lake, 2016.

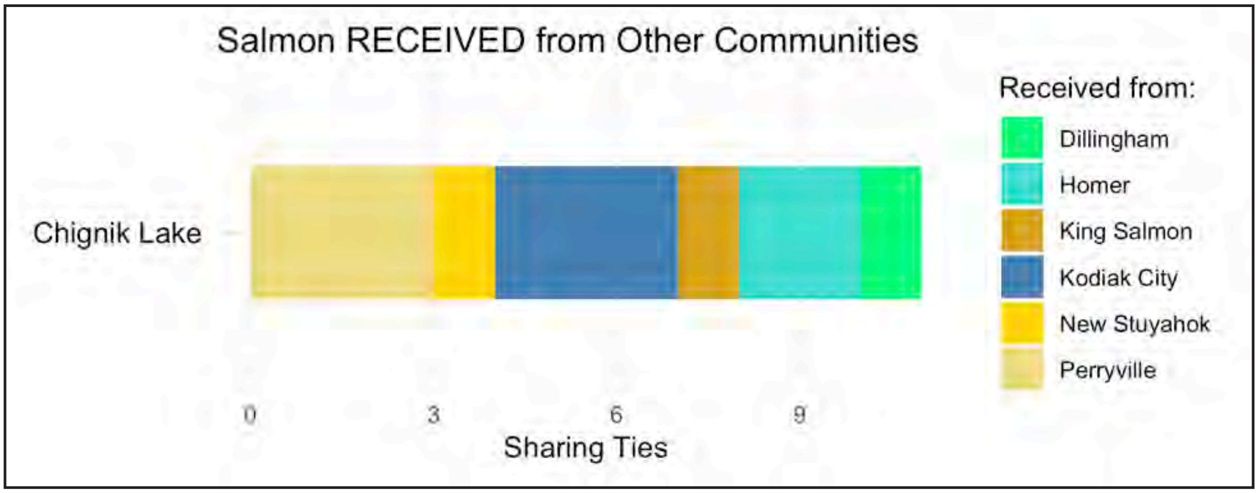

Figure 4-43.–Number of sharing ties based on salmon received from people outside the study community, Chignik Lake, 2016.

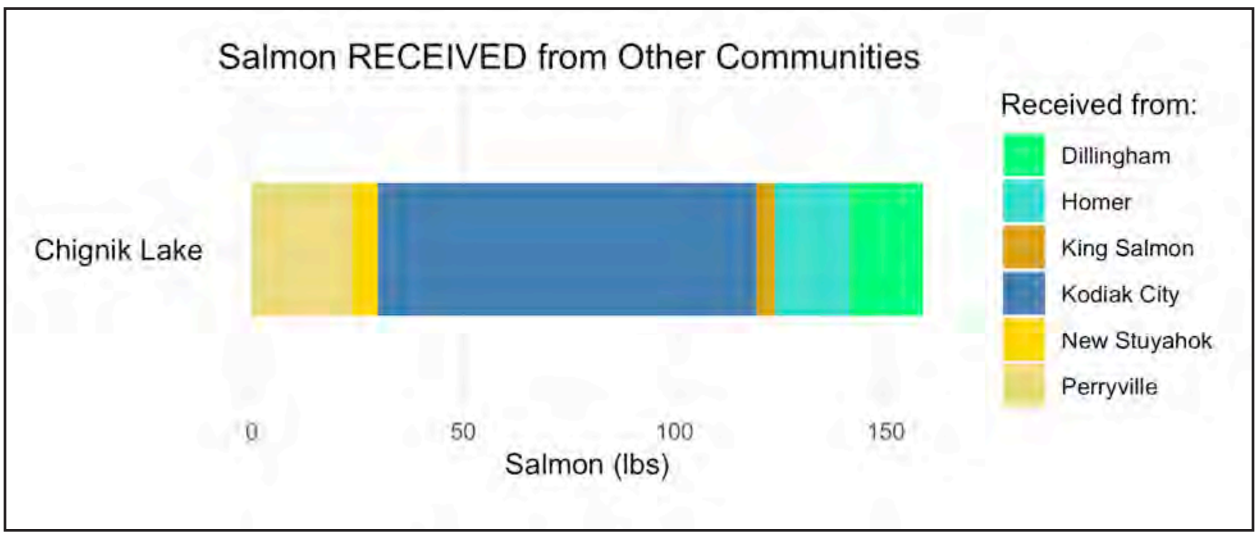

Figure 4-44.–Pounds of salmon received from people outside study community, Chignik Lake, 2016.

Table 4-13.–Descriptive statistics for non-local networks, by relationship, Chignik Lake, 2016.

	Giving to			Receiving from			Total		
Relation	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Children	13	265	20	1	9	9	14	274	20
Extended family	11	462	42	1	6	6	12	468	39
Grandchildren	9	185	21				9	185	21
Missing	2	26	13				2	26	13
Other relations	10	521	52	5	111	22	15	632	42
Parents	27	455	17	1	9	9	28	464	17
Siblings	17	245	14	3	24	8	20	269	13

Source ADF&G Division of Subsistence household surveys, 2017.

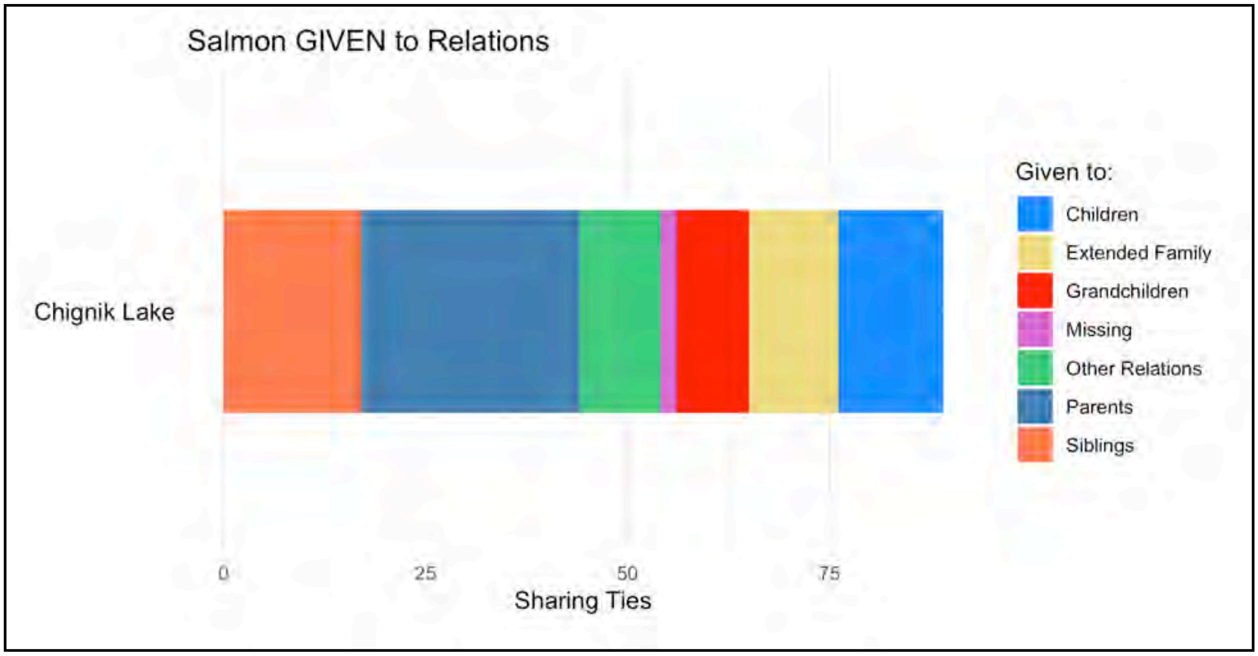

Figure 4-45.–Number of sharing ties based on salmon given to different relations living outside the study community, Chignik Lake, 2016.

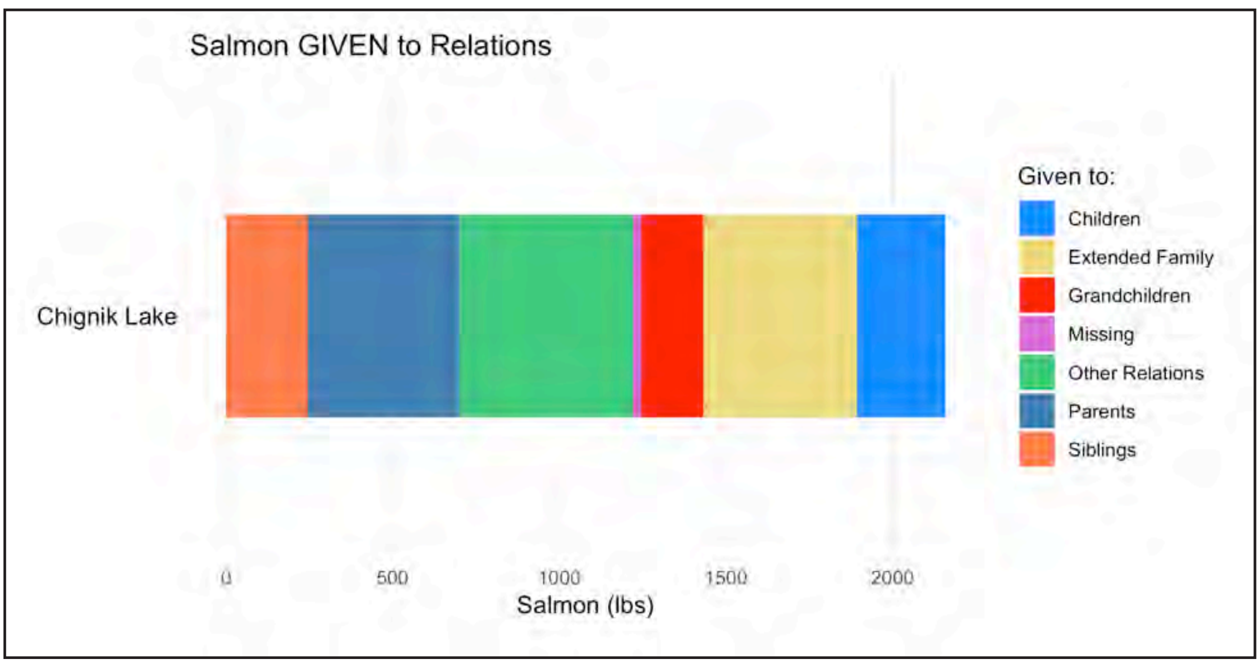

Figure 4-46.–Pounds of salmon given to different relations living outside the study community, Chignik Lake, 2016.

Figure 4-47.–Number of sharing ties based on salmon received from different relations living outside the study community, Chignik Lake, 2016.

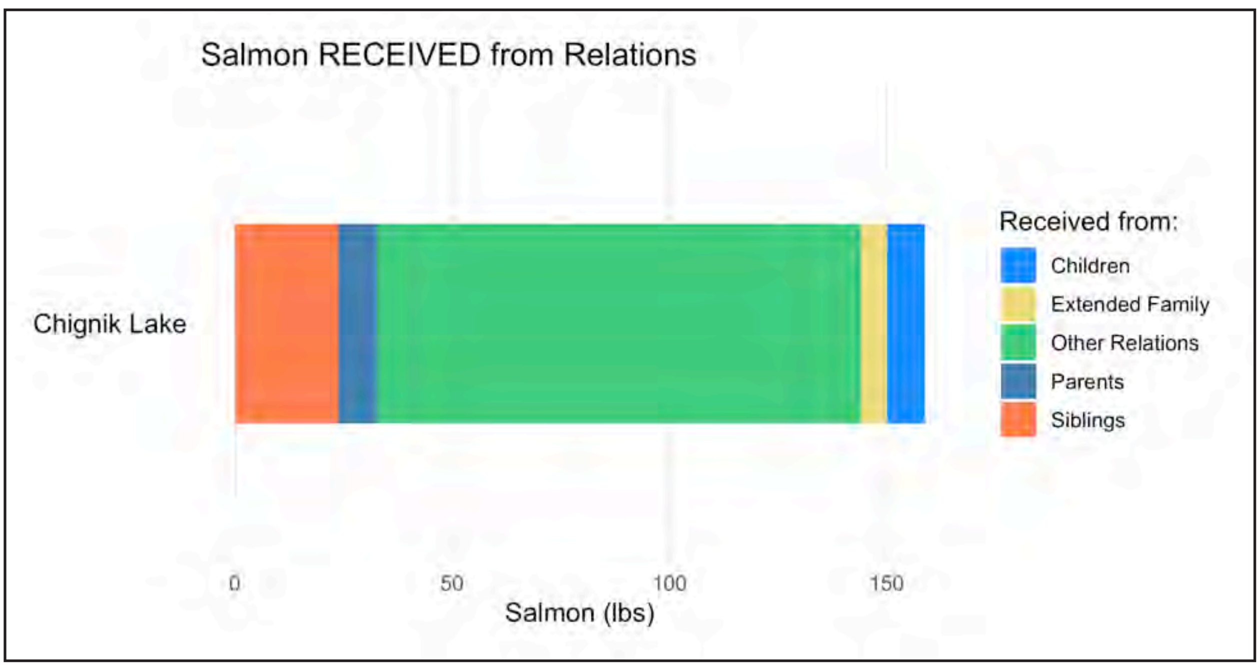

Figure 4-48.–Pounds of salmon received from different relations living outside the study community, Chignik Lake, 2016.

Perryville

Local Networks

The Perryville subsistence salmon harvest network includes 34 households, including 8 households that were not included in the survey but named by survey participants as part of their network (Figure 4-49). The network featured 59 total connections, including 16 harvesting and 16 processing connections, as well as 27 sharing connections (Table 4-14; Figure 4-49). Households connected to a range from 0–9 other households, with an average of 2.5 connections in the combined network.

About one-half of households in Perryville were involved in subsistence harvesting and processing networks in 2016. The structure of these networks was similar, with several pairs of households and one larger component. The large component is formed by one household that acts as a kind of "hub," connecting different branches or "spokes" in the network. Many of the connections with the hub household were incoming and unreciprocated, suggesting this household receives assistance from multiple parts of the community for harvesting and processing salmon. Some of the branches that provided assistance are disconnected from each other, including one or two households, but others overlap substantially with one another, featuring several transitive triads. These structural features are unique relative to other study communities. However, as in other study communities, Perryville's sharing network features a large component that includes almost three-quarters of the community and includes relatively low levels of transitivity, indicating that sharing relationships may be acting as bridges that connect different sub-groups within the community.

Non-Local Networks

As depicted in Table 4-15, the survey documented that in Perryville there were a total of 47 instances of people giving salmon to or receiving salmon from outside the community, with a total of 1,090 lb of salmon flowing through these sharing ties that are depicted in Figure 4-50. Salmon given by residents of Perryville to people living outside the community represented the majority of non-local sharing ties (66%), but the amount of salmon given to and received from outside the community was nearly equal. This suggests that Perryville has a generally balanced flow of salmon in and out of the community.

Location

Perryville's non-local network included sharing ties that connected community members to neighboring study communities (Chignik Bay, Chignik Lake, and Port Heiden), regional centers (Dillingham and Bethel), the Anchorage metro area (Anchorage), few select other Alaska locations, and beyond to other U.S. states (Table 4-15). Exchanges with neighboring study communities accounted for roughly equal proportions (51%) of total non-local sharing ties and pounds of salmon shared (Table 4-15; Figure 4-51; Figure 4-52). Although the frequency of sharing occurrences varied, nearly equal pounds of salmon were given outside Perryville to other study communities, regional centers, Anchorage, and other Alaska locations. Conversely, salmon were received by residents of Perryville from outside the community more frequently and in larger amounts from neighboring study communities than from Anchorage, regional centers (which did not send salmon to Perryville), or other Alaska communities (Figure 4-53; Figure 4-54). Together, these results suggest that in 2016 non-local networks in Perryville featured a balanced flow of salmon into and out of the community, with neighboring study communities playing an important role as reciprocal exchange partners, while salmon was primarily given to regional centers, Anchorage, and other Alaska locations.

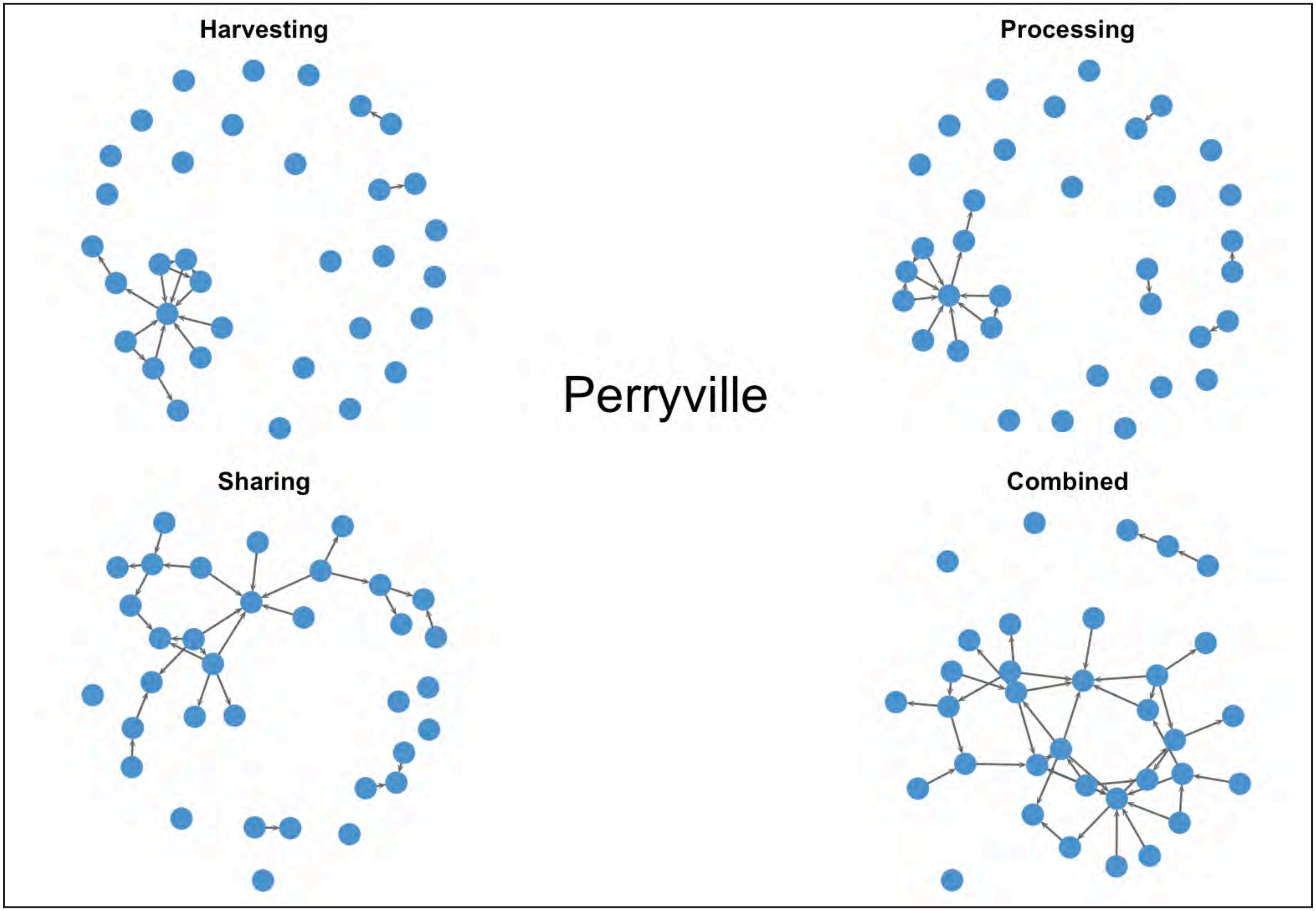

Figure 4-49.–Local networks: harvesting, processing, and sharing ties visualized as separate networks, and combined in a single network, Perryville, 2016.

Table 4-14.–Descriptive statistics for local networks, Perryville, 2016.

Network	Active households	Ties	Density	Components	Reciprocity	Transitivity
Combined	31	59	0.038	5	0.050	0.160
Harvesting	15	16	0.014	22	0.000	0.360
Processing	18	16	0.014	21	0.000	0.270
Sharing	27	27	0.024	10	0.000	0.170

Source ADF&G Division of Subsistence household surveys, 2017.

Table 4-15.–Descriptive statistics for non-local networks, by location, Perryville, 2016.

	Giving to			Receiving from			Total		
Location	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Anchorage	8	135	17	2	41	20	10	176	18
Bethel	2	55	27				2	55	27
Chignik Bay	2	55	27	5	364	73	7	419	60
Chignik Lake	11	95	9	5	46	9	16	141	9
Dillingham	1	45	46				1	45	46
Homer	1	27	27				1	27	27
Ivanof Bay	3	109	36	2	73	36	5	182	36
Nondalton				2	8	4	2	8	4
Other U.S.	2	32	16				2	32	16
Port Heiden	1	5	4				1	5	4

Source ADF&G Division of Subsistence household surveys, 2017.

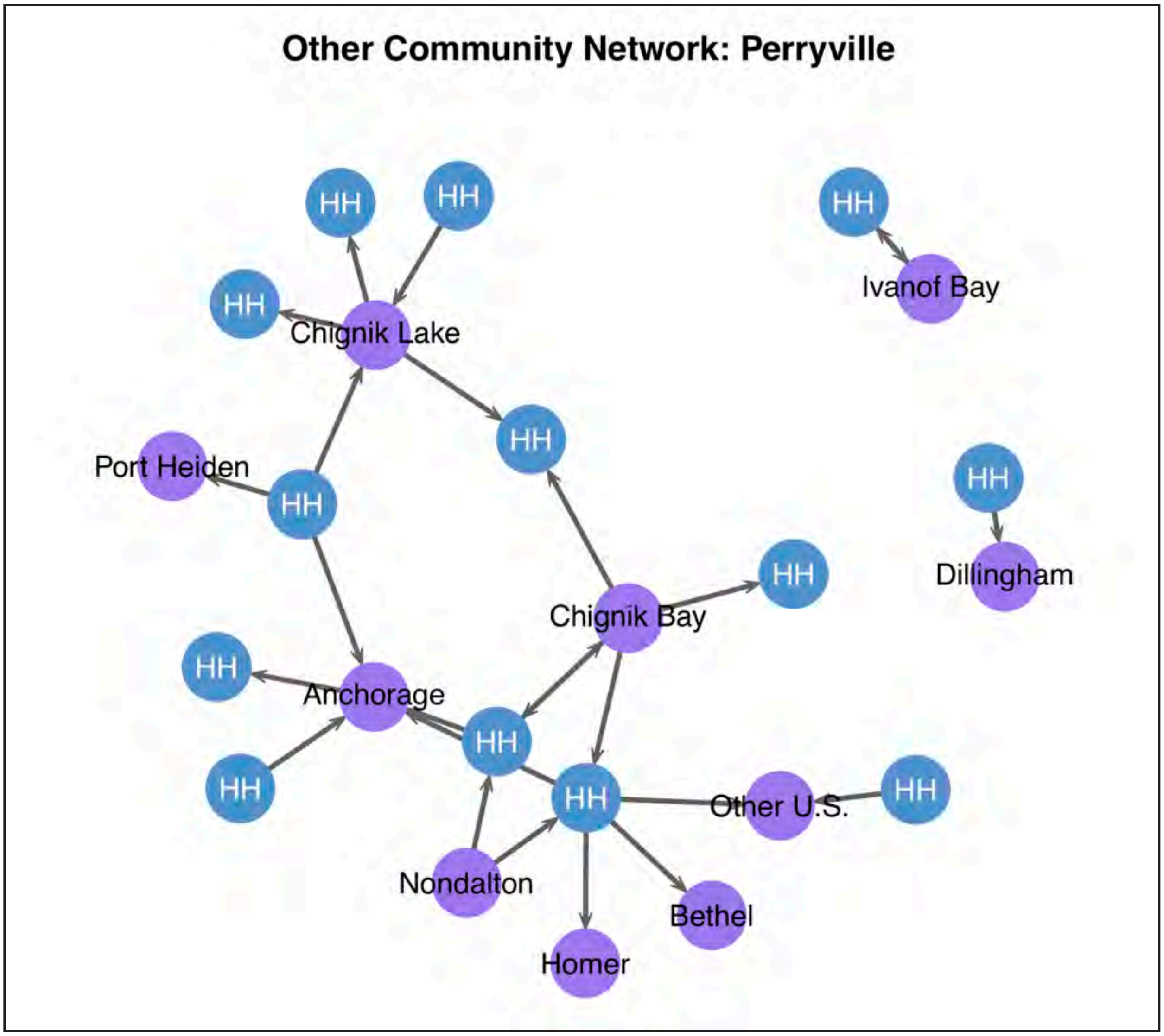

Figure 4-50.–Non-local networks: blue circles represent households in the community, purple circles represent locations of exchange partners, Perryville, 2016.

Relations

For salmon given to recipients located outside Perryville, the majority of both sharing ties and shared salmon were linked to close family and extended family combined (Table 4-16; Figure 4-55; Figure 4-56). For salmon received by residents of Perryville from outside the community, an almost equal number of sharing ties were connected to friends and close family, though a greater salmon weight was received from friends (399 lb) in comparison to close family (120 lb) (Table 4-16; Figure 4-57; Figure 4-58). Together, these results suggest that close family play a primary role in non-local networks in Perryville by being actively involved in sending salmon to and receiving salmon from Perryville. Exchanges between Perryville households and friends living outside the community were reciprocal, though more sharing ties for receiving salmon existed than giving salmon, and more pounds of salmon were received from friends than given to friends. Similar to Chignik Lake, the role of extended family in Perryville's non-local network was greater than in other study communities. A large number of sharing ties for giving salmon and pounds of salmon were given to extended family living outside Perryville.

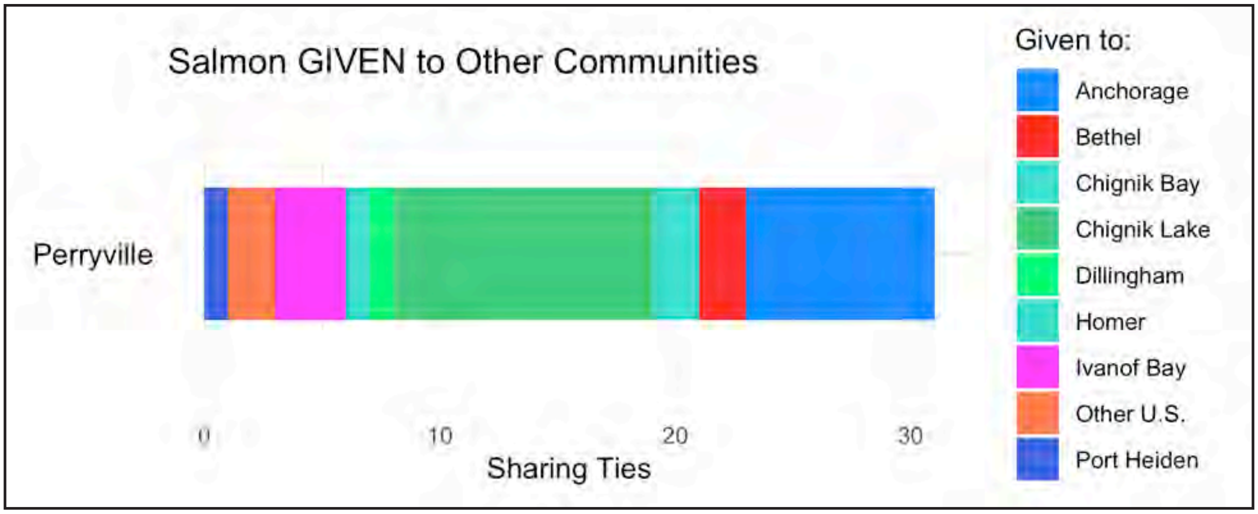

Figure 4-51.–Number of sharing ties based on salmon given to people outside the study community, Perryville, 2016.

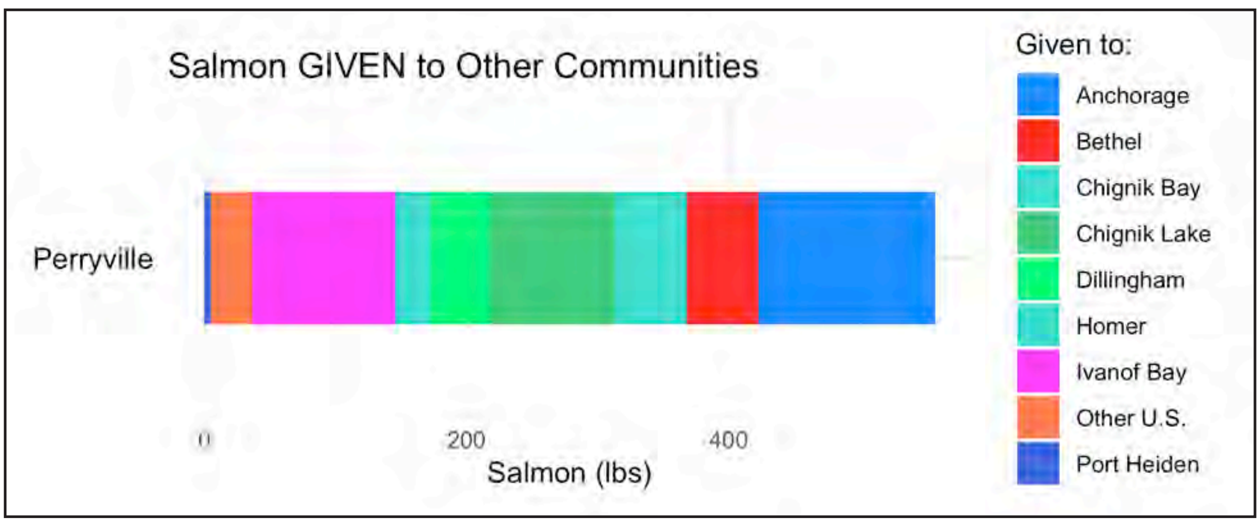

Figure 4-52.–Pounds of salmon given to people living outside the study community, Perryville, 2016.

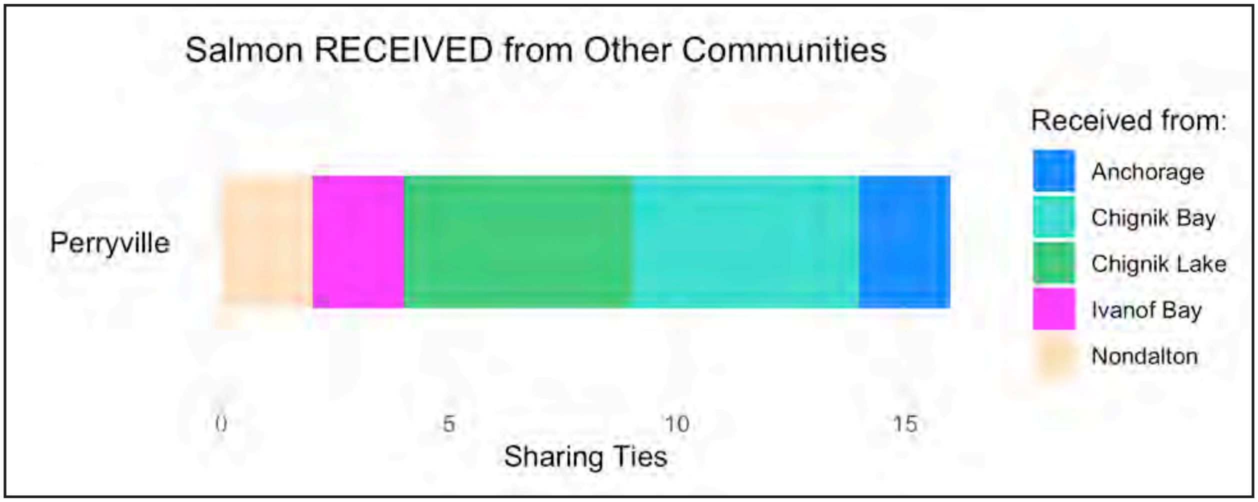

Figure 4-53.–Number of sharing ties based on salmon received from people outside the study community, Perryville, 2016.

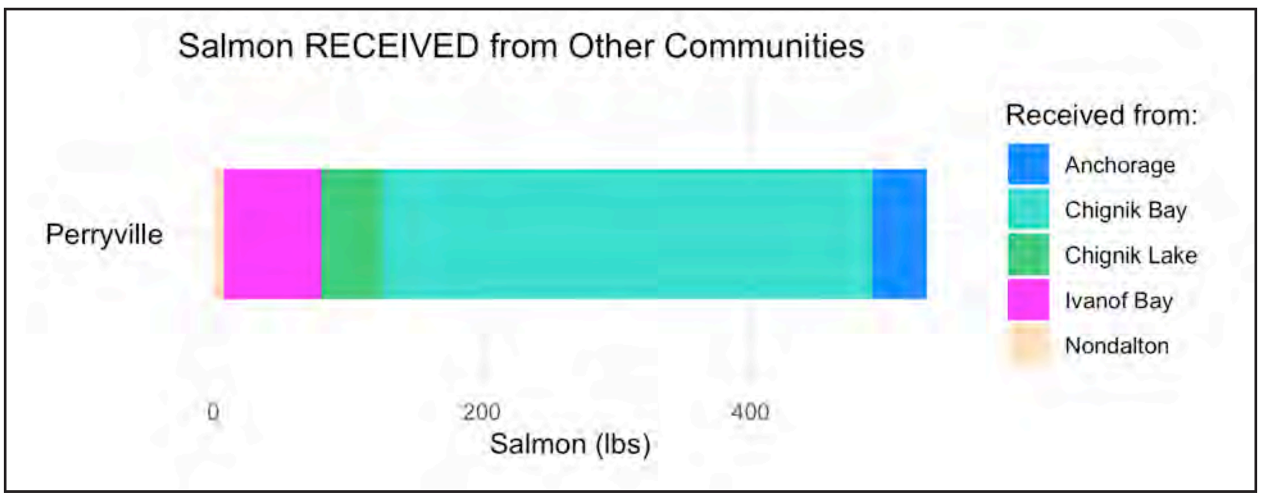

Figure 4-54.–Pounds of salmon received from people outside study community, Perryville, 2016.

Table 4-16.–Descriptive statistics for non-local networks, by relationship, Perryville, 2016.

Relation	Giving to			Receiving from			Total		
	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Children	5	77	16	1	5	4	6	82	14
Extended family	13	132	10	1	14	14	14	146	10
Grandchildren				1	6	6	1	6	6
Other relations	3	62	21	8	399	50	11	461	42
Parents	2	73	36	3	36	12	5	109	22
Siblings	8	213	27	2	73	36	10	286	29

Source ADF&G Division of Subsistence household surveys, 2017.

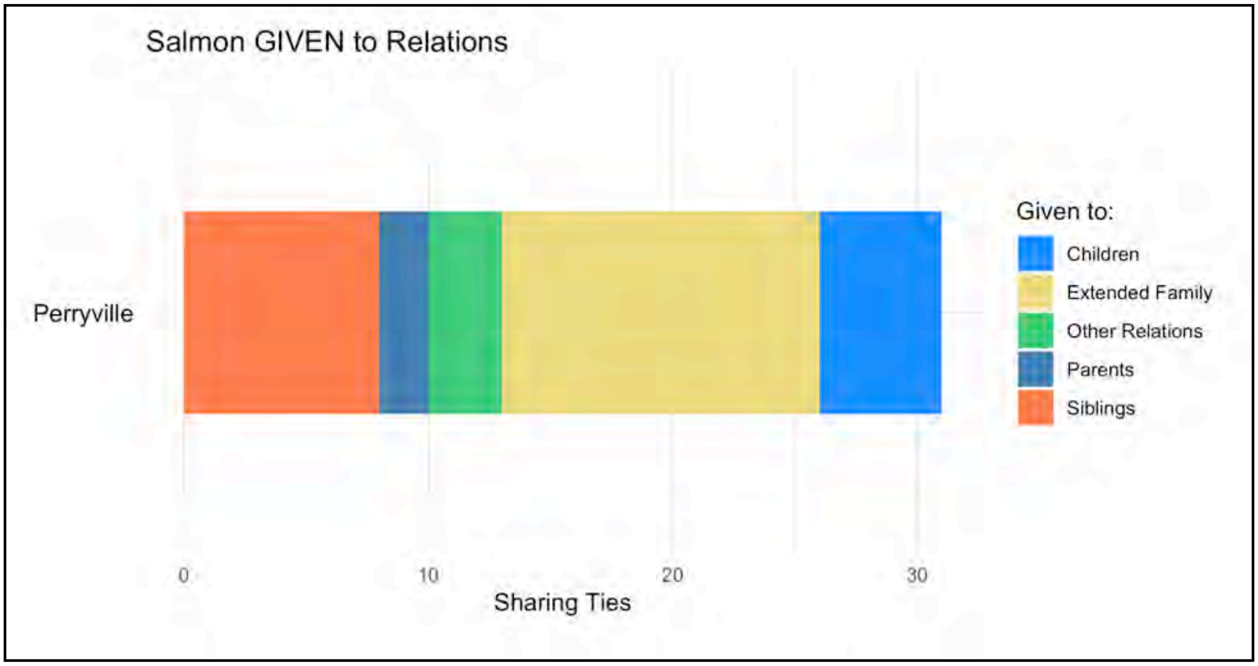

Figure 4-55.–Number of sharing ties based on salmon given to different relations living outside the study community, Perryville, 2016.

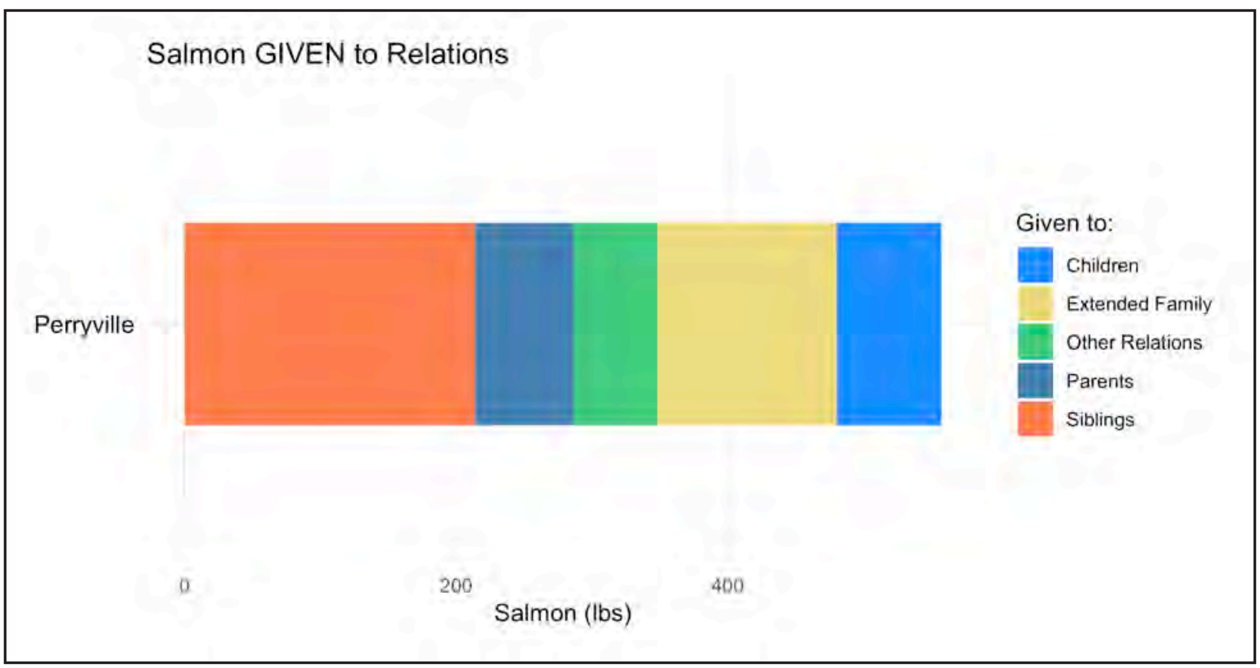

Figure 4-56.–Pounds of salmon given to different relations living outside the study community, Perryville, 2016

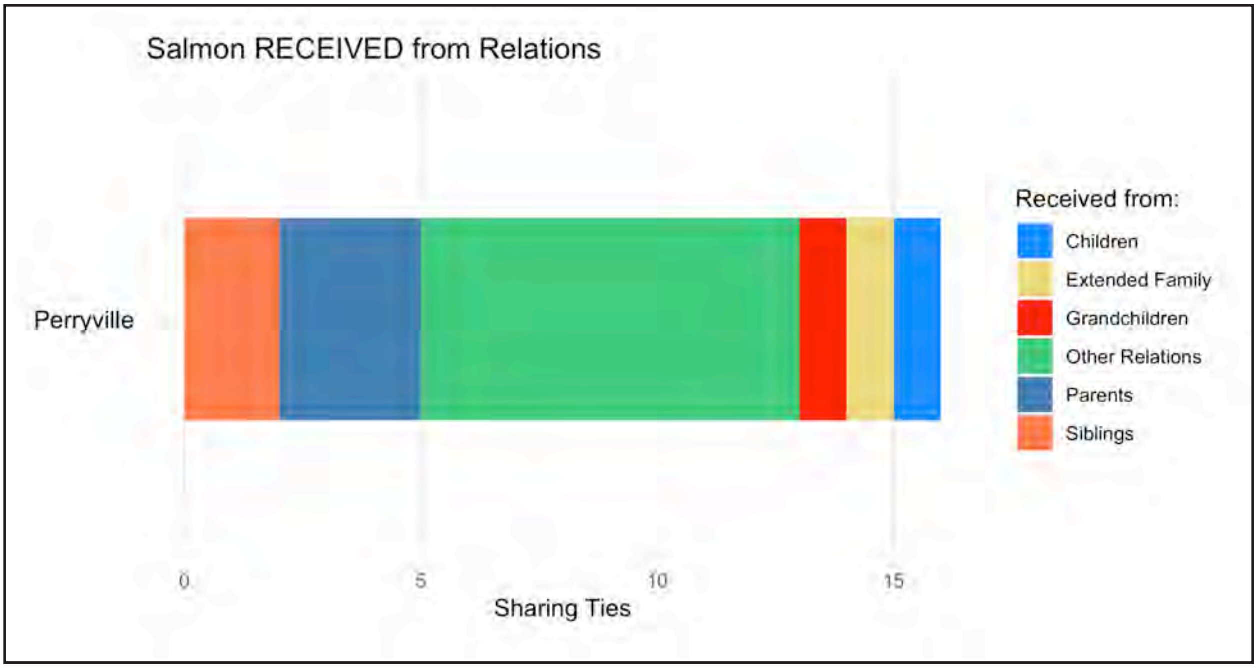

Figure 4-57.–Number of sharing ties based on salmon received from different relations living outside the study community, Perryville, 2016.

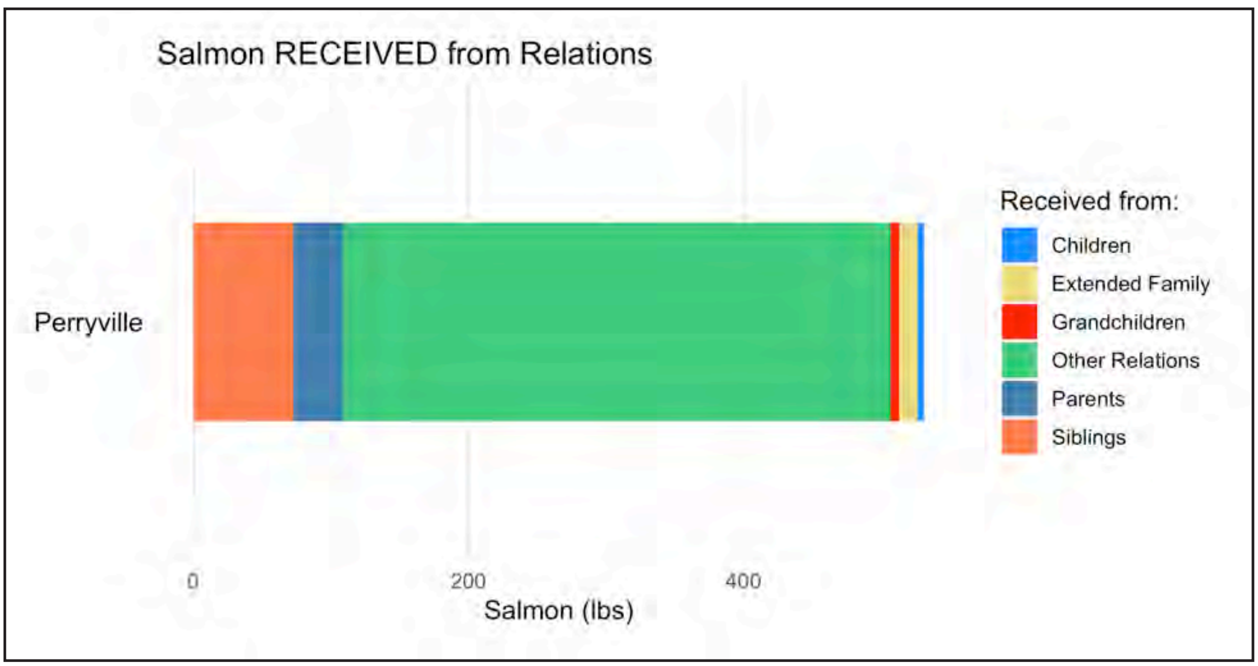

Figure 4-58.–Pounds of salmon received from different relations living outside the study community, Perryville, 2016.

