

Harvest and Use of Wild Resources in Akhiok, Old Harbor, and Larsen Bay, 2018

by

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Weights and measures (metric)		General		Mathematics, statistics		
centimeter	cm	Alaska Administrative Code	AAC	all standard mathematical signs, symbols and abbreviations		
deciliter	dL	all commonly-accepted abbreviations	e.g.,	alternate hypothesis	H _A	
gram	g		Mr., Mrs.,	base of natural logarithm	e	
hectare	ha		AM, PM, etc.	catch per unit effort	CPUE	
kilogram	kg	all commonly-accepted professional titles	e.g., Dr., Ph.D.,	coefficient of variation	CV	
kilometer	km		R.N., etc.	confidence interval	(F, t, χ^2 , etc.)	CI
liter	L	at	@	correlation coefficient (multiple)	R	
meter	m	compass directions:		correlation coefficient (simple)	r	
milliliter	mL				covariance	cov
millimeter	mm	east	E	covariance	cov	
Weights and measures (English)		north	N	degree (angular)	°	
	cubic feet per second	ft³/s	south	S	degrees of freedom	df
	foot	ft	west	W	expected value	E
	gallon	gal	copyright	©	greater than	>
	inch	in	corporate suffixes:		greater than or equal to	≥
	mile	mi	Company	Co.	harvest per unit effort	HPUE
	nautical mile	nmi	Corporation	Corp.	less than	<
	ounce	oz	Incorporated	Inc.	less than or equal to	≤
	pound	lb	Limited	Ltd.	logarithm (natural)	ln
	quart	qt	District of Columbia	D.C.	logarithm (base 10)	log
yard	yd	et alii (and others)	et al.	logarithm (specify base)	log ₂ , etc.	
Time and temperature		et cetera (and so forth)	etc.	minute (angular)	'	
	day	d	exempli gratia (for example)	e.g.	not significant	NS
	degrees Celsius	°C	Federal Information Code	FIC	null hypothesis	H ₀
	degrees Fahrenheit	°F	id est (that is)	i.e.	percent	%
	degrees kelvin	K	latitude or longitude	lat. or long.	probability	P
	hour	h	monetary symbols (U.S.)	\$, ¢	probability of a type I error (rejection of the null hypothesis when true)	α
	minute	min	months (tables and figures) first three letters (Jan,....Dec)		probability of a type II error (acceptance of the null hypothesis when false)	β
	second	s	registered trademark	®	second (angular)	"
	Physics and chemistry		trademark	™	standard deviation	SD
			United States (adjective)	U.S.	standard error	SE
		United States of America (noun)	USA	variance:		
alternating current		AC	U.S.C.	United States Code		
ampere		A	U.S. states	two-letter abbreviations (e.g., AK, WA)	population sample	Var
calorie		cal			sample	var
direct current		DC	Measures (fisheries)			
hertz		Hz		fork length	FL	
horsepower		hp		mideye-to-fork	MEF	
hydrogen ion activity (negative log of)		pH		mideye-to-tail-fork	METF	
parts per million	ppm	standard length		SL		
parts per thousand	ppt, ‰	total length		TL		
volts	V					
watts	W					

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HARBOR, AND LARSEN BAY, 2018**

by

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ABSTRACT

This report provides updated information about the harvests and uses of fish, wildlife, and wild plant resources by the communities of Akhiok, Old Harbor, and Larsen Bay. During February 2019, researchers conducted in-person surveys about household uses and harvests of wild resources in 2018 with households in each of the study communities. Through these household surveys, researchers 1) estimated annual harvests and uses of wild fish, wildlife, and wild plant resources in a 12-month study period by residents of the study communities; 2) mapped areas used for hunting, fishing, and gathering; 3) collected demographic and income information; and 4) evaluated trends in wild resource harvests. Researchers also identified particularly knowledgeable individuals in each community to conduct in-depth, semi-structured interviews with about subsistence harvesting practices, resource abundance patterns, and specific knowledge of the Olga and Akalura lakes systems.

During the 2018 study year, most households in each of the study communities used and harvested wild resources for nutrition and to support their subsistence way of life. Residents of the three communities used in excess of 85 different types of resources, most of which were harvested within the land and waters surrounding the study communities. Salmon was the most harvested resource category in each community, followed by nonsalmon fish and large land mammals. Marine invertebrates, marine mammals, birds and eggs, and small land mammals also contributed to the overall subsistence harvests. Per capita harvests ranged from 239 lb in Larsen Bay to 370 lb in Akhiok and 579 lb in Old Harbor. The information collected during this project complements similar data collected in these communities spanning the past 40 years and will contribute to an understanding of contemporary subsistence patterns in Kodiak Island communities.

The U.S. Fish and Wildlife Service Office of Subsistence Management provided funding for this project. Division of Subsistence research staff carried out the project with support from the Alutiiq Tribe of Old Harbor, the Native Village of Akhiok, and the Native Village of Larsen Bay.

Key words: subsistence hunting, subsistence fishing, Kodiak Island, demography, food security, wild resources, Larsen Bay, Akhiok, Old Harbor

1. INTRODUCTION

Wild resources have long been of paramount importance to the communities of Kodiak Island. In 2019, staff from Alaska Department of Fish and Game (ADF&G) Division of Subsistence worked with the Kodiak Island communities of Akhiok, Old Harbor, and Larsen Bay to document their continued dependence on the varied and abundant local wild resources (Figure 1-1). This report presents both the quantitative (such as harvest amounts, participation rates) and qualitative (information that provides spatial, temporal, and cultural context) findings for community harvests in 2018. The research results fill an information need identified by the federal subsistence management program as well as further the mission of the Division of Subsistence to gather, quantify, evaluate, and report information about customary and traditional uses of fish and wildlife resources. The three communities that participated in this study range in size: Akhiok, with 48 residents, was the smallest community; Larsen Bay had 67 residents; and the largest community of Old Harbor had 203 residents, based on survey results (Table 1-1). The majority of the population of all three communities was Alaska Native. Results of this study affirm prior findings that a wide variety of resources are used by residents of these communities and that subsistence practices continue as an integral component of their livelihoods. Table 1-2 lists all the resources used by each community in 2018.

PROJECT BACKGROUND

In its 2018 “Priority Information Needs” document, the U.S. Fish and Wildlife Service (USFWS) Office of Subsistence Management (OSM) requested reliable estimates of the harvest and use of salmon and other, nonsalmon fish species for subsistence from Kodiak Island communities, as well as information about lake rearing habitats of sockeye salmon stocks in Southwest Kodiak Island. As depicted in Table 1-3, spanning the last 40 years, the Division of Subsistence has conducted numerous studies on uses and harvests of wild resources in these communities, especially related to the *Exxon Valdez* oil spill of March 1989; but, the most recent comprehensive subsistence harvest survey was conducted more than 15 years ago for the study year 2003 (Fall 2006). Following that comprehensive study, research in the study communities included a salmon- and nonsalmon-only study in Akhiok for 2004 and in Old Harbor and Larsen Bay in both 2004 and 2005 (Williams et al. 2010), and a salmon-only study in Old Harbor and Larsen Bay in 2012 (Marchioni et al. 2016). With a clear need for updated comprehensive harvest information, division researchers successfully submitted a proposal to USFWS OSM to update information on the harvests and uses of wild resources in Akhiok, Old Harbor, Larsen Bay, and Karluk. These are the only contemporary communities on the southern end of Kodiak Island and are the most likely to use or know about sockeye salmon stocks on the southwest end of the island, particularly the Olga and Akalura lakes watersheds. The proposal was submitted with support from the first three communities, but researchers were not able to contact Karluk to discuss the project and ask for community support. After multiple attempts through various channels to contact the community, Karluk was eventually removed from the project scope of work.

REGIONAL BACKGROUND

Kodiak Island is the second largest island in the United States, measuring approximately 3,588 square miles.¹ The population of the entire island exceeds 13,000 residents. Most of the population is centered in Kodiak city and the surrounding road-connected area, but there are also seven populated smaller communities in the census designated place, including Aleneva on Afognak Island; Port Lions and Ouzinkie on the northern end of Kodiak Island; and Akhiok, Old Harbor, Larsen Bay, and Karluk on the southern end of Kodiak Island (Figure 1-1). The Kodiak National Wildlife Refuge is the dominant feature of land ownership on the southern end of the island; also, many of the islands on the southern end of the island are part of the Alaska Maritime National Wildlife Refuge. The three study communities are either within or adjacent to a refuge. Other landowners around the communities include local governments, village and regional Alaska Native Claims Settlement Act (ANCSA) corporations, and the State of Alaska. Each of the communities is incorporated as a second-class city.

1. Kodiak Island Borough. “About our community.” <https://www.kodiakak.us/621/About-Our-Community> (accessed September 2020).



Figure 1-1.—Map of study communities, 2018.

Table 1-1.—Population estimates, study communities, 2010 and 2018.

	Akhiok		Old Harbor		Larsen Bay	
	Census (2010)	This study (2018)	Census (2010)	This study (2018)	Census (2010)	This study (2018)
Total population						
Households	19	14.0	84	67.0	34	30.0
Population	71	48.4	218	203.2	87	67.1
Alaska Native						
Population	62	43.3	194	178.7	66	48.6
Percentage	87.3%	89.5%	89.0%	87.9%	75.9%	72.3%

Sources U.S. Census Bureau (n.d.) for 2010 decennial census data; ADF&G Division of Subsistence household surveys, 2019, for 2018 estimate.

Kodiak city is one of the largest fishing ports in the state and country. Commercial fishing and the U.S. Coast Guard Base and other government entities are the dominant industries on the island, but services, retail, tourism, and transportation also play important roles in the local economy. Kodiak is a transportation hub for Southwest Alaska and is the home port for the Alaska state ferry M/V *Tustumena*, which serves the Alaska Peninsula and the Aleutian Islands. Twice-daily jet service from Anchorage is the predominant mode of transportation to the island.

Mountains, glacial valleys, fjords, forests, rivers, and lakes are the distinguishing features of the Kodiak Island ecosystem. These diverse habitats sustain myriad wildlife—from brown bears, salmon, and other fish populations to upland birds and waterfowl—that the people of the island archipelago have long relied upon. In the adjacent marine waters, marine mammals such as seals and sea lions have also sustained local human populations. In more recent times, deer, elk, and mountain goats have all been introduced and flourished on parts of the island.² The original inhabitants of the area are the Alutiiq/Sugpiaq people. Kodiak Island is rich in archaeological sites and has been subject to much anthropological research, and understanding of earlier Kodiak populations is still expanding (Kopperl 2012). The Ocean Bay tradition is the earliest prehistoric tradition in the Kodiak Island area, dating to between 8,600 and 4,000 years ago (Gillispie 2018). During this time, small and mobile groups of individuals lived along the coast or stream mouths, likely to access marine mammals and fish resources—the mainstays of their harvests. As time went on, people also moved inland near large lakes.

Over time, fishing and fish resources became more important and harvesters developed nets to harvest salmon while also still pursuing Pacific cod (Yesner 1992). There is evidence of a shift from depending on procuring food season-to-season to producing surpluses for long-term storage and consumption (Gillispie 2018). Communities grew, trade increased, and art and tools were manufactured. These changes led to social structure changes, with larger homes housing multiple related families and the emergence of chiefs. Beginning around 650 years ago, the prehistoric culture, known as the Koniag tradition, developed into an essentially identical culture that Russians first encountered in the 18th century. With the arrival of Russian fur traders in the late 1700s, Alaska Natives were forced to hunt sea otters, fish for salmon, and hunt whales for the Russians (Black 2004). The Russian Orthodox faith was introduced during this period and remains a strong component of life in many of the area communities. The forced labor and changed social structures, along with the influx of outsiders, led to the death of many local inhabitants through starvation and infectious diseases. The most recent historic period in Kodiak began with the sale of Alaska to the United States in 1867. Commercial sea otter hunting continued until a ban on the practice in 1911. Trapping, whaling, cattle ranching, and gold mining were all attempted, but the rise of the modern commercial fishing

2. Sitka black-tailed deer were introduced to Kodiak Island in 1924 and 1934, mountain goats in 1952–1953, and Roosevelt elk were transplanted to Afognak Island in 1929 (Paul 2009rev.).

Table 1-2.–Resources used by study communities, 2018.

Community	Common name	Scientific name
Ahkiok	Salmon	
	Chum salmon	<i>Oncorhynchus keta</i>
	Coho salmon	<i>Oncorhynchus kisutch</i>
	Chinook salmon	<i>Oncorhynchus tshawytscha</i>
	Pink salmon	<i>Oncorhynchus gorbuscha</i>
	Sockeye salmon	<i>Oncorhynchus nerka</i>
	Nonsalmon fish	
	Pacific (gray) cod	<i>Gadus macrocephalus</i>
	Pacific halibut	<i>Hippoglossus stenolepis</i>
	Black rockfish	<i>Sebastes melanops</i>
	Sablefish (black cod)	<i>Anoplopoma fimbria</i>
	Dogfish	<i>Squalus acanthias</i>
	Dolly Varden	<i>Salvelinus malma</i>
	Steelhead	<i>Oncorhynchus mykiss</i>
	Large land mammals	
	Deer	<i>Odocoileus hemionus</i>
	Mountain goat	<i>Oreamnos americanus</i>
	Moose	<i>Alces alces</i>
	Small land mammals	
	Beaver	<i>Castor canadensis</i>
	Red fox	<i>Vulpes vulpes</i>
	Marine mammals	
	Harbor seal	<i>Phoca vitulina</i>
	Sea otter	<i>Enhydra lutris</i>
	Unknown whale	
	Birds and eggs	
	Bufflehead	<i>Bucephala albeola</i>
	Unknown goldeneye	<i>Bucephala spp.</i>
	Mallard	<i>Anas platyrhynchos</i>
	Surf scoter	<i>Melanitta perspicillata</i>
	Unknown ducks	
	Emperor goose	<i>Chen canagica</i>
	Unknown ptarmigan	<i>Lagopus spp.</i>
	Glaucous-winged gull eggs	<i>Larus glaucescens</i>
	Black-legged kittiwake eggs	<i>Rissa tridactyla</i>
	Unknown tern eggs	
	Marine invertebrates	
	Black (small) chitons	<i>Katherina tunicata</i>
	Butter clams	<i>Saxidomus gigantea</i>
	Pacific littleneck clams (steamers)	<i>Protothaca staminea</i>
	Unknown cockles	
	Dungeness crab	<i>Cancer magister</i>
	Red king crab	<i>Paralithodes camtschaticus</i>
	Tanner crab, <i>bairdi</i>	<i>Chionoecetes bairdi</i>

-continued-

Table 1-2.–Page 2 of 5.

Community	Common name	Scientific name
Akhiok, cont.	Octopus	<i>Octopus vulgaris</i>
	Unknown scallops	
	Sea cucumber	
	Sea urchin	<i>Strongylocentrotus spp.</i>
	Vegetation	
	Lowbush cranberry	<i>Vaccinium vitis-idaea minus</i>
	Crowberry	<i>Empetrum nigrum</i>
	Cloudberry	<i>Rubus chamaemorus</i>
	Salmonberry	<i>Rubus spectabilis</i>
	Strawberry	<i>Fragaria virginiana</i>
	Nettle	<i>Urtica spp.</i>
	Wild celery	<i>Angelica lucida</i>
	Wild parsley	<i>Pastinaca sativa</i>
	Wild rose hips	<i>Rosa acicularis</i>
	Fireweed	<i>Epilobium angustifolium</i>
	Wood	
Old Harbor	Salmon	
	Chum salmon	<i>Oncorhynchus keta</i>
	Coho salmon	<i>Oncorhynchus kisutch</i>
	Chinook salmon	<i>Oncorhynchus tshawytscha</i>
	Pink salmon	<i>Oncorhynchus gorbusha</i>
	Sockeye salmon	<i>Oncorhynchus nerka</i>
	Unknown salmon	<i>Oncorhynchus spp.</i>
	Nonsalmon fish	
	Pacific herring	<i>Clupea pallasii</i>
	Rainbow smelt	<i>Osmerus mordax</i>
	Pacific (gray) cod	<i>Gadus macrocephalus</i>
	Unknown flounder	
	Lingcod	<i>Ophiodon elongatus</i>
	Pacific halibut	<i>Hippoglossus stenolepis</i>
	Black rockfish	<i>Sebastes melanops</i>
	Yelloweye rockfish	<i>Sebastes ruberrimus</i>
	Dusky rockfish	<i>Sebastes ciliatus</i>
	Sablefish (black cod)	<i>Anoplopoma fimbria</i>
	Bullhead sculpin	
	Dolly Varden	<i>Salvelinus malma</i>
	Rainbow trout	<i>Oncorhynchus mykiss</i>
	Steelhead	<i>Oncorhynchus mykiss</i>
	Large land mammals	
	Brown bear	<i>Ursus arctos</i>
	Deer	<i>Odocoileus hemionus</i>
	Elk	<i>Cervus canadensis</i>
	Mountain goat	<i>Oreamnos americanus</i>
	Moose	<i>Alces alces</i>
	Small land mammals	
	Beaver	<i>Castor canadensis</i>
	Red fox	<i>Vulpes vulpes</i>

-continued-

Table 1-2.–Page 3 of 5.