Port Heiden

Local Networks

The Port Heiden subsistence salmon harvest network was composed of 38 households, including 9 households that were not surveyed but were named by survey participants as part of their network (Figure 4-59). The network is by far the densest among the study communities, featuring 293 total connections, including 101 harvesting and 99 processing connections, as well as 93 sharing connections (Table 4-17; Figure 4-59). Households had a range of 1–26 connections, with an average of 7.1 connections in the combined network.

Nearly all households in Port Heiden were involved in subsistence harvesting and processing networks. The structure of these networks is similar, with one well-connected, cohesive cluster of about 15 households that formed the core of a single, large component that connects almost every household in the community through direct and indirect ties. The structure of the sharing network is similar, with the same well-connected core at the center of a large component. As a result, each of the harvesting, processing, and sharing networks strongly resemble the combined network, which is unique among the study communities. Levels of reciprocity in each of Port Heiden's networks are also high compared to other study communities, suggesting that subsistence salmon networks in this community feature high levels of coordination and inter-dependence between households. Similarly, levels of transitivity are also high in Port Heiden's networks, suggesting higher levels of clustering, where multiple households work with one another to harvest, process, and share salmon.

Non-Local Networks

As depicted in Table 4-18, the survey documented in Port Heiden a total of 80 instances of people giving salmon to or receiving salmon from outside the community, with a total of 937 lb of salmon flowing through these sharing ties depicted in Figure 4-60. Salmon given by residents of Port Heiden to people living outside the community represent the majority (69%) of non-local sharing ties, but the amount of salmon received from outside the community was greater (60% of total shared pounds). This suggests that Port Heiden has a generally balanced flow of salmon in and out of the community, with salmon given more frequently to people living outside the community but salmon received from outside the community in greater amounts.

Location

Port Heiden's non-local network included sharing ties that connected community members to neighboring study communities (Chignik Lagoon and Chignik Lake); a regional center (Dillingham); the Anchorage metro area (Anchorage, Eagle River, and Palmer); several other Alaska communities in locations spread among Western, Interior, and Southeast Alaska; and beyond to other U.S. states and a foreign location (Table 4-18). For salmon given to households located outside Port Heiden, the majority of sharing ties and shared salmon weight were to people living in the Anchorage metro area, with a substantial proportion of ties (26%) and pounds of salmon (22%) also given to people in other U.S. states (Figure 4-61; Figure 4-62). Conversely, Port Heiden households received salmon from outside the community most often and in the largest amounts from neighboring study communities, particularly Chignik Lake (Figure 4-63; Figure 4-64). Together, these results illustrate that non-local networks in Port Heiden featured a flow of salmon out of the community and primarily into Anchorage and then beyond to other U.S. states, with a secondary and predominant flow into Port Heiden from Chignik Lake.

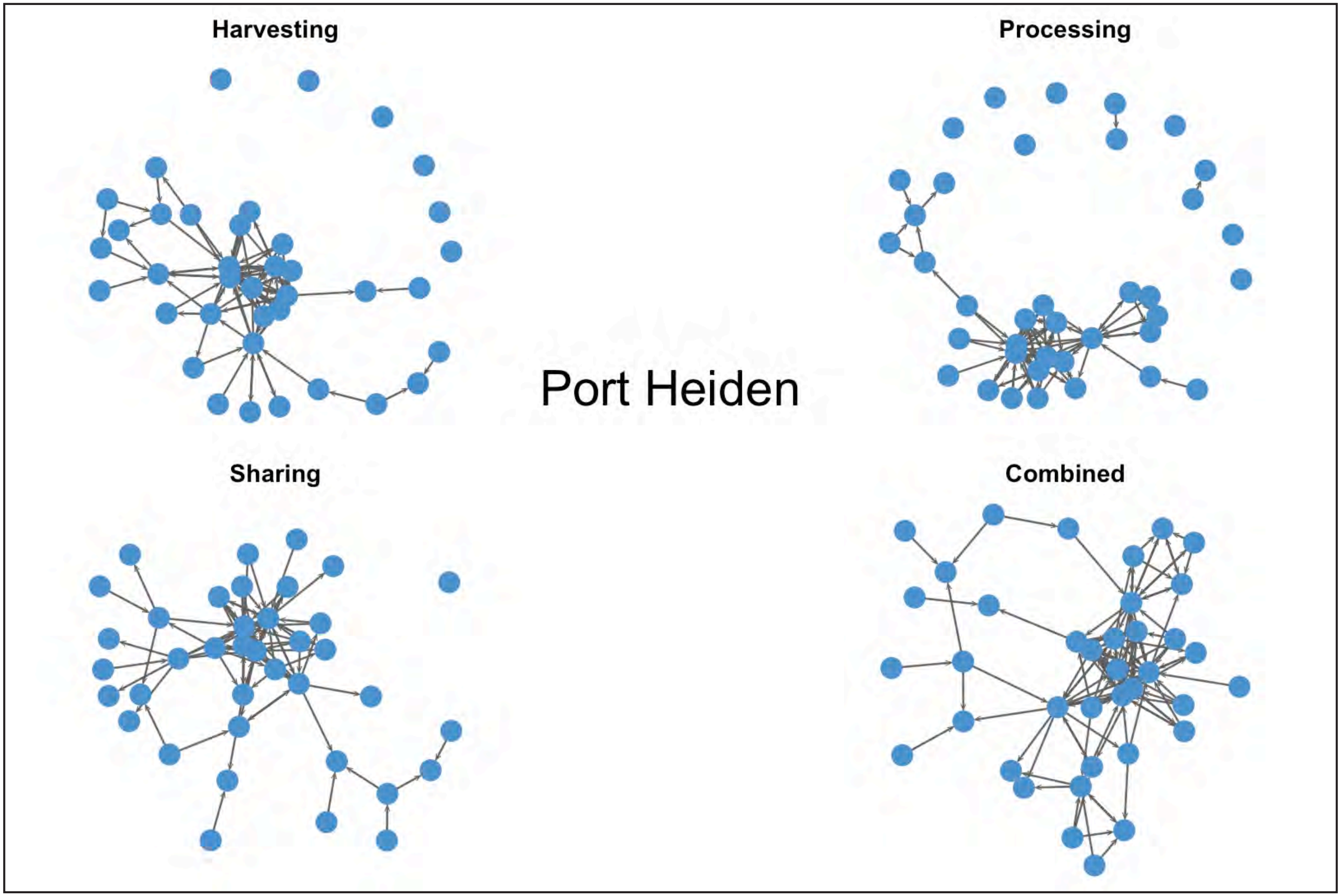

Figure 4-59.–Local networks: harvesting, processing, and sharing ties visualized as separate networks, and combined in a single network, Port Heiden, 2016.

Table 4-17.–Descriptive statistics for local networks, Port Heiden, 2016.

Network	Active households	Ties	Density	Components	Reciprocity	Transitivity
Combined	38	293	0.096	1	0.500	0.600
Harvesting	32	101	0.072	7	0.500	0.540
Processing	31	99	0.070	10	0.550	0.610
Sharing	37	93	0.066	2	0.340	0.490

Source ADF&G Division of Subsistence household surveys, 2017.

Table 4-18.–Descriptive statistics for non-local networks, by location, Port Heiden, 2016.

	Giving to			Receiving from			Total		
Location	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Anchorage	32	255	8	2	13	7	34	268	8
Chignik Lagoon				1	31	31	1	31	31
Chignik Lake				15	438	29	15	438	29
Dillingham	2	6	3				2	6	3
Eagle River	1	2	2				1	2	2
Fairbanks	2	6	3				2	6	3
Foreign	1	3	3				1	3	3
Igiugig				1	3	3	1	3	3
Juneau	1	2	2				1	2	2
Kalskag				4	72	18	4	72	18
Other U.S.	14	82	6				14	82	6
Palmer				1	4	4	1	4	4
Pilot Point				1	5	5	1	5	5
Soldotna	1	12	12				1	12	12
Unknown	1	3	3				1	3	3

Source ADF&G Division of Subsistence household surveys, 2017.

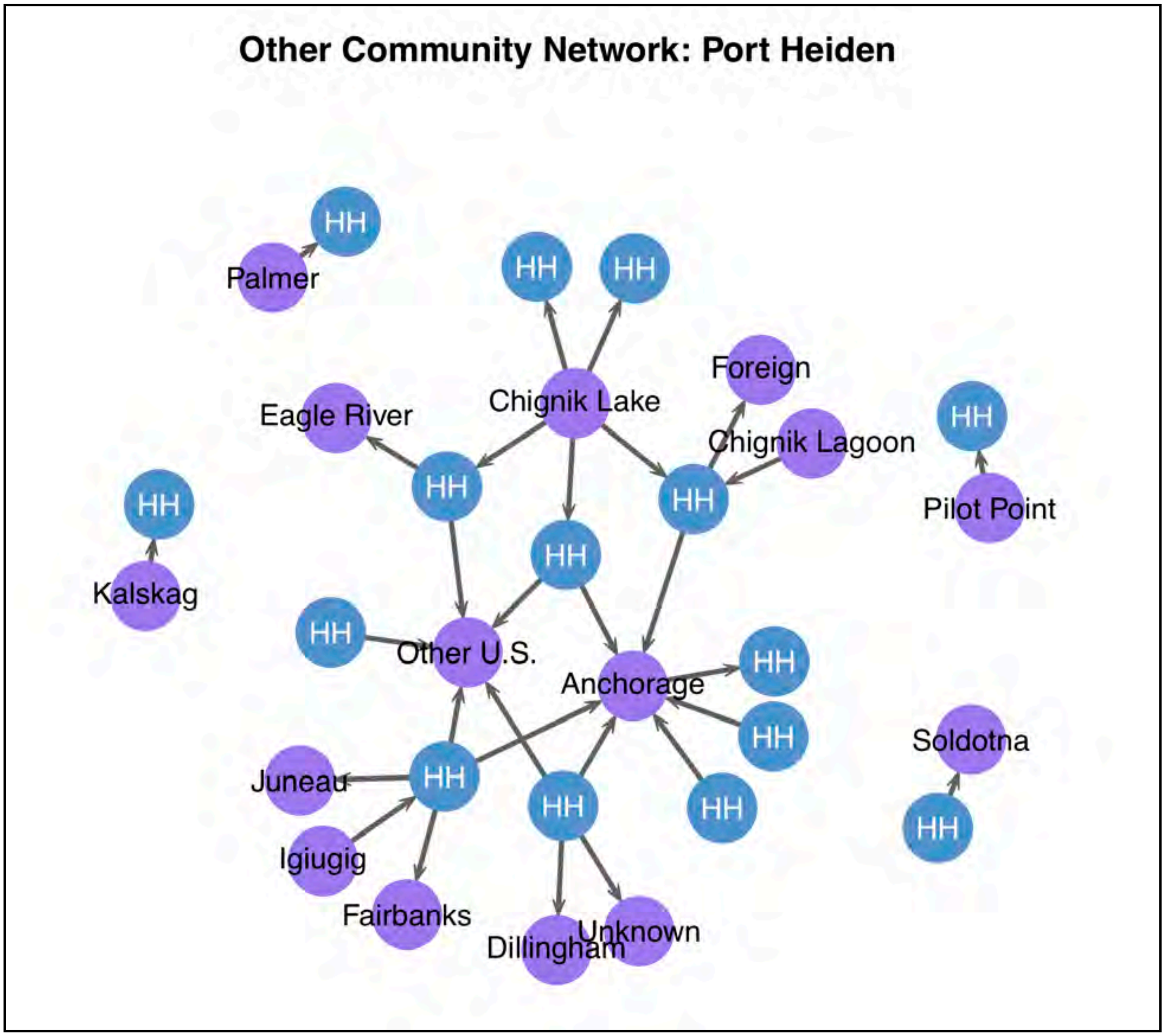

Figure 4-60.–Non-local networks: blue circles represent households in the community, purple circles represent locations of exchange partners, Port Heiden, 2016.

Relations

For salmon given away to households outside Port Heiden, the highest proportion (47%) of sharing ties were connected to close family and the majority of the salmon weight was given to close family (Table 4-19; Figure 4-65; Figure 4-66). Extended family and friends were both given salmon frequently in a similar number of ties. For salmon received by residents of Port Heiden from outside the community, close family overall was also the primary partner with the majority of sharing ties and received salmon weight coming from close family living outside the community rather than through other relationships (Table 4-19; Figure 4-67; Figure 4-68). Together, these results suggest that close family play the primary role in non-local networks in Port Heiden by actively being involved in sending salmon to and receiving salmon from Port Heiden. Exchanges between Port Heiden and friends living outside the community are reciprocal; however, a larger amount of salmon was received from friends, but salmon were given to friends more frequently. Similar to Chignik Lake and Perryville, a large number of sharing ties and pounds of salmon were given to extended family living outside Port Heiden compared to other study communities.

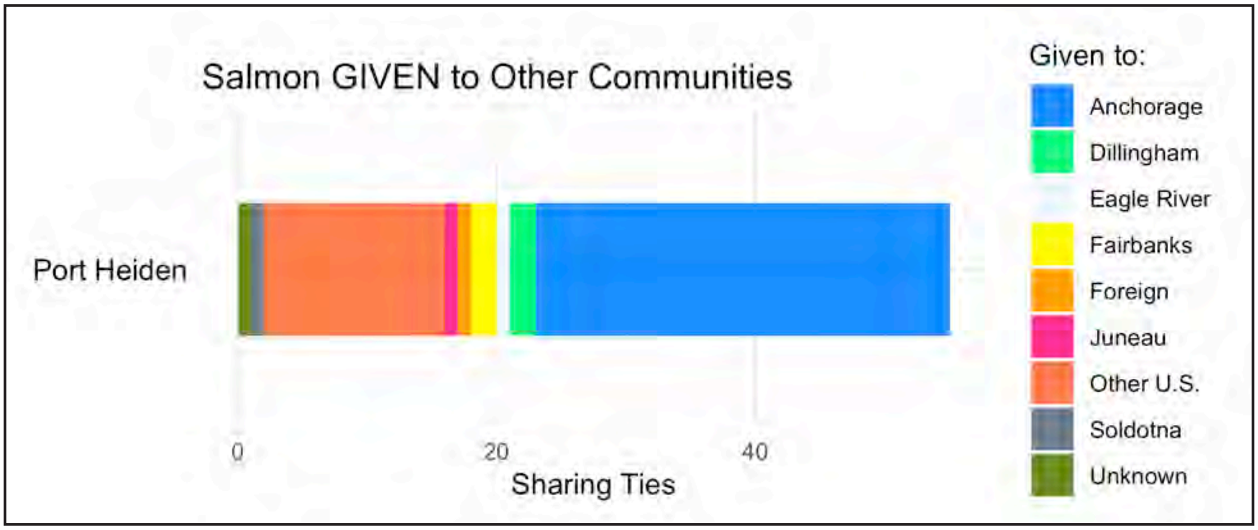

Figure 4-61.–Number of sharing ties based on salmon given to people outside the study community, Port Heiden, 2016.

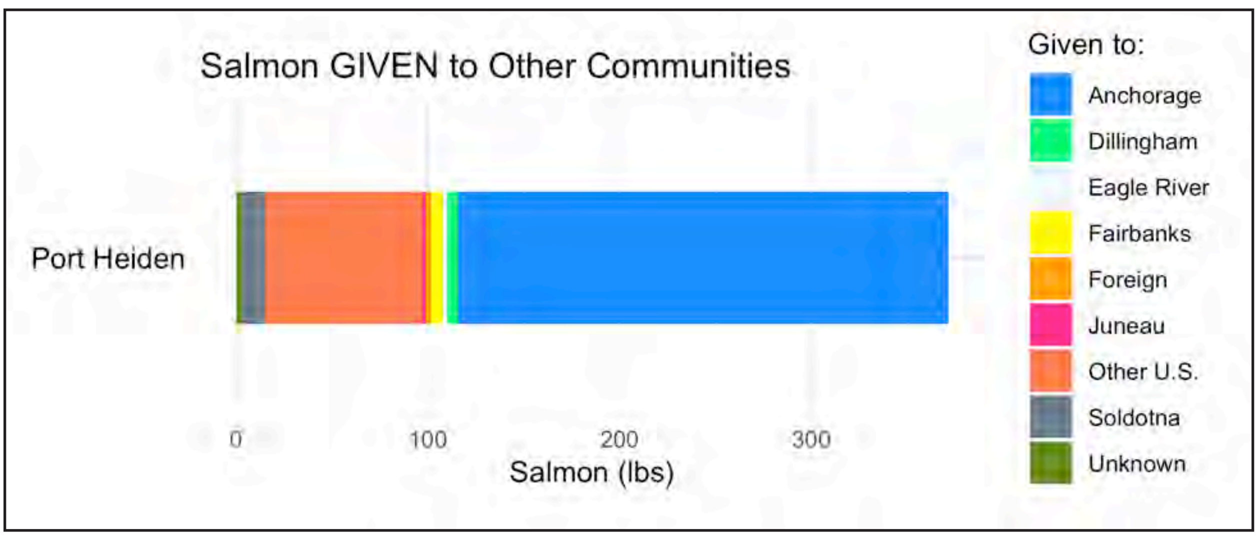

Figure 4-62.–Pounds of salmon given to people living outside the study community, Port Heiden, 2016.

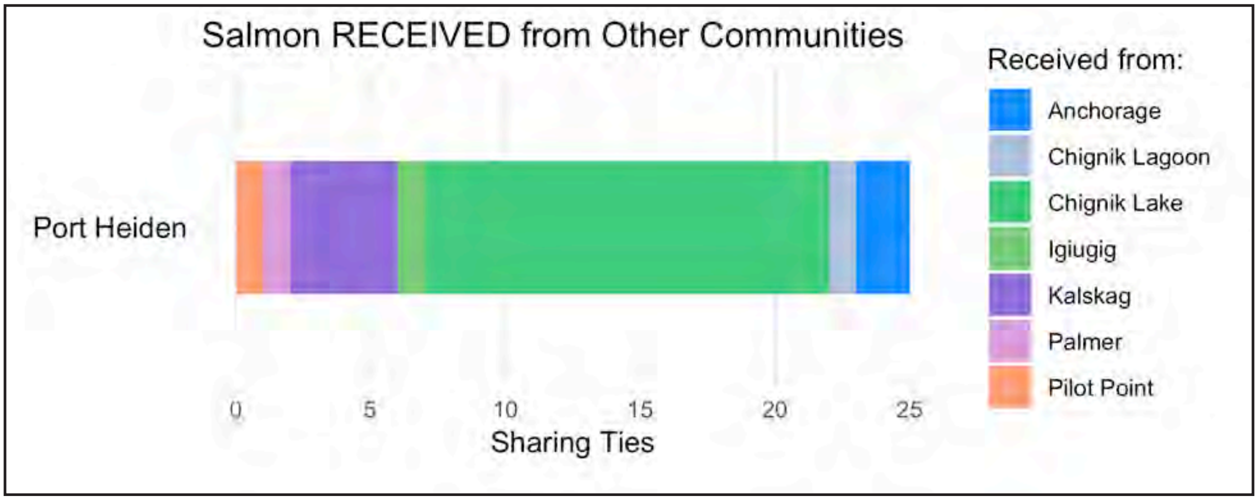

Figure 4-63.–Number of sharing ties based on salmon received from people outside the study community, Port Heiden, 2016.

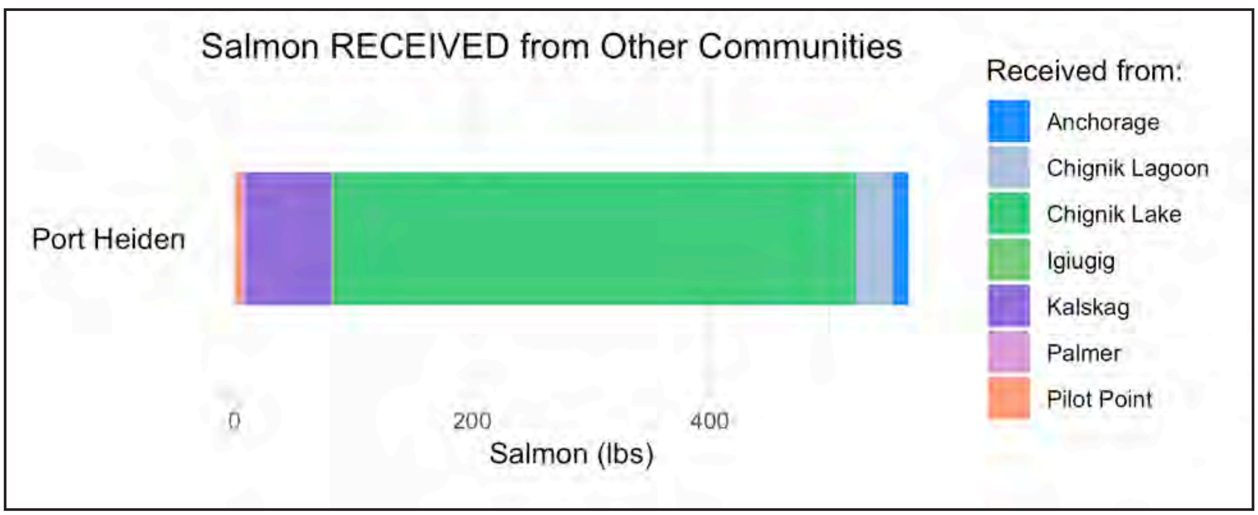

Figure 4-64.–Pounds of salmon received from people outside study community, Port Heiden, 2016.

Table 4-19.–Descriptive statistics for non-local networks, by relationship, Port Heiden, 2016.

	Giving to			Receiving from			Total		
Relation	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Children	8	70	9	6	123	20	14	193	14
Extended family	13	113	9	2	23	11	15	136	9
Grandchildren	1	2	2	2	13	7	3	15	5
Missing				1	9	9	1	9	9
Other relations	16	60	4	8	148	18	24	208	9
Parents	13	109	8				13	109	8
Siblings	4	18	4	6	251	42	10	269	27

Source ADF&G Division of Subsistence household surveys, 2017.

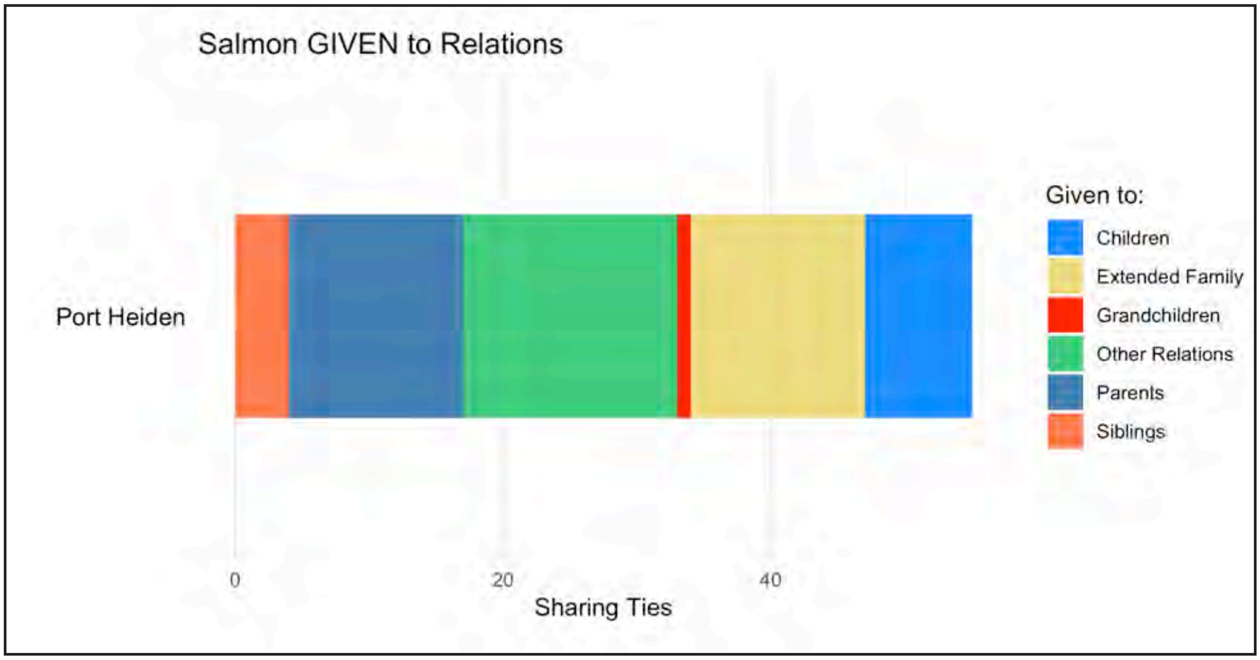

Figure 4-65.–Number of sharing ties based on salmon given to different relations living outside the study community, Port Heiden, 2016.

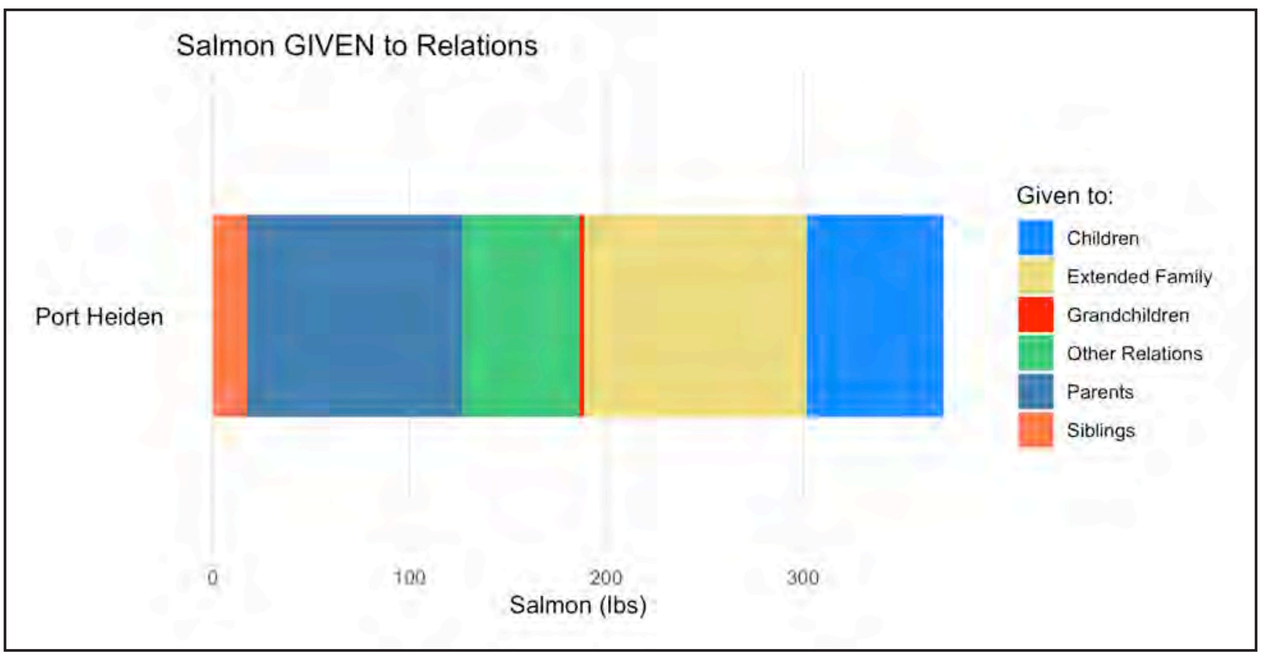

Figure 4-66.–Pounds of salmon given to different relations living outside the study community, Port Heiden, 2016.

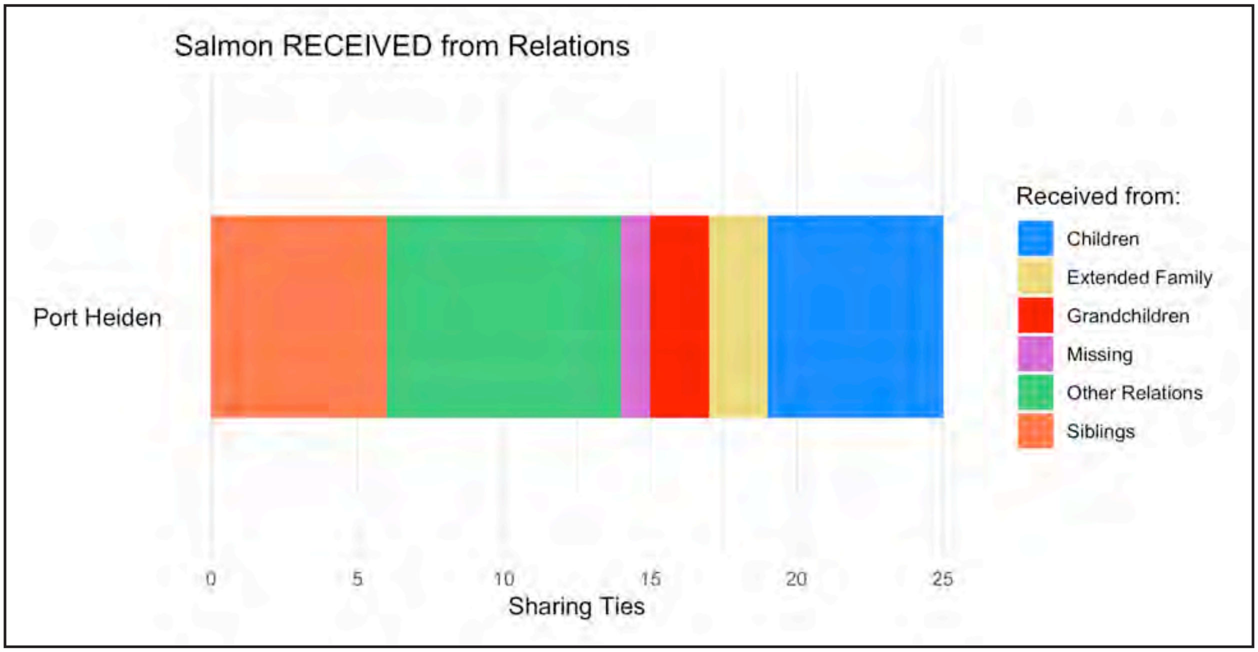

Figure 4-67.–Number of sharing ties based on salmon received from different relations living outside the study community, Port Heiden.

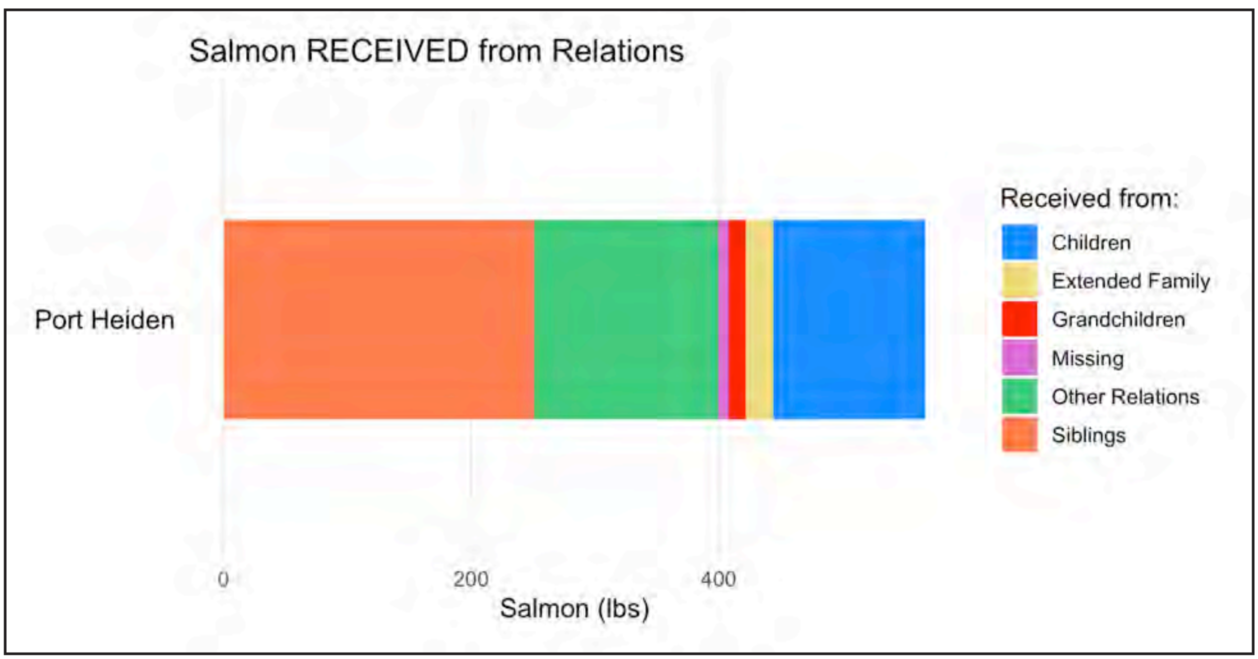

Figure 4-68.–Pounds of salmon received from different relations living outside the study community, Port Heiden, 2016.

Egegik

Local Networks

The Egegik subsistence salmon harvest network was composed of 22 households, including 2 households that were not included in the survey but were named by survey participants as part of their network (Figure 4-69). The network for Egegik had the lowest density among the study communities, featuring 10 total connections, including 2 harvesting and 1 processing connections, as well as 7 sharing connections (Table 4-20; Figure 4-69). Households ranged having from 0–4 connections, with an average of 0.9 connections in the combined network.

A small proportion of households in Egegik were involved in the subsistence salmon harvesting and processing networks, with only a few connections among them. This suggests that most households harvesting salmon for subsistence work independently or with people who do not live in the community year-round. More households were active in the sharing network, with about one-half of the households in the community included. The structure of the sharing network is disconnected, with no overlapping ties among multiple households. As a result, the combined network is similarly disconnected, with three small components that include one-half the households in the community and many isolated households with no connections to others. The unique structure of Egegik's local network compared with other study communities may be influenced by a variety of factors that were noted by study participants, including the recent closure of Egegik's school that resulted in several families moving away from the community, as well as general declines in the population of year-round residents relative to the large numbers of seasonal residents working in Egegik's commercial fishing industry.

Non-Local Networks

As depicted in Table 4-21, in Egegik, the survey documented a total of 31 instances of people giving salmon to or receiving salmon from outside the community, with a total of 815 lb of salmon flowing through these sharing ties that are depicted in Figure 4-70. Salmon given by residents of Egegik to people living outside the community represent the majority of non-local sharing ties (71%) and weight of salmon exchanged (62%) compared to sharing occurrences in which an Egegik household was the recipient. This suggests that Egegik is a source of salmon for other communities, with salmon flowing out of the community more frequently and in greater amounts than salmon flowing into the community.

Location

Egegik's non-local network includes sharing ties that connect community members to neighboring rural Alaska communities (Naknek, Ekwok, and Cold Bay), a regional center (King Salmon), the Anchorage metro area (Anchorage and Wasilla) and Kenai (also on the road system), and beyond to other U.S. states (Table 4-21). For salmon given to households located outside Egegik, the majority of sharing ties and shared salmon weight were with people living in the Anchorage metro area, followed by recipients in other U.S. states (Figure 4-71; Figure 4-72). Conversely, there is no discernable pattern in the locations that send salmon to residents of Egegik; there were relatively fewer sharing ties and smaller amounts received from a variety of locations (Figure 4-73; Figure 4-74). Together, these results suggest that non-local networks in Egegik primarily involved salmon flowing from the community to the Anchorage metro area and other U.S. states, with a secondary (but not often reciprocal) flow of salmon into the community from a variety of locations throughout Alaska.

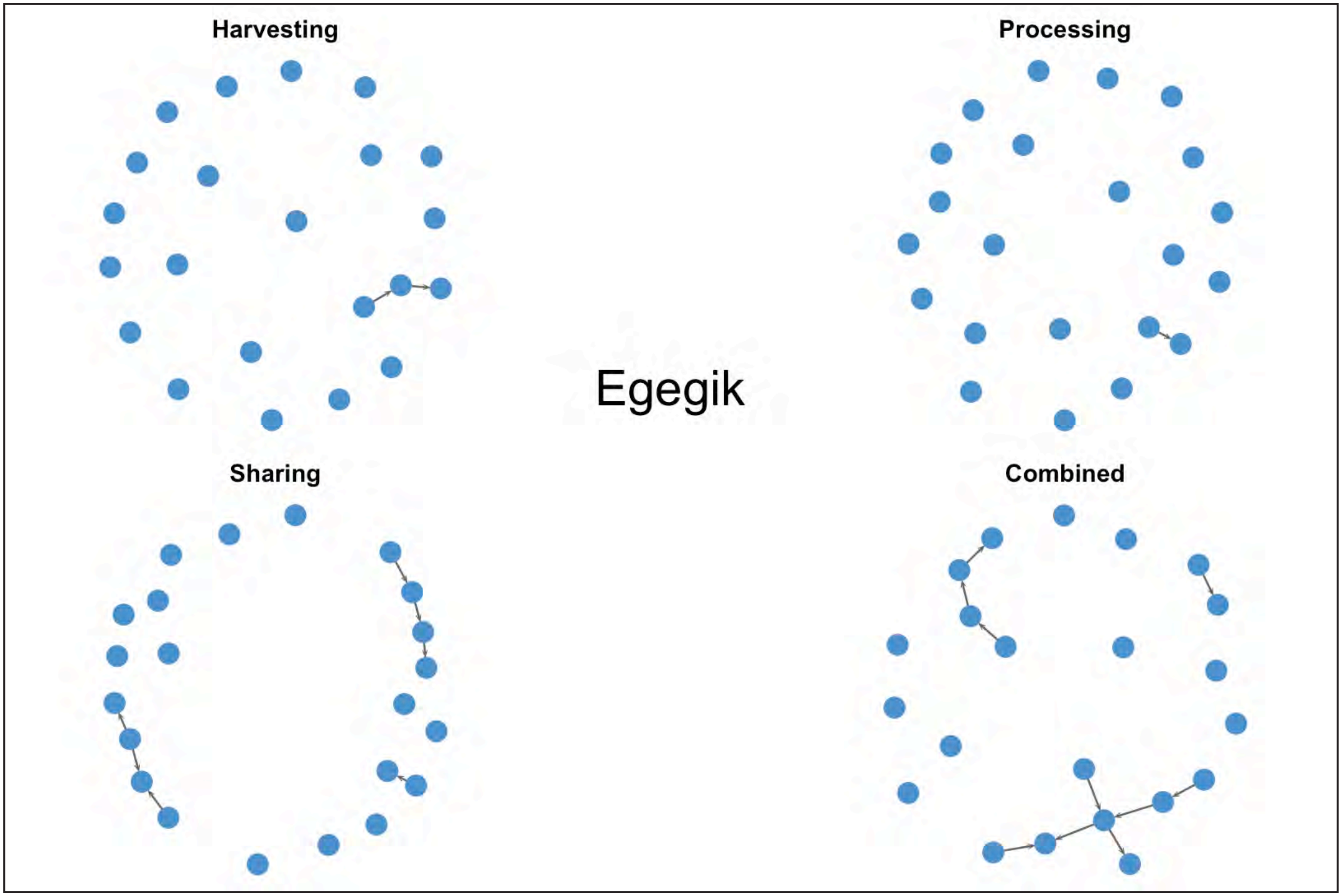

Figure 4-69.–Local networks: harvesting, processing, and sharing ties visualized as separate networks, and combined in a single network, Egegik, 2016.

Table 4-20.–Descriptive statistics for local networks, Egegik, 2016.

Network	Active households	Ties	Density	Components	Reciprocity	Transitivity
Combined	13	10	0.022	12	0.000	-0.020
Harvesting	3	2	0.004	20	0.000	0.000
Processing	2	1	0.002	21	0.000	1.000
Sharing	10	7	0.015	15	0.000	0.000

Source ADF&G Division of Subsistence household surveys, 2017.

Table 4-21.–Descriptive statistics for non-local networks, by location, Egegik, 2016.

	Giving to			Receiving from			Total		
Location	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Anchorage	9	361	40				9	361	40
Cold Bay	1	9	9	1	1	1	2	10	5
Ekwok				1	3	3	1	3	3
Kenai				1	88	88	1	88	88
King Salmon				1	9	9	1	9	9
Naknek				1	9	9	1	9	9
Other U.S.	9	83	9	2	88	88	11	171	65
Unknown				1	88	88	1	88	88
Wasilla	3	54	18	1	22	22	4	76	19

Source ADF&G Division of Subsistence household surveys, 2017.

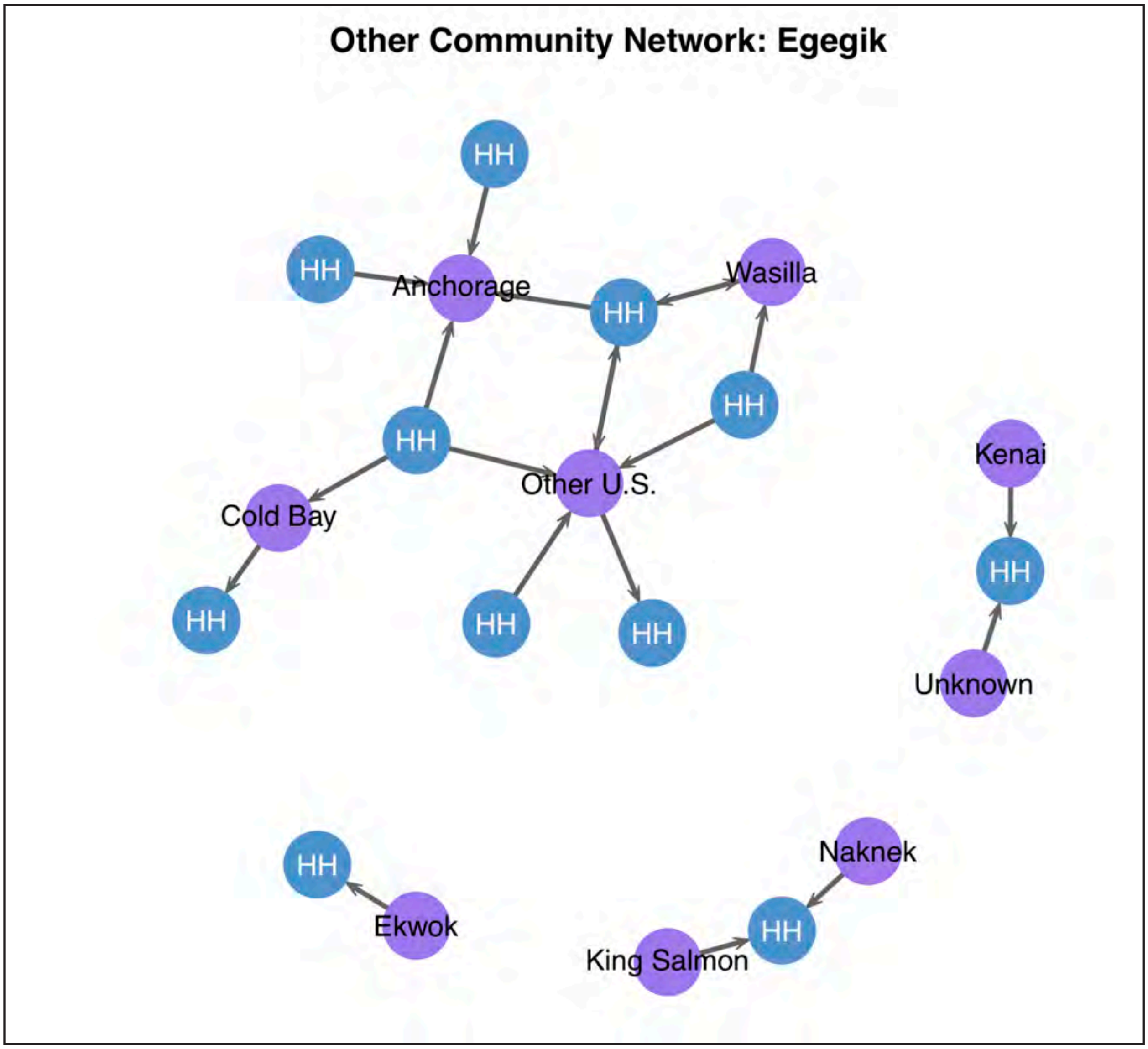

Figure 4-70.–Non-local networks: blue circles represent households in the community, purple circles represent locations of exchange partners, Egegik, 2016.