Community	Common name	Scientific name
Old Harbor, cont.	Snowshoe hare	<i>Lepus americanus</i>
	River (land) otter	<i>Lontra canadensis</i>
	Marine mammals	
	Harbor seal	<i>Phoca vitulina</i>
	Sea otter	<i>Enhydra lutris</i>
	Steller sea lion	<i>Eumetopias jubatus</i>
	Unknown whale	
	Birds and eggs	
	Bufflehead	<i>Bucephala albeola</i>
	Gadwall	<i>Mareca strepera</i>
	Barrow's goldeneye	<i>Bucephala islandica</i>
	Unknown goldeneye	<i>Bucephala spp.</i>
	Harlequin duck	<i>Histrionicus histrionicus</i>
	Mallard	<i>Anas platyrhynchos</i>
	Northern pintail	<i>Anas acuta</i>
	Black scoter	<i>Melanitta nigra</i>
	Surf scoter	<i>Melanitta perspicillata</i>
	White-winged scoter	<i>Melanitta fusca</i>
	Northern shoveler	<i>Anas clypeata</i>
	Unknown teal	<i>Anas spp.</i>
	American wigeon	<i>Anas americana</i>
	Unknown ducks	
	Brant	<i>Branta bernicla</i>
	Cackling goose	<i>Branta hutchinsii minima</i>
	Emperor goose	<i>Chen canagica</i>
	Unknown geese	
	Unknown ptarmigan	<i>Lagopus spp.</i>
	Glaucous-winged gull eggs	<i>Larus glaucescens</i>
	Unknown tern eggs	
	Marine invertebrates	
	Red (large) chitons	<i>Cryptchiton stelleri</i>
	Black (small) chitons	<i>Katherina tunicata</i>
	Butter clams	<i>Saxidomus gigantea</i>
	Pacific littleneck clams (steamers)	<i>Protothaca staminea</i>
	Razor clams	<i>Siliqua spp.</i>
	Unknown cockles	
	Dungeness crab	<i>Cancer magister</i>
	Red king crab	<i>Paralithodes camtschaticus</i>
	Tanner crab, <i>bairdi</i>	<i>Chionoecetes bairdi</i>
	Unknown Tanner crab	<i>Chionoecetes spp.</i>
	Octopus	<i>Octopus vulgaris</i>
	Unknown scallops	
	Sea urchin	<i>Strongylocentrotus spp.</i>
	Shrimp	
	Vegetation	
	Blueberry	<i>Vaccinium uliginosum alpinum</i>
	Highbush cranberry	<i>Viburnum edule</i>
	Crowberry	<i>Empetrum nigrum</i>
	Cloudberry	<i>Rubus chamaemorus</i>

-continued-

Table 1-2.–Page 4 of 5.

Community	Common name	Scientific name
Old Harbor, cont.	Raspberry	<i>Rubus idaeus</i>
	Salmonberry	<i>Rubus spectabilis</i>
	Strawberry	<i>Fragaria virginiana</i>
	Fiddlehead ferns	
	Wild celery	<i>Angelica lucida</i>
	Wild parsley	<i>Pastinaca sativa</i>
	Wild rose hips	<i>Rosa acicularis</i>
	Cottonwood buds ^a	
	Unknown mushrooms	
	Fireweed	<i>Epilobium angustifolium</i>
	Seaweed/kelp used for fertilizer	
	Wood	
Larsen Bay	Salmon	
	Coho salmon	<i>Oncorhynchus kisutch</i>
	Chinook salmon	<i>Oncorhynchus tshawytscha</i>
	Pink salmon	<i>Oncorhynchus gorbuscha</i>
	Sockeye salmon	<i>Oncorhynchus nerka</i>
	Nonsalmon fish	
	Pacific herring	<i>Clupea pallasii</i>
	Pacific herring roe on hemlock branches	<i>Clupea pallasii</i>
	Pacific (gray) cod	<i>Gadus macrocephalus</i>
	Unknown cod	
	Unknown flounder	
	Kelp greenling	<i>Hexagrammos decagrammus</i>
	Lingcod	<i>Ophiodon elongatus</i>
	Pacific halibut	<i>Hippoglossus stenolepis</i>
	Black rockfish	<i>Sebastes melanops</i>
	Yelloweye rockfish	<i>Sebastes ruberrimus</i>
	Quillback rockfish	<i>Sebastes maliger</i>
	Sablefish (black cod)	<i>Anoplopoma fimbria</i>
	Unknown shark	
	Dolly Varden	<i>Salvelinus malma</i>
	Rainbow trout	<i>Oncorhynchus mykiss</i>
	Steelhead	<i>Oncorhynchus mykiss</i>
	Unknown trout	
	Large land mammals	
	Brown bear	<i>Ursus arctos</i>
	Caribou	<i>Rangifer tarandus</i>
	Deer	<i>Odocoileus hemionus</i>
	Elk	<i>Cervus canadensis</i>
	Mountain goat	<i>Oreamnos americanus</i>
	Moose	<i>Alces alces</i>
	Small land mammals	
	Red fox	<i>Vulpes vulpes</i>
	Snowshoe hare	<i>Lepus americanus</i>
	Marine mammals	
	Harbor seal	<i>Phoca vitulina</i>
	Sea otter	<i>Enhydra lutris</i>

-continued-

Table 1-2.–Page 5 of 5.

Community	Common name	Scientific name
Larsen Bay, cont.	Birds and eggs	
	Bufflehead	<i>Bucephala albeola</i>
	Unknown goldeneye	<i>Bucephala spp.</i>
	Mallard	<i>Anas platyrhynchos</i>
	Glaucous-winged gull eggs	<i>Larus glaucescens</i>
	Marine invertebrates	
	Red (large) chitons	<i>Cryptchiton stelleri</i>
	Black (small) chitons	<i>Katherina tunicata</i>
	Butter clams	<i>Saxidomus gigantea</i>
	Pacific littleneck clams (steamers)	<i>Protothaca staminea</i>
	Razor clams	<i>Siliqua spp.</i>
	Unknown cockles	
	Dungeness crab	<i>Cancer magister</i>
	Red king crab	<i>Paralithodes camtschaticus</i>
	Tanner crab, <i>bairdi</i>	<i>Chionoecetes bairdi</i>
	Limpets	<i>Patella vulgata</i>
	Octopus	<i>Octopus vulgaris</i>
	Unknown scallops	
	Sea cucumber	
	Sea urchin	<i>Strongylocentrotus spp.</i>
	Shrimp	
	Vegetation	
	Blueberry	<i>Vaccinium uliginosum alpinum</i>
	Highbush cranberry	<i>Viburnum edule</i>
	Raspberry	<i>Rubus idaeus</i>
	Salmonberry	<i>Rubus spectabilis</i>
	Twisted stalk berry (watermelon berry)	<i>Streptopus amplexifolius</i>
	Other wild berry	
	Beach asparagus	<i>Salicornia virginica</i>
	Goose tongue	<i>Plantago maritima</i>
	Wild rhubarb	<i>Polygonum alaskanum</i>
	Fiddlehead ferns	
	Nettle	<i>Urtica spp.</i>
	Wild parsley	<i>Pastinaca sativa</i>
	Wild rose hips	<i>Rosa acicularis</i>
	Other wild greens	
	Unknown mushrooms	
	Fireweed	<i>Epilobium angustifolium</i>
	Sea lovage	<i>sigusticum scoticum</i>
	Bull kelp	<i>Honckenya peploides</i>
	Bladder wrack	<i>Fucus spp.</i>
	Seaweed/kelp used for fertilizer	
	Unknown seaweed	
	Wood	

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

a. Resource was collected for medicinal use only. As such, no conversion factor for pounds usable weight was calculated for the harvest of the resource; further, the resource obtained for medicinal purposes only is not included in use and harvest data in this report.

Table 1-3.—Previous study years, study communities, 1982–2018.