Relations

For salmon given to recipients outside Egegik, the majority of sharing ties and salmon were given to close family, particularly children (Table 4-22). Extended family and other relations (likely friends) were also given salmon, but more frequently and in larger amounts to other relations than extended family (Figure 4-75; Figure 4-76). For salmon received by residents of Egegik from outside the community, an equal number of sharing ties existed with close family and friends, though more pounds of salmon were received from friends (Figure 4-77; Figure 4-78). Together, these results suggest that close family and friends play a primary role in non-local networks in Egegik by actively being involved in sending salmon to and receiving salmon from Egegik. Exchanges with friends were generally reciprocal in terms of the number of ties, but more pounds of salmon were received by Egegik households from friends than given to friends. Conversely, more pounds of salmon were given to children living outside the community than received from them, indicating a non-local network structure that was not strongly reciprocal for this relationship.

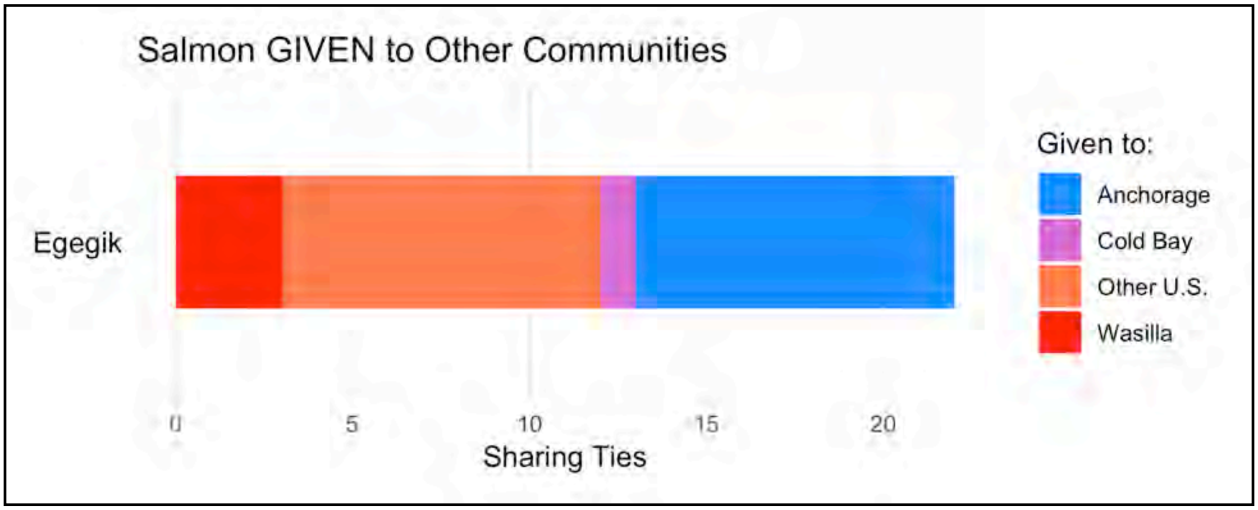

Figure 4-71.–Number of sharing ties based on salmon given to people outside the study community, Egegik, 2016.

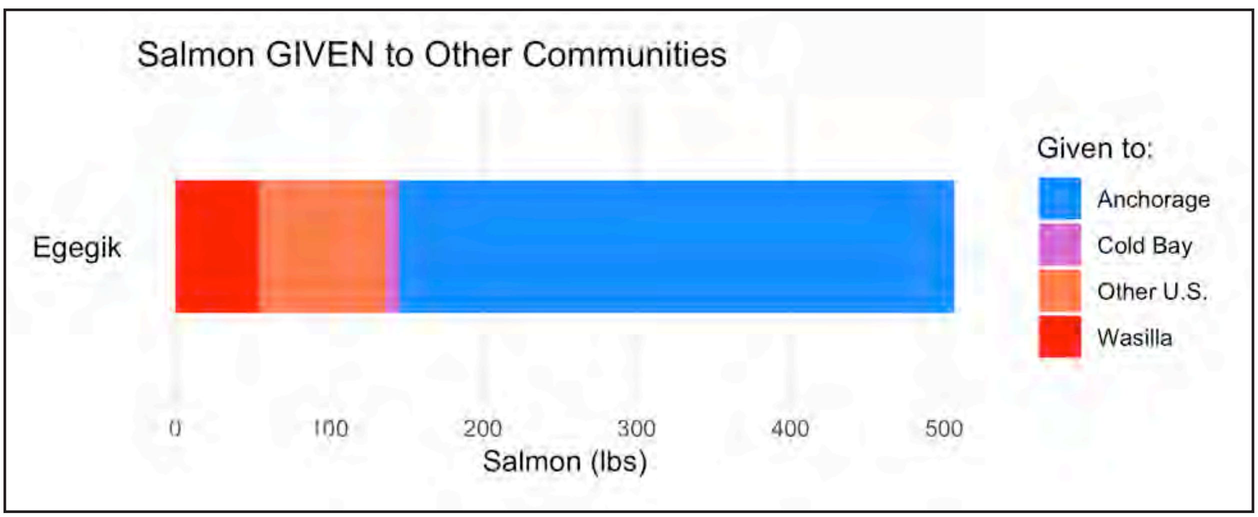

Figure 4-72.–Pounds of salmon given to people living outside the study community, Egegik, 2016.

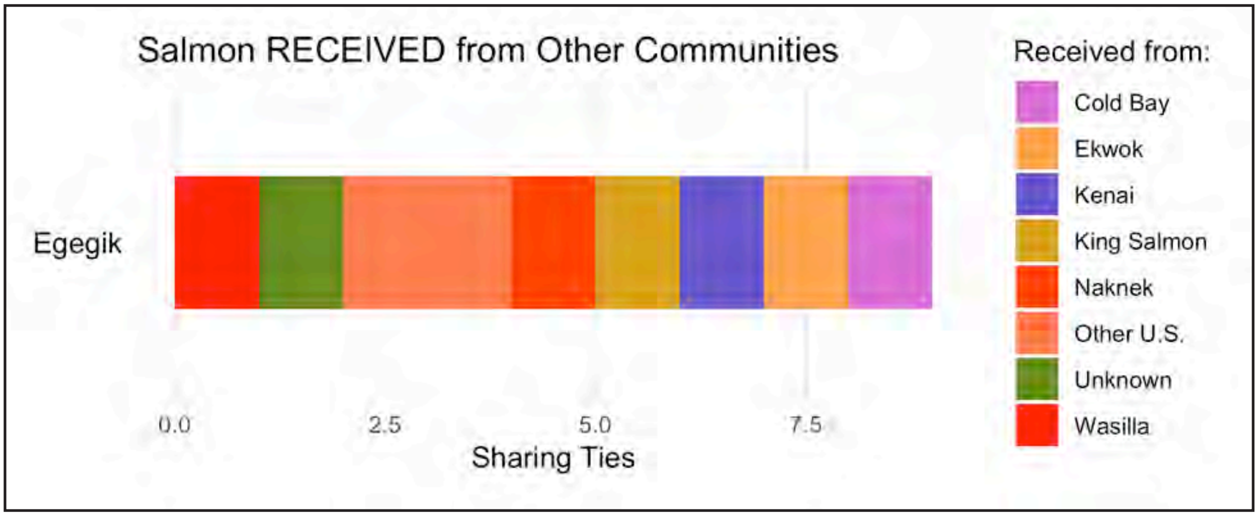

Figure 4-73.–Number of sharing ties based on salmon received from people outside the study community, Egegik, 2016.

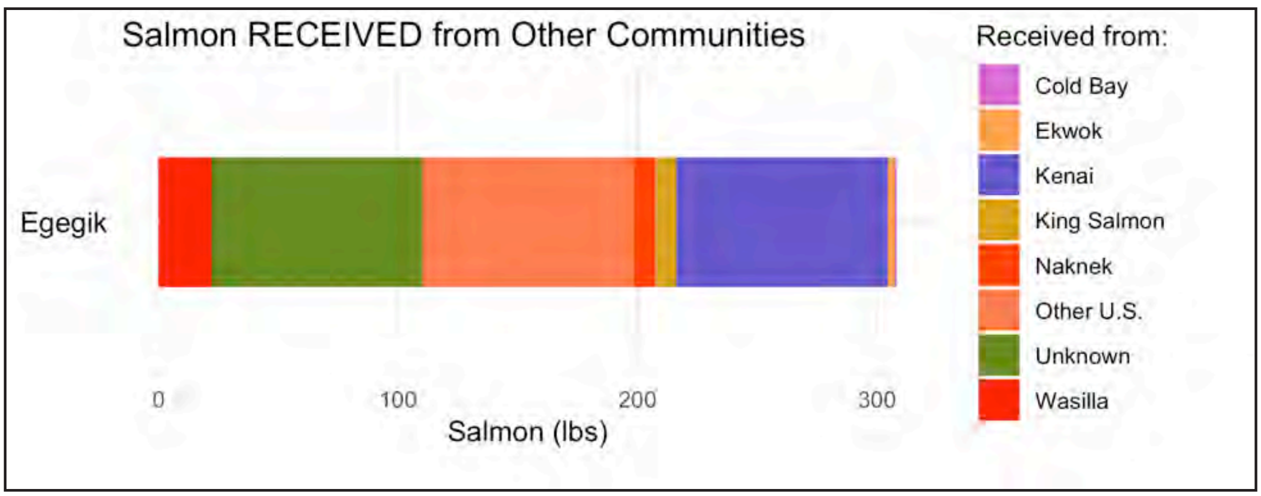

Figure 4-74.–Pounds of salmon received from people outside study community, Egegik, 2016.

Table 4-22.–Descriptive statistics for non-local networks, by relationship, Egegik, 2016.

	Giving to			Receiving from			Total		
Relation	Ties	Pounds	Average	Ties	Pounds	Average	Ties	Pounds	Average
Children	8	312	39	1	3	3	9	315	35
Extended family	3	57	19				3	57	19
Other relations	8	85	11	5	221	44	13	306	24
Parents	3	52	17	1	9	9	4	61	15
Siblings				2	75	38	2	75	38

Source ADF&G Division of Subsistence household surveys, 2017.

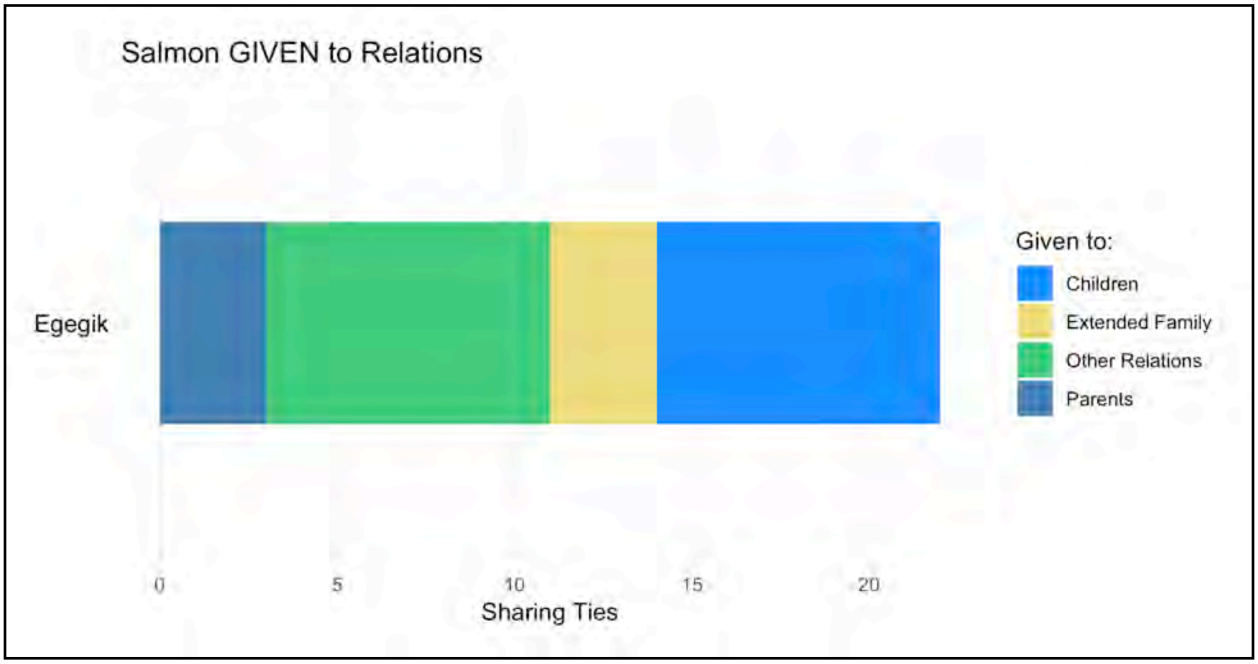

Figure 4-75.–Number of sharing ties based on salmon given to different relations living outside the study community, Egegik.

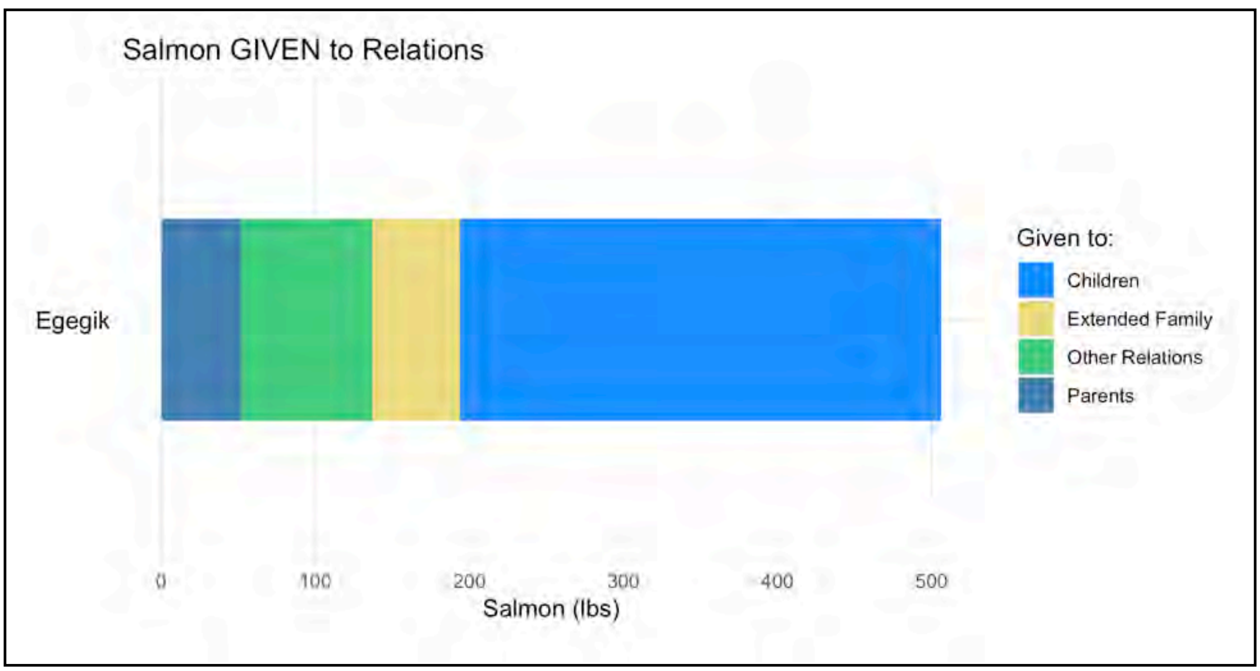

Figure 4-76.–Pounds of salmon given to different relations living outside the study community, Egegik, 2016.

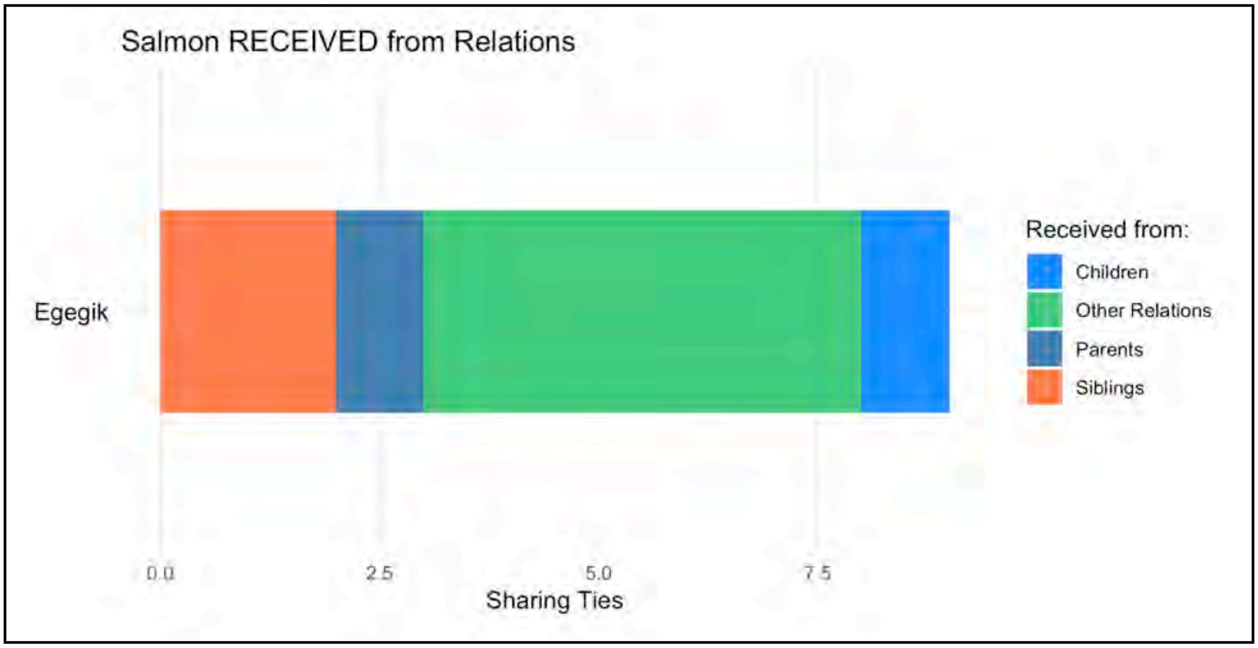

Figure 4-77.–Number of sharing ties based on salmon received from different relations living outside the study community, Egegik, 2016.

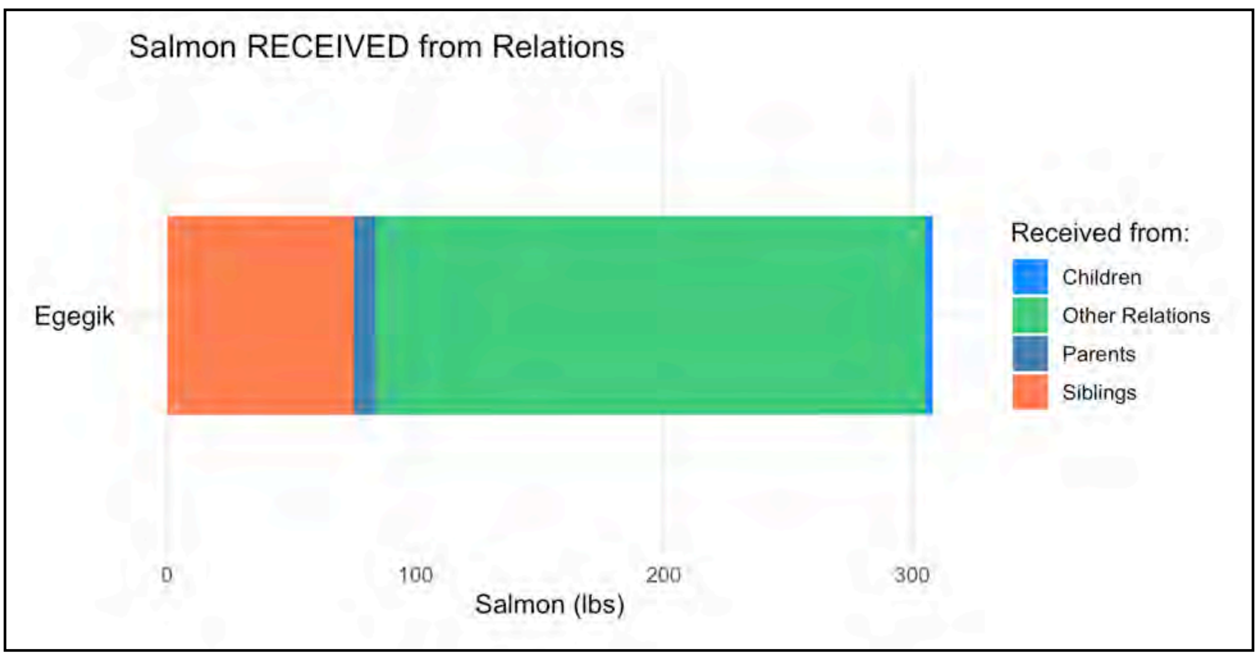

Figure 4-78.–Pounds of salmon received from different relations living outside the study community, Egegik, 2016.

Summary and Conclusions

Local Networks

The analysis of local networks focused on three important relationships underlying subsistence: harvesting, processing, and sharing salmon. When examined separately, the networks formed by each type of relationship differ between relationships that aid the production of salmon (harvesting and processing) and relationships that aid the distribution of salmon (sharing). Networks tied to production were generally less dense and less connected, with small clusters of households working actively with each other but isolated from other clusters of households. Networks tied to distribution were denser and more connected, with ties that bring clusters of households together by bridging the gaps in the production networks. These results illustrate the important role that sharing salmon plays in supporting social relationships, inter-dependence, and a general sense of togetherness in the study communities. While considering these general patterns across study communities, it is also important to note that the local networks of each study community have unique structural features, and these features may indicate equally unique social dynamics underlying subsistence salmon harvest activities in each community. Finally, the survey for this project collected data from a single year, so the results from the analysis provide a snapshot of what is surely a dynamic network of relationships. It is difficult to know whether or not the patterns identified represent long-term trends or new circumstances without data from additional years.

Non-Local Networks

While the data collected on local networks contributed to a large number of previous studies completed by the ADF&G Division of Subsistence, this study made a relatively unique contribution by collecting data on sharing subsistence salmon with people living outside the study communities. Researchers' primary goal in analyzing these data was to document key aspects of these exchanges, including the number of sharing ties that extend beyond the community, the amount of salmon flowing through these ties, the locations of exchange partners, and their relations with study participants.

Overall, salmon flows out of the study communities more frequently and in greater amounts than salmon flows in. About 77% of all ties documented and 75% of all salmon (in pounds) shared in non-local networks were given by a household in a study community to someone living outside the community (Table 4-2). These results support the idea that the importance of subsistence salmon harvests extends beyond the study communities, touching the lives of people at much broader scales. Researchers explored this effect further by reviewing key results from the analysis of the locations of exchange partners and their relationships to people in the study communities.

As noted before for local networks, there was substantial variation in non-local networks in the study communities, and these variations may indicate underlying differences in the social dynamics of each place. Also, the data on non-local networks represent a single year, so the possibility that these networks change from year to year should always be considered.

Locations

The scope of non-local networks extended far beyond the study communities, reaching people living in more than 29 locations in Alaska and other parts of the United States. Among all these locations that received salmon from any study community in 2016, salmon flowed from study communities to Anchorage more frequently (50%) and in greater amounts (47%) than other places. The flow of salmon between Anchorage and the study communities was also imbalanced, with 19 times more ties and 19 times more pounds of salmon flowing out of study communities than flowing into study communities from Anchorage. These patterns are similar to exchanges between study communities and other parts of the United States, with about seven times more ties and pounds of salmon flowing out from than into study communities. These exchanges represent a smaller but significant percentage of total ties (15%) and total pounds (15%) of salmon exchanged. Analysis of non-local networks also highlights the importance of regional exchange networks that connect the study communities with each other, as well as neighboring communities. Exchanges among study communities alone represent 21% of all ties and 22% of all pounds of salmon exchanged in the network. These exchanges are also more balanced in terms of flows out of and into the study communities. Together, these results suggest that non-local networks are characterized by two key patterns. The first pattern includes frequent, large transfers of salmon from study communities to people residing in Anchorage and other parts of the United States, while the second features more balanced exchanges at the regional scale among the study communities and other neighboring communities.

Relations

Overall, non-local networks in this study show several clear patterns in terms of the frequency of sharing and the amounts given to and received from people living outside study communities (Table 4-3). First, salmon are most frequently shared and shared in greater amounts with close family, followed by friends and then extended family. Second, salmon were given to close family and extended family much more frequently and in greater amounts than received from close and extended family. Third, the disparity in frequency and amounts of salmon given and received is much smaller for friends than close and extended family. These results suggest that non-local networks are driven primarily by asymmetrical exchanges with close and extended family, where salmon flows from study communities to relatives living outside the community. Friends also play a primary, and relatively more reciprocal, role in non-local networks that involved nearly one-third of all sharing ties and amounts of salmon exchanged.

These differences across relationships indicate the presence of different practices and norms for sharing salmon with people living outside the community, as well as different circumstances and motivations for sharing salmon. The practice of sharing is central in the Yup'ik and Sugpiaq culture and worldview, and has been adopted by many non-Native residents as a social norm. That people in the study communities give salmon more frequently and in greater amounts to close and extended family may suggest the relatively greater importance of maintaining kinship ties across geographic distance. That people who participated in this study gave salmon more frequently and in greater amounts to family living outside the community than they received from family outside the community suggests the study communities are important sources of salmon for relatives who live elsewhere, may not have the same access to salmon, and rely on a "taste of home" to maintain cultural ties and identity. That the difference in frequency of sharing and amounts given to and received from friends is relatively smaller than the differences for family suggests exchanges with friends may be less about enabling access to salmon than about maintaining social relationships or sampling different preparations. In addition to identifying these general patterns in non-local networks, it is important to consider variations across communities in terms of these different relationships. For example, Egegik, Port Heiden, and Perryville all reported receiving larger amounts of salmon from friends outside the community, and connections with extended family were more pronounced in Chignik Lake, Chignik Lagoon, and Perryville. Finally, as mentioned previously, the non-local networks in the study represent a single year, extracted from a social and ecological context of subsistence that unfolds across lifetimes and generations, and so results should be understood with the caveat that these networks are dynamic and may change from one year to the next in ways that are difficult to anticipate from the information reported here.

Trade Networks

Compared to local and non-local networks, this project documented very few instances of barter and customary trade. This may indicate that these exchanges occur relatively infrequently, or it may be due to the methods that were used to document these networks. The distinctions researchers tried to establish in the survey questions between sharing salmon and barter or customary trade of salmon may not have matched how participants in the study think about these different kinds of exchanges. Another possibility is that the people who most often engage in barter and customary trade are not year-round residents of the study communities, a point suggested by residents of Chignik Lake during the community data review meeting. From the few exchanges that were documented, it can be said that the majority involved exchanges of salmon for other subsistence foods, particularly foods that are relatively rare or unavailable in the study communities, and only a few exchanges involved cash, material goods, or services. Additional research, including both semi-structured interviews and surveys, is likely needed to determine whether the relatively small number of exchanges documented in this project reflect the actual frequency of these exchanges or a methodological challenge that affected how participants responded to the survey questions.

5. SHARING NETWORKS

Key Respondent Interview Results

Thirty-two people from the study communities participated in the qualitative portion of the study. There were 12 respondents in the 70–80 age range, 12 respondents in their 60s, 2 respondents in their 50s, 5 respondents in their 30s, and 1 respondent was 18–20 years old. Seventeen respondents were male and 15 respondents were female. All respondents except one had lived their entire lives or one-half or more of their lives in the study area. The one exception had lived in the study area for less than 10 years. The majority (28) of the respondents were Alaska Native, primarily Alutiiq/Sugpiaq. One respondent was originally from another country but had lived in the study area for 45 years. The other three respondents were of Euro-American descent.

The interviews were conducted in an open-ended and semi-structured format that followed a key respondent protocol (Appendix D). Most interviews were audio recorded with the permission of the respondent and later transcribed verbatim. Four respondents did not give consent to be audio recorded and the information they provided was recorded by handwritten notes and included in the data analysis effort. Once transcriptions and notes were compiled, key respondent interview data were analyzed using inductive coding to identify all prominent themes linked to wild food sharing traditions and networks (Bernard 2011). Final analysis of the qualitative data yielded the following themes: sharing traditions; practices of reciprocity; practices of barter and customary trade; types of resources shared, bartered, and traded; types of equipment shared; sharing with elders and how sharing practices are passed down through the generations; sharing with nonproductive persons; work ethic, division of labor, and cooperation surrounding the harvest and processing of shared subsistence foods; practices of distributing subsistence foods within communities; regional sharing networks; long-distance sharing networks; and socioeconomic and technological influences on the evolution of sharing.

Characterizing Wild Food Sharing Traditions in the Study Area

Study respondents depicted significant sharing traditions that can be characterized as fitting with long-recognized descriptions of sharing by subsistence hunting, fishing, and gathering communities in Alaska and globally (Bird-David 1990; Kelly 2007; Langdon and Worl 1981). Most of the sharing practices reported by respondents during this study fall under the rubric of generalized reciprocity, where food or other items are gifted without direct expectation for reciprocal returns (Barnard and Woodburn 1988; Bird-David 1990; Sahlins 1972). As voiced by a Chignik Lagoon respondent, the essential premise of generalized reciprocity is "what comes around goes around." An emphasis on generalized reciprocity is known to be foundational among many cultures that rely on procuring wild foods for subsistence. This is likely rooted in the unpredictable prospects of relying on wild foods, as well as processing and storage limitations. Wild resources are constantly in flux and harvests are not always predictably obtained. As such, both resource diversification and sharing are base adaptive measures for reducing risk among peoples who are substantially dependent on wild foods. Individuals, households, and communities that share are considered to have a better chance of survival than those that do not participate in reciprocity (Lewis et al. 2014). However, a practice of generalized reciprocity does not normally exclude sharing with "people who are incapable of helping themselves or others," such as the elderly and disabled (Sahlins 1972:194). For all these reasons it has been suggested that some subsistence hunting and gathering communities often maintain a core belief that not only is there an obligation to give but that there exists a consistent "demand" for generalized reciprocity (Endicott 1988; Peterson 1993).

Demand sharing represents an assumption that when food is harvested and brought into a community it is automatically distributed or claimed by community members without any agent-driven system of distribution based on pre-measured reciprocal obligations (Peterson 1993). Demands for food sharing can be either through direct verbal requests or can be unspoken (e.g., persons with an expectation to receive resources loiter around other individuals and households that do have food) (Peterson 1993). In a demand sharing environment individuals and households maintain little control over harvested resources and community members can demand food even if they rarely make any contribution to the harvest efforts (Lewis et al. 2014). Among study respondents an overt practice of demand sharing was not prominent, but certain traits of demand sharing are extant among the study communities.

Demand sharing is the maximum form of generalized reciprocity and is most emphasized in egalitarian immediate-return hunter-gatherer communities with high levels of cooperation (Bird-David et al. 1992; Woodburn 1972). Delayed reciprocity is a more moderate form of generalized reciprocity in which there exists an underlying assumption that the effort will in some manner be later reciprocated, although here reciprocity remains generalized and not fully calculated (Tacey et al. 2016). Balanced reciprocity brings in calculation and represents "even exchange" that might involve negotiation and thus effectively becomes barter or trade (Sahlins 1972). In balanced reciprocity the expected return can be either immediate or delayed.

The Alaska fish and wildlife regulatory categories of "barter" and "customary trade" account specifically for balanced reciprocity practices surrounding wild harvested resources in either food or craft form. Barter is trading resources for resources, resources for products, or resources for services—including physical work, transportation, and so forth. Customary trade—the non-commercial and limited sales of resources for cash—also falls under the rubric of balanced reciprocity. Who is involved in the transaction is a factor that influences whether a resource is shared in a more general or balanced manner; what to do with a resource will often be determined differently among close kin, coworkers, friends, partners, distant relations, strangers, and even enemies. The amount of goods involved and the perceived value of the goods or services are also important factors. For example, the size of a harvest often predicts whether a portion will be shared beyond the household of the harvester, and this can even apply to a certain degree in communities whose members follow a mostly generalized reciprocity ethos.

At the other end of the spectrum from demand sharing and generalized reciprocity is negative reciprocity, which specifically involves one party in the exchange seeking an advantage over the other party (Sahlins 1972). Negative reciprocity includes the sale of wild resources for cash profit (e.g., commercial-oriented trapping and commercial fishing). Purposeful cheating and stealing are also forms of negative reciprocity at its most extreme gradient. Study respondents reported adhering informally to ideals centered around delayed reciprocity yet rarely practiced balanced reciprocity, and, in fact, expressed that in most cases they are opposed to balanced reciprocity as a method for redistributing wild foods. A form of negative reciprocity exists in the prevalent commercial fishing practices in the study communities.

Sahlins (1972) described a "continuum" of reciprocity that included food, hospitality, and ceremonial exchanges. Sharing wild food at celebrations for holidays and traditional gatherings is an important contemporary resource distribution component in the study communities that falls mostly under generalized reciprocity. In contrast, certain practices of wild resource distribution, or redistribution, in some traditional subsistence communities has been motivated by persons attempting to gain status and prestige (Earle 1997; Maschner 1991). In this vein, more calculated socioeconomic motivations associate centralized resource redistribution practices with politicking and an elite class that is focused on enhancing its interests, rather than simply households or individuals that share on an equal footing (Earle 1997; Sahlins 1963). Up until the mid-20th century, Alutiiq/Sugpiaq communities in the study area were largely involved in redistribution systems directed by highly ranked individuals sometimes referred to as "chiefs" (Fitzhugh 2003; Morseth 2003; Partnow 2001). In the late 18th century during Russian colonization, which included Alaska Native involvement in the fur trade and the adoption of Russian Orthodoxy, Alutiiq/Sugpiaq village redistributive chieftainship began to shift more toward economic individualization and Westernized political orientations. The American period starting in the early 20th century ushered in further shifts in the socioeconomic structure, including individualized employment, dependence on cash for food and other necessities, increasing involvement in the commercial fishing industry, and an overall enhanced influence from Western economics that drove a cultural evolution toward an increasingly nuclear and extended family-based and less village-based social structure (Morseth 2003; Partnow 2001). Alutiiq/Sugpiaq sharing practices in the 20th century context thus became far less formalized compared to known precolonial practices for

Alutiiq/Sugpiaq, as well as known practices for many other northern cultures, especially those occupying precolonial coastal environments in the Pacific Northwest (Fitzhugh 2003; Maschner 1991).

An interesting phenomenon is that while pre-contact northern maritime cultures are generally considered to have been complex hunter-gatherers with high degrees of stratification, and thus often maintained centralized resource redistribution systems, sharing for respondents in this study can be almost wholly characterized as a form of generalized reciprocity that is noncentralized, nonformal, and non-rule driven. This far less formalized type of sharing documented for contemporary Alutiiq/Sugpiaq communities aligns with the wild food sharing practices documented among households across Alaska generally during the last half century (Hutchinson-Scarbrough et al. 2016). During a colonization period that has affected the region for longer than two centuries, the study communities appear to have adopted sharing practices that align more with the generalized reciprocity of non-complex egalitarian hunter-gatherers, rather than what has been documented as a previously prevalent delayed-return socio-politically complex redistribution process. This observation provides important context regarding how sharing practices can evolve over time.

As study results reveal, in the current century we must now consider generally that both precolonial and preindustrial levels of socioeconomic solidarity and cooperation formerly extant among the Alutiiq/Sugpiaq have become diminished to varying degrees as socioeconomic changes continue. As will be discussed in detail in the concluding section of this chapter, a dominant discussion theme among study respondents was that sharing as known in the past has become both increasingly intertwined with monetary variables—including the increasing cost of subsistence activities and other goods, the cost of shipping, employment, commercial fishing, and expanding use of digital technology—and the environmental effects of both climate change and commercial fisheries management. Adding to this theme of overall emerging constraints on the sharing system resulting from modern socioeconomic evolution is that nearly all respondents reported that sharing traditions are in decline, including lack of intergenerational subsistence enskillment. The following detailed ethnography of contemporary sharing practices is presented based on the results of interviews gathering local and traditional knowledge.

An Overview of Study Community Sharing Traditions as Discussed by Key Respondents

Sharing traditions surrounding wild foods and their harvests represent a significant cultural baseline for the study communities. Sharing was characterized by respondents as core to their identities. "It's part of life here, sharing, it's what we do," stated a Port Heiden respondent. A Chignik Lake respondent said, "I grew up with [sharing]. [The elders] told me I have to share. I grew up hearing that." And a Chignik Bay respondent said, "Most people if they have [wild foods] they will share it. We will never starve." Residents of other communities offer similar comments. "We share, that's how we survive, it's how it's always been," said a Perryville respondent. Sharing is "just something we have always done … you go to these older Native villages around here the first thing they do is feed you," said a Chignik Lagoon respondent.

In general, community-wide sharing occurs when there is a surplus from the harvesting and processing activities of an individual or family group. "It don't matter who you are. Everybody gets treated pretty much equal [they] get a share just for living in the community even," explained a Port Heiden respondent. Wild food sharing is also a consistent component of community gatherings and events, a practice rooted in multigenerational traditions. As will be discussed later in the section "Wild Food Sharing Networks," sharing networks also extend beyond households and beyond communities and to extended families and friends spread regionally and even across Alaska. Specific social actors in sharing networks remain consistent but are flexible and subject to change based on various socioeconomic and geographic circumstances. Study respondents stated that wild food sharing generally occurs automatically without the requirement for any requests on behalf of the receiving parties; the remainder of this overview highlights core sharing attitudes held by key respondents in the communities that reinforce this primary sharing principle.

A Diversity of Resources Shared

This study's focus was specifically on sharing salmon and salmon can be considered as the baseline wild resource shared among the study communities, but sharing includes numerous other food resources as well as physical materials necessary for harvesting, such as fishing nets and transportation. Study respondents reported a diverse array of food resources that tend to be shared within the following categories: fish, marine invertebrates, marine mammals, large land mammals, small land mammals, upland birds, migratory birds, and berries. Fish shared included salmon, Pacific halibut, cod, herring, eulachon, smelt, and sand lance. Marine invertebrates shared included crabs, octopus, clams, and sea urchins; seals were another marine environment resource shared. Large land mammals shared included moose, caribou, and brown bear. Small land mammals shared included porcupine and snowshoe hares. Ptarmigan was the upland bird species shared. Migratory birds shared were geese and ducks. Berries shared included cloudberries (sometimes referred to locally as "lowbush salmonberry"), lowbush cranberries, crowberries, and blueberries. Members of the study communities also sometimes shared garden produce, such as potatoes. Particular regional resources shared were caribou from Port Heiden and Sitka black-tailed deer sourced from Kodiak Island communities. Some respondents reported that whale meat and blubber were shared from northern communities in an Alaska-wide network. Various types of grocery produce such as fresh vegetables and eggs are often shared or exchanged by persons who reside in cities such as Anchorage.

Salmon was most frequently discussed by respondents as a shared resource. Due to the consistent abundance of salmon, every spring and summer salmon harvests normally yield a surplus beyond basic needs of the harvester and are therefore frequently shared. Respondents reported that because salmon is such a welcome resource when it first arrives in the region during spring there exists a longstanding tradition of widely sharing salmon during this time; in particular, the first fish harvest that is caught is shared among family and community members. "People share the first [salmon] catch so everyone has fresh fish," explained a Perryville respondent, and a Port Heiden respondent said, "The first salmon to hit the beach, that's important and that means a lot to people. They feel left out if nobody ask them [if they want some]."

Moose and caribou were the next most frequently discussed shared resources, highlighting both the practical and traditional importance of sharing meat from large land mammals. Respondents reported that due to the large amount of meat yielded, a successful moose harvest always means extensive sharing. "When I caught a moose the meat was spread out in the village," explained a Chignik Lake respondent, and a Chignik Bay respondent said, "If they shot a moose they only kept a quarter"—the remainder being shared with accompanying hunters and other community residents. Respondents said that moose hunters usually always work together and split their yield when successful, usually between five or six families. "You got two or three moose … you clean them up all together and cut them up all together and split them up. That used to be the old way and it's still the same thing now," explained a Chignik Lagoon respondent. A Perryville respondent said, "Of all the moose I caught I never did take a whole one." Caribou yield less meat per harvest but are shared similarly. "We used to go out and get, you know, maybe one or two [caribou] and then we would share it, you know give half of it away or something and keep half. That way everybody has what they need," said a Perryville respondent. A Chignik Bay elder recalled that family members "went and got caribou and they came back and they gave me some caribou meat, not only me but to everybody in the village."

However, caribou in the region have declined significantly and respondents reported that in recent years hunters lucky enough to harvest a caribou often do not share as much. Respondents said that sharing large land mammals like moose and caribou is different than sharing fish because these species are rare. Due to the scarcer availability of large land mammal resources, when a moose or caribou is harvested the social context of its distribution must be considered more carefully than is required for salmon.

Other resources that are shared also provide perspectives about sharing. For example, some respondents said it is a traditional practice to share harvested ducks with everyone rather than the individual hunter keeping the birds. Small fish and marine invertebrates can be harvested en masse, but processing those is more tedious than is processing larger fish and land mammals. Therefore, the harvester has an incentive in terms of both getting assistance with the workload and avoiding spoilage to quickly share small fish and marine invertebrates. These resources are thus often shared immediately and when they are fresh. A Chignik Lagoon respondent explained:

> [When we] get some crab [we] bring them down, put them in a tote, put the water in it and just drop it on the beach and called everybody on VHF [very high frequency

> radio], tell them there is some crab on the beach. Everybody want to go get it. So they used to share it that way [and] you take [home] a couple crab for a meal. The same thing with cod we used to do that … whatever coming in you bring a few [to give away].

Study respondents reported that properly understanding sharing practices requires acknowledging the diversity of resources that are harvested and shared within subsistence communities, as well as the health of the environments that subsistence resources exist within. A Chignik Bay respondent said that "all of the resources are intermingled to some degree" and explained that a focus only on sharing salmon or moose misses:

> …the whole context of food security … if … it's only going to be about salmon we are never going to have a handle on what's going on in rural Alaska. … how you open the door to local knowledge, elder knowledge, community knowledge, regional knowledge is only when you open up the discussion to broader food resources and environmental issues.

The availability of a diversity of subsistence resources and the knowledge to harvest and use them are important factors in the long-range resilience of subsistence cultures in Alaska, and around the world (Charnley 1984; Fienup-Riordan 1986; Moerlein and Carothers 2012). Biological and human resource diversity are key components in a community's capacity for coping with social and ecological change, including environmental and climate hazards as well as economic shifts (Folke 2006; Hansen et al. 2013; Leslie and McCabe 2013; Nelson et al. 2012). Sharing networks that utilize a diversity of wild resources and human skillsets are thus critical risk-buffering strategies (Nelson et al. 2012). When resource diversity is present, resource availability fluctuations are often not seen by subsistence users as a barrier because, as a Perryville respondent explained, they are often experts at "find[ing] different resources, we go find another to replace [what is not available]." Likewise, a Chignik Bay respondent emphasized that it should not be overlooked that the long-range success of Alutiiq/Sugpiaq cultural survival on the land is engrained in:

> … how well everybody was able to adapt and change when they were given the opportunity to live on the land that had [a diversity of] resources … . [This was a] 10,000-year process of selection based on the widest variety [of subsistence resources that provided] the most potential for [successful] adaptation.

It should also be noted here that diversity in available subsistence resources across a region also often drives the propensity for establishing both sharing and trading relationships across local and regional networks (Nelson et al. 2012). The networks covered in this study, to be discussed in detail below in the section "Wild Food Sharing Networks," are thus key components of community resilience.

Sharing Equipment and Materials

The resilience of sharing networks is not only dependent on the presence of bioregional wild food diversity, but also on a practice of sharing the labor and materials required to harvest subsistence resources that flow within the networks. "There are different types of sharing whether it be the sharing of the salmon itself or the resources it takes to get the salmon," explained a Chignik Lagoon respondent. In this regard, study respondents reported that they often share boats, fishing nets, smokehouses, tools, and labor efforts. "Sharing of nets and labor to make it all work," said a Port Heiden respondent. As will be highlighted throughout the remainder of this chapter, respondents reported that the social context of sharing labor and materials is just as important to community solidarity and individual wellbeing as are the foods produced. A Chignik Bay respondent said, "It's not only finished products, sometimes it's bringing the materials to that person's house and getting them involved in something that you enjoy doing. … it's not just food stuff, it's [also] the sharing of arts and crafts or materials."

Sharing and Learning to Share is Multigenerational

Wild food sharing traditions, including the labor and materials associated with harvesting these resources, are passed down through the generations. "My folks did the sharing when my folks were alive and well and we continue it. As we have gotten older, we share more because we have kids to share with," explained a Chignik Lagoon respondent. A Chignik Lake respondent said:

> Sharing is in our lifestyle because everyone in the village, and other villages, is taught to share by their parents … . Sharing is the way I was taught and brought up … ever since I could remember it was always giving and giving and you never thought otherwise.

Study respondents consistently described learning to share not necessarily by being directed to share but more so specifically by observing the sharing practices of their parents and grandparents from the time they were children forward. "[We] learn by watching," said a Perryville respondent. A Chignik Lake respondent said sharing is learned by "listening and watching what [the elders] do," and another Perryville respondent explained that learning about both subsistence practices and sharing was accomplished because "I observed, as you grow up you observe." These comments highlight not only that a sharing ethos is learned mostly by observation rather than direct instruction, but underscore a longstanding observation that most subsistence hunting, fishing, and gathering cultures emphasize learning by observing and doing rather than by directed instruction (Berkes 2009).

Study respondents reported that, as children, not only did they witness elders and adults broadly sharing wild foods, they also witnessed sharing being reciprocated, and thus they learned early on that in their communities what is given eventually comes back. As will be discussed below in the section "The Logic of Generalized Reciprocity in the Study Communities," the manner in which reciprocation occurs is mostly indirect and informal and respondents explained that while as youth they were taught to share in principle, they also observed sharing practices are rarely governed by formal complex rules.

Based on conversations with key respondents, many community members continue to work hard at passing on their sharing traditions and subsistence work ethic to their own children. However, young people continue to learn sharing in the traditional manner by observing more so than by being taught directly to share. For example, a Chignik Bay respondent said that she influences her children to practice sharing by "setting an example, teaching them share by sharing myself." A Perryville respondent said that his children "picked it up [the habits of sharing] just the way I did … . When people come over and visit we share things with them and [the children] see that. It gets in their head that, 'Oh, this is the right way to go about doing things.'" Another Chignik Bay respondent elaborated further:

> As you get older you try to instill those values on the people in the family or that you have contact with so that you have a [sharing] network to work with … that is sort of the role of the parents and the uncles and aunts in these families … their job is to teach and make sure that when their children or grandchildren are entering into this process of sharing food resources with others that it continues.

The Role of Sharing in Maintaining Social Ties and Community Wellbeing

While the primary motive to share and maintain sharing practices and sharing networks across generations is founded in maintaining a resilient food security arrangement, a sociocultural component of fostering strong long-range community cohesion is equally vital. Respondents reported that they achieve personal and social satisfaction through both harvesting the foods that they and their families need, and through sharing the remainder with other families. As such, sharing offers a profound sense of both material and social wellbeing. A Chignik Bay respondent provided an extended narrative on the social implications of sharing:

> My social ties are based on people always being so good to me and sharing is important for keeping good relationships and links of communication open. It's as important as being aware of weather or survival techniques. Every subsistence opportunity has social implications. The smaller the group of people the larger the social implications … . Living in a small community is much more complicated in terms of personal relationships and how people view things. If I lived in Anchorage and I had an opportunity for a proxy hunt for, let's say hunting moose or something

> like that, I really don't care what my neighbor thinks. [But] when you make a decision here [in Chignik Bay] in terms of subsistence [there] are all kinds of implications to take into account: is that somebody else's area where they like to hunt, etc.? If you are a hunter you are pretty well aware of where there is going to be rabbit opportunities, where there is going to be porcupine opportunities, where there is going to be duck opportunities, where there is going to be octopus opportunities, where there are king salmon opportunities and every opportunity is going to have a social implication.

For all these reasons, respondents reported that individual selfishness when it comes to subsistence practices is generally socially harmful; traditionally, most residents will always choose to share resources and materials rather than hoard. Respondents stated that it is normal for community residents to share wild foods even when they know that the resources are scarce and the chance of obtaining more is limited. Moreover, respondents made clear that, for them, subsistence hunting, fishing, and gathering opportunities are rarely motivated by surplus accumulation: people do not intentionally try to harvest more than they need for the purpose of sharing or obtaining prestige. "We just try not to take more than what we need, but if you have extra then you give it, share it with people," explained a Perryville respondent. For these reasons "you never see people begging for food in Native culture … . [Seeing] mothers with young children going door to door to beg food—that never happens in the Native culture," stated a Chignik Bay respondent. Not only are sharing traditions motivated by food security and social cohesion, respondents made clear that an ethos of sharing wild foods also serves as a primary connector between people and the land. "The connection between subsistence food resources and ecological relationships is also important … [and sharing] … is an important part of our food security simply because of environmental changes," said the Chignik Bay respondent.

Sharing with Elders

All study respondents noted that community elders are always prioritized in sharing activities. "Elders are first in line," said an Egegik respondent and a Chignik Bay respondent said, "I was taught that you take care of the elders first before you take care of anybody else." Another Egegik respondent said, "I remember my dad when I was a kid, [my father] used to go up and get the caribou, six–seven caribou, and bring them back and pull meat to the old elder houses and give them a whole caribou." Another Chignik Bay respondent, who was speaking about sharing in rural communities, said:

> There are a few things that are required by the community and making sure that the elders have food is probably the one universal concept and it's so strong that it is everywhere in the state of Alaska and, as far as I know, it is in every indigenous group everywhere in the world.

Study respondents reported that community members actively monitor elder food security, health, and wellbeing, always making sure that elders in the communities have enough food. For example, a Port Heiden respondent said, "We watch over an elder and when we get fish or something we will make sure that he's got fish in his freezer." Study respondents said that only after it is certain that elders in the communities have the food that they need does sharing occur with younger community members. A Perryville respondent said, "[We] call and ask elders first if they want [subsistence food], then ask family, then friends," and a Chignik Lake respondent said, "[Share with] elders first, the younger people last, usually how it goes, how it's always been." An elder respondent from Chignik Lagoon explained that people "share with me so I am taken care of." The elder said that he never needs to ask for food. "There is an unspoken rule that elders don't have to ask, they should just be already provided for," explained a Port Heiden respondent.

A Chignik Lake respondent talked about learning to be a hunter and being told by his father that he always needed to share what he harvested, especially with elders:

> I remember when [my father] caught five or six caribou and bringing them right to the elders. Dad he always shared the caribou and the fish and the geese and everything that he got, he gave it out to the elders. I didn't understand it at first, like

> when I caught my first caribou. He had me give it all away. I say, 'What the hell! It's my first caribou I should keep it.' But in traditional ways it shows respect to the elders. You are helping take care of them. It's an honorary thing to give it all to the elderly people. I understand it now, but I didn't understand it as a 12-year-old.

Similarly, a Port Heiden respondent explained that when young people make their first kill that they are expected to share it with an elder. "Traditionally the first thing you catch or kill you have to give away to an elder, and anything after that you still have to continue to consider your elders, like the first fish of the year that we would catch we would bring it to our grandmother." In this manner, early on in life young people are instilled with both a sharing ethic and practice of watching out for elders. The respondent's explanation continued, "Younger people are taught to look after their elders so they should not have to go without. Kind of makes people responsible for someone."

Respondents clarified that not only are elders consistently shared with as a point of honor, but also for the practical reason that older community members are often no longer able to adequately manage the active workloads involved with hunting, fishing, and gathering. "Elders they can't go out and do it you know, they have a hard time so [we] share with the elders first because the younger generation can go out there and hunt if they need to," explained a Perryville respondent. A Chignik Lagoon respondent said, "[We] especially [share with] the elders that aren't able to get out and get their own fish. They are asked first," and an Egegik respondent said, "If we get too much we give to the elders that can't go out for themselves, elders who don't have transportation." Another comment regarding the attitude toward helping elders came from a Port Heiden respondent: "Elders around the village … they can't go and catch things for themselves. How happy they are when you bring them meat." A Chignik Lake respondent said, "[When we] bring [wild foods] to the elderly they are really happy, so just seeing the look on their faces makes it worth it," and the same Chignik Lagoon respondent first quoted about providing for elders said, "I love the look on the elder's face, especially when they see the first fish of the season, it's just so exciting." A Chignik Bay respondent explained that as he has grown older, he and his wife have become more dependent on sharing. "[This year] we received 100% of our fish. I physically could not go out and put a net out so everything that I got I received from one source or another." Solidifying the sociocultural importance of able fishers and hunters developing a lifelong role of sharing with elders, the respondent continued:

> Sharing with elders is universal code. Young adults who don't make an effort to share are not seen in as good of light as if they did share with elders. Not sharing with elders hurts their image in the community. If you are in your late teens and early twenties and you are not putting some effort towards sharing food with elders in your community, you are sort of tagged with that for the rest of your life.

Sharing with Persons Who are Unable to Participate in Subsistence Activities

Also prioritized in sharing activities are people who cannot participate in hunting, fishing, and gathering for reasons other than old age, such as single mothers, people who are sick, and the physically disabled. "Some people don't have enough, not everybody has jobs. If they are low on [food], having a hard time, you give them what you can," explained a Port Heiden respondent. "There are certain households that I suppose get more [shared food] than others, busy households with a lot of kids … they need more food to feed everybody," explained another Port Heiden respondent and a Chignik Bay respondent said, "A family that is having a hard time, people who are sick or injured, you try to help them as much as you can." Likewise, a Chignik Lake respondent said, "If they are having a hard time … for instance one of the locals, their house burnt down, so everybody chipped in and gave them a box of food." A Chignik Lagoon respondent said that community members in need are often prioritized when considering wild food distribution: "If we know that there is a family in need we try to make sure they get first choice of how many [salmon] they would like." Assistance for households that lack their own harvesting equipment is also a normal practice. As a Port Heiden respondent explained, people who lack their own fishing nets are often allowed to check other people's nets and extract fish to keep:

> When the reds [sockeye salmon] hit the beach, someone might ask, 'When you get enough fish can you let me know and then I will pick your net for you before you pull it up?' They might not have a net themselves so they would like to pick the net and get the little fish they want or for jarring, smoking … . That's important and people like to be able to have that option.

In the same manner that community members observe the wellbeing of elders, respondents stated that they also observe the food status of more vulnerable community members for signs that they might need food. "[We] observe and make sure that everybody is set up for the winter," explained a Chignik Bay respondent and a Perryville respondent said, "You see someone hungry you give them food, that's the way it is." Another Chignik Bay respondent explained that it is normal that persons in need do not directly ask for assistance; instead, some community members will maintain careful observations about other residents so that they may notice when there might be cause for concern, and follow through by providing careful help:

> People do not hint … it's nonverbal and that means you notice when somebody loses weight … . You are actually looking at their overall health and the color of their skin in the wintertime … if they are not blushing and they are pale you know something is wrong and you don't know whether it's a medical issue or you don't know whether it's a food issue but your tendency [is] to spend more time with that person to find out. [This] is sort of how it works … . You would never ask somebody, you might spark up a friendship that you wouldn't normally because you have a concern.

For respondents, a practice of looking out for others is essential to their sense of community. A Chignik Lagoon respondent said, "Within the community people are kind of looking out for people who might need help and not waiting until that person has to ask them for help but, you know, just giving them [help]." A Port Heiden respondent said, "I think because of the way we were raised we always looked out for other people that didn't have anything you know, and gave them [food] … . [It's] just the way we were raised in our culture." A Chignik Lake respondent said, "My grandma used to say, 'Don't let them walk out of here hungry.' … . If somebody needs help, if you know they need groceries you are not going to stand by and watch them starve. That's not the way we were brought up; it's just in our nature to share, share, and share alike." Another Chignik Bay respondent remarked, "After being here for 35 years I know the kids that were taught at a young age … if they shot nine ptarmigan they gave six away."

Sharing with Nonproductive Community Members

Respondents explained that this firmly embedded cultural value of sharing and looking out for others is rarely altered even when certain parties commit transgressions in the community, such as simply being lazy about their own work habits or causing other conflicts. "I give them [food] anyway, it doesn't matter," said a Perryville respondent. A Port Heiden respondent said, "[It's] not an issue if people aren't ambitious, [we] will just share regardless." A Chignik Bay respondent explained that rather than punish community members for transgressions (such as theft), as a remedy, violators of norms are often provided with care:

> No matter how small the village is there really is no one who goes hungry … you would have to be so antisocial that nobody knew what was going on to be able to go without heat, to go without food in a village. I have seen it happen time and time again and it usually plays out this way: middle of winter somebody goes out to their freezer and they see that somebody has gone in their freezer and they have taken food. That's a big deal and we will as a community make a concentrated effort to find out who stole that food, and as soon as it is found who stole that food that person gets inundated with food. Instead of calling the cops [laugh] what we don't allow is we don't allow one person to steal. … instead when we find out what is happening and we make sure that everybody gives a small amount to that one person and that way [the need to share] has little or no effect on everybody in the community and that one person is getting everything that they need. That's just the

> dynamic in the community and [when theft occurs] quite often it's the only way that you know that somebody isn't getting enough food.

These narratives hint strongly toward a presence of demand sharing, although the process of demanding food and appeasement from the community seems more concealed than is normally described for most immediate-return hunter-gatherers. Importantly, however, study respondents simultaneously made clear that a cultural emphasis on maintaining a strong work ethic is of core importance when it comes to wild food harvesting and processing activities.

Sharing Requires a Work Ethic Among a Diversity of Actors

While an ethos toward taking care of community members who need assistance is a core feature of the local sharing praxis, respondents also see broad participation in labor efforts required for subsistence harvesting and processing as fundamental. For example, a Chignik Lagoon respondent said, "You have to work for what you want," and another Chignik Lagoon respondent said, "You want to eat, everybody has to do something." Respondents said that customarily most community members are willing to help with subsistence tasks and that working together in this regard is a strong cultural value. Working together for subsistence goes beyond merely the practical: it is a mechanism for ongoing familial and communal social bonding. "Sharing means a lot to me … . It's all about communication … talking to each other, helping each other," explained a Perryville respondent.

When people work together at completing the workload required for harvesting and processing subsistence foods, there is a longstanding custom that the participants receive a share of the produce. Additionally, respondents informed researchers that, if for any reason a person having a reputation for hard work toward subsistence tasks is not able to participate in harvesting or processing activities, then that person is often also allocated a share based on their previous contributions and overall reputation for generosity.

Some respondents said that the concept of sharing itself includes the sharing of labor and that when foods are given to persons or households that do not contribute to communal subsistence efforts it is more akin to "giving" rather than "sharing." For example, a Chignik Lagoon respondent said, "'Giving' would be giving to somebody who didn't partake in the whole operation of making it happen," and a Port Heiden respondent said:

> When you say 'sharing' that means that we put in the work together and that we caught the fish together, we harvested it together, and we put it away together, that's sharing. 'Giving' is to someone who had nothing to do with any of the process, they are just on the receiving end, they are just getting that finished product from us.

Aside from any expectations of labor contribution, it is traditional for most subsistence harvesting and processing activities to be group- or family based, rather than an individual effort. This is especially true for salmon processing and for large land mammal harvesting and processing. For example, when large land mammals are harvested the field processing duties are normally always shared among a hunting party and hunters who were not successful during the trip are always given a share of the meat. Regarding moose or caribou hunting, a Chignik Lake respondent said, "Five to 10 different guys go out hunting and they get their limit, or if they don't get anything they just share with whatever the other guys got … it's been like that all the time."

Respondents said that persons of both genders and multiple age groups normally participate in subsistence harvesting and processing and particularly expressed that it is always important for children to participate in these group activities so as to best facilitate their learning for the future. "I got my kids, their wives, and my grandkids, even the little ones are doing something," said a Port Heiden respondent. The respondent continued: "A kid who has never gone out hunting or has never shot a caribou goes out with an adult. The adult helps out but it is mostly the child who does all the work so they can learn how." Respondents said youth participation and learning is critical because as older people age, they rely on younger people to take over the subsistence efforts.

As discussed above, wild food sharing almost always extends even to persons or households that provide little to no contribution to the labor effort. However, respondents also reported that there are limits, particularly when specific persons become lazy about their treatment of subsistence resources and develop a reputation for wasting shared food. A Port Heiden respondent explained:

> It is when their behavior becomes so abnormal that the bells and whistles go off … . I have given to people who let that stuff go to waste and anybody who is wasteful is kind of looked down upon, and you know all you had to do was cook it or put it away and you wasted it. Not only did you waste food but you wasted that animal's life and that in return would make everyone else not want to give to you.

In summary, this overview has highlighted the various core aspects of sharing in the study communities and shown that sharing goes on constantly and in diverse ways. Perceived reciprocal obligations are mostly very generalized, but they also span from the characteristics of delayed to balanced reciprocity. The following two sections will discuss sharing perspectives and practices for both generalized and balanced reciprocity in the study communities.

The Logic of Generalized Reciprocity in the Study Communities

As explained in the chapter's introduction section "Characterizing Wild Food Sharing Traditions in the Study Area," most sharing practices in the study communities fall under the rubric of generalized reciprocity, with frequent tendencies toward informal ideals of delayed reciprocity as well as some acceptance of what might be characterized as demand sharing. This section will summarize the specific ideals voiced by study respondents that drive these practices.

Mainly, study respondents stipulated that when it comes to sharing wild foods there are, as one Egegik respondent put it, "no rules" and very seldom any formal expectation of direct reciprocation. "I don't expect anything in return," stated a Port Heiden respondent. Respondents consistently stated that sharing is practiced as a deeply embedded cultural value without any calculated ulterior intentions. Instead, there exists a simple assumption that others, whomever they may be, will eventually also share. "We give, people give back," explained a Chignik Lagoon respondent. "I didn't [share] with any idea I was going to get something back. I never did it with the intention of getting something back. I did it because I like it," continued the respondent. A Chignik Lake respondent said, "Grandma used to tell us all the time not to be stingy, she said, 'One day them people might feed you when you are hungry.'" A Perryville respondent said, "If I get game and I share it, down the road more will come." Another Perryville respondent said, "[Sharing] always comes back, sometimes in a different form or from different people. If you're a generous person, it will come back to you … . We don't assess checks and balances. In the future it comes back. I know that part, it always does." In contrast, respondents consistently expressed distaste toward logics that emphasize calculated allocation, distribution, and reciprocation of subsistence foods. For example, a Port Heiden respondent said that if formal rules were applied and required for sharing subsistence foods then people would be turned off and likely discontinue the practice; the respondent explained, "[Calculated sharing] would be too complicated, everybody [would say], 'Aw we don't need any of this sharing business, [it's] too complicated.'"

While most respondents made clear that reciprocal expectations are highly generalized in the study communities, there simultaneously exists a belief that a delayed return will in some manner arrive at some uncertain point in time. A Port Heiden respondent explained that her elders taught her the following: "If you give things out to others today, you can receive from others tomorrow, [but] to not hold account of who owes you what or what you owe others because everything balances out in time." Similarly, another Port Heiden respondent said, "There is no expectation. It's not like a negotiated [contract that] 'I will give you some salmon if you give me five pounds of berries.' It's more like you give some salmon [then] maybe a couple of months later some berries will show up." Moreover, as a Perryville respondent explained, delayed reciprocation often "comes in a different form … a different source … it doesn't have to be food or anything, [it can be] help or something." Likewise, a Chignik Bay respondent said, "Through my life I have always seen many a different way that if you help or do someone a favor it all comes back to you anyway.

It might not be in the same form or whatever but something good comes back to you." While there exists a strong belief that in some manner reciprocation will arrive, community residents do not generally get hung up on expectations of delayed reciprocation. "I think when people give back to you they are more likely to get more [in the future] but if they didn't [give back] it's not going to bother you … . You could give somebody 10 fish and they give you nothing back … it's not uncommon," said a Port Heiden respondent.

Within this highly informal sharing atmosphere there also exist elements of demand sharing; most clearly, demand sharing elements relate to already processed and stored food. For example, several respondents said that stored food is usually available communally to extended family members and acquaintances within communities. "It's like a big family I'd say. If they want [fish] they just take it. They take as much as they want," explained a Perryville respondent. Another Perryville respondent said, "Just share. Don't ask. Give them what they want." Yet another Perryville respondent made a similar remark: "Take what you need, you know." Similarly, a Chignik Lake respondent said that his family traditionally maintained multiple freezers filled with wild foods that they called "the meat house." The respondent continued, "[We] put it in the freezer [and] everybody is welcome to get what [they] want." Respondents said that this type of communal or extended family storage was long a tradition in the region but that it had in some ways fallen out of practice. Nonetheless, the ability to obtain wild foods on demand has generally not been altered. "If I need some [subsistence food I] usually just look around and somebody usually has it," explained a Port Heiden respondent.

While the above points expressed by respondents can be characterized as aspects of demand sharing, respondents were also clear that asking verbally in a direct manner for food is not a normal practice. "You would rather not have to ask," said a Port Heiden respondent. Rather than asking directly, appeals for sharing instead often occur through mild signaling. Another Port Heiden respondent explained how signaling might be accomplished: "They'll … hint. Very few people practice just asking … it's more of a subtle hint … worded: 'How did you get it? Where did you get it? Where did you go? What kind of hook did you use? Did you use a net?' They will ask every other question about you catching a fish versus, 'Can I have some of your fish?'" Similarly, another Port Heiden respondent said, "You get talking and somebody says, 'Oh boy I wish … . [I] haven't had halibut in ages.' And I have got extra [halibut] at my house, so I will give them some."

Respondents explained that shyness about asking for food is an accepted cultural norm and that people with a surplus of food generally take responsibility in caring for those in need rather than harboring expectations that persons in need must ask. A Perryville respondent explained:

> It's kind of uncomfortable to ask. People … might not have enough, but they feel like they can't ask … . Should they feel comfortable asking? Or is it up to the person who has stuff to know that a person maybe needs something and offer if before they have to ask?

Answering his own question, the Perryville respondent said that rarely are people required to ask directly for subsistence food because "the people you live around know what's going on," and people generally share without prompting whenever there is a perceived need and they share without any requirement of those in need to make a request. "[There exists a] no-man's-land between the nonverbal and verbal society … it is in the context of the nonverbal communication … . It is nonverbal, meaning that you watch for signs that the person might need food," explained a Chignik Bay respondent. A Perryville respondent said, "You could see it, who wants, who doesn't have fish … so everyone is kind of keeping track of each other and sort of seeing, like, 'Wait maybe this person needs something,' and they go ahead and offer it without [the other person] having to ask." Similarly, an Egegik respondent said, "No one really asks [for food]. Usually [the harvester] just asks them and they usually accept the fish or whatever it may be, moose, caribou, [etc.]."

A Port Heiden respondent shed light on the underlying reasons behind this practice that those who have food purposefully make observations to see who needs it, rather than expecting the needy to ask for it. The respondent said that this practice revolves around an underlying "mindfulness" of others that operates with an intention that all community members should never be put in a position where they need to ask for food, because needing to ask is far less socially comfortable for both giver and receiver. More appropriate is that people know they can always count on others to share without needing to ask "because you may be in a situation where you have to ask for something, too. Which brings us right back to being mindful of others. I think that's what was instilled in me [by my elders], it was mindfulness." A Chignik Bay respondent indicated that this mindfulness of others, often registered through wild food sharing, is a major factor in building social bonds and facilitating ongoing communication in the community:

> What is really important … is that even if a person doesn't need [subsistence foods] you need to keep … doing little things in terms of sharing foods to keep those bridges and those communications open because it is one of the easiest ways [to maintain social ties] … . If you … live in a village and you haven't really been friendly with somebody for a year or two [wild food sharing] is really sort of the easiest way to reestablish a connection with that person. [You] say, 'Hey I just caught this salmon and I can't eat it all and it's fresh and, you know, it's all clean already, would you like some?' And that person goes, 'Oh that's great thank you very much.' So sharing is really important in keeping lines of communication open. But it is not verbalized or really even equated with a quid pro quo. The reason why you do this sort of sharing is to keep lines of communication open.

A Port Heiden respondent described a logic that an overall generalized reciprocity-oriented sharing value system essentially underpins community solidarity and wellbeing:

> They share to show their friendship, to show their sense of community, and to promote sense of community and wellbeing within the community, to show that they care … . And of course everyone wants to be included, so [sharing yourself] is certainly a way to make sure that you are included, and then everyone is included … . It's better to give than to receive and it goes around and around like that.

An Egegik respondent put it more succinctly: "We are all in this together and you are only as strong as the lowest person on the totem pole."

Within this logic of holistically beneficial altruism, which is generated through generalized reciprocity, exists an accompanying logic that community members who receive shared food do not necessarily need to be ambitious subsistence harvesters who are guaranteed to one day reciprocate to their providers. Rather, there exists an underlying faith that the more one shares wild foods the more they will harvest in the future and the more they will be able to continue to share (Berkes 1998). For example, a Perryville respondent said, "I see [that] if I am getting game and I share it, down the road more will come, and the more I will get to share [in the future] … . This is what my parents always said: 'The more you share the more you are going to get,' and that is always true." This logic introduces the question as to whether residents of the study communities consider the potential for future resource scarcity when making decisions about sharing or not sharing. In this regard comments from study respondents reveal that maintaining an ongoing practice of freely sharing subsistence foods is generally a more important consideration than is concern for future resource scarcity. Additionally, some respondents represented an underlying confidence that more resources will always be available in the future. For example, the same Perryville respondent said, "When it's hard it's even a better time to give … . If there is another day you can get more," and an Egegik respondent said, "[I] can always get more." The Egegik respondent said that this is especially true when it comes to salmon. A Chignik Bay respondent said, "If I have something that somebody wants or needs I am going to give it to them no matter what," and a Chignik Lake respondent said, "[Community members are] not going to stand by and watch somebody starve, they are going to help them."

Perspectives and Practices Surrounding Balanced Reciprocity in the Study Communities

Study respondents reported little participation in the Alaska fish and wildlife regulatory categories of "barter" and "customary trade." Alaska Statute (AS 16.05.940(2)) defines barter as the exchange of fish or game for other fish or game resources, or for other food or nonedible items other than money. Barter is also understood to include exchange of fish and game for noncommercial services—including physical work or transportation. Alaska Statute (AS 16.05.940(8)) defines customary trade as the noncommercial exchange of fish or game for limited amounts of cash. Residents of the study communities expressed minimal interest in all forms of balanced reciprocity surrounding harvested wild resources in either food or craft form. A Chignik Lake respondent said that "traditionally there isn't quite as much of a developed network of trade for resources" in the region and a Perryville respondent said that he was "raised on just giving."

The minimal barter practices reported by study respondents included bartering wild resources for other wild resources and bartering wild resources for goods and services. For example, sometimes halibut or clams are traded for caribou or berries. Salmon is also sometimes bartered for berries. A Chignik Lake respondent said that he sometimes trades his frozen fish for smoked salmon and also that he has bartered salmon for moose and caribou meat: "I would give [a bartering partner] some frozen fish for some packaged smoked salmon … it's an agreement … same goes for [moose or caribou] meat. If you had a lot of fish and I had a lot of meat we would trade some fish in exchange for some meat, so, yeah, it's a communication thing that's all." However, the abundance of salmon in the study region usually means that any bartering of salmon occurs only between local residents and urban residents, where salmon is sometimes bartered for fresh produce, including fruits, vegetables, and eggs. Bartered salmon usually comes in processed form: either dried, canned, smoked, or frozen. Additionally, sometimes any local resource might be bartered to urban residents in exchange for firearm ammunition, and a Perryville respondent said that in the past he has traded fish and caribou meat for Alaska Native art.

The customary trade practices reported by study respondents mostly surrounded the purchasing of berries, including blueberries, cranberries, and particularly cloudberries. Respondents reported purchasing berries from as far away as Bethel, but most customary trade of berries reported by study respondents was an occurrence of Port Heiden residents buying berries from Perryville residents because berry picking around Perryville is reportedly much better than in the Port Heiden area. A Port Heiden respondent explained, "When it comes to berries, people pay for berries … . Between villages … they will have a certain price for a gallon of berries … blueberries and lowbush salmonberries, or cloudberries, those are a high commodities … . I would pay money for that … . Because we don't have many." Another Port Heiden respondent said, "Berry season I usually will buy berries from Perryville because I know these people … this girl don't have very much money so I buy my berries from her … [lowbush] salmonberries are very expensive berry but I do it just about every year, buy berries from her because it's her way of making some extra money." The respondent said that cloudberries "usually sell for about $50 a gallon or $75 a gallon," and reported that she spends approximately $500–$600 annually on purchasing berries. Study respondents reported that when purchasing berries, the purchaser must also pay for the air freight shipping costs. Aside from berries, seal is another customarily traded resource according to reports by respondents, particularly those from Egegik. An Egegik hunter reported that he sometimes sells seal meat and skins: "We … have no problem selling the meat … we sell it to people over in Dillingham, we sell it to Togiak, we sell it in Anchorage. The majority of the [buyers] are in Anchorage and Togiak and both of [the communities] would like the meat and the hides."

Despite these reports of participation in both barter and customary trade, the majority of study respondents overwhelmingly expressed not only disinterest in practicing balanced reciprocity, but that the principles that structure balanced reciprocity are antithetical to an established moral ethos to freely share subsistence foods. The following are comments from study respondents that represent a perspective on subsistence food use that can be characterized as anti-trade:

> *Chignik Lagoon respondent*—Selling? No way. I don't agree with it. Getting money for something that is your subsistence, that you are getting for free, you know, I don't find it right to sell. It doesn't make sense.
>
> *Chignik Bay respondent*—I'm giving it from the heart not for someone to go do something for me or for money. I'm doing it because I want to share, that's how I was raised.
>
> *Chignik Lagoon respondent*—I don't believe in selling subsistence, I think it is wrong. I would never personally sell to my elders.

> *Port Heiden respondent*—I don't trade. Just because I was raised to give more than to barter, to not ever let anybody go hungry or be without because that good karma always comes back to you.
>
> *Port Heiden respondent*—[We] never think about selling fish to somebody, you give it to them.
>
> *Perryville respondent*—I just give stuff. No bartering or trading.
>
> *Port Heiden respondent*—No bartering. It would almost be degrading or insulting, or I think because they would just say, 'No I don't want any payment for that, I am just giving it to you.'
>
> *Chignik Bay respondent*—It isn't 'You owe me this I gave you a fillet of fish or jar of fish,' no it's not that way.
>
> *Chignik Bay respondent*—I don't believe in barter … I have never really bartered with fish … . 'I will give you this fish if you give me this or whatever?' I have never really done that. Just not how I am, you know, because who knows one day they might need something or I might need something and they can get it.
>
> *Chignik Lagoon respondent*—This young man who sent us this caribou leg … eventually I might send him some halibut but he's not expecting something and I will just do it because he was kind enough to do something nice for us … . So I can't say its bartering or trading, its karma … whatever we have, whatever slice of halibut that we have decided is going to him [the amount] doesn't have to match.

Not only did most respondents express a general moral opposition to bartering and selling subsistence foods for cash, respondents also expressed the opinion that habits of selling subsistence foods (customary trade) have the tendency to evolve in socioeconomically negative ways. Particularly, community members expressed concern that cash sales of subsistence resources are leading to dependencies on obtaining cash for purchasing items that are harmful to community wellbeing (e.g., alcohol, drugs, and unhealthy food). "These people that I know that are [participating in customary trade] are doing it to get money for spending on bad habits … [the] money [they get is] going beyond necessities," said a Chignik Lagoon respondent. This observation provides an example of where increasing involvement in the cash economy, which normally engenders evolving dependencies on outside goods (that respondents argue are often unnecessary items), generates the possibility of increasing commercialization of subsistence resources. This introduces risk of potentially crossing the boundary from balanced reciprocity toward a pursuit of negative reciprocity, where resources are being targeted for commercial, rather than communal, interests.

Wild Food Sharing Networks

Key respondent interviews revealed that sharing occurs across three main networks: a village network, a broader local-regional network, and an Alaska-wide network. Additionally, there is some sharing that occurs in networks that expand outside of Alaska. The village network will first be discussed, including how resource harvesting and processing labor is shared, and how food is shared. Next the regional sharing network will be discussed, followed by discussions of the Alaska-wide network.

Sharing Networks Within Communities

Wild resource sharing networks represent key components in social relations within the study communities. In many ways wild food sharing activities are ties that consistently help bind relationships among nuclear families, extended families, and non-relatives. Study respondents expressed that sharing as a basis for communal ties is a normal and expected outcome in remote small communities that rely largely on local resources for food and materials, especially at the village level and also, to a lesser extent, at the regional level. Respondents expressed that it is normal for residents of such communities to look out for one another more than do persons who reside in larger communities. "If they know somebody that doesn't [have salmon], they are willing to help them out and share with them … so I see and hear a lot of people that help each other and make sure that they have food for their tables," explained a Chignik Bay respondent. Resources are shared among a variety of people. As previously discussed above, study respondents reported that in community sharing networks even nonproductive households are generally food secure as a result of sharing. According to a Chignik Lagoon respondent, nonproductive households are often "doing totally fine because they are relying on connections with other households in the community." Even new persons who previously did not have strong social ties are normally brought into the fold of social relations. For example, a Chignik Lagoon respondent said:

> We do get add-ons. We still share with the people we normally share with but, for an example, last year a new family moved into town that was kind of destitute. They didn't have much … she had lived here as a kid, went out and had kids, and came back. They didn't have access to a skiff or any of that kind of stuff to go get the fish so we offered them to come with us and go get it, you know, help us out that way and all the fish would be theirs.

Respondents said that this type of overall support by community members is a social baseline. As mentioned earlier, sharing is especially abundant with salmon, but other resources and materials are frequently shared in the community network. Infrastructure, such as smokehouses, is frequently shared because not every household has its own—as with harvesting tools such as skiffs and fishing nets. A Port Heiden respondent said, "Not everyone needs their own smokehouse because there is one that people have access to, they can use. They got a friend who got a smokehouse, so they use that, easier to share it than to have to build a whole bunch of smokehouses."

Respondents noted that they are generally rewarded with great personal and social satisfaction from sharing, particularly because of the confidence and security gained from building and maintaining ties. A Port Heiden respondent explained that this is normally instilled into community residents at a young age:

> My kids they come out of just glowing after they drop something [shared] off … they will be a little bit nervous and [say] kind of like, 'Uncle said thank you,' [laughter] and they never forget that part. They will talk about it: 'Do you remember so-and-so's grandpa he lives in this house and we brought him that one fish?' They don't ever forget that. [Sharing] helps them remember who people are in the village. They may not know that person's name, they just remember that time we brought them a ptarmigan or that time we brought them a fish. They remember that more than anything else.

Some respondents expressed that, because salmon is normally an abundant resource that everyone has access to, sharing salmon is rarely physically necessary within communities; in many cases salmon sharing is done primarily as a measure of maintaining social ties. For this reason, community residents often gather for events, celebrations, and large family meals, as well as share the workload for various activities. "If you don't have salmon and you don't have meat [to share] you are still looking for something to keep that social connection going," explained a Chignik Bay respondent and a Perryville respondent said, "When people work together partnerships stay the same." For these reasons extended families and neighbors often work together at harvesting activities and come together as larger groups for wild resource processing activities, especially for salmon. Participating in subsistence activities together is considered part of the community sharing network. "When we [process] our fish in the spring we are all putting into it. I assume it's sharing," said a Chignik Lagoon respondent.

Division of Labor in Subsistence Activities

While each family is different, in general families often expend a cooperative effort toward subsistence activities, especially surrounding salmon harvesting and processing. Some people are more motivated, have more skills, more resources, more free time, and better physical health than others, thus a division of labor exists among various social actors in the community subsistence harvesting and processing network. Such varying capacities among actors make up nodes within the community sharing network. For example, as persons grow older, younger people usually step in and fulfill formal roles such as a primary hunter, fish harvester, or fish processor. People who are more successful in the cash economy often pay more for fuel and other equipment required for subsistence harvesting. There are also always people in each family who make little physical and financial contribution to the subsistence effort. "It's a common thing in families [that] not everyone usually participates. It's a common thing. Some people are lazy," explained a Perryville respondent. Most respondents made clear, however, that resources are often shared equally regardless of how labor- and cost-sharing is divided. Nonetheless, there are sometimes disputes and conflicts that occur that cause specific persons or families to stop working with one another at subsistence activities.

Harvesting Salmon and Other Subsistence Resources

Salmon fishing opportunities are normally available to all households, so most families tend to fish independently. Men do the bulk of salmon harvesting, but some women also participate. Salmon fishing is frequently accomplished by small groups of five or six persons working together to manage the nets and extract the harvests. Hunting for moose and caribou is likewise often accomplished by hunting parties who share the processing efforts and the rewards. Respondents reported that specific harvest amounts are not normally precalculated and sought; rather, fishers harvest as many salmon as they can get with the intention to share the excess after they know their own household needs are met. "They go by the size of the household and it's just kind of a guessing thing, they … don't count fish for fish," said a Port Heiden respondent. "We plan on having extra to share, it's just what we do, but the basic needs have to be met first," explained an Egegik respondent and a Chignik Lagoon respondent said, "If we were able to put away enough fish [for the] year then we can expand in sharing." Subsistence fishers do not harvest to excess, however. They generally stop fishing when they become aware that they have caught too many fish to freeze or to keep in an individual smokehouse, especially when they know other communities' members are also getting plenty of fish. "Sometimes if … we end up getting more fish than we really wanted … once they are gilled you don't let them go because they are going to die anyway … if we get over 50 … then we will for sure get those shared out to other people or they go into the freezer," said a Chignik Lagoon respondent.

Most of the salmon harvested and shared by the study communities is harvested in the subsistence fisheries. A Port Heiden respondent said, "The subsistence setnets that they set out in front of the old village that is where [our salmon] comes from primarily … . If they get a lot of fish then they will call around and ask if you want a few fish or how many do you want." Some community members who are commercial fishers obtain most of their salmon from retaining a portion of their commercial fishing harvest for personal home use. This is normally referred to as "home pack." Home pack salmon are also often shared. Specific persons and households are often more active in harvesting resources than others and some productive households make harvest efforts directed specifically toward sharing. This is mostly done in a causal manner. For example, a Chignik Bay respondent said, "They just go and ask the person, 'Oh I am going to go fishing tomorrow for subsistence do you want to go?' … And if they say, 'Well I am going to be busy,' … they will say, 'Well do you need fish?' … and, 'How much do you need?' or 'How much do you want?'"

Sharing Freshly Harvested Salmon

Salmon are shared both when they are fresh-caught and whole and also after they are processed. Many respondents said that the first fresh-caught salmon of the year is traditionally shared with immediate family. For example, a Chignik Lagoon respondent said, "For the first fish of the year I will try to feed those that are closest to me, as time goes on you get more." Respondents also often discussed widespread sharing of fresh-caught salmon in the communities. "I have seen where if boats come in and they have some fish … they will go from house to house asking if people would like some; 'Would you like a couple salmon?' … and they deliver right … to you," reported a Chignik Bay respondent. "We would deliver fish to people," explained an Egegik respondent. A Chignik Lagoon respondent said, "[When] they got the whole bunch share it over the truck, put it in the truck and go around." Study respondents also reported that successful fishers will often place a phone or radio call to community residents to inform them that fresh salmon are also available to pick up down at the beach. A Port Heiden respondent said, "It's word of mouth usually.

Somebody will say, 'Hey fish are hitting, you want any? I can bring it over to you or you can grab it down there.' Or they might call you on the phone or VHF [radio] … it's informal the way they do it." A Chignik Lake respondent said, "When I was a kid I think it was more of a known thing that you could just [make a] CB [citizens band radio] or VHF [radio] announcement: 'If you want to get fish go help yourself, it's on the beach, take as much as you want.'" The respondent said that also sometimes an announcement would be made that crab were left on the beach in a tote that was free for the taking. Respondents said that fresh salmon are particularly welcomed by recipients if they are already filleted prior to distribution. "[I] call and ask around, see if they need salmon. Usually get takers pretty quick, especially when [there are] a bunch of fillets left instead of a whole fish, because they don't have to cut them," explained an Egegik respondent. A Chignik Bay respondent said, "My friends they will call me on the phone or stop by and ask how many fish I need and I have another friend that even fillets the fish and vacuum sealed them for me." Study respondents said that CB and VHF radios are no longer required to announce that fresh fish are available because today people simply use their cell phones. "Sharing definitely happens a lot faster. Everybody having a cell phone makes a big difference. 'OK the fish are hitting at the river right now, go now!' And before you would have to wait until somebody came back to town be like, 'Hey go get some fish right now,'" explained a Port Heiden respondent. Additionally, sometimes commercial fishermen return with a small load of fresh salmon and give it away to community members rather than try to sell it because their harvest is too small or the commercial tender is not operating. Study respondents also emphasized that large land mammal meat from successful moose and caribou hunts is also normally shared fresh, in a similar manner as fresh salmon.

Working Together to Process and Share Salmon and Other Subsistence Foods

Family and community-based group processing of salmon is a critical component of community sharing networks. When residents work together to process salmon and other wild foods, they share both the labor and its rewards. Respondents explained that processing both salmon and large land mammals is labor-intensive and time-consuming. "It's easier [when] you work together, you work to get the fish so you get enough, you've got help," said a Perryville respondent and a Chignik Lagoon respondent said, "When there's only two people doing it it's a lot of work." An example illustrated the effort put into processing a harvest: "If you had a person who sent you caribou that was properly butchered, cleaned, wrapped, identified, came in a box on an airplane and you have physically done that process you would have a really good understanding that person put a lot of time in," explained a Chignik Bay respondent.

Not only is cooperative salmon processing time- and labor-efficient, it also strengths social bonds in numerous ways. "Processing fish is a social event," said a Chignik Lagoon respondent. Another Chignik Lagoon respondent said, "They get 500 fish. That's a lot of fish to go clean for one family, so the whole family comes together. Would be about 10–15 people." While different persons take on different roles in fish processing, having an abundance of people involved is always appreciated by community members. Respondents said that processing normally involves the same core network of family and friends but that as elders age they tend to drop out from participating in the labor; meanwhile, young people grow older and take on larger roles. A Chignik Lagoon respondent said that it is traditional that families expect that most members contribute to fish processing activities: "Lots of families say if you want a share then you have to help." Similarly, a Port Heiden respondent said, "Family [members do not] really get away with [not participating in fish processing]. If you want to put away fish then you got to come learn, you got to get your hands dirty, start putting in some effort."

Salmon processing first consists of filleting the fish. If the salmon are to be hung in the smokehouse, they are filleted with their tails still attached. Some are cut into thin strips for hanging. Final products include kippered and canned fish that is usually smoked first for approximately three days, and dry fish, which is hung and smoked until it can be preserved without freezing. Some fillets are frozen and thus do not require smoking and are packaged and then directly placed in a freezer. All these products are shared and while families normally calculate the amounts of each specific product they intend to store for the year, no particular product is privileged for sharing over the others. Processing efforts are different depending on the intended product. Respondents reported that canned fish is the most labor-intensive of the products to make. Respondents also reported that smokehouse duties are both labor-intensive and tedious; the smoke needs to be maintained and the hanging fish need to constantly be monitored for both insects and moisture to avoid both fly eggs and mold. Monitoring the smokehouse requires "babysitting the fish, watching the fish, identifying the threats to the fish … smoke to keep the flies off of it … staying up all night to keep the fire going," explained a Chignik Bay respondent.

Study respondents reported that certain people take leadership responsibility for the various salmon processing tasks. Most often there is a core elder or household head of either gender that takes on the role of organizing the operation. "Depends on the family, sometimes it's a man sometimes it's the woman, just depends on what elder you have," explained a Port Heiden respondent. The respondent described this leadership role in detail:

> Each family unit comes together under a core elder and she's kind of the one in charge and she will help judge and ask people, 'How much of this do you want? How much of this should we get?' And she will coordinate how much more fish we need, how much more needs to be put away in this way or that way and through her … . We try to be centralized and then we will divvy up from there. We will make sure she gets what she needs and then each household will come and say I need this much, I need this much smoke fish, I need this much canned fish, I need this much fillets and we will, we help each other so we will do a whole day's worth of like filleting fish and vacuum packing it and … a couple days of canning and then we will do a couple days of smoking fish.