Year	Kodiak city ^a	Karluk	Port Lions	Ouzinkie	Akhiok	Old Harbor	Larsen Bay
1982	ALL	ALL	ALL	ALL	ALL	ALL	ALL
1983							
1984							
1985							
1986		ALL	ALL	ALL	ALL	ALL	ALL
1987							
1988							
1989		ALL	ALL	ALL	ALL	ALL	ALL
1990		ALL		ALL			ALL
1991	ALL	ALL		ALL		ALL	ALL
1992	ALL			ALL	ALL		ALL
1993	ALL		ALL	ALL			ALL
1994	MM	MM	MM	MM	MM	MM	MM
1995	MM	MM	MM	MM	MM	MM	MM
1996	MM	MM	MM	MM	MM	MM	MM
1997	MM	MM	MM	ALL	MM	ALL	ALL
1998	MM	MM	MM	MM	MM	MM	MM
1999							
2000	MM	MM	MM	MM	MM	MM	MM
2001	MM	MM	MM	MM	MM	MM	MM
2002	MM	MM	MM	MM	MM	MM	MM
2003	MM	ALL	ALL	ALL	ALL	ALL	ALL
2004	MM	MM	SAL/NS/MM	SAL/NS/MM	SAL/NS/MM	SAL/NS/MM	SAL/NS/MM
2005	MM	MM	SAL/NS/MM	SAL/NS/MM	MM	SAL/NS/MM	SAL/NS/MM
2006	MM	MM	MM	MM	MM	MM	MM
2007	MM	MM	MM	MM	MM	MM	MM
2008	MM		MM	MM	MM		MM
2009							
2010							
2011	MM	MM	MM	MM	MM	MM	MM
2012	SAL					SAL	SAL
2013							
2014							
2015							
2016							
2017							
2018					ALL	ALL	ALL

Source ADF&G Division of Subsistence, Community Subsistence Information System (CSIS); Williams et al. (2010); and Wolfe and Mishler (1995).

Note The resource categories in surveys varied by year: ALL = all resources, SAL = salmon, NS = nonsalmon fish, MM = marine mammals

a. Depending on the survey year, study area includes the city, U.S. Coast Guard Base, road-connected areas, Women's Bay, and Chiniak.

industry has had the most and longest lasting success. The first canneries on the island were established near Karluk beginning in 1878 and the industry quickly expanded with one-half of the entire Alaska pack of canned salmon produced from the Karluk River estuary through 1890 (Fall and Utermohle 1995a: pg XIV-1; Roppel 1994). While the canneries did hire Alaska Natives, the preference in the early years was to employ Chinese laborers. In the late 1800s, Scandinavians came to Kodiak to hunt sea otters and eventually to work as fishermen. Some of these immigrants settled in the area and married local women, as evidenced by the Scandinavian names of many contemporary area residents. Alaska Natives became increasingly involved in the commercial fishing industry, transitioning from living a strictly subsistence way of life to participating in a mixed cash–subsistence economy (Mason 1995).

The eruption of Mount Katmai in 1912 disrupted the lives of Kodiak and Katmai residents, destroying settlements and salmon streams and damaging vegetation. A naval base was constructed on Kodiak in the late 1930s and World War II increased the military presence on the island dramatically. After the war, the Kodiak Naval Operating Base became the contemporary U.S. Coast Guard Base near the city of Kodiak. The Good Friday earthquake in 1964 also greatly affected inhabitants and their physical communities. The rebuilding of Kodiak city following the earthquake hastened its emergence as the king crab fishery capital after processing operations consolidated in the town (Mason 1995). The *Exxon Valdez* oil spill in 1989 closed down some commercial fisheries in the area and had a lasting effect on subsistence practices (Fall 2006).

REGULATORY CONTEXT

Subsistence hunting and fishing in Alaska is managed under both state and federal regulations. In addition to subsistence activities, many Alaskans bring home fish from their commercial catches or by harvesting under sport fishing regulations. On Kodiak Island, subsistence use of lands encompassed by the Kodiak National Wildlife Refuge is guided by federal regulations; seasons and bag limits for sport harvests of fish and wildlife on these lands are set by ADF&G. Outside of the boundaries of the refuge, state regulations guide the harvest of resources for subsistence. In marine waters, the state manages most subsistence fisheries, including salmon and crab, but the harvest of Pacific halibut is regulated by the National Marine Fisheries Service (NMFS). For marine mammals locally available, subsistence uses are managed by either the National Oceanic and Atmospheric Administration (harbor seals and sea lions) or USFWS (sea otters). The remainder of this section will focus on regulations guiding harvests of salmon, nonsalmon fish, large land mammals, and marine invertebrates because of their importance to the study communities.

Salmon

The state Kodiak Management Area encompasses the entirety of the Kodiak Archipelago. The Alaska Board of Fisheries (BOF) has found that all salmon within the Kodiak Area are customarily and traditionally used for subsistence (5 AAC 01.536(a)). Additionally, the BOF has found that between 26,800 and 44,700 salmon are reasonably necessary for subsistence uses (5 AAC 01.536(b)). Within this area, a person can subsistence fish for salmon any day of the year between the hours of 6:00 a.m. to 9:00 p.m. (5 AAC 01.510(a)). Legal subsistence gear types are gillnet and seine; between June 1 and September 15, vessel and gear restrictions are in place because of the overlap between commercial salmon fishing and subsistence salmon fishing. Subsistence salmon fishers have to be present at their gillnet while it is in use. A permit is required to harvest salmon; harvests must be recorded and the permit returned to ADF&G (5 AAC 01.530). Through most of the Kodiak Area, there are no annual limits on the harvest of salmon; the only exception is in an area bordering the city of Kodiak. Special regulations apply to the Karluk River Chinook (king) salmon run: if the Karluk River king salmon biological escapement goal is projected to not be met, the department can mandate nonretention of king salmon and only allow beach seine as the legal gear type in the Karluk River area. There were no inseason changes to fishing regulations outside of the Kodiak city area in 2018. Federal regulations generally mirrored state regulations for subsistence salmon fishing (a difference of note, however, was that rod and reel was a legal gear type to harvest subsistence salmon under federal regulation) (Federal Subsistence Management Program n.d.:pg 49–51).

Nonsalmon Fish

There are a variety of nonsalmon fish harvested for subsistence uses, but Pacific halibut is one of the most important of these. Federal subsistence Pacific halibut fisheries are managed by NMFS. Fishers must obtain a Subsistence Halibut Registration Certificate (SHARC) to participate; there are no reporting requirements but ADF&G, through a grant from the National Oceanic and Atmospheric Administration, does distribute a biannual voluntary harvest survey to all SHARC holders. Halibut fishers in the Kodiak area (halibut regulatory areas 3A and 3B) can use rod and reel and other approved handheld gear or set a skate of up to 30 hooks in length to fish (but not to exceed 90 hooks per vessel). Harvest limits are 20 fish per day and in possession. These and other regulations concerning halibut fishing in Alaska can be found at 50 CFR 300.65.

Other nonsalmon fish harvested by Kodiak Island communities include Pacific herring, Pacific cod, rockfish, and lingcod. Of these species, a permit is only required for Pacific herring and there is an annual harvest limit of 500 pounds of herring (5 AAC 01.530(a) and (d)). Bag limits for other species are two lingcod per day and four in possession and 10 rockfish per day, 20 in possession (5 AAC 01.545). Lingcod and rockfish can only be harvested by a single hand-held line or longline with no more than five hooks (5 AAC 01.520); however, either species caught incidentally in another subsistence fishery can be retained, with a limitation of up to two lingcod or 10 rockfish per day; the season for lingcod is July 1 through December 31 (5 AAC 01.510).

Marine Invertebrates

The BOF has found that king crab, Tanner crab, Dungeness crab, shrimp, and miscellaneous shellfish (such as clams, chitons, and octopus) are customarily and traditionally taken for subsistence in the waters of the Kodiak Area (5 AAC 02.466). For marine invertebrates, a subsistence permit and harvest reporting are only required for crab. There is a daily bag and possession limit of 12 Dungeness crab per person, an annual limit of three king crab per household, and a daily bag and possession limit of 12 Tanner crab. Only male crab can be taken and each species has a minimum size limit. The low annual limit of king crab is a reflection of king crab stocks in the area being at historically low levels (Spalinger and Phillips 2017). Pot size limits and other restrictions for subsistence crab and shrimp fishing can be found at 5 AAC 02.410–425.