Other fish processing roles normally depend on the particular skills of individuals, or lack thereof. "People get good at a particular task as they do it over and over again and that becomes their task. They do that and everyone else does a different one," explained another Port Heiden respondent. Respondents reported that there also often exists a traditional division of labor based on gender. Some people take responsibility for bleeding, washing, and sliming the fish. These are often women and young girls. "You want to make sure the fish is clean, so you wash them, getting the slime off of them," explained a Chignik Lagoon respondent. Some people are experts at filleting salmon. "[Fish] splitters have to be good at it so there is no waste," said the same respondent. Fish splitters can be either women or men, but respondents in the Chignik communities reported fish splitters there are usually men, while Port Heiden respondents said that these experts are usually women. Before the split fish are hung in the smokehouse they are soaked in brine. Respondents explained that experts at brining usually take on this role. "We have certain people in charge of how much salt to put in the brine [and] how much sugar to put in the brine," said a Port Heiden respondent. Another Port Heiden respondent said, "We have only one person who makes brine all the time for the smoked salmon and she knows the recipe. She knows the time to [soak the fish] and she can delegate … not only is she in charge of doing it but she is also in charge of teaching the next generation how to do it." Other people take on the role of tying together strips of fish that are hung in the smokehouse to dry. Older men usually monitor the smokehouses and young boys are often sent to harvest alders for the smokehouse fires. A Port Heiden respondent reported that women are normally responsible for canning the fish once they are ready. "Women are the ones to do the jarring or canning," said the respondent. Another Port Heiden respondent commented that while there is a division of labor in salmon processing, ultimately it amounts to a "collective wisdom" that is required for both intergenerational knowledge transfer and long-range community resilience. In this regard, study respondents frequently emphasized that as elders become too old for continuing hard work, it is up to the younger generations to take on the leadership roles involved with fish processing. For example, a Chignik Lagoon respondent said that children and parents "work together to process everything but then almost there is like a transition where the parents have to do a little less work and the kids do more." In this regard, study respondents consistently emphasized the traditional importance of ongoing youth participation in community-oriented salmon processing activities. For example, a Chignik Lagoon respondent said the following:

> [We are] now trying to teach our granddaughters and grandsons how to split fish and slime it and get it ready for the smokehouse because that tradition has to be

> passed on. [We] have to teach them when they are young so they are excited about it and involved, or else it might be lost. I feel comfortable as long as we continue to teach them what they need to know.

After fish are processed into their various products they are distributed, usually first to closest family members and elders, then to others in the network of social relations. “Can’t feed everyone so do closest family first,” said a Chignik Lagoon respondent. Another Chignik Lagoon respondent said, “Try to make sure that [family has] first choice of how many fish they would like … . Elders who can’t go and get their own fish are asked first.” Anyone who participated in the labor effort is also normally given priority. “If somebody is there helping … they would be offered more to take home because they were working on it … they are more likely to get a bigger share, or get first dibs on it,” explained a Port Heiden respondent. After family, elders, and persons who made a significant labor contribution are provided for, other social ties are brought into the network. “We divide it up … everybody starts off with a case [of canned salmon] and … if there is more we split more with the bigger families,” said a Port Heiden respondent. Another Port Heiden respondent said, “When each person says, ‘OK we are good for this year, we have enough [salmon],’ then we will just keep passing [salmon] around to the next person: ‘Do you want fish? Do you want fish?’” A Chignik Lagoon respondent explained her intentions when distributing salmon at the wider community level:

> [When distributing salmon] we try to aim for elders and our younger families. There is a couple here who have no boat, they have two young children. One is a local, grew up here in these traditions but they are not able to [participate in] subsistence … . We try to incorporate them or their children in our tradition so that their children will know how to feed themselves or prepare everything … that aspect of the community does still come together, that has never really been affected.

Study respondents discussed salmon distribution that is both more formal and centralized and distribution that is highly informal. The most centralized type of salmon distribution was described by Port Heiden respondents who said that at times local organizations have taken the lead in redistributing canned salmon to community members.[1] A Port Heiden respondent said that in these cases she was unaware of where the salmon given to her even originated. Mainly, distribution originates centrally from the primary elder or other family members who directed most of the processing activities. “The person who is doing the most work … they leave it up to that person to divvy it up or certainly to get the biggest share if they want. It’s just an unspoken understanding,” explained another Port Heiden respondent. The respondent said that beyond this, formally calculated distribution is generally seen as “too complicated.” The respondent continued, “Family shares are decided based on household size. It isn’t an exact thing they just kind of give them some.” A Perryville respondent reported that salmon distribution is even less formalized and hinted toward a practice of demand sharing. “If they want it they just take it. That’s it. If they want it they just take, take as many as you want,” said the respondent. Similarly, another Perryville respondent said, “They just share what they have, even if they have to give it all away, so I give it all away.” Additionally, some respondents discussed that salmon distribution in the community network often occurs at secondary levels and beyond, with specific shares of fish being dynamically subdivided and redistributed among various persons and households over numerous times.

1. As an example, a research project funded by Bristol Bay Economic Development Corporation and Bristol Bay Regional Seafood Development Association was conducted that harvested fish in 2014 and 2015 to test sockeye salmon stock composition in the Outer Port Heiden and Ilnik management sections (Boatright et al. 2016). Salmon that were sampled for the project were processed, canned, and distributed to households in Port Heiden (Cody Larson, Subsistence Fisheries Scientist, BBNA, Dillingham, personal communication). The canned salmon that households received were mentioned to this project’s research staff when salmon sharing was discussed, and serves as an example of formal sharing.

Study respondents also relayed that the role of children in the salmon distribution process at the community level is important for both social wellbeing and for passing on the sharing traditions to the younger generations. "I have seen some kids look so proud and happy that their parents let them bring something for somebody else," said a Chignik Bay respondent. A Port Heiden respondent said, "[Children] learn by seeing people sharing. [I will say,] 'Call this person see if they need anything,' you know, 'Deliver this, run this salmon over to this household,' you know, so they get the idea." Another Port Heiden respondent provided the following narrative:

> I have children now so I have to teach them the etiquette on how to share, what to share, and who to share it with … bring them into the decision-making process early to teach them that this is what works … . I try to always teach my children mindfulness that you know we are not just hunting or fishing or gathering for ourselves. We just have to always consider that people can't do things for themselves and they should never be without because of that … . My oldest son who is nine truly enjoys that part, he loves dropping fish off. He thinks that's the coolest thing—to give food to elders. He loves the part where they tell him, 'Thank you,' like he did it all by himself [laughter].

It is also important to note here that salmon and other wild foods are not only distributed in the community network when fresh, or directly after group processing, but also later after being stored in household freezers or pantries. Most households in the study communities have their own freezers, but some families maintain larger freezers where food is stored that is considered as freely available to most extended family members in the community. "I don't recall ever asking [for freezer food]," said a Perryville respondent and a Chignik Lake respondent said, "When my girls need something [from the freezer] they usually just help themselves, that's our way." Study respondents said that often when spring arrives there is an effort by households to redistribute stored subsistence food that has not been consumed over the winter. The intention is both to clear space in the freezer for the coming new harvest and to share with anyone in need. A Chignik Lake respondent said that often when visiting other community members a "discussion comes up; 'Oh I got to empty my freezer out, empty out towards the spring,' and a lot of people … say, '[If] you need some fish or meat there is plenty of that [to share].'" The respondent continued, "Everybody tried to get rid of their winter pack to get ready for the summer, start a new pack, empty it out." Similarly, a Chignik Bay respondent said, "In the spring … frozen salmon and frozen berries … we calculated what we are going to need until those berries and salmon are going to be available fresh … so springtime is pretty much distributing the previous year's stored foods." The Chignik Lake respondent said that if other community members were not interested in obtaining frozen foods during the spring, then his mother "cooked the older fish or older meat for the dogs so it wouldn't go to waste anyway." The respondent said that older freezer-burned fish is also sometimes "put out on the beach for eagles or the bears."

The distribution of stored subsistence foods also occurs within both the regional and Alaska-wide sharing networks, both of which are discussed in the next two subsections.

Regional Sharing Networks

Wild resources have long been shared beyond the individual study communities across wider networks in the Bristol Bay, Alaska Peninsula, and Kodiak Archipelago region. A Chignik Bay respondent described that a primary example of regional resource sharing traditions stems from the land-accessible connection of the Meshik Valley and Black Lake Pass between Port Heiden and the Chignik area. The respondent provided the following narrative:

> There was always a connection with Port Heiden in terms of the old village of Meshik. If we go back and look at the pre-American salmon fishery days, we see in the priest's journal the donation of bear hides from the villagers in Meshik to build the first Russian Orthodox church in Chignik. It was built in Chignik Lagoon in what is now an abandoned village … there is still a strong connection even though the villages have changed location … [there is] a fairly easy route to go over so

> if you look at the Meshik River and you look at the Chigniks and you look at the [mobile] lifestyle … of people utilizing a route that probably went as far north as Aniakchak and then down through the Mother Goose Lakes and into the Meshik Valley and over into Chignik Lakes and down into the mouth … they followed a pattern and the pattern is centered around … utilizing both Bristol Bay resources and North Pacific coastal resources.

The respondent said that not only were resources and materials shared and traded in this traditional network, but that it also represents the foundations of an ongoing regional network of shared ecological knowledge:

> These people would move camps at different times of the year for different resources because the local knowledge is that if you didn't know better you wouldn't realize that there is king [Chinook] salmon available in December or you wouldn't know that there were red [sockeye] salmon available in January or you wouldn't know that certain bays, because of those microclimates, are going to hold moose when they weren't in other areas.

In the present era, the regional network continues to be centered around sharing both wild foods and environmental information, but, as study respondents explained, it is also centered around maintaining regional social ties, or on "keep[ing] connections strong with people farther away," as a Chignik Lagoon respondent explained. Study respondents voiced that these regional connections remain abundant and important to members of the communities. Often these regional connections center on close relatives and extended family members but they consist of relations of many types. People from neighboring communities "have always sent us their kinds of food, you know, so we felt like we would send them some too," said another Chignik Lagoon respondent.

Study respondents explained that because salmon is generally available in all of the study communities, regional sharing networks mostly centered around sharing resources that are not as easily available in specific communities. The geographic availability of caribou was often discussed in this regard because caribou population fluctuations in the region have meant that caribou have often been available to some communities while unavailable to others. An Egegik respondent said, "There is sharing with communities like Naknek and King Salmon because they can get caribou." Another Egegik respondent said that this is because not very many people can afford the fuel costs to get caribou from other regions. Similarly, a Chignik Lake respondent said, "Since we had no caribou here I called up to Dillingham and I talked to people up there and they came down with two airplane loads of caribou from Dillingham for the village and we shared it out to everybody." When people from other regional communities share caribou they are normally gifted other resources in return. A Port Heiden respondent said, "We invite [people from the Chignik communities] to come over if they need to hunt caribou. We are always open to help them because I know they have a hard time over there and people will send us cod sometimes and even crab. If they got it, they send it over, berries [too]. It's just the way it's always been, you just share." The respondent said that Port Heiden residents have often received marine resources such as clams, octopus, and Pacific halibut from the Chignik communities since these are resources that Port Heiden residents do not have access to.

Because the Chignik communities generally have access to salmon earlier in the year than Port Heiden, residents of the Chignik-area communities are also known to send early-run salmon to Port Heiden residents, both Chinook salmon and sockeye salmon. "When the fish first show up we will get a tote full of fish from Chignik [Lake], you know because ours never showed up yet … . They would make sure we had taste of fresh king [Chinook] salmon [and] because they get reds [sockeye] early over there," explained a Port Heiden respondent. Regarding receiving shared salmon from the Chignik communities, another Port Heiden respondent said:

> Usually it's family [who sends salmon to Port Heiden because] somebody who has moved here from Chignik grew up only eating Chignik fish. Their fish has a different taste than our fish here so they miss that taste so every year they will send for it, or they will go and get it themselves, and put it away. Usually it's a family

> member sending to an immediate family member just so that they can have that same familiar taste.

A Chignik Lagoon respondent said, "Those relationships [between the Chignik communities and Port Heiden] are very important for subsistence. Port Heiden's got all of [the] caribou [and] we got the fish that is not muddy like their muddy fish [laughter]." Another consistent regional sharing tie exists between Chignik Lake and Perryville, because Perryville residents also do not have as consistent access to salmon as do residents of the Chignik-area communities. "When I was a kid in Perryville I had to pack the salmon back to Perryville. Sometimes they can't get fish over there. They call when they need fish. Fall time they have a hard time getting fish in Perryville," explained a Chignik Lake respondent. Another regional tie exists between residents of Chignik communities and inhabitants of Kodiak Island. This tie has resulted from participation by Kodiak Island residents in the Chignik-area commercial fishery. Kodiak residents are known to send Sitka black-tailed deer meat to the Chignik communities whose residents will return smoked, canned, and dried salmon to Kodiak Island communities. Additionally, a Chignik Bay respondent reported that a person in Dillingham sometimes sends "potatoes, he grows potatoes, nice potatoes and, he didn't ask me to, but I gave him some halibut because they like their halibut up that way."

The above descriptions of wild food sharing within the regional network show that regional exchanges are normally reciprocated in some manner, but that these exchanges are mostly informal and not guided by the goals of balanced reciprocity. "If you send some caribou meat to Chignik Lake and then they send some octopus or crab back here it's not like a trade with any expectation of exchange but it's just you wanting to give them something that they don't have and then they want to give you something that you don't have," explained a Port Heiden respondent. In nearly all contemporary cases, regionally shared foods are transported to the receiving community by one of the local air transport services for a fee. Study respondents reported that persons receiving gifts of subsistence food from distant communities normally always try to pay for the costs of transporting the shared food. Regarding sharing food with a Perryville household, a Chignik Lake respondent said, "If she wants something from me she picks up the cost of freight … she always tries to offer to pay for gas or whatever but I really don't worry about it." Similarly, a Perryville respondent said, "This guy asked me, 'Do you have any seal?' I said, 'Not now. This was from New Stuyahok.' I said, 'I will get you one when I have it.' I didn't expect nothing, [yet] he sent me a whole caribou. But I paid for the freight." A Port Heiden respondent reported that rather than hassling with getting the receiver to pay for the freight costs of a shared good, she instead plans to air carry the items intended for sharing to the relational community herself the next time she travels there:

> Instead of 'OK I will send you some, I will put it on the plane,' its 'When I come to town next I will bring it to you,' which makes us more conscious about what we are giving, when, and how we are getting it there because it costs the same to bring 50 pounds of clothes versus 50 pounds of fish as luggage.

Readers should be reminded here that actions of balanced reciprocity do also sometimes occur in the regional network of social relations, such as when berries are purchased by a community member from residents of a separate community, which was discussed earlier.

Study respondents commented that modern transportation, and especially airplanes, is what today makes these inter-regional wild resource exchanges possible. A Chignik Lagoon respondent explained:

> When we shared in the past it was always with people close to us and that's the one thing I need to express to you guys that has changed is because of airplanes, you know, you can ship stuff fast and it will stay frozen … . The area of where we share has expanded way far from what it used to be.

The respondent went on to share a concern that the ability to share wild resources at longer distances might have generated more pressure on resources locally, because people today might harvest more in order to share with those who are a further distance from the local community. The respondent explained:

> I will say [harvesting to share non-locally has] got to be harder on the resource than it was 30 years ago because when you … take our redfish [spawning salmon] off

> the spawning grounds that gets shared all the way up the Bristol Bay side now, that never used to happen.

The transportation costs of sharing in the regional network are prohibitive for most respondents, however. “It costs money to ship stuff out. People don’t have money,” explained a Perryville respondent. Study respondents reported that the costs of shipping subsistence foods with regional air carriers has increased dramatically over the last decade in tandem with airline consolidation and the industry-wide trend to charge more restrictively for excess luggage. “To send 50 pounds of freight that’s $2.50 a pound or $2.25 a pound,” reported a Port Heiden respondent. The respondent continued:

> It’s gotten more expensive to freight fish out still frozen or cold. It’s gotten harder to mail it because even that has gotten more expensive you know just in the last 10 years a postage stamp has doubled its worth and so it cost more money to share and for some families it’s harder to do that, you know, and it’s better to—instead of mailing or sending out freight—it’s better to take those items as luggage … it really makes us rethink the logistics of getting stuff to other places … even just from the community to Pilot Point, which is just above us, or Chignik Lake or the Bay or the Lagoon which is right below us; even that is hard for us to just throw something on the plane. They used to never care or even record something being transferred from a village to village and now … it’s a $25 fee no matter what it is, it could be one pound of butter but it will cost you $25.

Similarly, a Chignik Lagoon respondent explained that the cost of sending deer meat from Kodiak Island to the Chignik communities has become highly prohibitive: “[I said to my friend] ‘Well if you get a deer send me some deer,’ and so he did but he didn’t realize how much it was going to cost. It cost him $95 to send a little box of deer about five pounds!”

The cost of transporting subsistence foods has the potential to be a significant barrier to the long-range temporal robusticity of the regional sharing network.

Distant Sharing Networks Within Alaska and Beyond

Study respondents consistently discussed sharing subsistence foods with distant relatives and friends in Alaska who are mostly urban residents of Anchorage. As with the regional network, here community residents and their urban relations take advantage of the opportunities to share and receive subsistence foods presented by access to aircraft travel, and occasionally the Alaska Marine Highway ferry system. Participants in this long-distant network also normally pay for air transport costs in order to partake. Nonetheless, study respondents made clear that whenever they travel to Anchorage or other distant places by aircraft it is a standard practice to bring along with them subsistence foods for sharing. Likewise, when relations from Anchorage visit the study area it is ordinary for them to return with a cache of shared subsistence foods.

Study respondents explained that it has been common for local residents to end up relocating to Anchorage for economic or health reasons. “Elders are leaving the community to take care of their health and end up staying away for good. They find it easier to live outside of the village. Usually [they] go to Anchorage,” said a Chignik Lagoon respondent. Yet, people who relocate to the city usually never give up their taste for subsistence foods even though they unfortunately have much less access to these foods once residing in Anchorage or other urban locations. “When people move away the resources from the village become important to them,” explained a Chignik Lagoon respondent. The respondent said her sister in Anchorage now “relies on the shipments [of salmon] from out here so she doesn’t have as much and she holds it closely what she gets [and] I noticed that with my grandmother on my dad’s side that, when she moved out, she lived in Seattle and the stuff she got from up here was like gold to her.”

Several study respondents commented that for the purpose of making sure their urban family members are supplied with subsistence foods, a portion of their annual salmon harvest is intentionally directed to be shared with relatives in residing in Anchorage. While some community members mail these gifts to Anchorage, most take subsistence foods with them for distribution when they travel to Anchorage themselves for events, shopping, or healthcare appointments. “We take it to Anchorage because we go back and forth,” explained a

Chignik Lagoon respondent. An Egegik respondent said, "I go to Anchorage and I want to share something with somebody. I will just put it in my suitcase." A Chignik Bay respondent said:

> Starting in fall we are now starting to meter out what we put away during the summer and as we go into Anchorage … we will take 5–10 pounds of frozen finished product whatever it may be: [salmon] heads, bellies, fillets. We will take that in each trip in the fall, start distributing it out so we don't end up with a lot of old fish in the spring … . Get some freezer space, no wasted food … . When we do dig through the bottom and we find the heads, we say, 'OK let's go set this aside for next month's doctor trip.'

In cases where any community member is traveling to Anchorage, other community members often ask them to carry subsistence foods with them to give to relatives in Anchorage. "We will send it with someone that's going to Anchorage and my sisters and brothers up there will distribute it," said a Chignik Bay respondent. A Chignik Lagoon respondent said, "Especially now with modern technology we have food savers and freezers and it doesn't take all day to get from here to Anchorage … there is people [who] will ask, 'Oh you are going to Anchorage Monday can I send this with you?'"

Study respondents reported that aside from Anchorage, their long-distance sharing network covers places in Alaska such as Palmer, Fairbanks, Wasilla, Kenai, Utqiagvik (formerly Barrow), Akutan, and Kaktovik, as well as more distant places outside Alaska such as Washington, Montana, Georgia, Oregon, Maryland, and even Japan. Other than frozen, smoked, or dried salmon, the types of wild resources shared in the long-distance sharing networks that were specifically mentioned by study respondents include: caribou, berries, sea urchin, crab, Pacific halibut, whale meat, and seal.

According to study respondents, aside from urban recipients sometimes paying for transport costs, most long-distance sharing also operates as generalized or delayed reciprocity. However, respondents reported that urban residents sometimes offer reciprocation by sending welcome supplies of fresh foods to the communities. "They ship other stuff back you know, like fish for fresh stuff, produce and things like that that you can't get here. I mean without a store now we have to order everything," said an Egegik respondent. A Chignik Lake respondent said that long-distance sharing "works both ways … it's harder for us to get fresh stuff; eggs, anything that is perishable." A Chignik Bay respondent said that when some households receive fresh produce from Anchorage they normally share it with other households in the community: "They will come and bring the fruit and vegetables, share it with us, and they ask for nothing in return," said the respondent. On the other hand, sometimes rural residents will share subsistence foods in Anchorage as a means of informal exchange for a place to stay. A Port Heiden respondent said:

> I have given my cousin berries and smoked salmon for staying with her for a weekend in town because she lives in Anchorage and instead of renting a hotel she is like, 'Come visit me, come stay with me but bring berries and smoked salmon' [laughter] … that's pretty much what I did; 'I will come stay with you but I will bring berries.'

Modern transportation, in conjunction with the ongoing relocation of Alaska rural residents to Anchorage for the purpose of pursuing employment, has greatly expanded the geographic scope of wild resource sharing in Alaska. In the sense that non-local sharing is dependent on industrial transportation, the long-distance sector of the Alaska wild food sharing network has become globalized. As a Chignik Lagoon respondent stated, "In fact it is probably easier [to share] because of all the modern equipment we use." Nonetheless, as with the regional sharing network, the costs of transporting subsistence foods in the long-distance sharing network can be prohibitive.

Mailing packages to Anchorage is far more expensive for study community residents than is taking subsistence foods as carry-on luggage for air travel. One respondent remembered being charged $170 to mail a box of salmon to Anchorage. "The price of freight and mailing out fish is making it more expensive to share. It's cheaper to take fish as luggage," said a Port Heiden respondent. An alternative option discussed by study respondents in the Chignik communities is to transport subsistence foods on the Alaska Marine

Highway ferry system, which maintained a stopover in Chignik Bay in the study year. A Chignik Lake respondent explained:

> You have a choice between flying it out or taking it on a ferry with you. In our case we try to use the ferry system because you're allowed 100 pounds each person, which makes it good so you can take 100 pounds of meat or fish out of here if you wanted to. So it is a lot easier. [The ferry] takes a couple more days extra but it's cheaper—$176 a person, so it's a big difference.

Lastly, some respondents reported the concern that modern transportation and its capacity to allow for the distribution of subsistence foods across Alaska has led to an expanded demand for subsistence foods in urban environments that has led to an increasing phenomena of wild resource commodification. Respondents expressed concern that this trend has the tendency to produce negative social and environmental repercussions for the traditional subsistence way of life; a Chignik Lake respondent shared a specific concern in this vein:

> People are selling their subsistence fish for money and exploiting the resources …. What I see happening a lot is like with the AFN [Alaska Federation of Natives] convention people are taking their subsistence food up there and selling it. I am not necessarily fond of that idea and … like bartering, you know, they are using the extra money they get from that to live on I guess but I see a lot of it going to other purposes too.

The other purposes the respondent referred to are alcohol, drugs, and evolving dependency on non-essential consumer goods. Study respondent concerns on this issue, as well as an overall perspective that sharing traditions are in jeopardy, will be covered in the following section.

Respondents' Perspectives on Declines in Sharing in Relation to Environmental and Socioeconomic Change

To conclude the presentation of this study's qualitative results, it is important to describe a prominent theme that emerged from the key respondent interviews: concern by most respondents that traditional levels of sharing, and the positive values associated with sharing discussed by respondents in the above sections, are in decline. Study respondents illustrated the presence of multifaceted threats to traditional sharing patterns associated with: environmental trends, such as declines in resource abundance due to overharvesting, poor management, and habitat shifts resulting from climate change; and also involvement with the cash economy, which introduces related sociocultural trajectories, including movement of some residents to urban environments for economic reasons, expanding use and dependency on technology, and related loss of subsistence harvesting and processing skills. Study respondents frequently discussed a generational gap related to these evolving sociocultural factors and an overall resulting decline in social bonds. A Chignik Lagoon respondent said, "Sharing customs are diminishing" and a Perryville respondent said, "Sharing [is still] there but it's not the amount of sharing it used to be … . [We are] losing our identity somehow." An Egegik respondent said, "What we are saying is there isn't much sharing going on here, simply because these young people now days … don't want to go out and do the hunting and fishing." The following subsections will discuss all these considerations in detail.

Environmental Change: Declining Resource Abundance and Predictability

Maintaining sharing and exchange networks has likely been for millennia an important factor in the long-range resilience of subsistence cultures when coping with abrupt environmental and socioeconomic change (Cooper and Sheets 2012). In this regard, study respondents consider healthy and predictable environmental conditions important to community food security, and consistently expressed concern that environmental changes are altering their ability to reliably maintain traditional subsistence practices, including their capacity to share wild foods.

Study respondents reported declines in the reliability to harvest all five species of Pacific salmon. Recent unprecedentedly high water temperatures are considered by study respondents as one cause of this decline.

A Chignik Bay respondent said that high temperatures have led salmon to avoid entering the river system and that this has negatively affected the health of sockeye salmon runs:

> [Sockeye salmon] were milling around in salt and brackish water instead of going into the [river] system … so water temperatures apparently had an effect on the pattern of the fish … so we were seeing … mushy fish in the salt water throughout the entire season and you would have to pick through fish that have actually no food value at all and [then] discard it or turn it into bait or do something else with it.

When salmon are unhealthy, or their numbers are low or unpredictable, the sharing capacity of community members is directly affected. A Chignik Lagoon respondent said:

> The fluctuation in fish numbers in general has a direct impact on whether we share because we do have to think of our children first … . [If] our first [sockeye] run it isn't strong we aren't going to put away a whole bunch in the spring … we [still] share but it will affect how many we can give away and still be able to provide for our family.

Study respondents reported that increasingly abnormal air temperatures are also influencing salmon sharing because relatively predictable weather is required for reliably processing and drying fish. Some study respondents reported that warmer rains have created humid air that has made drying salmon increasingly difficult, and others reported that warmer sunny days have generated an influx of flies that incessantly lay their eggs on drying fish. In combination, these two factors have reportedly led to increased fish spoilage and a decrease in the capacity to share processed salmon. "Whether it was bugs [or] excess moisture … increased air temperature was a big part of low quality of the product, compared to what we are used to," said a Chignik Bay respondent. The respondent commented extensively on his observations that an influx of flies, including previously unobserved species that remain in the area even during the winter months, has created increasingly challenging conditions for drying fish:

> Now the flies never go away and can't dry fish. Where we would contend with one type of fly one point in the year, and maybe another type of fly another point in the year, we are now contending with four or five different types of flies. Two or three [species] we are not sure, we are not used to seeing them all occurring at the same time and basically shutting down our subsistence … . Instead of large flies you get tiny ones then … you just can't keep up, can't get the smoke on the fish fast enough and can't repair the smokehouse or modify it quick enough before that fish starts to turn sour … . [In 2016] we had to cut [fish drying] short because we could see that we weren't going to be able to get dry fish without it rotting … we weren't going to be able to get … a three-day smoke, we had to pull it the second day because of bug infestation, we weren't even going to put in the smokehouse, we were going to have to freeze it.

Though not necessarily related to environmental change, study respondents also reported that overharvest and mismanagement of commercial fisheries in the region have likely contributed to both sockeye and Chinook salmon declines and thus also affected sharing. While commercial fishing has long been the primary economic driver in the region that most community members have benefited from, some study respondents explained that the commercial fishing industry has consistently prioritized profit over sustainability and asserted that associated effects of this have become increasingly problematic for both the commercial fisheries and long-range subsistence uses. Some respondents expressed concern that the commercial industry frequently wastes harvested salmon and that commercial and home pack salmon harvests frequently go unreported.

Study respondents reported caribou declines and overall difficulty in hunters being able to access large land mammals as another important changing environmental factor that has a negative effect on food sharing. "No moose, no caribou … can hardly find it … there is not enough animals. Before [we] used to … get a couple caribou, two or three, now you are lucky to see one," said a Chignik Lagoon respondent. While accessing large land mammals is more difficult for residents of the Chignik area communities, moose and caribou hunting is generally better for residents of Port Heiden and Egegik and respondents from those communities reported that caribou populations have been increasing over recent years. Nonetheless, these respondents said that caribou populations remain significantly lower in the region than they have been traditionally. Respondents reported that small land mammals, such as snowshoe hares, and upland birds, such as ptarmigan, have also declined in both abundance and size. "The animals are getting smaller and we lost our ptarmigan this year, there is no ptarmigan this year. Our rabbits used to be three, four feet [long] now they are down to a foot," said a Perryville respondent. A Chignik Bay respondent said, "Chignik Bay, my community, we have become more dependent on marine resources and less dependent on terrestrial resources because of the lack of terrestrial opportunity. It is darn tough to find a rabbit around here in Chignik Bay, it's darn tough to find ptarmigan in Chignik Bay and it wasn't always like that."

Study respondents suggested that climate-induced habitat change is a meaningful factor contributing to reducing the abundance of, and accessibility to, terrestrial resources for local subsistence hunters. A Chignik Bay respondent said, "Because of the climate change the density of alders and their size is way worse than it was 30 years ago." The respondent said that he has also observed a large increase in the size and density of willows and reported noticing previously unobserved and unknown species of vegetation now growing in the region. Some study respondents said that vegetation change is one reason why moose have become harder for hunters to access since the increasing density of shrubs in lowland areas has driven moose to higher elevations. "Moose are harder to get [now] because they are so high up," said a Port Heiden respondent.

Overall, by altering the amount of resources available for harvest by subsistence fishers and hunters, lower resource abundance and less access to resources resulting from environmental change directly affects sharing decision-making when considering how much to share. "If we harvest less then we can't share as much," said a Port Heiden respondent. A Chignik Lagoon respondent said, "If you don't have enough for yourself you are not going to [share]." A Perryville respondent said, "[It's] getting harder to get resources. Fewer resources … some people have a harder time to give away." Further, a Chignik Bay respondent said, "If a resource is showing any stress or depletion, what [is harvested] is going to go to family first and as a friend status it is going to be something in abundance or when all family needs have been met."

Study respondents reported that observations of environmental change and their negative effects on subsistence and food security are driving awareness of coming threats in the study communities. Some respondents voiced a need for contemporary community members to begin focusing on measures of adaptation to environmental change. "You got to adapt … climate I think it is going to be the biggest underlying driver of how we as humans adapt and how we move forward," said a Perryville respondent. The respondent said that switching to new resources will be one adaptive requirement and expressed confidence that in some manner the communities will adapt. One adaptation to environmental change discussed by study respondents was a report that some moose and caribou hunters have begun making the efforts to pursue harvests through often arduous and lengthy foot travel, which has become necessary as a result of expanding deciduous vegetation in low-elevation large land mammal habitats. A Chignik Bay respondent provided the following narrative:

> [Some] younger hunters [that] own or operate very expensive fishing boats [are] now willing to organize a group hunt, take a boat out and spend many more hours walking to much higher elevation in search of the opportunity to possibly fulfill one or two Tier II [caribou permits] … . If we went back 10 years ago there was no way that you could have got somebody to hike seven miles through this type of terrain for a caribou. We literally, uh, 20–30 years ago wouldn't hunt caribou unless it was right down on the beach, or moose, because it's very difficult to move through these types of alders … . Yet [today] people are willing to go to much higher lengths to get that food … What we [before] thought was really bad in terms of [vegetation] density and difficulty is nothing compared to what we are actually

> living in today … . Yeah so, people adapt, instead of searching low grounds near the shoreline they will follow a stream up to a much higher elevation where they can look over a big area in the Pacific range and [they are] even starting to push now into going up to an elevation where they can look both on to the Bristol Bay side and the Pacific side … . That would have been unheard of 30 years ago, somebody to go to that length.

Evolving Influence of the Cash Economy on Subsistence Sharing and Trading Practices

In comparison to environmental change, socioeconomic change was represented by study respondents as being equally, if not more, detrimental to the long-range robusticity of traditional subsistence sharing practices. Note that there is previous research that shows that engaging in the cash economy provides a mechanism for rural residents to acquire modern equipment that makes subsistence harvesting more expedient, which generally allows for increased harvests in both volume and diversity (Brinkman et al. 2014; Kruse 1991; Van Lanen 2018; Wolfe 1986). However, exposure to and evolving dependency on the cash economy and its associated consumer goods and technologies were cited by most study respondents as generating sweeping effects to traditional small-scale, remote-community subsistence culture, including negative effects on sharing. Ongoing commercial fishing activity during the 20th century was a major influence in this regard, bringing in employment opportunities and increasing access to modern goods, and initiating outside cultural influences. "Being a member of a crew on a [commercial fishing] boat gave people an exposure to different ways of modern living," explained a Chignik Lagoon respondent. As the communities develop economically and infrastructurally, local residents experience change to the nature of their dependence on cash for survival. "A modern village is like a little miniature city. You have to have a job to survive now days … to pay for your fuel, your lights, your gas, your groceries [and] everything [costs] double around here. Everything is more expensive," said a Chignik Lake respondent. Respondents explained that access to and the desire for store-bought food has been an important dynamic of the economic development process that has directly influenced community perspectives on food and subsistence; for one, store-bought food is expensive. "It costs a lot to get food in here, whether it's by boat or by plane … there is no cheap way to get any," said a Chignik Lagoon respondent. Another factor is that for most people cash dependency requires employment and full-time employment takes away time from subsistence activities thereby not only leading to fewer persons participating in hunting, fishing, and gathering, but also a loss of subsistence enskillment, and a subsequent overall loss in levels of wild food sharing. All of this "is a dynamic that we can't get away from," voiced a Chignik Lake respondent.

A related socioeconomic dynamic discussed by respondents is relocation of community residents and their relatives to Anchorage and other urban places, normally for the purposes of obtaining cash income through employment. There are few employment opportunities in the study region and the prospects are far greater in Anchorage. "It's lack of opportunity, that's what drives people out I think, there is no opportunity for [younger people to work] down here," explained a Chignik Lagoon respondent and a Perryville respondent said, "There is no jobs, there is no money. It's usually money, right? It's all about the money." A Chignik Bay respondent said, "There are not a lot of 12-month jobs in the community so young people can't really afford to live here." Another Chignik Lagoon respondent said that the motive to leave the communities is not only monetary, it is also social. As generations become more exposed and immersed in modernity, they feel limited in remote Alaska communities and "need to get rid of the isolation," said the respondent. Study respondents explained that through these dynamics the communities are losing young people to Anchorage, young people who would have in the past participated heavily in the subsistence activities that generate sharing. A Chignik Lake respondent said that in the past "there was bigger families here and more people around, more people sharing." A Chignik Lake respondent said that a decline in commercial fish prices following the *Exxon Valdez* oil spill in 1989 initiated the first exodus of local residents who had become cash dependent from commercial fisheries employment: "After the *Exxon* oil spill people moved out of the area because fish prices were low. They couldn't afford to live in the village and moved to places like Anchorage and Seattle." A Chignik Lagoon respondent reported that making an adequate living from commercial fishing remains a struggle for many local fishermen today and that the overall trend has been for the newer generations to stop fishing and leave. The respondent said:

> Our biggest problem is we don't have no income for this area. We depend on the [commercial] fishery and when it's a bad year, like this year [2016] and last year [2015] that's two bad years we got here. The people haven't made that much money, and that is one thing [that] impacts everybody.

According to the same respondent, the inability to rely on the commercial fishery today has generated a trend of local commercial fishing permits being sold to non-local people. The respondent provided the following narrative:

> [Local commercial fishers] don't have that much money [and] they are selling their permits. There used to be 20 permits, you know local Native operated. Now I bet you there is only four or five of them. They sold them because they can't afford it, they can't afford fishing. The old man died, the kid doesn't care too much for it so they sell them to make money, and that's a lot. Your dad has a permit you know and he retires and then he passes on and he leaves you the permit, you decide to sell it to somebody else because it's worth a lot of money and you don't want to keep fishing. They don't have no jobs so why the hell do they want to stay here? So, they just leave.

For more than a century, active commercial fisheries have generated a large-scale outside cultural influence in the Bristol Bay and Chignik regions (Branson 2007; Troll 2011). Not only did local residents become more dependent on the cash economy, their cultural perspectives shifted as well. Study respondents said that this shift has in many ways been influenced by non-local commercial fishermen who only reside in the communities seasonally. A Perryville respondent explained that non-local commercial fishermen come "from somewhere else, [we] don't know each other['s] values" and a Chignik Bay respondent said, "... the seasonal people that have no ties to this community. Their influence is pretty dramatic." A Perryville respondent said one effect was that people increasingly felt compelled to "try to sell all the fish you catch for money," rather than to retain a portion of the commercial harvest for subsistence home use. These respondents suggest that such non-local cultural influences, combined with the market-oriented profit motive associated with the commercial fisheries, shifted much about traditional cultural ethos in the study area regarding attitudes about community, subsistence, and sharing. "Sure they make the money, but the social impact for the community, it was disastrous," said a Chignik Lagoon respondent. The "younger generation [was] not raised to honor standards and traditions like [the] older generation was," said an Egegik respondent. The respondent also said, "…elders have passed, and the traditional ways are getting diluted with modern people who don't understand the Native ways of doing things."

Study respondents expressed that a primary influence of economic modernity in the communities has been expanding individual selfishness, and an individual profit motive. "People are being greedy and are kind of more for themselves," said a Chignik Lake respondent. A primary concern in this regard for some respondents is what they observe as an increased effort by younger residents to sell subsistence-caught salmon under customary trade regulations. A Chignik Lagoon respondent said, "Taking your tradition to make money on? I don't find that right. I think selling in general of goods isn't right because that's not where our people came from." Regarding the foreseen consequences of an evolving trend toward selling subsistence-caught salmon, an Egegik respondent said:

> … it would go commercial and just become another business and then there's you know the hard feelings and competition, you know … I see that as a future competition to the subsistence way of life. People selling subsistence … I think people living in cities and getting used to the non-Native ways has contributed a lot to that. It's not sharing it's taking advantage … . It's sad to see but it's kind of a dog-eat-dog world now days and so you are looked on as less than aggressive or whatever …

Another related concern expressed by study respondents is increasing alcohol and drug use by younger community residents, which members of the older generations associate in many ways with modern influences. According to some respondents, a need for cash to provision increasing alcohol and drug use has influenced younger community residents to steal property from others. For example, a Chignik Lake respondent said that when he was younger no one ever needed to worry about theft of subsistence fishing equipment, but that today this has changed:

> You leave everything in [your boat] your gear, your gas, your oars, your tools. You wouldn't have to worry about anybody stealing or taking it versus now you can't do it anymore because the respect is different. Too much outside influence I think, you know … . It makes a difference if you are brought up … in a city or a village … . I notice the kids that come here that were born and raised in [Anchorage] are just totally different from the ways down here.

Study respondents expressed that the above suite of socioeconomic-driven circumstances have, in their totality, severely diminished the motivation of younger community residents to hunt, fish, and gather for the benefits of their communities. For example, an Egegik respondent said:

> Young people … got no interest in hunting and fishing and sharing nothing with nobody. They weren't taught by the elders to share otherwise they would be out there hunting for us and getting us something, and fishing. They ain't doing it.

Rapid adoption of digital technology use during recent years was the most frequently mentioned facet related to loss of motivation by younger people to participate in subsistence activities.

Study Respondent Perspectives on the Adoption of Digital Technology and the Effects on Food Sharing Traditions

Key respondent interviews during this study collected numerous comments from community residents regarding the perceived negative effects of digital technology adoption on intergenerational subsistence skills, efforts, and sharing. Study results reveal that technology is an important topic of concern for many study area residents. The following are select comments from key respondent interviews concerning the effects of technology on subsistence motivations and sharing, mostly concerning the efforts of younger community members:

> *Chignik Lagoon respondent*—[It] used to be we would fish and subsist for fun, now [young people] go on Honda [ATV] and telephones for fun. Technology has really screwed things up.
>
> *Chignik Lake respondent*—Look at this younger generation they are all piled up in the house playing video games or on the iPad.
>
> *Perryville respondent*—It's all the electronics. They share music files and things like that … they share music not fish.
>
> *Egegik respondent*—[Young people today] are lazy so yeah, there is way less sharing. It's changed a lot. The young people here now don't know about sharing. I always brought … the elders porcupine and food and fish and smelt. These young kids haven't brought me no smelts or nothing. I am 61 [years old]. I went down there and cut the first hole and went smelting myself and you got four 21-year-old boys here playing Nintendo … . They got into that Nintendo and that was the worst thing for them … they can go 14, 16 hours nonstop till three in the morning before they quit. An addiction … I don't know who made that China or what, but they sure got ahold of our kids when they made that game. It's not only here in this village it's in all the villages and all over in the cities. I mean there are some people who can't write and read because they are playing the Nintendo. They aren't getting their education and they ain't learning nothing good on it … they ain't sharing with nobody and they got nothing to share because they don't go and hunt. They don't catch none, they ain't got time. So they don't think of, 'Oh well grandpa or dad needs some ptarmigan or ducks.' The young ones should be

> down there shooting right now, handing out to the elders right now, and not playing Nintendo … the elders don't even bother with them no more they don't even care to talk to them or nothing because they are ashamed that they don't understand that you got to help the elders, that's what matters and that's who you learn from. When you sit down and you give them something and he tells you a story or something he is letting you know.

Study respondents said that young persons need to engage in learning both subsistence skills and traditional ecological knowledge if they are to become successful hunters, fishers, gatherers, and food sharers in the future, but that constant attention to digital technology is in many ways blocking young people from adequately learning. Traditionally young people learned subsistence skills by watching and doing:

> *Chignik Lake respondent*—The younger generation is getting lazier … . I hope they learn some time; they are going to have to. I don't think I have seen too much of the younger generation wanting to learn. Technology I think is becoming a big part of their life. Yeah I was just discussing today about GCI [cell phone service company], they got sued over their cell service and, uh, I think it was culture disruption.

> *Port Heiden respondent*—Today you have to make an effort to teach kids about fishing whereas before you didn't because they would follow you down to the beach and learn from watching and doing. Now days kids are so caught up in video games and movies.

> *Chignik Lake respondent*—[I am] worried about our younger generation because all they do is play video games and watch TV, stay up all night and sleep all day. They have to follow the elder's ways or else they are going to starve. They won't be successful in life if they keep playing games all the time.

Study respondents also commented that younger community residents are not passionate about subsistence foods because they have largely adapted to eating store-bought processed foods, as described by two respondents:

> *Perryville respondent*—[We] didn't used to have TVs and phones, now we have more distractions. Kids just sit around and do their things [and are] not eating as much subsistence, [instead eating] more junk food…[I] blame technology mostly.

> *Chignik Lake respondent*—The TV has got [young people] wound up or these quick foods they order … I am not sure how to explain that because I am not used to living like that … . My granddaughter has a lot of them, what do you call them things in an envelope [laugh] you stick them in the microwave and eat them … a 'hot pocket' yeah. [The store owner] can't keep her store stocked enough with that kind of stuff [because] that's what the younger generation eats.

More than just affecting levels of subsistence harvests, wild food sharing, and nutrition, study respondents also reported that the effects of how time is spent and changing food preferences resulting from the adoption of digital technology have in combination greatly lessened traditional social bonds in the communities:

> *Chignik Lake respondent*—People don't sit and drink tea and tell stories, none of that anymore.

> *Chignik Lagoon respondent*—People don't interact. They have technology for entertainment, cellphone … internet … . People used to have to entertain each other and help each other.

> *Port Heiden respondent*—Everybody used to live down at old village down there and you walked, and people visited around a lot. That was before we had TV and

> stuff like that. People visited—you know mingled together more. Now I could go month or two without seeing some people in the village here.

Study Respondent Perspectives on Successful Future Adaptations to Ongoing Socioecological Change

Study respondents pointed out that while salmon and other resources are being negatively affected by environmental change, communities in the study region continue to retain excellent opportunities for harvesting and sharing subsistence resources, particularly salmon. "Fish is still plenty [and] people are pretty equal in [their] ability to get resources," explained a Chignik Lagoon respondent. Of greater immediate concern for respondents is what they see as a lack of generational and social ties being built and maintained in the communities, as well as a large-scale loss of traditional subsistence harvesting skills related to the socioeconomic and technological trends discussed in the previous two subsections. Overall, the volume of comments provided by study respondents concerning the negative effects on sharing being generated by 21st-century socioeconomic and technological change invokes some key concluding takeaways for the qualitative component of this study.

Study respondents essentially sum up the maintenance of vital social capital as imperative to traditions of consistent familial and communal help and cooperation, which are largely centered around the harvest, sharing, and use of subsistence foods. Losses of that social capital incur when cooperation stops and social bonds begin to wither with the rise of individualism that dependency on the cash economy and its commodities prompt. A Perryville respondent discussed an observed decline in "partner connections" for subsistence activities and said, "People don't really work together anymore. The work ethic has changed over time, for the worse … . Before people used to go out in a group; now they are all alone by themselves." A Chignik Bay respondent described how individualism affects cooperation and likely further provokes declining social ties: "The worst thing you could do is start burning your bridges in terms of opportunity to share with people by making a misstep … . Or alienating somebody." A Chignik Lagoon respondent said that what is needed is for community members is to "start using that little touch that was important, that's what kept the family, you know, the family community together: it was 'help,' and still there are a few guys who will get taught to do that." In a small-scale subsistence-oriented community, it is connections to one another through harvesting, processing, and sharing that ultimately build the bonds of cooperative community health and resilience. In this regard, respondents spoke on the fundamental importance of maintaining social bonds through sharing in a subsistence culture, as supported in research by Bird-David (Bird-David 1990; 1994). A Chignik Bay respondent said:

> You must have something to anchor it, and then those children and those young people go through a lifetime of similar experience … so you set the anchor at an early age. But they don't create the links in that transmission of knowledge without having a hunter-gatherer lifestyle, and that is important to live out here.

A Port Heiden respondent said:

> There is always a good social aspect to sharing and group harvesting that is good for us mentally to have that good quality time, and to show our kids: 'This is how we take care of ourselves for the winter and that it's good for us socially and mentally to do these activities together.'

And a Chignik Lake respondent said:

> [Sharing] was in our nature I think the way we were brought up as the Aleut tribe. It was always that way before we had TV [laugh]. Then grandma used to say, 'You keep on giving you will never run out of anything, never have to worry about food.'

In sum, study respondents promote a sociocultural trajectory that adaptively navigates the future in a manner that will "anchor" an ongoing importance of subsistence hunting, fishing, gathering, and sharing for personal and communal wellbeing. Yet community members acknowledge that in the study period they found themselves in a difficult double-bind where 21st-century socioeconomic, technological, and ecological conditions present immense challenges for maintaining traditions. A Chignik Lagoon respondent said:

> I feel that there is a great possibility it will be lost. Times have dramatically changed in 20 years since I was a kid. Times have changed and there is not as much sharing. So if I looked 20 years ahead, where is that going to lead? Because not everyone strives to provide for their community like they used to. I see it where lots of people are leaving the communities … . And then those that keep those traditions are laughed at or are told, 'Hey you guys going to go out and party?' 'No we got to go do fish.' 'Oh well see you later.'

Respondent comments imply, however, that—for the people who continue to call the study area home—the choice between either following the trajectory of 21st century modernity or finding ways to maintain the traditional socioeconomic and physical mechanisms of robust and intact subsistence sharing networks will inevitably trend toward the latter. Study community residents are faced with a reality that assumed total socioeconomic dependence on distant resources is problematic not only for its social implications but also because it is expensive and increasingly unaffordable for many community residents. Several study respondents expressed concerns about increasing unaffordability of subsistence transportation equipment, fuel, and store-bought foods. "People can't afford snowmachines anymore along with the fuel needed … [which is] lots of fuel. They can't afford it, so that diminishes that part; traveling and trying to get out hunting," explained an Egegik respondent and a Chignik Lake respondent said, "Today [we] can't afford to go buy meat from the store—Oh my God! The freight costs more than what's in the box." A Port Heiden respondent said that for these reasons alone it is wise for community residents to focus their efforts on subsistence practices as much as possible, rather than dedicate limited financial resources to purchasing non-local foods:

> Store-bought foods are so expensive, it cost a lot … I just spent $1,000 on a meat order that's only going to fill my freezer for about six months, if that. With my growing family I could just have easily spent a week fishing and filled my freezer and got the same fullness in my freezer and same amount of pounds of protein and would have only have wasted money on a tank of gas versus thousands of dollars on the meat, the freight, and just getting it here you know. It's a lot more effective to harvest [wild] food I guess because having to buy store food [is expensive] ... .

Study respondents expressed that financial concerns are important and are not going away anytime soon. A Chignik Lake respondent said that the best strategy for the future is to pursue a careful balance between dependence on the cash economy and subsistence:

> It's got to be a balance between store-bought [food] and the natural resources. In order to stretch your money you are not going to be able to pay, you know, you go into Anchorage and you pay thousand dollars in food and you want to ship it home you are probably looking at another grand. That's basically a whole paycheck there. And that's only going to last you what, a month? So, you know, you balance between the natural resources and the store-bought food then you might be able to stretch what you have out longer.

Successful balance in the mixed cash-subsistence economy requires maintaining income by some means, but some community members underscore that a vital fallback for food security will always be locally derived wild subsistence foods. An Egegik elder stressed that ultimately if the younger generations do not maintain their subsistence skillsets, their connections to the land, and a capacity to share their harvests, then they will lose a large part of their capacity for adaptive resilience and leave themselves vulnerable to future change:

> Eventually the younger generation is going to need to go out and hunt or fish to get their food, they got to catch it themselves … . These kids could do it if they wanted to do it. When times get harder and everything, I know they are going to have to go

> out and get the moose and the caribou eventually. They are going to have to do it. They are going to have to learn and get up on their two feet and grab that gun and go out and gather their food. And we are getting too old to go out hunting. They are going to have to bring us some. I would sure hope my son learns that.

Chapter Discussion

This chapter has revealed multiple key findings about subsistence food sharing in the study area obtained from key respondent interviews. Overall, respondents from the study communities consistently reported extant values and beliefs that support a longstanding practice of informal generalized reciprocity surrounding subsistence foods, including salmon. In contrast, study respondents reported little interest in using formalized delayed reciprocity or balanced reciprocity for the purposes of distributing subsistence foods. Study respondents reported that bartering subsistence foods is rarely practiced and that, aside from the sale and purchase of berries and occasionally seal, customary trade is also rarely practiced. In fact, most study respondents expressed general opposition to customary trade of subsistence foods other than berries and marine mammal products.

This study established that sharing practices involve a diversity of resources, including the sharing of equipment and smokehouses. Cooperative harvesting and processing of subsistence foods, especially salmon, was reported to be integral to sharing practices in the study communities. In this regard, sharing was shown to be very important for generating and maintaining social ties among individuals, families, elders, and children. Study respondents made clear that the purpose and value of sharing is more profound than merely food security: it is critical for maintaining the sense of community. Nurturing a subsistence work ethic was also voiced as an important cultural value in the study communities. However, particularly regarding salmon harvesting and processing, study respondent responses displayed a contradiction between ideals of sharing with nonproductive community members regardless of their capacity for reciprocation versus resistance to sharing with nonproductive community members who are disrespectful or lazy. Importantly, across the study communities, sharing with elders who can no longer participate in harvesting activities was reported to be of primary importance when distributing subsistence foods.

The community, or local, network was reported to be the primary sharing network for study respondents and salmon was represented as the most widely shared resource in the local network. Study respondents reported the occurrence of regional-level sharing and discussed that this practice is largely inhibited now by transport costs. Salmon was not reported to be a primary resource shared at the regional level because it is usually readily available to all the communities. Instead of salmon, regional sharing most often focuses on providing resources that are not available to certain communities. The non-local, or long-distance, sharing network is centered around providing subsistence foods to relatives and friends in Anchorage and other locations across Alaska. A diversity of resources is provided to urban residents, including large amounts of salmon. Members of the study communities frequently take resources to Anchorage as checked luggage whenever they fly to town.

Environmental change and its effect on resource availability and thus the capacity to share was voiced by several respondents as a critical concern for the future. It is believed that climate change will negatively affect the availability of salmon and other resources. Study respondents expressed concern that if fewer resources are available for harvest in the future then there will inevitably be less sharing by community members. Contemporary socioeconomic and technological evolution were also voiced by study respondents as serious threats to the maintenance of subsistence practices and associated sharing due to the observed effects on cultural motivations, particularly among the younger generations. Study respondents overwhelmingly voiced concern that youth subsistence enskillment and motivation are declining as a result of digital technology use. Several respondents reported that traditional levels of sharing with elders has declined as a result of this phenomenon. These respondents believe that if younger persons do not actively harvest subsistence resources, levels of sharing across the communities will inevitably decline. Study respondents simultaneously reported that store-bought food is too expensive to ship to the communities and then purchase and is not an economically sustainable option. According to multiple study respondents, a resilient future requires that communities in the region actively maintain a successful balance between the cash economy and an economy based on the subsistence use of wild resources. According to study respondents, as a longstanding core attribute of the subsistence lifeway, the maintenance of wild food sharing traditions is critical for long-range resilience of the local subsistence economy.

6. DISCUSSION AND CONCLUSION

Introduction

The goals of this project were to describe the noncommercial harvests and uses of salmon in six study communities (Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, Port Heiden, and Egegik) and to illustrate the sharing networks for salmon within each community and between communities, as well as networks between study communities and broader locations. This concluding chapter first summarizes the patterns of salmon harvesting and sharing as documented in the household surveys for 2016 and across earlier study years. Next is a discussion about sharing and exchange patterns based on the key respondent interviews (qualitative findings) and the social network analysis (quantitative findings). Based on these findings, the discussion turns to identifying challenges and threats to the subsistence way of life as expressed through subsistence harvests and exchanges of these harvests. The chapter ends with some general observations about resilience and sustainability in the study communities.

Patterns of Salmon Use and Sharing

Figure 6-1 depicts population trends in the study communities. From 1980 (the first year for which population estimates are available for all six places), the combined population dropped from 642 to 493 in 2016, a decline of 23%. Trends vary by community. Chignik Bay's population fell from 178 in 1980 to 68 in 2016 (down 62%), and Egegik's population was down 48% over the same time period. Chignik Lagoon's population was 50% higher in 2016 than 1980, but was down from 103 in 2000. Perryville's population has been relatively stable since 1960. The implications of population loss for patterns of subsistence harvests and sharing are discussed below.

The systematic household surveys identified that subsistence use of salmon was virtually universal in the study communities in 2016 (Figure 6-2). For the six communities combined, 96% of households used salmon in the study year and 75% fished for salmon. Most study community households were engaged in the exchange of salmon in 2016. Overall, 80% received salmon from other households, ranging from 50% in Egegik to 90% in Port Heiden. Also, 56% of all households in the six communities combined gave salmon to others, ranging from 40% in Egegik to 66% in Port Heiden.

These findings for 2016 are consistent with those for other study years. Of the 36 community/study year combinations shown in Figure 6-3, in only two (6%) did fewer than one-half the households receive salmon; in 28 cases (78%), an estimated 60% or more of the households received gifts of salmon. Giving away salmon was also common across study years (Figure 6-4). In only six cases (17%) did less than one-half of a study community's households give away salmon. In 20 cases (56%), an estimated 60% or more of the households gave salmon away. Clearly these results show the central role that sharing of salmon plays in the subsistence economy and way of life of the study communities.

The importance of salmon is also evidenced by the large harvests of salmon for home use in the study communities across study years (Figure 6-5). As estimated in pounds usable weight per person, out of the 36 community/study year combinations, in only six cases (17%) were harvests of salmon less than 100 lb per person. In 22 cases (61%), harvests ranged between 100 lb and 199 lb per person, and in 8 cases (22%), harvests exceeded 200 lb per person. For comparison, in 2017, the noncommercial harvest of salmon in rural Alaska was estimated at 89 lb per person, and 10 lb per person in urban Alaska (ADF&G 2019).

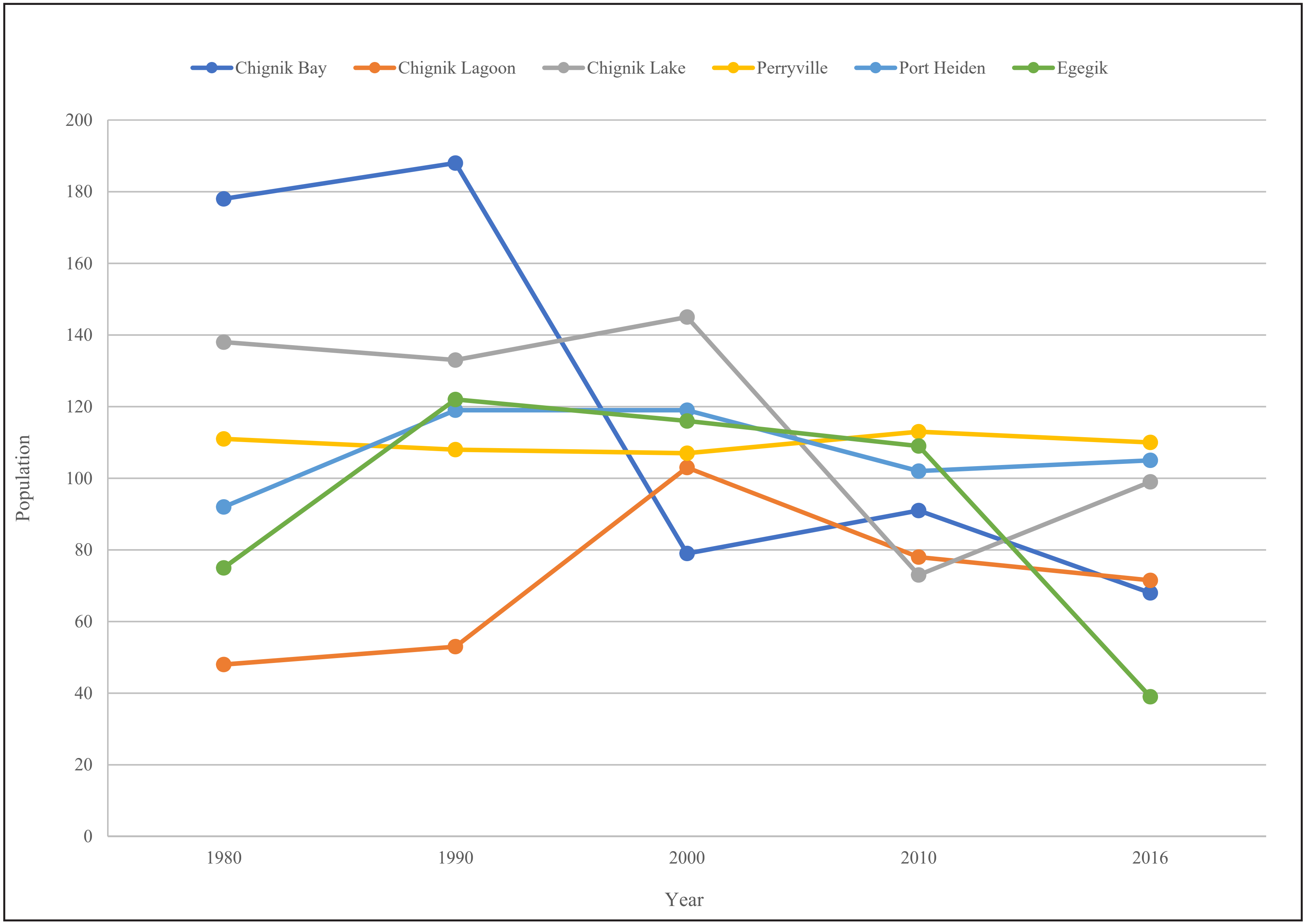

Figure 6-1.–Historical population by the U.S. Census, 1980–2010, and study population estimate, 2016, all study communities.

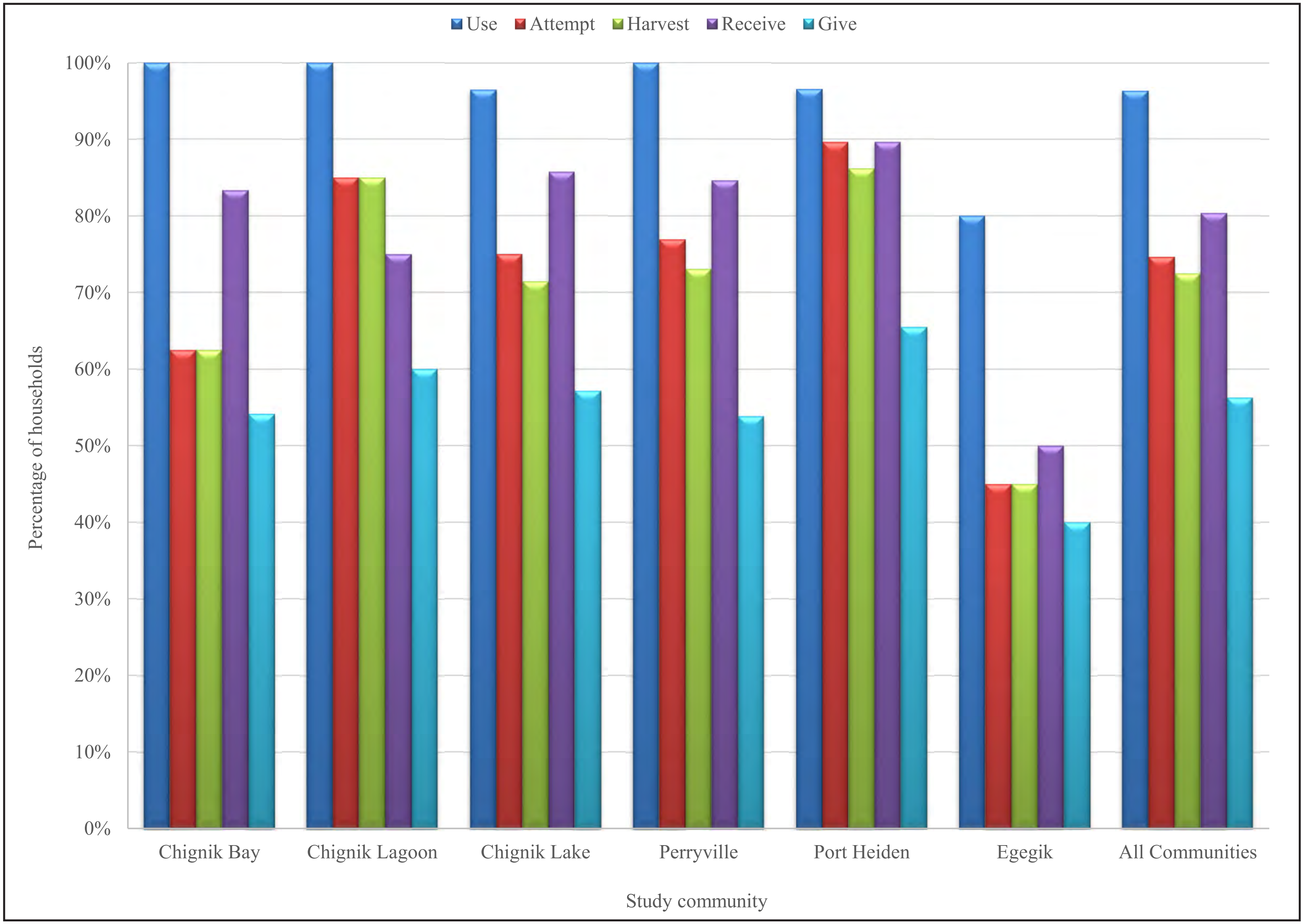

Figure 6-2.–Percentage of households using, attempting to harvest, and harvesting salmon resources, all study communities, 2016.

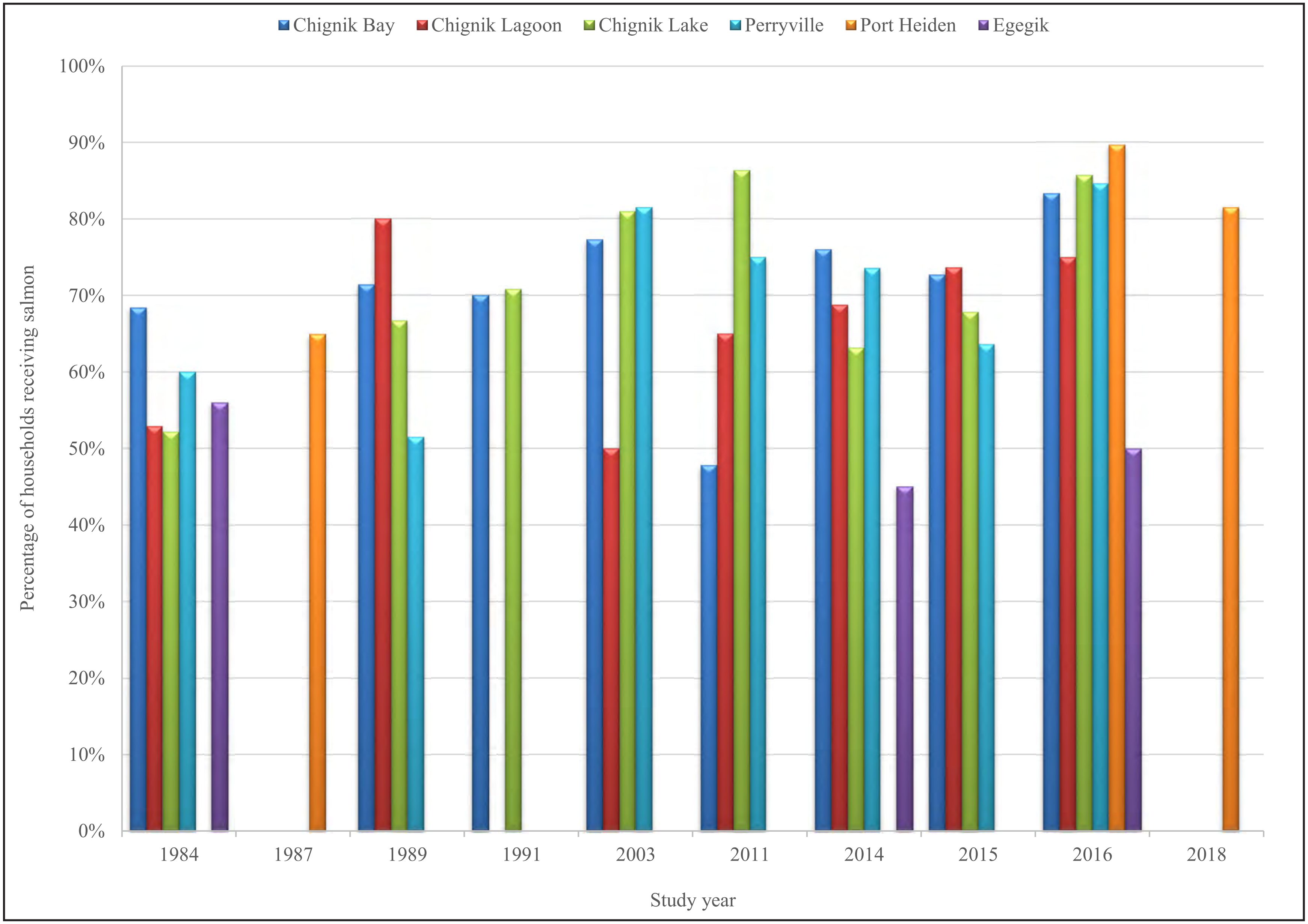

Figure 6-3.–Comparisons of the percentage of households that received salmon , all study communities, 1984–2018.

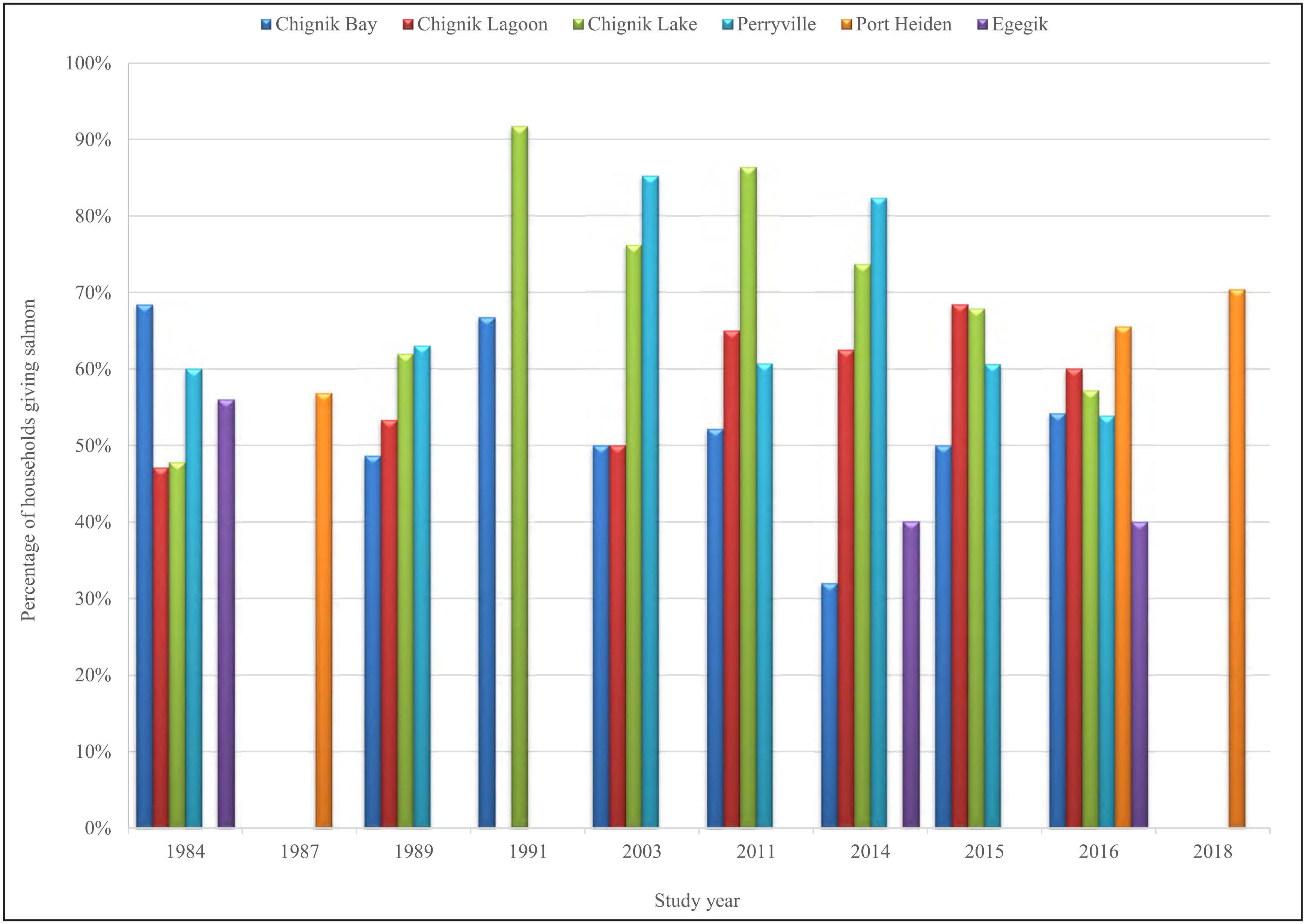

Figure 6-4.–Comparisons of the percentage of households that gave away salmon , all study communities, 1984–2018.

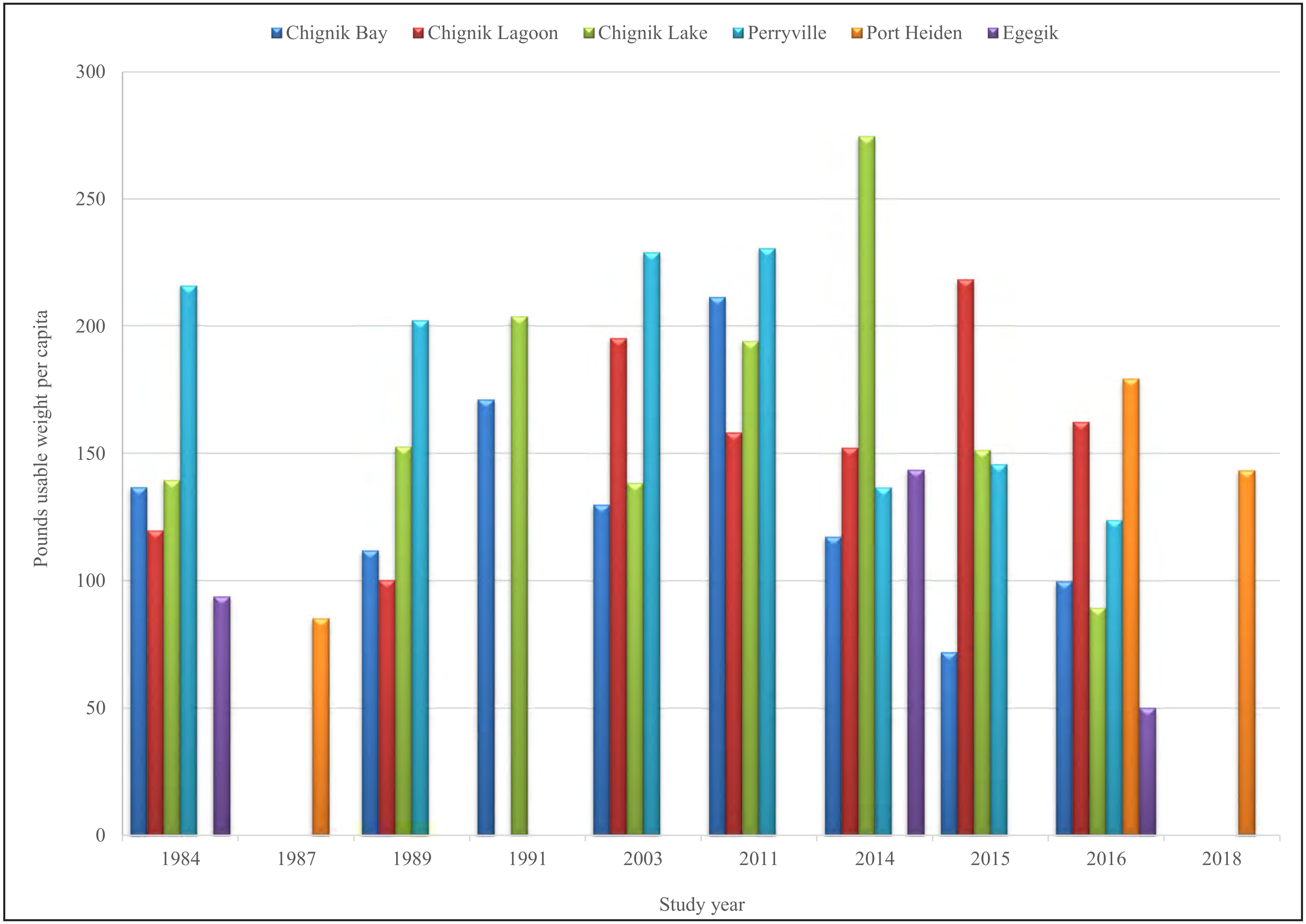

Figure 6-5.–Comparisons of the per capita harvests of total salmon, all study communities, 1984–2018.

Figure 6-5 also shows that subsistence harvests of salmon have varied in the study communities (see the discussion in Chapter 2). As an example, Port Heiden has experienced an interesting historical change in salmon harvest: the sockeye salmon per capita harvest increased slightly more than six times since the first household harvest surveys in the community for 1987 (Figure 2-70). This likely is at least in part due to the decline in caribou harvests connected with declines in the Northern Alaska Peninsula herd and restrictive regulations. In 1987, Port Heiden's caribou harvest was among the largest in the state (Fall 1993:10), and the sockeye salmon harvest was similar to other salmon species (Figure 2-69). In 1987, harvests of coho, Chinook, and sockeye salmon all ranged from 22–34 lb per capita (Figure 2-70). But in 2016, the difference in harvests was dramatic: the sockeye salmon per capita harvest was 136 lb compared to the Chinook salmon per capita harvest at 14 lb. This change in harvest patterns related to protein replacement of subsistence food is also evidenced in the assessments of use section (Chapter 3). Six Port Heiden households reported that in 2016 they did not get enough Chinook salmon, and they replaced that resource with different subsistence foods (Table 3-29). Interestingly, those households that reported that they did not get enough large land mammals said they used more commercial foods instead. In total though, for all Port Heiden households that responded regarding all wild resources (salmon and large land mammals), 16 households indicated replacing these resources with commercial food, and 12 indicated using more subsistence foods. More research would be needed in Port Heiden to assess what other subsistence foods were substituted in the community's diets.

Quantitative and Qualitative Perspectives on Sharing

At the outset, it is important to note that while the project and this chapter highlight salmon, understanding social networks that support the production and exchange of salmon should be done in context of the diversity of resources used in the study communities. Salmon is one component of a much larger sharing network; delving into the topic of sharing salmon inevitably included discussions of other resources, such as large game or berries, that are part of the sharing networks of these communities. The qualitative components of the research, achieved primarily through key respondent interviews, cast a broad net and captured how use and sharing of salmon interact with other resources.

Qualitative information also provided a temporal component that is unavailable through the more focused quantitative work regarding 2016 sharing networks. Social network findings based on data collected using the survey form are limited in that they provided only a one-year (2016) snapshot of conditions in the communities. Each study community has at least one other study year of data against which the 2016 results can be compared to identify changes through time, but the sharing information from these studies is not as extensive or in-depth as this study (Figure 6-3; Figure 6-4). By combining insights from the qualitative and quantitative data collected on sharing networks, the study provided both a detailed snapshot of sharing practices in the 2016 study year that enabled comparisons among study communities, as well as a detailed description of the cultural norms and values that shape these practices and the broader social and historical contexts in which they are embedded. Both qualitative and quantitative data for 2016 regarding social networks support similar conclusions about the role of producing and sharing salmon in supporting the viability and resilience of the study communities.

A final point to bear in mind in a discussion of project results is that the survey was designed to capture information from households that were eligible to participate in the survey, meaning the household had lived in the community for at least three months in 2016 and was present for the survey administration period in the late winter season. By design, this meant people who only live in the communities for the summer were not interviewed during the research. Some communities maintain strong connections with former permanent community members who return each summer for commercial fishing and who also put up subsistence resources during this time. Although these seasonal community members did not participate in the survey, many are likely included in the sample of exchange partners reported for non-local sharing networks. Still, community members may consider their community broader than just those who live there year-round, and if the research had been conducted during the summer and attempted to interview more seasonal residents, the results might have been different in some of the study communities.

Social Network Structures

The dominant mode of exchanging salmon in the study communities is generalized reciprocity: resources are shared without the expectation of a return. The research documented very few instances of barter (exchanging salmon for other resources) or customary trade (exchanging salmon for small amounts of cash). The few occurrences of these practices normally involved a desire for resources that are rare or unavailable for one community, but relatively accessible for another.

Each study community's networks (local and non-local) have unique structural features, and these features may indicate equally unique social dynamics. Nevertheless, sharing plays a critical role in community cohesion and overall social well-being in all the study communities. One relatively unique aspect of this study is the way it documented both local networks of interactions within study communities and non-local networks of interactions between study communities and people living in other locations throughout Alaska and beyond.

In the local networks, small clusters of households worked together to harvest and process salmon, and sharing bridged the gaps between these clusters, creating a single network that included most or all households in the community. The networks that work together to harvest and process salmon were less dense and less connected than those that facilitated sharing, which have ties that bring clusters of households together.

In the non-local networks, two patterns emerged regarding the location of sharing partners: sharing of resources between communities within the region is a more balanced exercise; alternatively, with more distant communities (such as Anchorage or other parts of the U.S.), salmon flows out of the study communities in greater amounts and with greater frequency than it flows into the communities. The relationships between sharing partners in non-local networks display three major patterns. First, salmon is most frequently shared and shared in greater amounts by study communities with close family, followed by friends and then extended family. Of all the salmon given and received in all the study communities combined, 53% of all ties and 51% of total pounds of salmon exchanged were with close family, followed by 31% of ties and 35% of total pounds of salmon exchanged with other relations. Extended family accounted for just 14% of all ties and of total pounds of salmon exchanged. Second, salmon is given by study communities to close family and extended family much more frequently and in greater amounts than it is received from close and extended family. Looking only at ties between relationships, there are nearly five times more ties going to close family than coming from, and approximately eight times more ties going to extended family than coming from. The picture is similar in terms of pounds of salmon exchanged: approximately 4 and 10 times the amount of salmon goes to close family and extended family, respectively, than comes from these groups. Third, the difference in frequency and amounts of salmon given and received is much smaller for friends than close and extended family.

Two drivers likely shape non-local sharing relationships: a familial driver and a cash/subsistence driver. Relationships between local residents and non-local residents documented in this study may not have existed a generation ago but have developed due to outmigration. As family and friends leave communities, they still seek connections to home and family that come through sharing food. Through sharing, family members remaining in the study communities can provide those connections. This pattern was documented in both the quantitative and qualitative data regarding sharing locations, where Anchorage emerged as the most frequent sharing location. Along with this familial driver, an influencing factor of local and non-local sharing ties has to do with the facilitating role cash resources play in subsistence activities. The availability of monetary resources to purchase and maintain equipment and procure hunting and fishing supplies supports successful subsistence harvests. Commercial fishing provides those cash resources to participating community residents and to the non-local participants who return to these communities every fishing season. Salmon in the form of home pack gets distributed throughout communities. Before, after, or in between commercial fishing periods, commercial equipment is used for subsistence harvests, which then get distributed through town and beyond. The interactions of cash resources in the subsistence economy with regard to sharing was illustrated in the key respondent interview data but not in the quantitative social network data.

Comparing Quantitative and Qualitative Data Gathering and Results

Following are a few additional observations comparing the study findings regarding networks from the key respondent interviews and the social network data. As already noted, the quantitative data corroborate the importance of both the local and non-local networks described in the key respondent interviews, but the interviews were more detailed in respect to the dynamics of the local networks over time, particularly in relation to socioeconomic and sociocultural changes to the communities themselves. Nevertheless, the network data lent support to much of the key respondents' observations. For example, key respondents discussed the connection between Perryville and Chignik Bay and Chignik Lake residents, which was corroborated in the quantitative results.

The key respondent data are largely general and not community-specific enough for reliably distinguishing separate patterns between the study communities, or to capture unique social features distinct to the individual communities. For example, the non-local Alaska network represented in the quantitative results is much larger than the non-local network described in the qualitative results. The quantitative results identified more than 29 Alaska communities in the non-local network, whereas key respondents mentioned 11 Alaska communities (other than the 6 study communities).

Qualitative information, either through key respondent interviews or less formal conversations with community residents, can capture more information about specific sharing events during a study year, especially those for which there are unknown or undocumented recipients, such as community-wide events. As an example, in the study year, specific seine fishing efforts were expended in connection to preparations for the funeral of a community matriarch in Chignik Lake that garnered attendance by people from around the state. The survey form was not designed to collect social network data that segregated salmon harvesting, processing, and sharing for events and ceremonies, though some participants may have included these activities in their responses.

In the "given to relations" segment of the quantitative results, "grandparents" are identified as a relation but there was no general category for "elders" in the survey. Compared with the high prioritization for sharing with elders expressed by key respondents, the quantitative results may have underestimated the importance of sharing with elders. This project applied the standard ADF&G coding scheme for relationships, which lacks a code for "elder," meaning that sharing ties with elders are likely distributed across varied relationship codes, including grandparents and other relationships (including both close friends and acquaintances).

As mentioned previously, the key respondent interviews also explored how sharing patterns for salmon are linked to sharing other subsistence resources, providing additional context for the results of the quantitative survey. Expanding data collection to include social networks associated with the production and distribution of other subsistence resources would likely result in changes to the structure of both local and non-local networks. For local networks, ties associated with harvesting and processing salmon were found primarily in relatively small, isolated clusters of households. Including ties associated with harvesting and processing other resources might expand the size of these clusters and establish connections between them. Similarly, ties associated with sharing salmon established connections among clusters of households that worked together to process and harvest salmon. Including data on sharing other subsistence resources would likely enhance the integrative role of sharing networks further. For non-local networks, including sharing ties associated with other subsistence resources might alter the balance between resources flowing into and out of the study communities. Focusing only on salmon, the analysis suggests much greater amounts of salmon flowing out of study communities and into urban locations like Anchorage and other parts of the United States. It is possible these different types of subsistence resources flow into the study communities in greater amounts to balance the outflows of salmon. The balance between in-flows and out-flows might be altered further if the study had included physical materials necessary for harvesting, which are also a key part of sharing networks according to the key respondent interviews summarized in Chapter 5. The analysis of social networks associated with subsistence salmon harvests provided by this study should be interpreted with these caveats in mind, perhaps providing a foundation for future research that focuses directly on multiple networks associated with a wider variety of subsistence resources.

Threats and Challenges

Change is a constant in Alaska communities. Subsistence users are always adapting to changing resource availability throughout the year and over time. As hunting and fishing regulations have been introduced, people have had to adapt to them as well. For hundreds of years, however, sharing has persisted as a common practice with great cultural value in the study communities. During household surveys and in the in-depth interviews conducted for this project, several themes emerged as potential challenges to the continued patterns of sharing documented here. These challenges have not transformed the patterns and values of sharing yet, but key respondents expressed deep concern about their potential effects in the future. These challenges include: increasing focus of youth on modern information technology to the detriment of involvement in subsistence activities; increasing participation in the market economy; regulatory changes generally connected to declining resource abundance; environmental change; demographic change, outmigration and seasonal residency; and increasing transportation costs.

Respondents voiced concern that the focus on modern communication technology, especially among youth, is a threat to traditional values because the technology vies for residents' attention and involvement in subsistence activities. However, adoption of communication technologies alone does not necessarily lead to disruption of traditional social ties. For example, one respondent from Port Heiden did highlight how cellphone and social media use have generated an improved capacity for community members to communicate with each other about salmon fishing and sharing. The challenge is thus to foster responsible daily use of communication technology in support of maintaining traditional subsistence activities.

Key respondents were also concerned that increasing involvement in the cash economy is transforming values related to sharing. Increased participation in the market economy may initially increase harvest and sharing because of the purchase of more efficient transportation and harvesting and processing equipment. Eventually, however, there may be less reliance on other households to acquire foods and go about day-to-day life. An example is decreased ride-sharing because more households own their own vehicles, such as trucks in Port Heiden, skiffs in Chignik Lake, and ATVs in Egegik. A general decrease in reliance on others decreases the number of activities spent together to form relationships and memories that bring communities closer in general. Information about household needs for particular resources, including salmon, is conveyed through these local social interactions; households within each community make needs assessments throughout the year to form a collective knowledge of households' well-being in the community as a whole. When social interactions diminish, this collection of knowledge of needs is threatened.

Additionally, outmigration of community residents leads to the loss of commercial limited entry permits and perhaps shifting values and goals related to commercial harvesting and cash. Instead of commercial fishing to earn cash to support subsistence activities and living in local communities, seasonal residents may seek to maximize harvests in support of an urban lifestyle. Such a change in values around commercial harvesting may further contribute to a decline in social relationships among current and former community members and a change in sharing patterns. Additionally, losing local commercial permits and community participation leads to a necessary shift in subsistence harvesting methods for residents that may be less efficient or economical. As young people leave communities for wage opportunities, subsistence harvesting skills and values may not be passed along and labor available for subsistence activities decreased.

Restrictive regulations and environmental change may also affect sharing patterns. For example, when regulatory and abundance factors restrict caribou harvests, households that normally hunt together may not interact in other ways during the year and may not have the same social consciousness as before. Also, with the overall decline in the size of the caribou harvest, sharing networks for this resource may not be as extensive as before (although sharing of caribou is still widespread in the study communities). The same concerns apply if ice conditions limit participation in smelting that could lead to the social tie between individual community members being severed, leading to less understanding of families' hardships and needs. This may not be noticed if the erosion of activities happens over a long period of time, but key respondents described the cumulative effects as perceived threats to subsistence activities.

Respondents linked other perceived threats to sharing and changing values with the seasonal influx of people from urban areas to their communities during the commercial salmon fishing. There is a distinct seasonal population that resides outside of the region for most of the year that has seasonal homes in the region. According to key respondents, some seasonal residents have customary trade practices (that is, may be open to exchange of subsistence products for cash or barter) that differ from the values voiced by the respondents in the surveys and interviews.

The increasing costs of transporting subsistence foods has the potential to become a significant barrier to the long-range temporal robusticity of the regional sharing network. Local residents must spend more money to transport resources to friends and relatives in other communities in Bristol Bay, Alaska, or the rest of the United States.

Concluding Observations

In conclusion, the research found that social networks in the study communities operate at three levels: within the community, between communities within the region, and between local communities and more distant communities. Within communities, subsistence production and sharing networks work to balance risk. Generalized reciprocity is the norm, rather than barter or trade. People are aware of the needs of others and the sharing of subsistence products such as salmon links most households over time. The development of a cash component to local economies has not replaced the key role of the production and distribution of subsistence foods. Key values have persisted, including the sharing of labor and contributing to the community. If a community resident is not pulling his or her weight in the community, this will be noticed and judged by other residents, but not so harshly that the person is excluded from communal care. The ideal measure of "wealth" is how much a person or family shares, and not how much is accumulated. As noted by a key respondent, these traditions are key to community survival in the face of socioeconomic and environmental change: "The connection between subsistence food resources and ecological relationships is also important … [and sharing] … is an important part of our food security simply because of environmental changes." However, these relationships may be threatened if fewer people are engaged in subsistence harvests, or if individual values and goals replace communal ones.

Generally, for both local and non-local sharing networks, social ties are important to resource distribution. Receiving gifts of salmon from "home" helped relatives who have moved from local communities keep connected to family and to cultural traditions. Within a community, these social ties may become more important to community well-being as a developing cash economy reduces the necessity to work with others. It is also important to note, as did some key respondents, that because of the costs of importing food, subsistence harvests and sharing are necessary for community survival.