Large Land Mammals

Brown bear, deer, elk, and mountain goat are the large land mammals found on Kodiak Island. Sitka black-tailed deer were introduced to Kodiak Island sometime around the early 1900s and have grown to become the dominant subsistence resource for Kodiak Island residents (Svoboda and Crye 2020). Winter mortality is the major limiting factor for local deer populations. The primary methods of assessing the deer population have been through hunter harvest reporting and anecdotal evidence, despite ADF&G having attempted several other techniques for population assessment. The winter of 2011 was severe and resulted in a reduced deer population, but a series of mild winters following 2011 led to an increasing population and higher harvests (Svoboda and Crye 2020). Regulations regarding the harvest of deer in Game Management Unit (GMU) 8 range from more restrictive around the city of Kodiak and the road system to more liberal in the outlying areas. State hunting regulations for the areas outside of the road system allowed three deer from August 1–December 31 and antlerless deer could only be taken after October 1 (5 AAC 85.030(a) (6)). Federal regulations mirrored state regulations, except the season ended on January 31 (U.S. Fish and Wildlife Service 2018).

STUDY OBJECTIVES

The project had the following objectives:

- Estimate the harvest of wild resources, including salmon and nonsalmon fish, during the study year (2018) by residents of Akhiok, Old Harbor, and Larsen Bay.
- Record the spatial extent of search and harvest areas for salmon and nonsalmon fish by residents of Akhiok, Old Harbor, and Larsen Bay.

- Document patterns associated with subsistence salmon and nonsalmon harvests, historically and in the recent past.
- Collect local, traditional knowledge (LTK) of habitat important to salmon lifecycles held by residents of Akhiok and Larsen Bay, with a specific focus on Olga and Akalura lakes.

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*³ and by the National Science Foundation, Office of Polar Programs in its *Principles for the Conduct of Research in the Arctic* that were approved in 1990 (Social Science Task Force, U.S. Interagency Arctic Research Policy Committee 1995), the *Ethical Principles for the Conduct of Research in the North* (Association of Canadian Universities for Northern Studies 2003), as well as the Alaska confidentiality statute (AS 16.05.815). These principles stress community approval of research designs, informed consent, anonymity or confidentiality of study participants, community review of draft study findings, and the provision of study findings to each study community upon completion of the research.

Project Planning and Approvals

This project was implemented by the ADF&G Division of Subsistence, with the support and assistance of the study communities (Table 1-4). During development of the project, the proposed study communities were approached by phone and email to gauge their interest in the study activities. Letters of support for the project were submitted by Larsen Bay and Old Harbor (Appendix A). Although no letter of support was submitted from the community of Akhiok, the tribal administrator expressed interest in being a part of the study. The community of Karluk could not be contacted to discuss participation and was therefore dropped from the study objectives. In addition to communicating with the proposed study communities, division researchers contacted the Kodiak National Wildlife Refuge, the Alutiiq Museum, and Koniag, Inc., to discuss the project and seek their support. Letters of support from these entities were also submitted along with the proposal (Appendix A). After the project was awarded funding, division staff developed a draft survey based on previous research done in the communities. ADF&G researchers Lauren Sill and Amy Wiita created a Microsoft PowerPoint⁴ presentation to give an overview of the proposed project's goals, objectives, methods, and timeline. Sill and Wiita traveled to each of the three study communities (Akhiok, Old Harbor, and Larsen Bay) in the winter months of early 2019 to hold a community scoping meeting, reintroduce the project through the Microsoft PowerPoint presentation, discuss the survey form and species lists, seek feedback on the project plans, and coordinate logistics of returning to the communities to conduct the surveys (Table 1-5). During these meetings, community members and tribal staff raised their concern of non-local hunters and fishers accessing lands near their communities for harvesting purposes. As the conversation progressed, researchers were able to learn about significant recent outmigration of local residents and how that had changed subsistence practices in the communities. While the harvest survey could not obtain information about all non-local residents who may be using local lands for harvesting, researchers decided to add a section to the survey instrument to try to better understand the recent increase in outmigration and its effect on harvesting practices.

Systematic Household Surveys

The primary method for collecting subsistence harvest and use information in this project was a systematic household survey. Following receipt of comments at the scoping meetings, ADF&G finalized the survey instrument in February 2019. A key goal was to structure the survey instrument to collect demographic,

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3. Alaska Federation of Natives. "Alaska Federation of Natives Guidelines for Research." Alaska Native Knowledge Network, <http://www.ankn.uaf.edu/IKS/afnguide.html> (last modified August 15, 2006, accessed January 17, 2017).
 4. Product names are given because they are established standards for the State of Alaska or for scientific completeness; they do not constitute product endorsement.

Table 1-4.–Project staff.

Task	Name	Organization
Southern Regional Program Manager	Robin Dublin	ADF&G Division of Subsistence
Previous Southern Regional Program Manager	Brian Davis	ADF&G Division of Subsistence
Principal Investigators	Lauren Sill	ADF&G Division of Subsistence
	Amy Wiita	ADF&G Division of Subsistence
	Jacqueline Keating	ADF&G Division of Subsistence
Data Management Lead	David Koster	ADF&G Division of Subsistence
Data Management Assistant	Gayle Neufeld	ADF&G Division of Subsistence
Administrative support	Tamsen Coursey-Willis	ADF&G Division of Subsistence
	Pamela Amundson	ADF&G Division of Subsistence
	Zayleen Kalalo	ADF&G Division of Subsistence
	Robin Bartlett	ADF&G Small Divisions
		Administrative Services
Programmer	Margaret Cunningham	ADF&G Division of Subsistence
Data entry	Margaret Cunningham	ADF&G Division of Subsistence
	Alex DePue	ADF&G Division of Subsistence
	Halia Janssen	ADF&G Division of Subsistence
Data cleaning/validation	Margaret Cunningham	ADF&G Division of Subsistence
Data analysis	Gayle Neufeld	ADF&G Division of Subsistence
Cartography	Margaret Cunningham	ADF&G Division of Subsistence
Editorial Review Lead	Mary Lamb	ADF&G Division of Subsistence
Field research staff	Lauren Sill	ADF&G Division of Subsistence
	Amy Wiita	ADF&G Division of Subsistence
	Jacqueline Keating	ADF&G Division of Subsistence
	Katheryn Hayden	ADF&G Division of Subsistence
Local research assistants	Frieda Panamaroff	Larsen Bay
	Katherine Alexanderoff	Old Harbor

Table 1-5.–Community scoping meetings, study communities, 2019.

Community	Date	Attendance	
		Community residents	Project staff
Akhiok	January 31, 2019	6	2
Old Harbor	January 29, 2019	11	2
Larsen Bay	January 30, 2019	10	2

resource harvest and use, and other economic data that are comparable with information collected in other household surveys in the study communities and with data in the Community Subsistence Information System (CSIS⁵). The household survey also included a series of questions about food security, sharing wild resources, and the role of former community households in local harvest activities. Appendix B is an example of the survey instrument used in this project.

The study communities chosen for this project are all small to moderate in size. Based on the 2010 federal census and speaking with community leaders, researchers anticipated community sizes of approximately 20 households in Akhiok to 75 households in Old Harbor. Each community was geographically defined by city boundaries. Because of the anticipated sizes of the communities, a census was attempted for each (Table 1-6). In Akhiok and Larsen Bay, 70% or more of community households were surveyed. In both communities, several households were out of town or were sick for the duration of the survey effort and could not be contacted. One household in Akhiok and two households in Larsen Bay declined to participate

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

Table 1-6.—Estimated households and sample achievement, study communities, 2018.

Sample information	Community		
	Akhiok	Larsen Bay	Old Harbor
Number of dwelling units	19	32	67
Survey goal	100%	100%	100%
Households surveyed	11	21	30
Households failed to be contacted	2	9	18
Households declined to be surveyed	1	2	19
Households moved or occupied by nonresident	5	2	0
Total households attempted to be surveyed	14	32	67
Refusal rate	8.3%	8.7%	38.8%
Final estimate of permanent households	14	30	67
Percentage of total households surveyed	78.6%	70.0%	44.8%
Survey weighting factor	1.27	1.43	2.23
Sampled population	38	47	91
Estimated population	48.4	67.1	203.2

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

Table 1-7.—Survey duration, study communities, 2018.