Established sharing networks contribute to the resiliency of the community. Sharing networks maintain social ties that strengthen community values and provide alternative access to resources in the event of unanticipated events. How traditional activities look may change over time in response to changing sociocultural and economic traditions, but persist in some form. For example, fishing for smelt has become a good way to unwind after a long day in the office. More regular subsistence harvest and use and social network data collection should take place to track changes in the future. One year's data provide a brief snapshot in time, but without a time series, it is difficult to identify, and respond to, longer trends.

In sum, study respondents described a sociocultural strategy that adaptively navigates the future in a manner that will anchor an ongoing importance of subsistence hunting, fishing, gathering, and sharing for personal and communal well-being. Community members acknowledge that today they find themselves in a difficult double-bind where 21st century socioeconomic, technological, and ecological conditions will continue to present immense challenges for maintaining these traditions.

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APPENDIX A–PROJECT SUPPORT LETTERS FROM COMMUNITY ORGANIZATIONS

Chignik Lake Traditional Council
P.O. Box 33
Chignik Lake, Alaska 99548

March 25, 2015

Fisheries Resource Monitoring Program
Office of Subsistence Management
US Fish & Wildlife Service
1011 East Tudor Road MS 121
Anchorage, AK 99503

Dear Office of Subsistence Management:

The Chignik Lake Traditional Council is the federally recognized tribal entity representing the Native village of Chignik Lake and a member tribe of the Bristol Bay Native Association (BBNA). As President of our tribal council, I would like to take this opportunity to express our support for the cooperative research proposal submitted by BBNA and ADF&G to the USFWS Fisheries Resource Monitoring Program.

Courtenay Carty, BBNA's Director of Natural Resources attended our regularly scheduled tribal council meeting today and provided an overview presentation on their project that was submitted to you a couple weeks ago. Our council reviewed the Executive Summary that Ms. Carty provided us with and she was able to answer our questions about the project and funding process.

We've been working with BBNA for a long time now and feel that their partnership with ADF&G is essential to getting this research completed in our communities. Please accept this extension of our support for their project titled, "Description and analysis of the subsistence salmon network in Bristol Bay."

We are looking forward to working with the research team to help understand how our resources are being harvested and shared throughout our communities here on the Alaska Peninsula. This is valuable information that the Federal Subsistence Board needs to have in order to provide for the subsistence priority of us out here in rural Alaska. Thank you for the opportunity to express our support for their funding proposal.

Sincerely,

Johnny Lind
President

c/o ADFG Board Support
PO Box 1030
Dillingham, AK 99576

March 13, 2015

Fisheries Resource Monitoring Program
Office of Subsistence Management
US Fish & Wildlife Service
1011 East Tudor Road MS 121
Anchorage, AK 99503

Dear Office of Subsistence Management:

The Chignik Fish & Game Advisory Council (Chignik AC) would like to express our support for the proposal submitted to the USFWS Fisheries Resource Monitoring Program by ADF&G's Division of Subsistence and the Bristol Bay Native Association.

BBNA staff regularly participate in the Chignik AC meetings by providing information updates regarding opportunities and activities that affect subsistence resources in our area. They work with us to help guide research opportunities and to help our tribes and harvesters navigate the dual management system. Through their regular attendance of meetings such as the local advisory committees throughout Bristol Bay and the Bristol Bay Subsistence Regional Advisory Council, they are in a unique position to hear the concerns communities are having and work with resource managers to respond to these concerns through research and regulation.

As part of that process they have worked with ADF&G and Oregon State University to respond to the 2016 Priority Information Need for a "description and analysis of social networks underlying the allocation and management of subsistence salmon fisheries in the Bristol Bay – Chignik Area." Today BBNA staff attended our AC meeting and provided us with an overview of the project, "*Description and analysis of the subsistence salmon network in Bristol Bay*", the project objectives and helped us to understand how the research proposed will benefit our communities through the data they collect.

Please accept our support of this proposed research project which we feel will provide important information to resource managers, ensuring that the subsistence fisheries priority of Alaska Peninsula communities is met.

Sincerely,

Jacob Shangin
Chairman

BRISTOL BAY NATIVE ASSOCIATION
P.O. BOX 310
DILLINGHAM, ALASKA 99576
PHONE (907) 842-5257

January 11, 2016

Tribal Councils Served by BBNA:

Aleknagik
Chignik Bay
Chignik Lagoon
Chignik Lake
Clarks Point
Curyung
Egegik
Ekuk
Ekwok
Igiugig
Iliamna
Ivanof Bay
Kanatak
King Salmon
Kokhanok
Koliganek
Levelock
Manokotak
Naknek
New Stuyahok
Newhalen
Nondalton
Pedro Bay
Perryville
Pilot Point
Port Heiden
Portage Creek
South Naknek
Togiak
Twin Hills
Ugashik

Dear Federal Subsistence Board and Staff:

The Bristol Bay Native Association (BBNA) has partnered with the Alaska Department of Fish & Game, Division of Subsistence (ADF&G) in submitting to two (2) proposals to the USFWS Federal Subsistence Management Program: *"16-451: Description and Analysis of the Subsistence Salmon Network in Bristol Bay Salmon"*, and *"16-453: Subsistence Harvest Assessment and Biological Sampling of Chinook Salmon in the Togiak River Drainage."* The information gathered during these collaborative research projects will assist managers in making decisions that include a more full consideration of management's effects on subsistence resources and the communities that depend on them.

In both proposals, Courtenay Carty is listed as Co-Principal Investigator. Ms. Carty is no longer BBNA's Natural Resources Director. The recruitment for a new Director has resulted in a pool of very well-qualified candidates, and I will make an appointment in the very near future. I am reconfirming that BBNA is still committed to these projects, and the new NRD Director will assume the Co-Principal Investigator responsibilities outlined in the proposals. We are also now recruiting for a Fisheries Scientist, under the Partners for Fisheries Monitoring Program, which we hope to fill in January 2016 as well. The Fisheries Scientist may lend their knowledge and experience to both projects as well.

Since 2001, BBNA has partnered with the ADF&G and others to successfully carry out several research projects funded by the USFWS Fisheries Research Monitoring Program. We continue to endorse the community-based research approach used, and commit our staff to participating as full partners in efforts to document and manage our subsistence resources.

Thank you for considering these two proposals for funding in 2016.

Sincerely,

Ralph Andersen
President & CEO

Chignik Bay Tribal Council
P.O. Box 50
Chignik, Alaska 99564

RESOLUTION 01-17

A RESOLUTION IN SUPPORT OF BBNA AND ADF&G TO ENGAGE IN EFFORTS TO BETTER UNDERSTAND THE HARVEST, USE AND DISTRIBUTION NETWORK OF SALMON FOR SUBSISTENCE USES ON THE ALASKA PENINSULA

WHEREAS: The Chignik Bay Tribal Council is the federally recognized tribal entity representing the Native Village of Chignik Bay and a member tribe of the Bristol Bay Native Association; and

WHEREAS: The Chignik Bay Tribal Council recognizes the value in understanding how our resources are being harvested, used, and shared within the following 6 communities, Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, Egegik, and Port Heiden, as well as shared with other Alaska and outside of Alaska communities; and

WHEREAS: The Bristol Bay Regional Advisory Council recognizes the prioritization of information needed for a description and analysis of the social network underlying the distribution of fish harvested for subsistence by residents of the Bristol Bay area and Chignik area; and

WHEREAS: The Bristol Bay Sharing Network Project fundamentally aims to assist our community to ensure our subsistence needs are being met, and direct access to those resources is maintained.

NOW THEREFORE BE IT RESOLVED by the Chignik Bay Tribal Council that it authorizes and supports the Bristol Bay Native Association and the Alaska Department of Fish and Game's Division of Subsistence in their research to better understand the harvest and sharing of wild resources in our community.

CERTIFICATION:
The foregoing resolution was passed by the Chignik Bay Tribal Council on the January 3, 2017

and that a quorum was present.

Signed: Roderick E Carlson President
Roderick Carlson

RESOLUTION

A RESOLUTION IN SUPPORT OF BBNA AND ADF&G TO ENGAGE IN EFFORTS TO BETTER UNDERSTAND THE HARVEST, USE AND DISTRIBUTION NETWORK OF SALMON FOR SUBSISTENCE USES ON THE ALASKA PENINSULA

WHEREAS: The Chignik Lagoon Village Council is the federally recognized tribal entity representing the Native Village of Chignik Lagoon and a member tribe of the Bristol Bay Native Association; and

WHEREAS: The Chignik Lagoon Traditional Council recognizes the value in understanding how our resources are being harvested, used, and shared within the following 6 communities, Chignik Lagoon, Chignik Lake, Chignik Bay, Perryville, Egegik, and Port Heiden, as well as shared with other Alaska and outside of Alaska; and

WHEREAS: The Bristol Bay Regional Advisory Council recognizes the prioritization of information needed for a description and analysis of the social network underlying the distribution of fish harvested for subsistence by residents of the Bristol Bay area and Chignik area; and

WHEREAS: The Bristol Bay Sharing Network Project fundamentally aims to assist our community to ensure our subsistence needs are being met, and direct access to those resources is maintained.

NOW THEREFORE BE IT RESOLVED by the Chignik Lagoon Traditional Council that it authorizes and supports the Bristol Bay Native Association and the Alaska Department of Fish and Game's Division of Subsistence in their research to better understand the harvest and sharing of wild resources in our community.

CERTIFICATION:
The foregoing resolution was passed by the Native Village Chignik Lagoon on the 11 day of NOV 2016 (year) and that a quorum was present.

Signed: [signature]

Title: PRESIDENT CLVC

Chignik Lake
Village Council

RESOLUTION

A RESOLUTION IN SUPPORT OF BBNA AND ADF&G TO ENGAGE IN EFFORTS TO BETTER UNDERSTAND THE HARVEST, USE AND DISTRIBUTION NETWORK OF SALMON FOR SUBSISTENCE USES ON THE ALASKA PENINSULA

WHEREAS: The Chignik Lake Traditional Council is the federally recognized tribal entity representing the Native Village of Chignik Lake and a member tribe of the Bristol Bay Native Association; and

WHEREAS: The Chignik Lake Traditional Council recognizes the value in understanding how our resources are being harvested, used, and shared within the following 6 communities, Chignik Lake, Chignik Lagoon, Chignik Bay, Perryville, Egegik, and Port Heiden, as well as shared with other Alaska and outside of Alaska communities; and

WHEREAS: The Bristol Bay Regional Advisory Council recognizes the prioritization of information needed for a description and analysis of the social network underlying the distribution of fish harvested for subsistence by residents of the Bristol Bay area and Chignik area; and

WHEREAS: The Bristol Bay Sharing Network Project fundamentally aims to assist our community to ensure our subsistence needs are being met, and direct access to those resources is maintained.

NOW THEREFORE BE IT RESOLVED by the Chignik Lake Traditional Council that it authorizes and supports the Bristol Bay Native Association and the Alaska Department of Fish and Game's Division of Subsistence in their research to better understand the harvest and sharing of wild resources in our community.

CERTIFICATION:
The foregoing resolution was passed by the Chignik Lake Traditional Council on the 8th day of 2017 (year) and that a quorum was present.

Signed: ____________________

Title: Council President

Native Village of Perryville
101 1st Avenue
P.O. Box 89
Perryville, AK 99648

Phone 907-853-2203
Fax 907-853-2230
nvproads@hotmail.com
perryvilleadmin@bbna.com

RESOLUTION
2016-04

A RESOLUTION IN SUPPORT OF BBNA AND ADF&G TO ENGAGE IN EFFORTS TO BETTER UNDERSTAND THE HARVEST, USE AND DISTRIBUTION NETWORK OF SALMON FOR SUBSISTENCE USES ON THE ALASKA PENINSULA

WHEREAS: The Native Village of Perryville is the federally recognized tribal entity representing the Native Village of Perryville and a member tribe of the Bristol Bay Native Association; and

WHEREAS: The Native Village of Perryville recognizes the value in understanding how our resources are being harvested, used, and shared within the following 6 communities, Perryville, Chignik Lake, Chignik Lagoon, Chignik Bay, Egegik, and Port Heiden, as well as shared with other Alaska and outside of Alaska communities; and

WHEREAS: The Bristol Bay Regional Advisory Council recognizes the prioritization of information needed for a description and analysis of the social network underlying the distribution of fish harvested for subsistence by residents of the Bristol Bay area and Chignik area; and

WHEREAS: The Bristol Bay Sharing Network Project fundamentally aims to assist our community to ensure our subsistence needs are being met, and direct access to those resources is maintained.

NOW THEREFORE BE IT RESOLVED by the Native Village of Perryville that it authorizes and supports the Bristol Bay Native Association and the Alaska Department of Fish and Game's Division of Subsistence in their research to better understand the harvest and sharing of wild resources in our community.

CERTIFICATION:
The foregoing resolution was passed by the Native Village of Perryville/Perryville Council on the 14th day of November, 2016 and that a quorum was present.

Signed: ______________________

Title: Village Council President

Native Council of Port Heiden
PO Box 49007
Port Heiden, Alaska 99549
907-837-2296 907-837-2297 (fax)

RESOLUTION 17-80

A RESOLUTION IN SUPPORT OF BBNA AND ADF&G TO ENGAGE IN EFFORTS TO BETTER UNDERSTAND THE HARVEST, USE AND DISTRIBUTION NETWORK OF SALMON FOR SUBSISTENCE USES ON THE ALASKA PENINSULA

WHEREAS: The Port Heiden Village Council is the federally recognized tribal entity representing the Native Village of Port Heiden and a member tribe of the Bristol Bay Native Association; and

WHEREAS: The Port Heiden Village Council recognizes the value in understanding how our resources are being harvested, used, and shared within the following 6 communities, Port Heiden, Chignik Lagoon, Chignik Lake, Chignik Bay, Perryville, and, Egegik, as well as shared with other Alaska and outside of Alaska communities; and

WHEREAS: The Bristol Bay Regional Advisory Council recognizes the prioritization of information needed for a description and analysis of the social network underlying the distribution of fish harvested for subsistence by residents of the Bristol Bay area and Chignik area; and

WHEREAS: The Bristol Bay Sharing Network Project fundamentally aims to assist our community to ensure our subsistence needs are being met, and direct access to those resources is maintained.

NOW THEREFORE BE IT RESOLVED by the Port Heiden Village Council that it authorizes and supports the Bristol Bay Native Association and the Alaska Department of Fish and Game's Division of Subsistence in their research to better understand the harvest and sharing of wild resources in our community.

CERTIFICATION:
The foregoing resolution was passed by the Native Council of Port Heiden on the 6th day of February 2017 (year) and that a quorum was present.

Signed: [signature]

Title: President

Egegik Village Tribal Council

P.O. Box 29
Egegik, AK 99579
Phone: 907-233-2211 Fax: 907-233-2312
Email: egegikvillage2013@yahoo.com

RESOLUTION 14-16

A RESOLUTION IN SUPPORT OF BBNA AND ADF&G TO ENGAGE IN EFFORTS TO BETTER UNDERSTAND THE HARVEST, USE AND DISTRIBUTION NETWORK OF SALMON FOR SUBSISTENCE USES ON THE ALASKA PENINSULA

WHEREAS: The Egegik Village Council is the federally recognized tribal entity representing the Native Village of Egegik and a member tribe of the Bristol Bay Native Association; and

WHEREAS: The Egegik Village Council recognizes the value in understanding how our resources are being harvested, used, and shared within the following 6 communities, Egegik, Port Heiden, Chignik Lake, Chignik Lagoon, Chignik Bay, and Perryville, as well as shared with other Alaska and outside of Alaska communities; and

WHEREAS: The Bristol Bay Regional Advisory Council recognizes the prioritization of information needed for a description and analysis of the social network underlying the distribution of fish harvested for subsistence by residents of the Bristol Bay area and Chignik area; and

WHEREAS: The Bristol Bay Sharing Network Project fundamentally aims to assist our community to ensure our subsistence needs are being met, and direct access to those resources is maintained.

NOW THEREFORE BE IT RESOLVED by the Egegik Village Council that it authorizes and supports the Bristol Bay Native Association and the Alaska Department of Fish and Game's Division of Subsistence in their research to better understand the harvest and sharing of wild resources in our community.

CERTIFICATION:
The foregoing resolution was passed by the Egegik Village Tribal Council on the 16 day of December (year) and that a quorum was present.

Signed: Ben Chernikoff
Title: 2nd. Chief

APPENDIX B–PROJECT PARTNER COOPERATIVE AGREEMENTS

Alaska Department of Fish and Game
Division of Administrative Services
P.O. Box 115526
Juneau, AK 99811-5526

Cooperative Agreement Number CT 170007717
Title: Subsistence Salmon in Bristol Bay

Between:
Alaska Department of Fish and Game
Division of Subsistence

and
Bristol Bay Native Association

I. AUTHORITY:

This agreement is entered into by and between the Alaska Department of Fish and Game, Division of Subsistence (hereinafter referred to as the "ADF&G" or the "Department") and the Bristol Bay Native Association (hereinafter referred to as "BBNA").

ADF&G enters into this agreement under authority AS16.05.050 (12), and AS 36.30.850 (d).

II. PURPOSE OF THE AGREEMENT:

This project will document harvest and use of salmon in six communities on the Alaska Peninsula. The study communities of Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, Egegik, and Port Heiden each has a unique regional sharing pattern as identified during previous ADF&G Division of Subsistence research. The project will also attempt to document and analyze the local social networks based on the exchange of salmon and salmon-related activities.

Salmon are harvested under different state and federal regulations, some of which address the exchange of subsistence resources. Customary trade is recognized as a subsistence activity by ANILCA and by state law. Interpretations of ANILCA have refined the definition of customary trade to include the exchange of fish and wildlife resources for other non-edible items including small amount of cash. ANILCA defines barter is an exchange of fish or wildlife for other food items or non-food items other than money. The goal of this project is to provide information on how these kinds of exchanges—customary trade, barter and sharing—operate within specific social networks. A description of the way salmon move throughout these networks will prove useful in the allocation and management of subsistence resources.

III. PROJECT OBJECTIVES:

Project objectives include:

1. Estimate the harvest and use of salmon by residents of Chignik Bay (pop. 70), Chignik Lake (pop. 70), Chignik Lagoon (pop. 72), Egegik (pop. 106), Perryville (pop. 101), and Port Heiden (pop. 114) during the study year 2016.

2. Describe the harvest of salmon in terms of species, gear, location, timing of harvests, and distribution patterns.

3. Through harvest surveys and key respondent interviews, illustrate the sharing networks both within each community, across the broader region, and throughout Alaska.

Data collection will involve the administration of systematic household surveys and key respondent interviews. The subsistence household harvest survey, which will include questions related to social exchanges, and sharing related to salmon, will provide data necessary to meet Objectives 1, 2 and 3. Survey questions will also capture data related to the harvest of different salmon species, gear, location, and timing of harvests. Household surveys are expected to be administered in the six study communities from February - May of 2017.

Key respondent interviews will provide information on sharing networks within each of the study communities, the broader Bristol Bay – Chignik area, and the entirety of Alaska. Key respondent interviews will be open-ended and semi-structured and their foci will build on previous interviews conducted in these communities by Division of Subsistence researchers. Key respondent interviews will follow an interview protocol developed to understand sharing networks and distribution of salmon to meet Objective 3. Key respondent interviews will be administered in all six study communities during the summer and fall of 2017.

The project will be carried out by Subsistence Resource Specialists at the ADF&G Division of Subsistence, Natural Resources employees at BBNA, and staff from Oregon State University (OSU). Primary responsibilities shared between partners will include administering the surveys, interviewing key respondents, and writing the draft final report. ADF&G and BBNA will work to get community approval, arrange for local research assistants, and conduct community review meeting at the end of the project. ADF&G and OSU will work to analyze the household survey and key respondent interview data.

IV. TERM OF THE AGREEMENT:

The term of this Agreement shall begin July 1, 2016, and shall remain in effect through December 31, 2018.

V. PROJECT CONTACTS:

BBNA (DUNS 067639807)
Cody Larson
PO Box 310
Dillingham, AK 99576
Ph: (907) 842-5257
Fax: (907) 842-5932
Email: clarson@bbna.com

ADF&G (DUNS 809387475)
Dr. Amy Wiita, Subsistence Resource Specialist
333 Raspberry Road
Anchorage, AK 99518
Ph: (907) 267-2360
amy.wiita@alaska.gov

VI. FINANCIAL CONSIDERATIONS:

ADF&G will distribute to BBNA a total amount not to exceed $67,400 during the lifetime of this contract. BBNA agrees to provide $30,633 in match funds for this Agreement in accordance with USFWS OSM Project Numer 16-451, and the following budget.

BBNA Budget Detail:

Year	Subsistence Fisheries Scientist	Intern	Travel	Indirect (15.16%)	Match	Total
2017	$ 10,211	$ 20,475	$ 6,950	$ 5,706	($10,211)	$33,131
2018	$ 10,211	$20,475	$ 5,250	$ 5,448	($10,211)	$31,173
2019	$ 10,211	$ 0	$ 0	$ 3,096	($10,211)	$ 3,096
Total	**$ 30,633**	**$ 40,950**	**$12,200**	**$14,250**	**($30,633)**	**$67,400**

BBNA will submit an invoice upon completion of deliverable(s) to ADF&G, who will remit payment within 30 days of receipt of invoice. Payment made upon acceptance of deliverables, as follows:

1. BBNA will help ADF&G introduce the project to study communities of Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, Egegik and Port Heiden.

2. BBNA will help administer household surveys in all study communities.

3. BBNA will assist ADF&G with Key Respondent Interviews in all study communities.

4. BBNA will assist ADF&G with writing draft final report.

BBNA will be reimbursed only for the cost of work it has actually completed and which ADF&G has approved. Submitted invoices will detail financial information for the completed portion of the project and adequately document the expenses incurred for direct and indirect costs. Documentation may include copies of materials invoices, payroll ledgers, equipment logs, contract payments, etc. Reimbursement will be made within 30 days of receipt and approval, by ADF&G, of a request for reimbursement.

VII. FEDERAL COMPLIANCE REQUIREMENTS:

1. Political Activity – Federal funds cannot be used for partisan political purposes of any kind by any person or organization involved in the administration of federally assisted programs.

2. Civil Rights – No person shall, on the grounds of race, color, national origin, age, or handicap, be excluded from participation in or be subjected to discrimination in any program or activity funded in whole or in part by federal funds.

3. Allowable Costs/Cost Principles – 2 CFR Part 225, "Cost Principles for State, Local, and Indian Tribal Governments" (OMB Circular No. A-87) establishes principles and standards for determining costs for Federal awardees carried out through grants, cost reimbursement contracts, and other agreements with State and local governments and federally-recognized Indian tribal governments (governmental units). A cost is allowable for federal reimbursement only to the extent of benefits received by federal programs, and costs must meet the basic guidelines for allowability, reasonableness, and allocability.

4. Drug-Free Workplace Act – BBNA, by signing this agreement, certifies that they will provide a drug-free workplace.

5. Debarment/Suspension – BBNA, by signing this agreement, certifies that neither it, nor its principals or subcontractors is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from federal financial assistance programs or activities.

6. Audits – BBNA acknowledges that 100% of the funding for this agreement is from the Federal Fish and Wildlife Services, OSM Project 16-151, CFDA 15.636. BBNA acknowledges that receipt of federal funds may create audit requirements under OMB 2 CFR 200.

7. 41 United States Code (U.S.C.) 4712, Pilot Program for Enhancement of Recipient and Subrecipient Employee Whistleblower Protection: This requirement applies to all awards issued after July 1, 2013 and shall be in effect until January 1, 2017.

   a. This award and related subawards and contracts over the simplified acquisition threshold and all employees working on this award and related subawards and contracts over the simplified acquisition threshold are subject to the whistleblower rights and remedies in the pilot program on award recipient employee whistleblower protections established at 41 U.S.C. 4712 by section 828 ofthe National Defense Authorization Act for Fiscal Year 2013 (P.L. 112-239).

b. Recipients, and their subrecipients and contractors awarded contracts over the simplified acquisition threshold related to this award, shall inform their employees in writing, in the predominant language of the workforce, of the employee whistleblower rights and protections under 41 U.S.C. 4712.

c. The recipient shall insert this clause, including this paragraph (c), in all subawards and contracts over the simplified acquisition threshold related to this award.

VIII. GENERAL PROVISIONS

1. Nothing in this agreement shall obligate any party in the expenditure of funds, or for future payments of money, in excess of appropriations authorized by law.

2. Each party agrees that it will be responsible for its own acts and omissions including those of its officers, agents, and employees for damages to property or injury to persons occasioned by each party's own acts or omissions in connection with the terms of this agreement.

3. Both parties agree to comply with all applicable federal or State laws regulating ethical conduct of public officers and employees.

4. Each party will comply with all applicable laws, regulations, and executive orders relative to Equal Employment Opportunity.

5. Nothing herein is intended to conflict with federal, state, or local laws or regulations. If there are conflicts, this agreement will be amended at the first opportunity to bring it into conformance with conflicting laws or regulations.

6. Policy and position announcements relating specifically to this cooperative program may be made only by mutual consent of the agencies.

7. The effective date of this agreement shall be July 1, 2016.

8. The termination date of this agreement shall be December 31, 2018. However, either party may terminate its participation in this agreement by providing to the other party notice in writing 30 days in advance of the date on which its termination becomes effective.

9. A free exchange of research and assessment data among agencies is encouraged and is necessary to insure the success of these cooperative studies.

10. BBNA and any agents or employees act in an independent capacity and not as officers, employees, or agents of the State in performance under this agreement.

11. This agreement may be amended by mutual written consent of the parties.

IX. APPROVING SIGNATURES

IN WITNESS WHEREOF, the parties hereto have caused this Cooperative Agreement to be executed as of the date of last signature below.

BRISTOL BAY NATIVE ASSOCIATION

Ralph Andersen
Signature

RALPH ANDERSEN, PRESIDENT & CEO
Printed Name and Title

3·20·17
Date

ALASKA DEPARTMENT OF FISH AND GAME

Hazel Nelson
Hazel Nelson, Director
Division of Subsistence

5/23/17
Date

Carol Petraborg
Carol Petraborg, Director
Division of Administrative Services

6/9/2017
Date

Alaska Department of Fish and Game
Division of Administrative Services
P.O. Box 115526
Juneau, AK 99811-5526

Cooperative Agreement Number CT 170007716
Title: Subsistence Salmon Network in Bristol Bay

Between:
Alaska Department of Fish and Game
Division of Subsistence

and
Oregon State University

I. AUTHORITY:

This agreement is entered into by and between the Alaska Department of Fish and Game, Division of Subsistence (hereinafter referred to as the "ADF&G" or the "Department") and Oregon State University (hereinafter referred to as "OSU").

ADF&G enters into this agreement under authority AS16.05.050 (12), and AS 36.30.850 (d).

II. PURPOSE OF THE AGREEMENT:

This project will document harvest and use of salmon in six communities on the Alaska Peninsula. The study communities of Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, Egegik, and Port Heiden each has a unique regional sharing pattern as identified during previous ADF&G research. This project will also attempt to document and analyze the local social networks based on the exchange of salmon and salmon-related activities.

Salmon are harvested under different state and federal regulations, some of which address the exchange of subsistence resources. Customary trade is recognized as a subsistence activity by the Alaska National Interest Lands Conservation Act (ANILCA) and by state law. Interpretations of ANILCA have refined the definition of customary trade to include the exchange of fish and wildlife resources for other non-edible items including small amount of cash. ANILCA defines barter is an exchange of fish or wildlife for other food items or non-food items other than money. The goal of this project is to provide information on how these kinds of exchanges—customary trade, barter and sharing—operate within specific social networks. A description of the way salmon move throughout these networks will prove useful in the allocation and management of subsistence resources.

III. PROJECT OBJECTIVES:

Project objectives include:

1. Estimate the harvest and use of salmon by residents of Chignik Bay (pop. 70), Chignik Lake (pop. 70), Chignik Lagoon (pop. 72), Egegik (pop. 106), Perryville (pop. 101), and Port Heiden (pop. 114) during the study year 2016.

2. Describe the harvest of salmon in terms of species, gear, location, timing of harvests, and distribution patterns.

3. Through harvest surveys and key respondent interviews illustrate the sharing networks both within each community, across the broader region, and throughout Alaska.

Data collection will involve the administration of systematic household surveys and key respondent interviews. The subsistence household harvest survey, which will include questions related to social exchanges, and sharing related to salmon, will provide data necessary to meet Objectives 1, 2 and 3. Survey questions will also capture data related to the harvest of different salmon species, gear, location, and timing of harvests. Household surveys are expected to be administered in all six study communities from February to March of 2017.

Key respondent interviews will provide information on sharing networks within each of the study communities, the broader Bristol Bay – Chignik area, and the entirety of Alaska. Key respondent interviews will be open-ended and semi-structured and their foci will build on previous interviews conducted in these communities by Division of Subsistence researchers. Key respondent interviews will follow an interview protocol developed to understand sharing networks and distribution of salmon to meet Objective 3. Key respondent interviews will be administered in all six study communities during the summer and fall of 2017.

The project will be carried out by Subsistence Resource Specialists at the ADF&G Division of Subsistence, Natural Resources employees at Bristol Bay Native Association (BBNA), and staff from OSU. Primary responsibilities shared between partners will include administering the surveys, interviewing key respondents, and writing the draft final report. ADF&G and BBNA will work to get community approval, arrange for local research assistants, and conduct community review meeting at the end of the project. ADF&G and OSU will work to analyze the household survey and key respondent interview data.

IV. TERM OF THE AGREEMENT:

This Agreement will begin September 1, 2016, and shall remain in effect through December 31, 2018.

V. PROJECT CONTACTS:

OSU (DUNS 053599908)
Dr. Drew Gerkey, Assistant Professor
Department of Anthropology
238 Waldo Hall
Corvallis, OR 97331
Ph: (541) 737-3793
Email: drew.gerkey@oregonstate.edu

ADF&G (DUNS 809387475)
Dr. Amy Wiita, Subsistence Resource Specialist
Division of Subsistence
333 Raspberry Rd.
Anchorage, AK 99518
(907) 267-2360
Email: amy.wiita@alaska.gov

VI. FINANCIAL CONSIDERATIONS:

The total amount of the Agreement shall not exceed $54,007. ADF&G will distribute funds in accordance with the following budget.

Year	Professor Cost	Course Buyout Cost	Travel	Indirect (26%)	Total
2017	$6,921	$4,579	$6,150	$4,589	$22,239
2018	$13,842	$0	$4,450	$4,756	$23,048
2019	$6,921	$0	$0	$1,799	$8,720
Total	$27,684	$4,579	$10,660	$11,144	$54,007

OSU will submit an invoice upon completion of deliverable(s) to ADF&G, who will remit payment within 30 days of receipt of invoice. Payment made upon acceptance of deliverables, as follows:

1. OSU will assist ADF&G with administration of household harvest surveys in study communities of Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, Egegik and Prot Heiden. February – May 2017 (40%) - $21,603

2. OSU will assist ADF&G with administration of key respondent interviews in the study communities of Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, Egegik and Port Heiden. February 2017 – March 2018 (20%) - $10,801

3. OSU will assist ADF&G with analysis of key respondent interview and household survey social network data. June 2017 – March 2018 (20%) – $10,801

4. OSU will assist ADF&G with writing draft final report. May – September 2018 (20%) - $10,801

VII. FEDERAL COMPLIANCE REQUIREMENTS:

1. Political Activity – Federal funds cannot be used for partisan political purposes of any kind by any person or organization involved in the administration of federally assisted programs.

2. Civil Rights – No person shall, on the grounds of race, color, national origin, age, or handicap, be excluded from participation in or be subjected to discrimination in any program or activity funded in whole or in part by federal funds.

3. Allowable Costs/Cost Principles – 2 CFR Part 225, "Cost Principles for State, Local, and Indian Tribal Governments" (OMB Circular No. A-87) establishes principles and standards for determining costs for Federal awardees carried out through grants, cost reimbursement contracts, and other agreements with State and local governments and federally-recognized Indian tribal governments (governmental units). A cost is allowable for federal reimbursement only to the extent of benefits received by federal programs, and costs must meet the basic guidelines for allowability, reasonableness, and allocability.

4. Drug-Free Workplace Act – OSU, by signing this agreement, certifies that they will provide a drug-free workplace.

5. Debarment/Suspension – OSU, by signing this agreement, certifies that neither it, nor its principals or subcontractors is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from federal financial assistance programs or activities.

6. Audits – OSU acknowledges that 100% of the funding for this agreement is from the Federal Fish and Wildlife Service, OSM Project 16-151, CFDA 15.636. OSU acknowledges that receipt of federal funds may create audit requirements under OMB 2 CFR 200.

7. 41 United States Code (U.S.C.) 4712, Pilot Program for Enhancement of Recipient and Subrecipient Employee Whistleblower Protection: This requirement applies to all awards issued after July 1, 2013 and shall be in effect until January 1, 2017.

   a. This award and related subawards and contracts over the simplified acquisition threshold and all employees working on this award and related subawards and contracts over the simplified acquisition threshold are subject to the whistleblower rights and remedies in the pilot program on award recipient employee whistleblower protections established at 41 U.S.C. 4712 by section 828 ofthe National Defense Authorization Act for Fiscal Year 2013 (P.L. 112-239).

   b. Recipients, and their subrecipients and contractors awarded contracts over the simplified acquisition threshold related to this award, shall inform their employees in writing, in the predominant language of the workforce, of the employee whistleblower rights and protections under 41 U.S.C. 4712.

c. The recipient shall insert this clause, including this paragraph (c), in all subawards and contracts over the simplified acquisition threshold related to this award.

VIII. GENERAL PROVISIONS

1. Nothing in this agreement shall obligate any party in the expenditure of funds, or for future payments of money, in excess of appropriations authorized by law.

2. Each party agrees that it will be responsible for its own acts and omissions including those of its officers, agents, and employees for damages to property or injury to persons occasioned by each party's own acts or omissions in connection with the terms of this agreement.

3. Both parties agree to comply with all applicable federal or State laws regulating ethical conduct of public officers and employees.

4. Each party will comply with all applicable laws, regulations, and executive orders relative to Equal Employment Opportunity.

5. Nothing herein is intended to conflict with federal, state, or local laws or regulations. If there are conflicts, this agreement will be amended at the first opportunity to bring it into conformance with conflicting laws or regulations.

6. Policy and position announcements relating specifically to this cooperative program may be made only by mutual consent of the agencies.

7. The effective date of this agreement shall be September 1, 2016.

8. The termination date of this agreement shall be December 31, 2018. However, either party may terminate its participation in this agreement by providing to the other party notice in writing 30 days in advance of the date on which its termination becomes effective.

9. A free exchange of research and assessment data among agencies is encouraged and is necessary to insure the success of these cooperative studies.

10. OSU and any agents or employees act in an independent capacity and not as officers, employees, or agents of the State in perfomance under this agreement.

11. This agreement may be amended by mutual written consent of the parties.

IX. APPROVING SIGNATURES

IN WITNESS WHEREOF, the parties hereto have caused this Cooperative Agreement to be executed as of the date of last signature below.

OREGON STATE UNIVERSITY

Signature

Zach Gill, Director Proposal and Award Management

Printed Name and Title

2/28/2017

Date

ALASKA DEPARTMENT OF FISH AND GAME

Hazel Nelson, Director
Division of Subsistence

3/14/17

Date

Carol Petraborg, Director
Division of Administrative Services

3/04/2017

Date

APPENDIX C–SURVEY FORM (CHIGNIK BAY)

OSM BRISTOL BAY SHARING NETWORKS/CHINOOK INITIATIVE, 2016

CHIGNIK BAY

APRIL 1, 2016, to THE PRESENT

This survey is used to estimate subsistence and other non-commercial salmon harvests and uses for the Chignik Management Area, for 2016. 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, the U.S. Fish and Wildlife Service, the National Park Service, the Alaska Board of Fisheries, and the Federal Subsistence Board. We work with the local Fish and Game Advisory Committees, the Federal Regional Advisory Councils, and the Chignik Regional Aquaculture Association 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.

HOUSEHOLD ID:		
COMMUNITY ID:		86
INTERVIEWER 1:		
INTERVIEWER 2:		
INTERVIEW DATE:		
START TIME:		
STOP TIME:		
	DATA CODED BY:	
	DATA ENTERED BY:	
	SUPERVISOR:	

COOPERATING ORGANIZATIONS

DIVISION OF SUBSISTENCE
ALASKA DEPT OF FISH & GAME
333 RASPBERRY ROAD
ANCHORAGE, AK 99518
907-267-2353

BRISTOL BAY NATIVE ASSOCIATION
BOX 310
DILLINGHAM, AK 99576
907-842-5257

CHIGNIK BAY
TRIBAL COUNCIL
BOX 50
CHIGNIK, AK 99564
907-749-2445

U.S. FISH & WILDLIFE SERVICE
OFFICE OF SUBSISTENCE MANAGEMENT
1011 E. TUDOR ROAD
ANCHORAGE, AK 99503
907-786-3888

OREGON STATE UNIVERSITY
DEPT. OF ANTHROPOLOGY
238 WALDO HALL
CORVALLIS, OR 97331
541-737-3793

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 April 1, 2016, and the present, 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?	How many years has this person lived in Chignik area?	*In 2016, did this person have a subsistence SALMON permit?*		
ID#	*circle*	*relation*	*circle*	*circle*	*year*	*number*	*circle*	*permit number*	*return*
HEAD	Y N		M F	Y N			Y N ?		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			Y N ?		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			Y N ?		Y N ?
3									
PERSON 4			M F	Y N			Y N ?		Y N ?
4	0								
PERSON 5			M F	Y N			Y N ?		Y N ?
5	0								
PERSON 6			M F	Y N			Y N ?		Y N ?
6	0								
PERSON 7			M F	Y N			Y N ?		Y N ?
7	0								
PERSON 8			M F	Y N			Y N ?		Y N ?
8	0								
PERSON 9			M F	Y N			Y N ?		Y N ?
9	0								
PERSON 10			M F	Y N			Y N ?		Y N ?
10	0								
PERSON 11			M F	Y N			Y N ?		Y N ?
11	0								
PERSON 12			M F	Y N			Y N ?		Y N ?
12	0								
PERSON 13			M F	Y N			Y N ?		Y N ?
13	0								
PERSON 14			M F	Y N			Y N ?		Y N ?
14	0								

HOUSEHOLD INFORMATION: 01 **CHIGNIK BAY: 86**

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 (APRIL 1, 2016, to THE PRESENT), 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] *number*	Of those removed how many did you give to OTHERS?[4] *number*	Units[5] *specify*	Person ID from page 2 *number*	*comments*
CHINOOK SALMON *KING SALMON* 113,000,001	Y N	Y N					
SOCKEYE SALMON *RED SALMON* 115,000,001	Y N	Y N					
COHO SALMON 112,000,001	Y N	Y N					
CHUM SALMON *DOG SALMON* 111,000,001	Y N	Y N					
PINK SALMON *HUMPIES* 114,000,001	Y N	Y N					
	Y N	Y N					
	Y N	Y N					
	Y N	Y N					
	Y N	Y N					

1 *"LAST YEAR" means from APRIL 1, 2016, to THE PRESENT.*
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 **CHIGNIK BAY: 86**

SUBSISTENCE HARVESTS: SALMON

HOUSEHOLD ID

1. Do you, or members of your household USUALLY harvest salmon?.. Y N ?
2. During the last year *(April 1st, 2016 to PRESENT)*, did you or members of your household USE or TRY to fish for salmon? Y N ?

If the answer to question 2 is NO, go to the SALMON assessment questions page.

During the last year, did you, or members of your household…
A: Use _____ salmon?
B: Try to harvest _____ salmon?
C: Harvest (catch) _____ salmon?
D: Receive _____ salmon from another
E: Give _____ salmon to another household?

Condition, or spawning stage, of salmon…
B: "bright" or pre-spawn salmon
R: "red" or spawning salmon
S: "spawned-out" or post-spawn salmon
?: "unknown" or salmon whose spawning condition is not known

If the answer to the harvest question (C) is yes, please estimate how many salmon all members of your household harvested for subsistence uses during the last year. Record salmon taken from commercial catch while commercial fishing, on previous page.

Read the species names below in the blanks

Include salmon that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. Report only this household's share of the harvest.

	A Use	B Try	C Harv	D Rec	E Give	Date	Location	Condition	Gear type	Harvest
	circle one					mm / dd	name	circle ONE	(NOT commercial)	number
SOCKEYE	Y N	Y N	Y N	Y N	Y N			B R S ?		
115 000 000										
								B R S ?		
								B R S ?		
								B R S ?		
								B R S ?		
								B R S ?		

	Use	Try	Harv	Rec	Give	Date	Location	Gear type	Harvest
	circle one					mm / dd	name	(NOT commercial)	number
CHINOOK	Y N	Y N	Y N	Y N	Y N				
113 000 000									

SUBSISTENCE SALMON HARVESTS: 04 **CHIGNIK BAY: 86**

SUBSISTENCE HARVESTS: SALMON CONTINUED...

HOUSEHOLD ID

If the answer to the harvest question (C) is yes, please estimate how many salmon all members of your household harvested for subsistence uses during the last year. Record salmon taken from commercial catch while commercial fishing, on previous page.

Read the species names below in the blanks

Include salmon that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. Report only this household's share of the harvest.

	A Use	B Try	C Harv	D Rec	E Give	Date	Location	Condition	Gear type	Harvest
	circle one					*dd / mm*	*name*	*circle ONE*	*(NOT commercial)*	*number*
COHO	Y N	Y N	Y N	Y N	Y N			B R S ?		
112 000 000										
								B R S ?		
								B R S ?		
								B R S ?		
								B R S ?		
								B R S ?		
								B R S ?		

	Use	Try	Harv	Rec	Give	Date	Location	Gear type	Harvest
	circle one					*dd / mm*	*name*	*(NOT commercial)*	*number*
CHUM	Y N	Y N	Y N	Y N	Y N				
111 000 000									

	Use	Try	Har	Rec	Giv	Date	Location	Gear type	Harvest
	circle one					*dd / mm*	*name*	*(NOT commercial)*	*number*
PINK	Y N	Y N	Y N	Y N	Y N				
114 000 000									

NETWORKS: SALMON

HOUSEHOLD ID

If this household did NOT HARVEST or USE salmon last year, go to the BRIGHT SOCKEYE SUMMARY PAGE.
If this household did NOT HARVEST salmon last year, go to the HOUSEHOLD PARTICIPATION section, on this page below.
Otherwise, continue with the mapping, household participation, network, and assessment sections...

MAPPING: SALMON

Refer to data collection maps and mapping instructions to map ...

HOUSEHOLD PARTICIPATION: SALMON

110000000

During the last year did any members of YOUR HOUSEHOLD fish for or cut salmon, or receive a share of salmon for helping someone else with their salmon?............ Y N

If NO, go to the LOCAL NETWORK section below.
If YES, continue with this section…

During the last year...[1]
…which members of your household CAUGHT salmon for your household? (Enter most important person first.)

CAUGHT SALMON	*enter person code from page 2*
1	

…which members of your household PROCESSED salmon for your household? (Enter most important person first.)

PROCESSED SALMON	*enter person code from page 2*
2	

…which members of your household received A SHARE of salmon WHILE HELPING someone else FISH FOR salmon?

SHARE FOR HELPING FISH	*enter person code from page 2*
3	

…which members of your household received A SHARE of salmon WHILE HELPING someone else CUT salmon?

SHARE FOR HELPING CUT	*enter person code from page 2*
4	

LOCAL NETWORK: SALMON (SHARING WITHIN THIS COMMUNITY)

110000000

During the last year did anyone in ANOTHER HOUSEHOLD in CHIGNIK BAY fish for, cut, or share salmon WITH MEMBERS of your household?............ Y N

If NO, go to the NEXT PAGE.
If YES, continue with this section…

During the last year...[1]
…Did anyone else in another CHIGNIK BAY household FISH FOR salmon with members of your household?............ Y N
IF YES, who CAUGHT the salmon your household used? (Enter most important household first.)

CAUGHT SALMON	*Enter household ID of other Chignik Bay households*
3	

During the last year...[1]
...Did anyone else in another CHIGNIK BAY household CUT salmon with members of your household?............ Y N
IF YES, who CUT the SALMON your household used? (Enter most important household first.)

PROCESSED SALMON	*Enter household ID of other Chignik Bay households*
4	

During the last year...[1]
…Did anyone in another CHIGNIK BAY household SHARE salmon with your household?............ Y N
IF YES, who GAVE salmon to your household? (Enter most important household first.)

SHARED SALMON	*Enter household ID of other Chignik Bay households*
10	

NOTES

[1] *"LAST YEAR" means APRIL 1, 2016, to THE PRESENT*

SALMON NETWORKS: 67 **CHIGNIK BAY: 86**

NON-LOCAL NETWORKS: SALMON

HOUSEHOLD ID ______

Now I would like to ask about salmon that came from or went to another community, but were NOT bought, sold, or traded.

During the last year,[1] did anyone living in your household give salmon to or receive salmon from someone in another community?.. Y N

If NO, go to the TRADE NETWORKS page.

If YES, continue on this page…

I'd like to ask you about the first exchange of salmon you remember in the last year.

#	In that exchange, did someone in your household GIVE or RECEIVE salmon? Give or Receive	Where did the other person live?	Resp. ID	How are you (ID) related to the other person?[2]	Where did this exchange happen?[3]	How much salmon was exchanged? Amount	Unit?[4]	How would you describe this exchange? Sharing / A share for Helping someone else[5] / Other kind of exchange.. (describe)		How many exchanges exactly like this one did your HH have last year?
1	G R							S H O	*description*	
1										

After recording the first exchange, repeat the next question until respondent does not remember any more exchanges...

Do you remember another exchange in the last year? (*IF NO, go to next page. If YES, continue below...*)

#	In that exchange, did someone in your household GIVE or RECEIVE salmon? Give or Receive	Where did the other person live?	Resp. ID	How are you (ID) related to the other person?[2]	Where did this exchange happen?[3]	How much salmon was exchanged? Amount	Unit?[4]	How would you describe this exchange? Sharing / A share for Helping someone else[5] / Other kind of exchange.. (describe)		How many exchanges exactly like this one did your HH have last year?
2	G R							S H O	*description*	
2										
3	G R							S H O	*description*	
3										
4	G R							S H O	*description*	
4										
5	G R							S H O	*description*	
5										
6	G R							S H O	*description*	
6										
7	G R							S H O	*description*	
7										
8	G R							S H O	*description*	
8										
9	G R							S H O	*description*	
9										
10	G R							S H O	*description*	
10										
11	G R							S H O	*description*	
11										

Here's an example. Assume that, one time last year, the respondent (person 2) gave 5 salmon to the respondent's sister's family in Anchorage...

#	Give or Receive	Where did the other person live?	Resp. ID	How are you (ID) related to the other person?	Where did this exchange happen?	Amount	Unit?	S H O	description	How many exchanges
X	G R	Anchorage	2	sister	Chignik Lagoon	5	salmon	S H O	*description*	1
X										

1 *"LAST YEAR" means from APRIL 1, 2016, to THE PRESENT.*

2 *"RELATED" means the biological or marriage relation to the page respondent: mother, son, uncle, father-in-law, etc. For ELDER relatives, enter actual relationship, such as grandmother. For unrelated elders, enter "other elder." For friends, enter "friend." Otherwise, enter "not related."*

3 *When two parties to an exchange were in the same community, enter the community. When two parties were in different communities, enter the method used to set up the exchange: phone, text, Facebook, etc. Include context if known: AFN, basketball game, feast, etc.*

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

5 *"HELPING" includes any form of helping (not necessarily related to salmon), but NOT to include barter, sell, or trade.*

TRADE NETWORKS: SALMON

HOUSEHOLD ID ______

Now I would like to ask about salmon that were bought, sold, or traded, either with someone in CHIGNIK BAY or SOMEWHERE ELSE.

During the last year,[1] did anyone living in your household buy, sell, or trade[2] for subsistence-caught salmon.. Y N

If NO, go to the ASSESSMENTS page.
If YES, continue on this page…

I'd like to ask you about the first exchange you remember in the last year...

In that exchange, did someone in your househeold BUY, SELL, or TRADE[2] for subsistence salmon?

#	Buy, Sell, or Trade? *(circle)*	Where did the other person live?	Resp. ID	How are you related to the other person?[3]	Where did this exchange happen?[4]	What did your household give? Item exchanged?	How much?	Unit?[5]	What did your household receive? Item exchanged?	How much?	Unit?[5]	How many exchanges exactly like this one did your HH have last year?
1	B S T											
1												

After recording the first exchange, repeat the next question until respondent does not remember any more exchanges...
Do you remember another exchange in the last year? (*IF NO, go to next page. If YES, continue below...*)

In that exchange, did someone in your househeold BUY, SELL, or TRADE[2] for subsistence salmon?

#	Buy, Sell, or Trade? *(circle)*	Where did the other person live?	Resp. ID	How are you related to the other person?[3]	Where did this exchange happen?[4]	What did your household give? Item exchanged?	How much?	Unit?[5]	What did your household receive? Item exchanged?	How much?	Unit?[5]	How many exchanges exactly like this one did your HH have last year?
2	B S T											
2												
3	B S T											
3												
4	B S T											
4												
5	B S T											
5												
6	B S T											
6												
7	B S T											
7												
8	B S T											
8												
9	B S T											
9												
10	B S T											
10												
11	B S T											
11												

Here's an example: Assume the respondent (person 2) sold 10 to 12 pints of jarred salmon during AFN to friends and strangers...

#	Buy, Sell, or Trade?	Where did the other person live?	Resp. ID	How are you related to the other person?	Where did this exchange happen?	Item exchanged?	How much?	Unit?	Item exchanged?	How much?	Unit?	How many exchanges?
X	B S T	ANC	2	not related	FAI / AFN	1 pint of jarred salmon			$25			10 to 12
X												

1 "LAST YEAR" means from APRIL 1, 2016, to THE PRESENT.
2 "TRADE" includes subsistence-caught salmon exchanged for another item, such as meat, berries, services or gasoline, but not for cash. Exchanges on this page should NOT include salmon obtained from a store or a commercial fishery. For the latter, see "RETAINED COMMERCIAL HARVESTS."
3 "RELATED" means the biological or marriage relation to page respondent: mother, son, uncle, father-in-law, etc. For ELDER relatives, enter actual relationship, such as grandmother. For unrelated elders, enter "other elder." For friends, enter "friend." Otherwise, enter "not related."
4 When two parties to an exchange were in the same community, enter the community. When two parties to an exchange were in different communities, enter the method used to set up the exchange: phone, text, Facebook, etc.
5 UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.

SUBSISTENCE SUMMARY: EARLY RUN "BRIGHT" SOCKEYE SALMON

HOUSEHOLD ID

ASSESSMENTS: EARLY RUN "BRIGHT" SOCKEYE SALMON

115,000,000

Note: Ask the following questions to all households and continue with other questions if the household USED EARLY RUN "BRIGHT" SOCKEYE SALMON last year (April 1,2016 to the present) or in recent years.

Last year[1] ….

…did your household USE LESS, the SAME, or MORE EARLY RUN "BRIGHT" SOCKEYE SALMON than in recent years? X L S M *(X = do not use)*

If LESS or MORE…

WHY was your use different?.................. ______ 1 ______ 2

Note: Ask the following questions only for households that have USED EARLY RUN "BRIGHT" SOCKEYE SALMON last year or in recent years. If no to either time period, then go to next page......*

Last year[1] ….

…did your household GET ENOUGH EARLY RUN "BRIGHT" SOCKEYE SALMON ? Y N

(If yes, continue with the next section at the bottom on this page)

IF NO, about how many EARLY RUN "BRIGHT" SOCKEYE SALMON does your household need annually? ______

IF NO, did your household do anything differently because you did not get enough EARLY RUN "BRIGHT" SOCKEYE SALMON ? Y N

IF YES…

What did your household do differently? ______ 1 ______ 2

How would you describe the impact of your household not getting enough EARLY RUN "BRIGHT" SOCKEYE SALMON 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 EARLY RUN "BRIGHT" SOCKEYE 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 EARLY RUN "BRIGHT" SOCKEYE SALMON that you needed? 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 EARLY RUN "BRIGHT" SOCKEYE SALMON ?

Travel further: Y N

Different locations: Y N

If YES, please explain why and where? ______ 1 ______ 2

Where do you usually harvest your EARLY RUN "BRIGHT" SOCKEYE SALMON ?

______

How do you usually harvest your EARLY RUN "BRIGHT" SOCKEYE SALMON ?

Home Pack?	Seine?	Set gillnet?	Rod and Reel?	Handline?	Other?
(4)	(7)	(5)	(15)	(16)	(17)

circle methods(s) ______ *(Specify)* 1 2

If you use a rod and reel, handline, or jigging gear to harvest EARLY RUN "BRIGHT" SOCKEYE SALMON why?

Conservation?	Selectivity?	Gillnet mesh too small?	Tradition?	Ease?	Fun?	Other?
(1)	(2)	(3)	(4)	(5)	(6)	(7)

circle response(s) ______ *(Specify)* 1 2

*1 or *) "Last year" means from April 1st, 2016 to PRESENT.*

ASSESSMENTS OF EARLY RUN "BRIGHT" SOCKEYE SALMON : 66 **CHIGNIK BAY: 86**

SUBSISTENCE SUMMARY: EARLY RUN "BRIGHT" SOCKEYE SALMON

HOUSEHOLD ID

OBSERVATIONS: EARLY RUN "BRIGHT" SOCKEYE SALMON 115,000,000

1. Have you observed any changes to the number (abundance) of EARLY RUN "BRIGHT" SOCKEYE SALMON in your area? Y N

   IF YES...
   What changes have you observed? ____________ 1 ____________ 2

2. Have you observed any changes in the quality or appearance of EARLY RUN "BRIGHT" SOCKEYE SALMON you harvested last year? Y N

   IF YES...
   What changes have you observed? ____________ 1 ____________ 2

3. Have you observed any changes in the behavior of EARLY RUN "BRIGHT" SOCKEYE SALMON in your area; such as run timing or harvest location? Y N

   IF YES...
   What changes have you observed? ____________ 1 ____________ 2

4. Do you feel there is adequate escapement of EARLY RUN "BRIGHT" SOCKEYE SALMON through the Chignik River Weir to maintain a future healty stock as well as enough to provide for subsistence needs? Y N

   IF NO, please explain. ____________ 1 ____________ 2

5. Do you have any other comments or concerns about EARLY RUN "BRIGHT" SOCKEYE SALMON ?

ASSESSMENTS OF EARLY RUN "BRIGHT" SOCKEYE SALMON : 66 **CHIGNIK BAY: 86**

ASSESSMENTS: LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON

HOUSEHOLD ID

ASSESSMENTS: LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON 117,050,000

Note: Ask the following questions to all households and continue with other questions if the household USED LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON last year (April 1,2016 to the present) or in recent years.

Last year[1] ….

…did your household USE LESS, the SAME, or MORE LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON than in recent years? X L S M *(X = do not use)*

If LESS or MORE…

WHY was your use different?................. ____ 1 2

Note: Ask the following questions only for households that have USED LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON last year or in recent years. If no to either time period, then go to next page......*

Last year[1] ….

…did your household GET ENOUGH LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON ? Y N

(If yes, continue with the next section at the bottom on this page)

IF NO, about how many LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON does your household need annually? ____

IF NO, did your household do anything differently because you did not get enough LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON ? Y N

IF YES…

What did your household do differently? ____ 1 2

How would you describe the impact of your household not getting enough LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON 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 LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE 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 LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON , that you 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 LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON ?

Travel further: Y N
Different locations: Y N

If YES, please explain why and where? ____ 1 2

Where do you usually harvest your LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON ?

____

How do you usually harvest your LATE RUN "REDFISH" (NOT spawnouts) SOCKEYE SALMON?

Home Pack?	Seine?	Set gillnet?	Rod and Reel?	Handline?	Other?	
(4)	(7)	(5)	(15)	(16)	(17)	____ *(Specify)*

circle methods(s) 1 2

If you use a rod and reel, handline, or jigging gear to harvest your LATE RUN "REDFISH" (NOT spawnouts) SOCKEYE SALMON

Conservation?	Selectivity?	Gillnet mesh too small?	Tradition?	Ease?	Fun?	Other?	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	____ *(Specify)*

circle response(s) 1 2

Do you usually harvest SPAWNOUTS?

If YES…how do you usually harvest your SPAWNOUTS?

Home Pack?	Seine?	Set gillnet?	Rod and Reel?	Handline?	Other?	
(4)	(7)	(5)	(15)	(16)	(17)	____ *(Specify)*

circle methods(s) 1 2

If you use a rod and reel, handline, or jigging gear to harvest SPAWNOUTS why?"

Conservation?	Selectivity?	Gillnet mesh too small?	Tradition?	Ease?	Fun?	Other?	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	____ *(Specify)*

circle response(s) 1 2

*1 or *) "Last year" means from April 1st, 2016 to PRESENT.*

SUBSISTENCE OBSERVATIONS: LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON

OBSERVATIONS: LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON

117,050,000

1. Have you observed any changes to the number (abundance) of LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON in your area? Y N

   IF YES...
   What changes have you observed? ______ 1 ______ 2

2. Have you observed any changes in the quality or appearance of LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON you harvested last year? Y N

   IF YES...
   What changes have you observed? ______ 1 ______ 2

3. Have you observed any changes in the behavior of LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON in your area; such as run timing or harvest location? Y N

   IF YES...
   What changes have you observed? ______ 1 ______ 2

4. Do you feel there is adequate escapement of LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON through the Chignik River Weir to maintain a future healty stock as well as enough to provide for subsistence needs? Y N

   IF NO, please explain. ______ 1 ______ 2

5. Do you have any other comments or concerns about LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON ?

SUBSISTENCE OBSERVATIONS OF LATE RUN "REDFISH/ SPAWNOUT" SOCKEYE SALMON : 36¦ CHIGNIK BAY: 86

ASSESSMENTS: CHINOOK (KING) SALMON

HOUSEHOLD ID

ASSESSMENTS: CHINOOK (KING) SALMON 113,000,000

Note: Ask the following questions to all households and continue with other questions if the household USED CHINOOK (KING) SALMON last year (April 1,2016 to the present) or in recent years.

Last year [1] ....

...did your household USE LESS, the SAME, or MORE CHINOOK (KING) SALMON than in recent years? X L S M *(X = do not use)*

If LESS or MORE...

WHY was your use different?.................. ______ 1 ______ 2

Note: Ask the following questions only for households that have USED CHINOOK (KING) SALMON last year or in recent years. If no to either time period, then go to next page......*

Last year [1] ....

...did your household GET ENOUGH CHINOOK (KING) SALMON ? Y N

(If yes, continue with the next section at the bottom on this page)

IF NO, about how many CHINOOK (KING) SALMON does your household need annually? ______

IF NO, did your household do anything differently because you did not get enough CHINOOK (KING) SALMON ? Y N

IF YES...

What did your household do differently? ______ 1 ______ 2

How would you describe the impact of your household not getting enough CHINOOK (KING) SALMON 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 CHINOOK (KING) 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 CHINOOK (KING) SALMON , that you needed? 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 CHINOOK (KING) SALMON ?

Travel further: Y N
Different locations: Y N

If YES, please explain why and where? ______ 1 ______ 2

Where do you usually harvest your CHINOOK (KING) SALMON ? ______

How do you usually harvest your CHINOOK (KING) SALMON ?

Home Pack?	Seine?	Set gillnet?	Rod and Reel?	Handline?	Other?	
(4)	(7)	(5)	(15)	(16)	(17)	______ *(Specify)*

circle method(s) 1 2

If you use a rod and reel, handline, or jigging gear to harvest CHINOOK (KING) SALMON why?

Conservation?	Selectivity?	Gillnet mesh too small?	Tradition?	Ease?	Fun?	Other?	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	______ *(Specify)*

circle response(s) 1 2

*1 or *) "Last year" means from April 1st, 2016 to PRESENT.*

SUBSISTENCE OBSERVATIONS: CHINOOK (KING) SALMON

HOUSEHOLD ID

OBSERVATIONS: CHINOOK (KING) SALMON

113,000,000

1. Have you observed any changes to the number (abundance) of CHINOOK (KING) SALMON in your area? Y N

   IF YES...

   What changes have you observed? ______ 1 ______ 2

2. Have you observed any changes in the quality or appearance of CHINOOK (KING) SALMON you harvested last year? Y N

   IF YES...

   What changes have you observed? ______ 1 ______ 2

3. Have you observed any changes in the behavior of CHINOOK (KING) SALMON in your area; such as run timing or harvest location? Y N

   IF YES...

   What changes have you observed? ______ 1 ______ 2

4. Do you feel there is adequate escapement of CHINOOK (KING) SALMON through the Chignik River Weir to maintain a future healty stock as well as enough to provide for subsistence needs? Y N

   IF NO, please explain. ______ 1 ______ 2

5. Do you have any other comments or concerns about CHINOOK (KING) SALMON ?

SUBSISTENCE OBSERVATIONS OF CHINOOK (KING) SALMON : 368 CHIGNIK BAY: 86

ASSESSMENTS: OTHER SALMON (PINK, COHO, CHUM)

HOUSEHOLD ID

ASSESSMENTS: OTHER SALMON

110,000,000

Note: Ask the following questions to all households and continue with other questions if the household USED OTHER SALMON last year (April 1,2016 to the present) or in recent years.

Last year [1] ....

...did your household USE LESS, the SAME, or MORE OTHER SALMON than in recent years? X L S M *(X = do not use)*

If LESS or MORE...

WHY was your use different?.................. ______ 1 ______ 2

Note: Ask the following questions only for households that have USED OTHER SALMON last year or in recent years. If no to either time period, then go to next page......*

Last year [1] ....

...did your household GET ENOUGH OTHER SALMON ? Y N

(If yes, continue with the next section at the bottom on this page)

IF NO, about how many OTHER SALMON does your household need annually? ______

IF NO, did your household do anything differently because you did not get enough OTHER SALMON ? Y N

IF YES...

What did your household do differently? ______ 1 ______ 2

How would you describe the impact of your household not getting enough OTHER SALMON 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 OTHER 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 OTHER SALMON , that you needed? 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 OTHER SALMON ?

Travel further: Y N

Different locations: Y N

If YES, please explain why and where? ______ 1 ______ 2

Where do you usually harvest your OTHER SALMON ?

______

How do you usually harvest your OTHER SALMON ?

Home Pack?	Seine?	Set gillnet?	Rod and Reel?	Handline?	Other?	
(4)	(7)	(5)	(15)	(16)	(17)	______ *(Specify)*

circle method(s) 1 2

If you use a rod and reel, handline, or jigging gear to harvest OTHER SALMON why?

Conservation?	Selectivity?	Gillnet mesh too small?	Tradition?	Ease?	Fun?	Other?	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	______ *(Specify)*

circle response(s) 1 2

*1 or *) "Last year" means from April 1st, 2016 to PRESENT.*

SUBSISTENCE OBSERVATIONS: OTHER SALMON

HOUSEHOLD ID

OBSERVATIONS: OTHER SALMON

110,000,000

1. Have you observed any changes to the number (abundance) of OTHER SALMON in your area? Y N

   IF YES...
   What changes have you observed?
   1
   2

2. Have you observed any changes in the quality or appearance of OTHER SALMON you harvested last Y N

   IF YES...
   What changes have you observed?
   1
   2

3. Have you observed any changes in the behavior of OTHER SALMON in your area; such as run timing or harvest location? Y N

   IF YES...
   What changes have you observed?
   1
   2

4. Do you feel there is adequate escapement of OTHER SALMON through the Chignik River Weir to maintain a future healty stock as well as enough to provide for subsistence needs? Y N

   IF NO, please explain.
   1
   2

5. Do you have any other comments or concerns about OTHER SALMON ?

SUBSISTENCE OBSERVATIONS OF OTHER SALMON : 368 **CHIGNIK BAY: 86**

HARVESTS: LARGE LAND MAMMALS

HOUSEHOLD ID

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

2. During the last year (between April 1, 2016 and the present), did you, or members of your household USE or TRY TO HARVEST large land mammals?...................................... Y N

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

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

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 large land mammals ALL MEMBERS OF YOUR HOUSEHOLD got during the last year. How many were harvested in ….

INCLUDE large land mammals that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	SEX M/F	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS[3] (specify)
							(specify amount harvested per month)													
CARIBOU	Y N	Y N	Y N	Y N	Y N	M														IND
						F														IND
211000000						UNK														IND
211000001						1														
211000002						2														
211000009						-9														
MOOSE	Y N	Y N	Y N	Y N	Y N	M														IND
						F														IND
211800000						UNK														IND
211800001						1														
211800002						2														
211800009						-9														
BROWN BEAR	Y N	Y N	Y N	Y N	Y N															IND
210800000																				
	Y N	Y N	Y N	Y N	Y N															IND
	Y N	Y N	Y N	Y N	Y N															IND
	Y N	Y N	Y N	Y N	Y N															IND
	Y N	Y N	Y N	Y N	Y N															IND
	Y N	Y N	Y N	Y N	Y N															IND

During the last year, did your household use or try to harvest any other kind of large land mammals, such as sheep?..................... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between APRIL 1, 2016, to THE PRESENT.*
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.*

HARVEST SUMMARY: LARGE LAND MAMMALS

HOUSEHOLD ID

If this household did NOT USE or HARVEST large land mammals last year, go to the ASSESSMENT section below.
Otherwise, continue with mapping, and assessment sections…

MAPPING *Refer to data collection maps and mapping instructions to map large land mammals…*

ASSESSMENTS: LARGE LAND MAMMALS 210000000

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

During the last year,[1]
*… did your household USE LESS, the SAME, or MORE large land mammals than in recent years? ………………………………*X L S M
IF LESS or MORE … X = do not use
WHY was your use different? 1 2

During the last year,[1]
…did your household GET ENOUGH large land mammals?.. Y N
If NO…
What KIND of large land mammals did you need?

…did your household do anything DIFFERENTLY because you did not get enough large land mammals?.................................... Y N
If YES…
What did your household do differently? 1 2

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

1 *"LAST YEAR" means between January 1, 2015 and December 31, 2015.*

NETWORKS & ASSESSMENTS OF LARGE LAND MAMMALS: 66, 67 **CHIGNIK BAY: 86**

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 **CHIGNIK BAY: 86**

APPENDIX D–KEY RESPONDENT INTERVIEW PROTOCOL

Key Respondent Interviews
Bristol Bay Sharing Networks Project
Perryville, Chignik Lake, Chignik Bay, Chignik Lagoon, Port Heiden, Egegik
Draft 3: 3/2/17

Targeted:
Elder
Young-20-30 y/o
Mid high-harvester
Mid y/o struggling: according to LRA not really too many people in this situation in community
Mid y/o customary trade
Mid y/o low harvester

Themes:
Sharing--general
Changes in sharing
HH participation
Local Network participation
Non-local Sharing

DREW's
Catching & Processing

1. How do you decide who does what job/role when you put up fish?

2. How does a hh decide what jobs people have when they are helping fish [FISHING]?
   a) Is it based on who is good at what [skill]?
   b) Is it based on age?
      - [What role does age play?]
   c) Something else?

3. How does a hh decide what jobs people have when they are helping put up fish [PROCESSING (not fishing]?

4. Why do some people who are physically able, not participate in helping?
   a) Due to economic resources?
   b) Due to skills (lack thereof)?

5. How are shares for helping negotiated?
   a) Help put fish up and then take whatever share you need?
   b) Help a certain amount and then get a certain amount?

6. How are shares for helping different than sharing [open giving]? [Open giving versus shares]
   a) Do people give freely/openly to people who can't help & instead only provide shares if a person is capable of helping
      - [meaning if they are capable of helping and don't they don't get a share and don't get freely given resources]
      - Or?

7. Who works together in local networks?
   - Why do specific hh's work together?
   - Why do hh's work alone?
   - What would cause hh's to stop working together?

Sharing

8. Why do people share?
   - Other people are in need?
   - Because they are friends?
   - Because they are relatives?
   - Because there is an expectation of reciprocity?
   - How do kids learn to share?

Non-local sharing [between communities]

9. Logistics
   - How is a sharing relation set up
   - How is the exchange itself set up
   - How are exchange values of resources determined [How much of X for how much of Y]?
      - Resource availability based?
      - Other?
   - How are exchange of resources determined [what is exchanged for what]?
      - [E.g., want seal have caribou: share caribou to get seal]

Questions:
[Brackets contain clarifications for interviewer not Qs for respondent]

Terminology/Concepts

10. Tell me if giving and sharing are different and why
    - What do you mean when you say giving
    - What do you mean when you say sharing
    - [example of issue of inviting people over for a salmon meal versus giving them salmon]

11. Tell me what you mean when you say/think about:
    - Sharing
    - Giving
    - Receiving
    - Bartering
    - Trading

Sharing and Exchange of salmon:

12. Tell me about how sharing was when you were young?

13. How do people in your community exchange food? How do people in your community share food currently?
    - Tell me about how it works for people/hh's to give/receive? [how does the network function]
        - Within the COMMUNITY
        - Within the REGION
        - Within the STATE
        - ELSEWHERE

14. Has sharing changed over time in XXXXXXX? How so?
    - If there is less/more—why do you think that is?
    - How about between hh's in XXXXXX and elsewhere
        - [relate this back to own hh if Q is too general]
    - Is there more or less sharing with communities farther away?

15. Does your household regularly share salmon with other households (either giving them or receiving them?)

16. How do you decide how many fish to catch?

17. What factors do you consider when deciding how to preserve those fish?

18. How do you decide who you share your fish with?
    - [e.g. Are they always relatives? Do you have a trading relationship with them? Is it usually based on need? Etc.]

19. Do you ever exchange salmon for other subsistence resources or other items, such as gasoline, groceries, or wood, etc?

20. Do you ever exchange salmon for cash?

Connectivity

21. How much do the sharing connections between hh's change [how flexible are the connections]
    - Does who you fish/hunt with change a lot or no?
        - Why/why not
    - Does who you share with or receive from change a lot or no?
        - Why/why not
    - Do you see the connections changing: (fewer for some & that makes for some hh's to share?)

Barriers/Challenges/ Causes for Changes

22. What are some of the challenges to giving/receiving?
    - [fewer resources/fewer people fishing so gathering fewer resources to share/inequalities within community structure, etc.]

23. Are people receiving as much as they used to? Why/why not?

24. Are environmental conditions (e.g., climate change, etc.) affecting hh's ability to exchange?

25. What would make you stop sharing with a hh?

Additional

26. Connections between sharing networks and regulations—how might they affect one another?

27. Why not form trade networks?

APPENDIX E–CONVERSION FACTORS

Appendix Table E-1.– Conversion factors, salmon and large land mammals resources, study communities, 2016.

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 three individual chum salmon in Egegik, the quantity would be multiplied by the appropriate conversion factor (in this case 4.8) to show a harvest of 14.4 lb of chum salmon.

		Alaska Peninsula West[a,b]	Alaska Peninsula East[c]
Resource name	Reported units	Conversion factor	Conversion factor
Chum salmon	Individual	5.0313	4.7976
Chum salmon [CF retention]	Individual	5.0313	4.7976
Coho salmon	Individual	5.2330	4.7153
Coho salmon [CF retention]	Individual	5.2330	4.7153
Chinook salmon	Individual	5.4343	7.1712
Chinook salmon [CF retention]	Individual	5.4343	7.1712
Pink salmon	Individual	2.9242	2.1903
Pink salmon [CF retention]	Individual	2.9242	2.1903
Sockeye salmon	Individual	4.3836	4.1839
Sockeye salmon [CF retention]	Individual	4.3836	4.1839
Black bear	Individual	N/A	58.0000
Brown bear	Individual	340.0000	150.0000
Caribou	Individual	150.0000	150.0000
Deer	Individual	43.2000	43.2000
Moose	Individual	540.0000	540.0000
Dall sheep	Individual	80.0000	104.0000

Source ADF&G Division of Subsistence household surveys, 2017.

a. Alaska Peninsula West communities inlcude Chignik Bay, Chignik Lake, Chignik Lagoon, and Perryville.

b. No black bear were harvested in Alaska Peninsula West communities.

c. Alaska Peninsula East communities include Egegik and Port Heiden.

Appendix Table E-2.– Conversion factors, unknown salmon, study communities, 2016.

The following table presents the conversion factors used in determining how many pounds of unknown salmon were harvested for each community. For instance, if respondents reported harvesting three individual unknown salmon in Egegik, the quantity would be multiplied by the appropriate conversion factor (in this case 4.4) to show a harvest of 13.2 lb of unknown salmon.

		Unknown salmon	Unknown salmon [CF retention]
Community	Reported units	Conversion factor	Conversion factor
Chignik Bay	Individual	4.4196	4.4196
Chignik Lagoon	Individual	4.4480	4.4480
Chignik Lake	Individual	4.3971	4.3971
Egegik	Individual	4.4094	4.4094
Perryville	Individual	4.5463	4.5463
Port Heiden	Individual	4.4044	4.4044

Source ADF&G Division of Subsistence household surveys, 2017.

APPENDIX F–PROJECT SUMMARY

SUMMARY - Technical Paper No. 459

Subsistence Salmon Networks in Select Bristol Bay and Alaska Peninsula Communities, 2016

"Sharing is in our lifestyle because everyone in the village, and other villages, is taught to share … sharing is the way I was taught and brought up … ever since I could remember it was always giving and giving and you never thought otherwise." —Chignik Lake resident

Introduction and Project Overview

Funded by the U.S. Fish and Wildlife Service, Office of Subsistence Management's Fisheries Resource Monitoring Program, this project collected information about the harvest, use, and sharing of salmon in Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, Port Heiden, and Egegik in 2016. The study was a collaboration among Bristol Bay Native Association (BBNA), ADF&G Division of Subsistence, Oregon State University (OSU), and the six study communities.

Main objectives of the project were to estimate the harvest and use of salmon by residents of the study communities; describe the salmon harvest in terms of species, harvest gear, location, and timing; and to illustrate the sharing networks through which salmon are distributed within communities, across the region, and throughout and beyond Alaska. The project demonstrated how vastly important salmon are to the residents of these communities, and also to an extensive network of people living elsewhere.

Source for this information

Hutchinson-Scarbrough, L., D. Gerkey, G. Halas, C. Larson, L. A. Sill, J. M. Van Lanen, and M. Cunningham. 2020. Subsistence Salmon Networks in Select Bristol Bay and Alaska Peninsula Communities, 2016. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 459, Anchorage.

Electronic copy of this report

http://www.subsistence.adfg.state.ak.us/TechPap/TP459.pdf

Community Subsistence Information System (CSIS)

http://www.subsistence.adfg.state.ak.us/CSIS

The primary method for collecting subsistence harvest, use, and sharing data in this project was a household survey. Researchers interviewed 147 households out of 183 (80%) in the six communities overall. Additionally, researchers conducted in-depth interviews with 32 individuals from the study communities about subsistence activities and salmon resource sharing and networks.

Harvest Survey

More than 14,000 salmon were harvested by study community households in 2016. The average per capita harvest was 118 lb usable weight for all the study communities combined. Sockeye salmon is the main salmon species harvested by community residents: this species composed more than one-half of the salmon harvest in each community (Figure 1). Most households (96%) in the communities used salmon overall and more than 70% harvested salmon during 2016 (Figure 2). Sharing of salmon was widespread: 55% of all households gave away salmon during the study year and 80% of households received salmon. In general, community residents harvested salmon through subsistence methods, but particularly in Chignik Bay and Chignik Lagoon a substantial amount of salmon (69% and 39%, respectively) was retained from commercial harvests ("home pack"). In most communities, except for Chignik Bay, there have been declines in home pack over the years. In general, households reported that they had enough sockeye salmon in 2016, though use was generally less than in recent years. Most households in the study communities said that they did not have to work harder to get the salmon they needed in 2016.

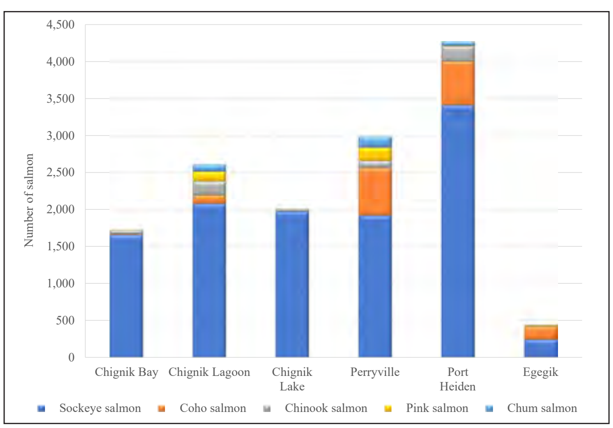

Figure 1.–Estimated salmon harvested, by species, 2016.

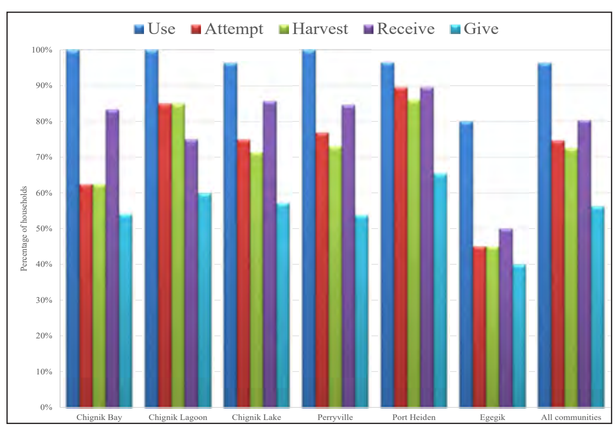

Figure 2.–Estimated household participation, 2016.

"I try to always teach my children mindfulness that you know we are not just hunting or fishing or gathering for ourselves. We just have to always consider that people can't do things for themselves and they should never be without because of that … ." — Port Heiden resident

Key Respondent Interviews

While the project highlights salmon results, understanding social networks that support the production and exchange of salmon should be done in context of the diversity of resources used in the study communities. Salmon is one component of a much larger sharing network; delving into the topic of sharing salmon inevitably included discussions of other resources, such as large game or berries, that are part of the sharing networks of these communities. The qualitative components of the research, achieved primarily through key respondent interviews, cast a broad net that captured how use and sharing of salmon interact with other resources. Qualitative information also provided a temporal component that is unavailable through the more focused quantitative work regarding 2016 sharing networks. Overall, several themes emerged through the in-depth interviews with community residents who are active subsistence harvesters. These themes focused on:

- sharing traditions;
- practices of reciprocity (providing something in return for something you received);
- practices of barter and customary trade;
- types of resources included in sharing networks;
- types of equipment shared;
- sharing with elders and how sharing practices are passed down through the generations;
- sharing with nonproductive persons;
- work ethic;
- division of labor;
- cooperation surrounding the harvest and processing of shared subsistence foods;
- practices of distributing subsistence foods within communities;
- regional sharing networks;
- long-distance sharing networks; and
- socioeconomic and technological influences on the changing patterns of sharing.

Detailed discussion of these topics can be found in Chapter 5 of Technical Paper No. 459.

"I'm giving it from the heart not for someone to go do something for me or for money. I'm doing it because I want to share, that's how I was raised." —Chignik Bay resident

Splitting salmon in Chignik Lake (*front page*). Processing salmon for jarring in Chignik Lake (*above*).

Social Network Survey

Salmon harvested in these communities are shared throughout Alaska and elsewhere. Small networks of households participate in harvesting and processing salmon; these networks are then linked together through sharing salmon within and between communities. The dominant mode of exchanging salmon in the study communities was generalized reciprocity: resources were shared without the expectation of a return. The research documented very few instances of barter (exchanging salmon directly for other resources) or customary trade (exchanging salmon for small amounts of cash).

Local Networks

While most of the study communities had similar numbers of households, the number of connections within a community varied widely. This suggests that each community has its own unique social context underlying the role of social relationships in subsistence salmon harvests. The structure of local networks differed between relationships that support the production (harvesting, processing) of salmon and relationships that support the distribution (sharing) of salmon. While harvesting and processing networks were generally less dense—with small numbers of households clustered together but disconnected from households in other parts of the network—sharing networks connected these household clusters, bringing most or all households in the community into a single, large component of the community network. Figure 3 shows the links between households within a community from sharing, processing, and harvesting salmon. Table 1 summarizes the local network ties within each study community for salmon.

Non-Local Networks

Salmon harvested in these communities in 2016 were shared throughout Alaska and elsewhere (Figure 4). Sharing of salmon between communities within the region is a more balanced exercise; with more distant communities (such as Anchorage or other parts of the U.S.), salmon flows out of the study communities in greater amounts and more frequently than into the communities. When salmon is shared outside of a study

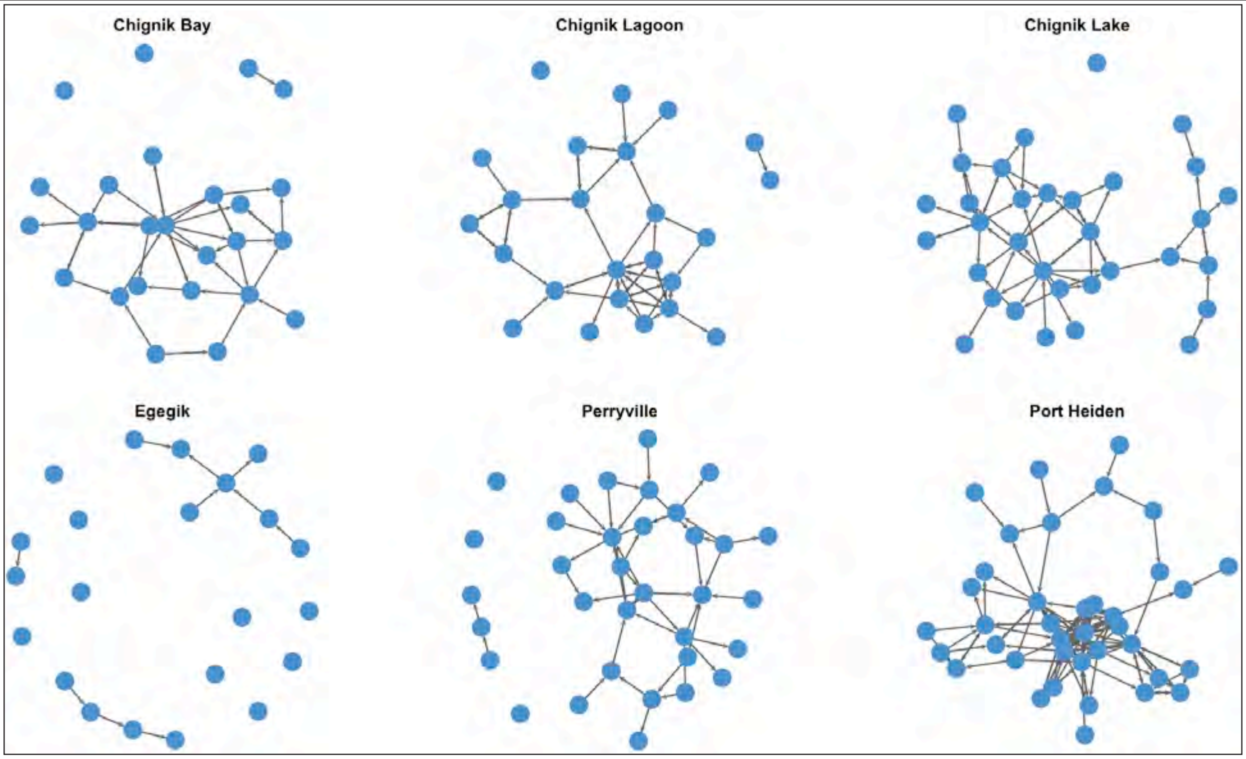

Figure 3.–Visualizations of salmon harvesting, processing, and sharing ties between households, by community, 2016.

Table 1.–Descriptive statistics for local networks within each study community, by study community, 2016.

Community	Total number of households	Total ties[a]	Number of ties ________. Harvesting	Processing	Sharing
Chignik Bay	25	47	9	9	29
Chignik Lagoon	24	71	19	30	22
Chignik Lake	33	79	24	18	37
Perryville	34	59	16	16	27
Port Heiden	38	293	101	99	93
Egegik	22	10	2	1	7

Source ADF&G Division of Subsistence household surveys, 2017.
a. Ties means connections between households that harvested, processed, or shared salmon.

Table 2.–Descriptive statistics for non-local networks for salmon, by relationship, all study communities combined, 2016.

	Giving to			Receiving from		
Relation	Total ties[a]	Total pounds of salmon	Average pounds of salmon per tie	Total ties[a]	Total pounds of salmon	Average pounds of salmon per tie
Children	51	1,786	35	9	139	16
Extended family	49	1,126	23	6	109	18
Grandchildren	10	187	19	3	19	6
Grandparent	3	235	78			
Missing	3	35	12	1	9	9
Other relations	76	1,902	25	46	1,263	28
Parents	65	979	15	6	133	22
Siblings	43	565	13	17	620	36

Source ADF&G Division of Subsistence household surveys, 2017.
Note Blank cells indicate no ties were reported with the relationship group.
a. Ties means connections between households that harvested, processed, or shared salmon.

Salmon fishing by gillnet (*this page*).

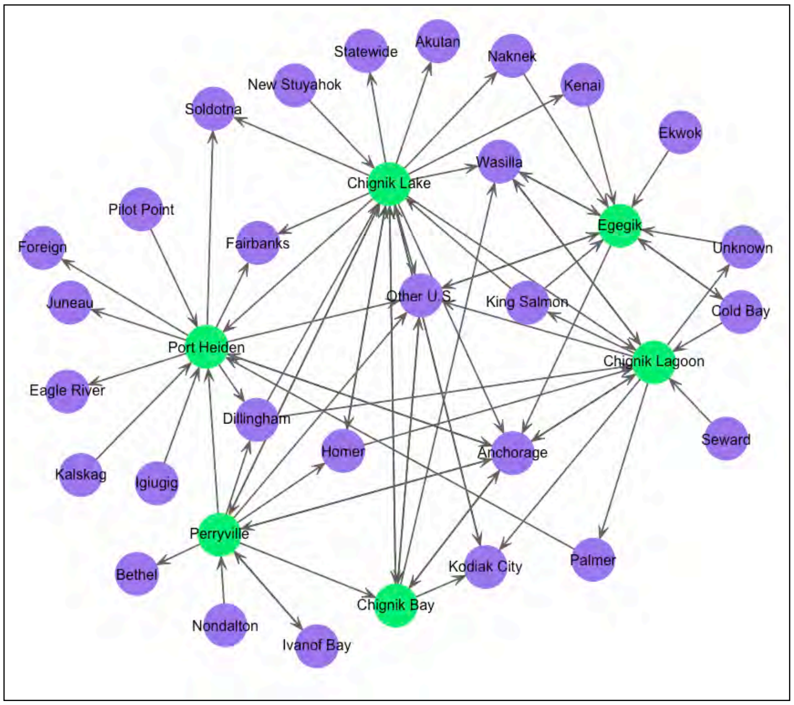

Figure 4.–Non-local networks depicting exchanges of salmon between households in study communities (green) and people living outside study communities (purple), 2016.

community, it is most frequently shared and shared in greater amounts with close family, followed by other relations (generally friends) and extended family (Table 2). Salmon is given by study communities to non-local close and extended family much more frequently and in greater amounts than it is received from close and extended family. The difference in frequency and amounts of salmon given and received is much smaller for friends than close and extended family.

Discussion

Change is a constant in Alaska communities. For hundreds of years, however, sharing has persisted as a common practice with great cultural value in the study communities. "We share, that's how we survive, it's how it's always been," said a Perryville respondent. And a Chignik Lagoon respondent said, sharing is "just something we have always done … you go to these older Native villages around here the first thing they do is feed you."

During household surveys and the in-depth interviews conducted for this project, several themes emerged as potential challenges to the continued patterns of sharing documented by this study. These challenges have not transformed the patterns and values of sharing yet, but key respondents expressed deep concern about their potential effects in the future. These challenges include: increasing focus of youth on modern information technology to the detriment of involvement in subsistence activities; increasing participation in the market economy; regulatory changes generally connected to resource scarcity; environmental change; climate change; demographic change, outmigration, and seasonal residency; and increasing transportation costs.

Both qualitative and quantitative data for 2016 regarding social networks support similar conclusions about the role of producing and sharing salmon in supporting the viability and resiliency (the ability to adapt to change) of the study communities.

Sharing networks maintain social ties that strengthen community values and provide alternative access to resources in the event of unanticipated events. How traditional activities look may change over time in response to changing sociocultural and economic conditions but will likely persist in some form.

"The connection between subsistence food resources and ecological relationships is also important … [and sharing] … is an important part of our food security simply because of environmental changes." —Chignik Bay resident

Acknowledgments

We extend heartfelt gratitude to all the people who invited us into their homes and shared their knowledge. Many local research assistants made this work possible in the study communities. These individuals were Billy Anderson, Angela Daugherty, and Melissa Stangel in Chignik Bay; Hanna Overton, Alvin Pedersen, and Justin Smith in Chignik Lagoon; Jarin Lind, Mitchell Lind, and William Lind III in Chignik Lake; Richard Alto, Anthony Chernikoff, and Charles Clayton in Egegik; Taylor Lind, Daniel Kosbruk, and Victoria Tague in Perryville; and Celestee Christensen, Evan Kosbruk, and Jamie Matson in Port Heiden. We would also like to thank the local councils in the study communities for their approval of the project and assistance throughout: Chignik Bay Tribal Council, Chignik Lagoon Village Council, Chignik Lake Traditional Council, Egegik Village Tribal Council, Native Village of Perryville, and Native Council of Port Heiden.

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