Community	Interview length (in minutes)		
	Average	Minimum	Maximum
Akhiok	87	20	210
Larsen Bay	79	19	305
Old Harbor	56	17	130

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

in the survey. Of the 67 households of Old Harbor, researchers were able to survey 30 (45%); the remaining households either could not be contacted despite multiple attempts (18 households) or did not wish to participate in the survey (19 households). The survey effort faced more challenges in Old Harbor than in Akhiok or Larsen Bay. One example of this is that researchers encountered difficulties finding local research assistants (LRAs) to work with; even with the active assistance of the tribal council staff, only one resident was interested and available during the survey period. Lack of local assistants likely contributed to the low survey rate. Additionally, several residents told researchers that the recent distribution of dividends from the regional Native corporation, Koniag, Inc., may have contributed to the high no-contact and refusal rates during the study period. On average, completed surveys lasted a little longer than an hour. In Old Harbor, the average survey lasted 56 minutes; in Larsen Bay, it lasted on average 79 minutes; and in Akhiok it was 87 minutes on average (Table 1-7). The longest survey overall occurred in Larsen Bay (305 minutes), in Akhiok the longest survey took 210 minutes and in Old Harbor it lasted just longer than two hours (130 minutes). The shortest surveys in each town took approximately 20 minutes to complete.

Mapping Locations of Subsistence Hunting, Fishing, and Gathering Activities

During household interviews, the researchers asked respondents to indicate the locations of their fishing, hunting, and gathering activities during the study year. In addition, interviewers asked the respondents to mark on maps the sites of each harvest, the species harvested, the amounts harvested, and the month(s) of harvest. Points were generally used to mark harvest locations and polygons were used to indicate harvest effort areas, such as areas searched while hunting deer. Points were also used to designate a harvest effort location, especially if fishing from a riverbank. Lines were drawn in order to depict when the harvesting

activity did not occur at a specific point; for example, lines were used to depict traplines or courses taken while trolling for fish or driftnetting.

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

Once a survey was complete researchers conducted a quality control exercise by matching the map data to the survey form to ensure all map data had been documented. This was completed in the field before the surveys were submitted to the project lead. Once the data had been uploaded, researchers also verified that the household data were logged into the server.

Key Respondent Interviews

While researchers were in the study communities they consulted with tribal governments and knowledgeable individuals to identify key respondents to interview. The purpose of the key respondent interviews was to provide additional context for the quantitative data and also to provide specific information about Olga and Akalura lakes, as well as information for the community background section at the beginning of each community results chapter, each seasonal round section, harvest-over-time analysis, and the community comments and concerns section at the end of each chapter. The number of key respondent interviews varied among communities: four interviews were conducted in Akhiok, six were completed in Old Harbor, and one was done in Larsen Bay. Key respondent interviews were semi-structured and directed by a key respondent interview protocol designed by ADF&G researcher Wiita (see Appendix C). In addition to gathering qualitative data through the key respondent interview protocol, ADF&G staff took notes during interviews to provide additional context for this report. Key respondents were informed that, to maintain anonymity, their names would not be included in this report.

Household Survey Implementation

Akhiok

ADF&G researcher Sill worked with the Akhiok tribal administrator Jeanetta Rastropsoff to set up a time and place for a community scoping meeting in the 2018/2019 winter season. Sill and Wiita traveled to Akhiok on January 31, 2019, to hold the community scoping meeting that afternoon at the Akhiok school (Table 1-5). Six residents attended the presentation. After the meeting, field dates for survey administration were set for the week of February 25. Due to the small number of households in Akhiok, only two division staff traveled to the community on February 25 to administer surveys and no LRA was hired. The tribal administrator assisted project staff in contacting households for the survey. Researchers began conducting surveys on February 26 and completed the final one on February 28. Surveys were conducted at the tribal council building, in the school, or in the respondents' homes.

Old Harbor

ADF&G researchers Sill and Wiita worked with the Old Harbor tribal administrator Alicia Inga and environmental coordinator Lepani Nadore to set up a time and place for a community scoping meeting in the winter of early 2019. Sill and Wiita traveled to Old Harbor on January 29, 2019, to hold the community scoping meeting that evening in the community room upstairs from the tribal organization's offices (Table 1-5). Eleven residents attended the presentation. After the meeting, field dates for survey administration were set for around the first week of March. ADF&G researchers Jacqueline Keating and Katheryn Hayden arrived in Old Harbor on February 28 to begin survey administration. Despite the efforts of tribal council staff and several advertisements posted around town prior to their arrival, no residents had expressed interest

in working with staff as an LRA. By March 1, an LRA was hired and ADF&G researchers Sill and Wiita arrived in Old Harbor. A brief training was held the afternoon of March 1 and surveys began on March 2. Survey administration continued through March 7. Staff determined at that point that it was unlikely any other households would consent to the survey if the survey period were extended.

Larsen Bay

ADF&G researcher Sill worked with the Larsen Bay tribal administrator Marilyn Arneson to set up a time and place for a community meeting in the winter of early 2019. Sill and Wiita traveled to Larsen Bay on January 30, 2019, to hold the community scoping meeting that evening at the tribal council office (Table 1-5). Ten residents attended the presentation. After the meeting, field dates for survey administration were set for the week of February 1. Three division staff—Sill, Wiita, and Keating—traveled to the community on February 11 to begin the survey effort. Frieda Panamaroff was hired as an LRA and a brief training was held the afternoon of February 11. The first survey was conducted later that same day and surveys continued until February 14, a day earlier than planned. Surveys were conducted in residents' homes, at the tribal council building, at the researchers' lodgings, or in the school building.

DATA ANALYSIS AND REVIEW

Survey Data Entry and Analysis

Surveys were coded for data entry by research staff and reviewed by the project lead Sill for consistency. Responses were coded following standardized conventions used by the Division of Subsistence to facilitate data entry. Information Management staff within the Division of Subsistence set up database structures within Microsoft SQL Server at ADF&G in Anchorage to hold the survey data. The database structures included rules, constraints, and referential integrity to ensure that data were entered completely and accurately. Data entry screens were available on a secured internal network. Daily incremental backups of the database occurred, and transaction logs were backed up hourly. Full backups of the database occurred twice weekly. This ensured that no more than 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, or in gallons or buckets, were converted to pounds usable weight using standard factors (see Appendix D 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 phenomena 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:

$$H_i = \bar{h}_i S_i \quad (1)$$

$$\bar{h}_i = \frac{h_i}{n_i} \quad (2)$$

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:

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

where:

s = sample standard deviation,

n = sample size,

N = population size,

$t_{\alpha/2}$ = student's t statistic for alpha level ($\alpha=0.95$) 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 six months during the study year 2018. Because not all households were interviewed, population estimates for each community were calculated by multiplying the average household size of interviewed households by the total number of year-round households, as identified by Division of Subsistence researchers in consultation with community officials and other knowledgeable respondents.

There may be several reasons for the differences among the population estimates for each community generated from the division's surveys and other demographic data developed by the 2010 federal census, the U.S. Census Bureau's American Community Survey, and the Alaska Department of Labor and Workforce Development (ADLWD 2019; U.S. Census Bureau 2021). Sampling of households, timing of survey implementation, or eligibility criteria may explain differences in the population estimates. There are several families in each community that have moved to Kodiak city or Anchorage for health, schooling, or employment opportunities but still return to the communities for a good portion of every year. These families may get included as part of the permanent population for some population estimates depending on when the estimate is made, the method of estimation, and the criteria used to determine residency.

Map Data Entry and Analysis

As discussed above, maps were generated based on data collected using an iPad. Map features were matched to the survey form to ensure that all harvest data were recorded accurately. Once all data were downloaded from the ESRI cloud server to a localized database managed by ADF&G, the data were sorted by community and then by resource. ADF&G Information Management staff created search and harvest location maps for resource categories in ArcGIS 10.6.1 using a standard template for reports. To ensure confidentiality, the maps produced for the report do not distinguish between overall search areas and specific harvest locations.

Key Respondent Interview Analysis

Key respondent interviews were audio recorded with permission from participants. A team of three ADF&G staff transcribed the interviews following ADF&G Division of Subsistence transcription protocols, including assigning a numeric code to each respondent for anonymity. To ensure accuracy, each transcript was reviewed by a second team member who listened to the interview audio while reading the transcript text. After discrepancies were reconciled, transcripts were uploaded to QSR International's NVivo 12 Pro for qualitative analysis. A draft coding structure was developed with coding nodes based on the original interview protocol (Appendix C) and emergent themes. Coding allowed researchers to assign a topic category to a section of text, which then generated a list of relevant excerpts that address specific research questions. Following standard procedures for intercoder reliability (Campbell et al. 2013), ADF&G researcher Keating and technician Zayleen Kalalo each coded the same transcript from two of the 11 interviews and met to discuss discrepancies and adjustments to the coding structure. Based on this discussion, the final codebook that was used for the remaining interview transcripts contained 13 primary nodes and 36 secondary nodes (see Appendix E for codebook).

Food Security Analysis

A "food security" section of the survey used a modified version of a standard national questionnaire to assess whether or not the household had enough food to eat, whether from subsistence sources or from market sources. The protocol used in this survey was based on the 12-month food security scale questionnaire developed by the U.S. Department of Agriculture (USDA). This questionnaire is administered nationwide each year as part of the annual Current Population Survey (CPS). In 2016–2018, an annual average of 115,576 U.S. households were interviewed, including 1,351 in Alaska (Coleman-Jensen et al. 2019:23). From CPS data, the USDA prepares an annual report on food security in the United States. From 2016 to 2018, the USDA estimated that on average 88% of U.S. households were food secure, while on average 89% of Alaska households were food secure.

Food security protocols have been extensively reviewed (Coates 2004; Webb et al. 2006; Wunderlich and Norwood 2006) and have been used around the world, including in northern Burkina Faso (Frongillo and Nanama 2006), Bangladesh (Coates et al. 2006), Bolivia and the Philippines (Melgar-Quinonez et al. 2006), and Brazil (Pérez-Escamilla et al. 2004). Although there have been efforts to develop a universal food security measurement protocol (Swindale and Bilinsky 2006), researchers often modify the protocol slightly to respond to community social, cultural, and economic circumstances, as was done here.

For this study, the food security protocol was modified by the addition of several questions designed to determine whether food insecurities, if any, were related to subsistence foods or store-bought foods. Additionally, the wording of some questions was changed slightly. As in Brazil (Pérez-Escamilla et al. 2004), the USDA term "balanced meals" was difficult to interpret for indigenous Alaska populations, and was replaced with the term "healthy meals" to reflect unique dietary and cultural circumstances in rural Alaska.

In 2015, Division of Subsistence added a filter question to reduce the number of questions asked to food secure households. Households agreeing with the statement "We had enough of the kinds of foods we wanted to eat" were considered food secure and were not asked about increasingly severe instances of food insecurity.

Community Review Meetings

No community review meetings were held in the study communities due to the continued presence of COVID-19. To provide an opportunity for community members to review the data (including maps that depicted search and harvest areas) and offer feedback, digital and printed copies of the presentation that would have been discussed at a community data review meeting were sent to the tribal administrator of each study community. The administrator then made the copies available to community residents for review. Tribal council staff also reviewed the documents. Communities were given one month to provide feedback on the materials; no comments were received.

FINAL REPORT ORGANIZATION

This report summarizes the results of systematic household surveys and key respondent interviews conducted by staff from ADF&G, and the report also summarizes resident feedback provided following review of data review presentation materials. The findings are organized by study community with one additional chapter devoted to the ethnographic findings. Each community chapter includes tables and figures that report findings on demographic characteristics, employment characteristics, individual participation in harvesting and processing wild resources, characteristics of resource harvests and uses (including the sharing of wild foods), food security, and also harvest and use trends over time. The chapters begin with a brief overview of the community's history and a description of the contemporary community, then move into the results from the harvest and use survey, broken out by subsections addressing demographic, economic, and then harvest and use characteristics by resource category. After presenting study year findings, the chapters continue with a discussion of historical subsistence harvest trends before concluding with a summary of concerns that local residents shared during surveys and community meetings. Table 1-8 shows selected study findings for all the study communities and will be referenced in later discussions of survey results. The content of each chapter is consistent because the data are based on the same survey instrument; however, there are differences among the chapters in terms of documenting historical trends because each community has a different history of subsistence harvesting practices and surveys. The ethnographic chapter following the community harvest results looks at patterns in subsistence resource abundance, quality, and access; perceived commercial fishing effects on subsistence harvests; observations of environmental patterns and changes; social factors and subsistence harvests; and LTK of Olga and Akalura lakes systems. The final chapter of the report provides a short, general overview and discussion of the harvests and uses of wild resources in the study communities.

ADF&G provided a draft report to the USFWS Office of Subsistence Management and to the study communities for review and comment. After receipt of comments, the report was finalized. ADF&G mailed a short (four-page) summary of the study findings to every household in the three study communities (Appendix F).

Table 1-8.—Comparison of selected study findings, study communities, 2018.

Category	Community		
	Akhiok	Old Harbor	Larsen Bay
Demography			
Population	48.4	203.2	67.1
Percentage of population that is Alaska Native	89.5%	87.9%	72.3%
Percentage of household heads born in Alaska	78.9%	78.7%	61.3%
Average length of residency of household heads (year)	29.3	31.9	28.2
Cash economy			
Average number of months employed, all adults	7.6	7.5	6.2
Percentage of employed adults working year-round	57.9%	44.9%	68.2%
Percentage of income from sources other than employment	22.7%	26.3%	26.3%
Average household income ^a	\$56,280	\$53,343	\$73,437
Per capita income ^a	\$16,291	\$17,585	\$32,812
Resource harvest and use			
Per capita harvest, pounds usable weight	369.7	578.5	239.3
Average household harvest, pounds usable weight	1,277.1	1,754.7	535.5
Number of resources used by 50% or more households	16.0	15.0	11.0
Average number of resources used per household	18.6	19.7	15.7
Average number of resources attempted to be harvested per household	17.8	14.5	11.8
Average number of resources harvested per household	15.8	14.3	11.5
Average number of resources received per household	5.5	9.7	6.3
Average number of resources given away per household	10.1	10.9	6.0
Percentage of total harvest taken by top 25% ranked households	47.4%	76.8%	62.5%
Percentage of households that harvested 70% of harvest	36.4%	20.0%	28.6%
Per capita harvest by lowest ranked 50% of households	53.9	28.1	34.4
Percentage of total harvest taken by lowest ranked 50% of harvesting households	14.6%	4.9%	14.4%
Average number of resources used by lowest ranked 50% of households	11.0	12.6	12.7
Average number of resources used by top 25% ranked households	29.5	34.0	18.8

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

a. Includes income from sources other than employment.

2. AKHIOK

COMMUNITY BACKGROUND

On the windswept, hilly tundra on the southern tip of Kodiak Island is the Alutiiq community of Akhiok (Figure 2-1). This remote community sits on Alitak Bay, located between Moser and Kempff bays. The community is not connected by road to any other Kodiak Island community. The coastline in the area consists of narrow, rocky beaches with a gradual incline to surrounding uplands, which reach from 10 feet to 40 feet above sea level. The terrain around the community is mainly flat land with low-lying hills and valleys. The climate of the area is maritime, characterized by moderately heavy precipitation, lots of fog and clouds, and generally cool weather. Seasonal variations in temperatures are small, ranging annually from 25°F to 54°F. Severe storms tend to occur from December through February. The area is abundant in both terrestrial and aquatic natural resources.

Archaeological evidence points to settlement of Kodiak having occurred at least 7,000 years ago, and the record shows that the cultural ancestors of modern Kodiak Alaska Natives were living in the island group from at least 800–1300 AD (Schroeder et al. 1987:452). There is evidence of prehistoric habitation at Cape Alitak where there is an assemblage of pictographs and village sites.^{1, 2} Little is written about the history of Akhiok, however. The original village of Akhiok was located across Alitak Bay, near Humpy Cove, and was called *Kashukugniut*. This sea otter hunting settlement was occupied by the Russians in the early 1800s and residents relocated in 1881 to the present-day location (Kodiak Island Borough 1986:4). However, part

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1. WonderVisions. 2010. “Cape Alitak Petroglyphs on Film: Petroglyphs; ‘The Appearing and Disappearing Petroglyphs of Cape Alitak.’” Alutiiq Museum and Archaeological Repository, video, 6:47. <https://www.alutiiqmuseum.org/research/archeology/petroglyphs> (accessed January 2021).
 2. WonderVisions. 2010. “Cape Alitak Petroglyphs on Film: Sod Houses; ‘This Sod House.’” Alutiiq Museum and Archaeological Repository, video, 11:420 <https://www.alutiiqmuseum.org/research/archeology/petroglyphs> (accessed January 2021).



Photo by Lauren A. Sill, ADF&G

Plate 2-1.—View of the Russian Orthodox church.



Figure 2-1.—Community study area, Akhiok.



Photo by Lauren A. Sill, ADF&G

Plate 2-2.—Akhiok K–12 school building.

of the present-day village sits on a shell midden of “considerable antiquity” (Fall and Utermohle 1995a). According to a contemporary resident of Akhiok, the community moved in part because of the abundant resources and more sheltered location. While the early focus of Akhiok inhabitants was hunting sea otters, residents transitioned into more of a fishing community as sea otter populations declined (Kodiak Island Borough 1986:4).

The population of Akhiok is first enumerated in the U.S. Census in 1880. A church was constructed in 1881 just north of the present church site. The contemporary Russian Orthodox church in Akhiok was constructed in 1926 by carpenters from the Alitak Packing Co. (Historic American Buildings Survey n.d.) (Plate 2-1). Most residents are members of the church. A post office was established in 1933. After the 1964 earthquake destroyed the nearby community of Kaguyak, residents relocated to Akhiok and Old Harbor.

The city of Akhiok was incorporated in 1972 as a second-class city and is governed by a seven-member city council, from which a mayor is chosen. Native Village of Akhiok and Kaguyak Village are the two federally recognized tribes in Akhiok and there are two village corporations: Akhiok-Kaguyak, Inc., and Ayakulik, Inc. A Village Public Safety Office (VPSO) is stationed in Akhiok but there is no fire department. A new clinic was built in 2009, operated by Kodiak Area Native Association and staffed by community health practitioners and a behavioral health assistant, with itinerant medical and dental practitioner visits. A K–12 school operates in the community with two full-time teachers and support staff; the building is used by the community during afterschool hours (Plate 2-2). The post office shares space with the offices for the City of Akhiok and the Akhiok and Kaguyak tribal councils. The community generates electricity from diesel and the entire community is connected to the piped water and sewer system. A landfill is operated by the city and is located east of town. There are no roads connecting Akhiok to other communities; Island Air Service provides near-daily service from Kodiak using a small gravel airstrip. Weather can delay flights for up to two weeks. There is no boat harbor or barge or docking facilities. There is also no grocery store, but residents can travel by boat to the Alitak processing plant in Lazy Bay for fuel.

Table 2-1.—Population estimates, Akhiok, 2010 and 2018

	Census (2010)	5-year American Community Survey (2014–2018)				This study (2018)	
		Estimate	Range ^a	Estimate	Range ^b		
Total population							
Households	19	16.0	5 – 27	14.0			
Population	71	57.0	26 – 88	48.4	41 – 56		
Alaska Native							
Population	62	53.0	23 – 83	43.3	37 – 50		
Percentage	87.3%	93.0%	40.4% – 100.0%	89.5%	75.9% – 100.0%		

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

Note Division of Subsistence household survey eligibility 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.

POPULATION ESTIMATES AND DEMOGRAPHIC INFORMATION

This study estimated that in 2018 there were 48 residents living in 14 households in Akhiok (Table 2-1). Of those 48 people, 90% (43 people) were Alaska Native. These estimates were lower than the 2010 federal census and the American Community Survey (ACS) five-year (2014–2018) average estimate. As can be seen in Figure 2-2, the ACS estimate and this study’s estimate were not significantly different. Also, while the overall number of Alaska Native residents differed among all three sources, the percentage of the total population was similar. Part of the difference in total population estimates likely has to do with who is counted as a resident; there are multiple families that live part-time in Akhiok and part-time in Kodiak or Anchorage. This study only counted individuals who lived in Akhiok for at least six months of the study year. It appears that as residents age, more people move to Anchorage or Kodiak, at least part of the time, for access to services. The first U.S. Census Bureau count of Akhiok documented 114 residents in 1880 (Figure 2-3). The general population trend from 1880 to 2018 has been slightly decreasing, with lows documented by the census in 1950 and the Alaska Department of Labor in 2007, both of which were succeeded by substantial increases in subsequent years. After the first low in 1950, the population rebounded by 1970, likely due to the influx of Kaguyak residents after the 1964 earthquake. According to U.S. Census counts, the population has generally remained around the 77 people documented in 1990 through the subsequent decades. Emigration to Kodiak and other cities, as well as changing economic opportunities, are likely responsible for some of the declines observed in the past four decades.

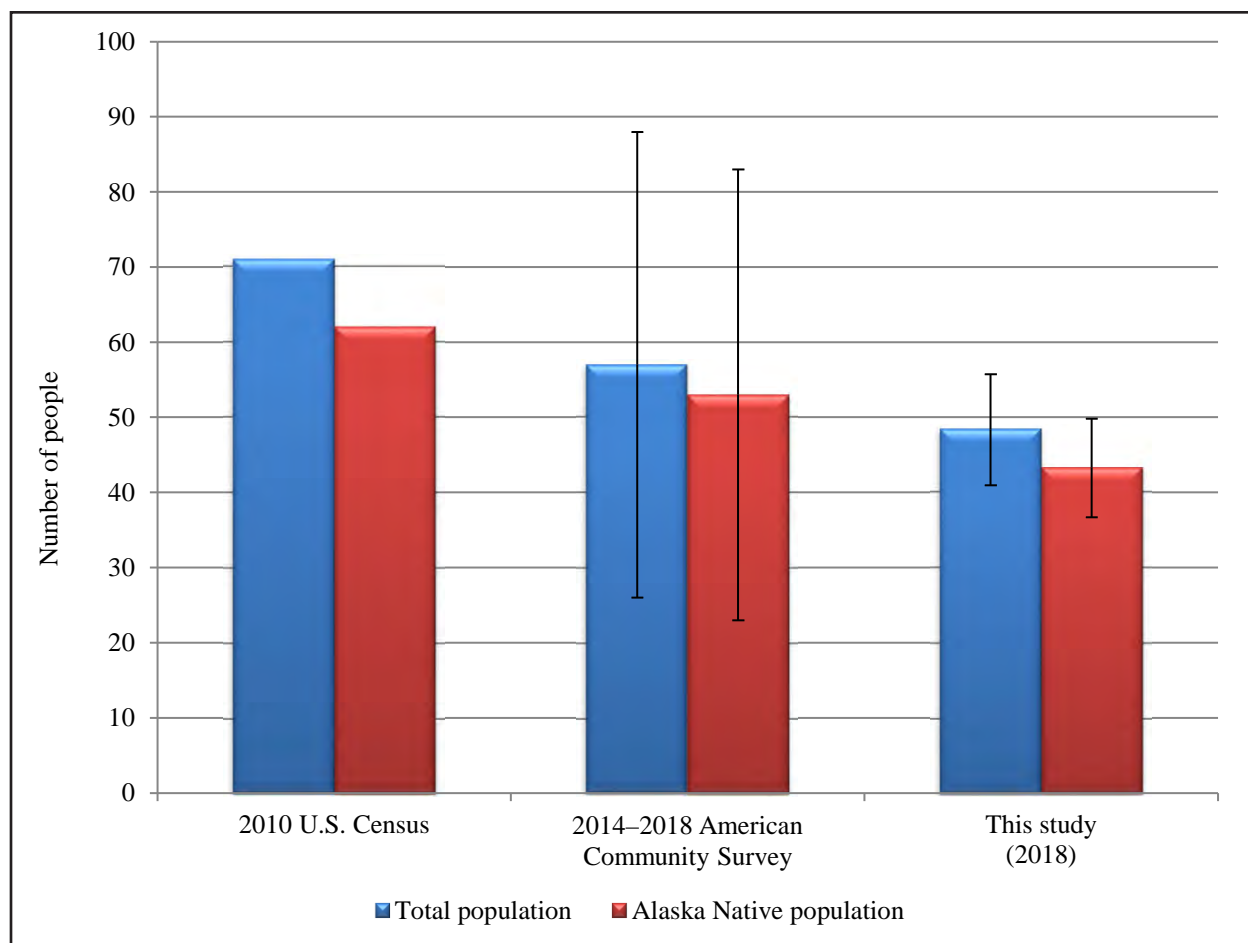


Figure 2-2.—Alaska Native and overall population estimates, Akhiok, 2010 and 2018.

For the 2018 study, researchers interviewed 11 of 14 households in Akhiok, or 79% of total households (Table 2-2). Of the 14 permanent households, 13 were headed by an Alaska Native, or 91% of all households; this proportion was similar to the 90% of all residents who identify as Alaska Native. Based on the sample of 11 households, it is estimated that there was an average of 3.5 people living in each Akhiok household. The average resident of Akhiok was 31 years old and had lived in the community for 23 years. Household heads had lived in the community longer—for 29 years on average. Slightly more males lived in Akhiok than females (26 compared to 23) but the population was relatively gender balanced except for the 60–79 age range, which was populated only by males (Table 2-3; Figure 2-4). No age was given for 17% of the female population, however. The majority of Akhiok residents were born in Akhiok: 76% were born in the community and 11% were born in another state (Table 2-4). Most remaining residents were born on Kodiak Island, with just 3% of the population having been born in Anchorage. In comparison to the overall population, slightly fewer household heads were born in Akhiok: 68% were born locally, 21% outside of Alaska, and 11% in other Kodiak Island communities (Table 2-5).

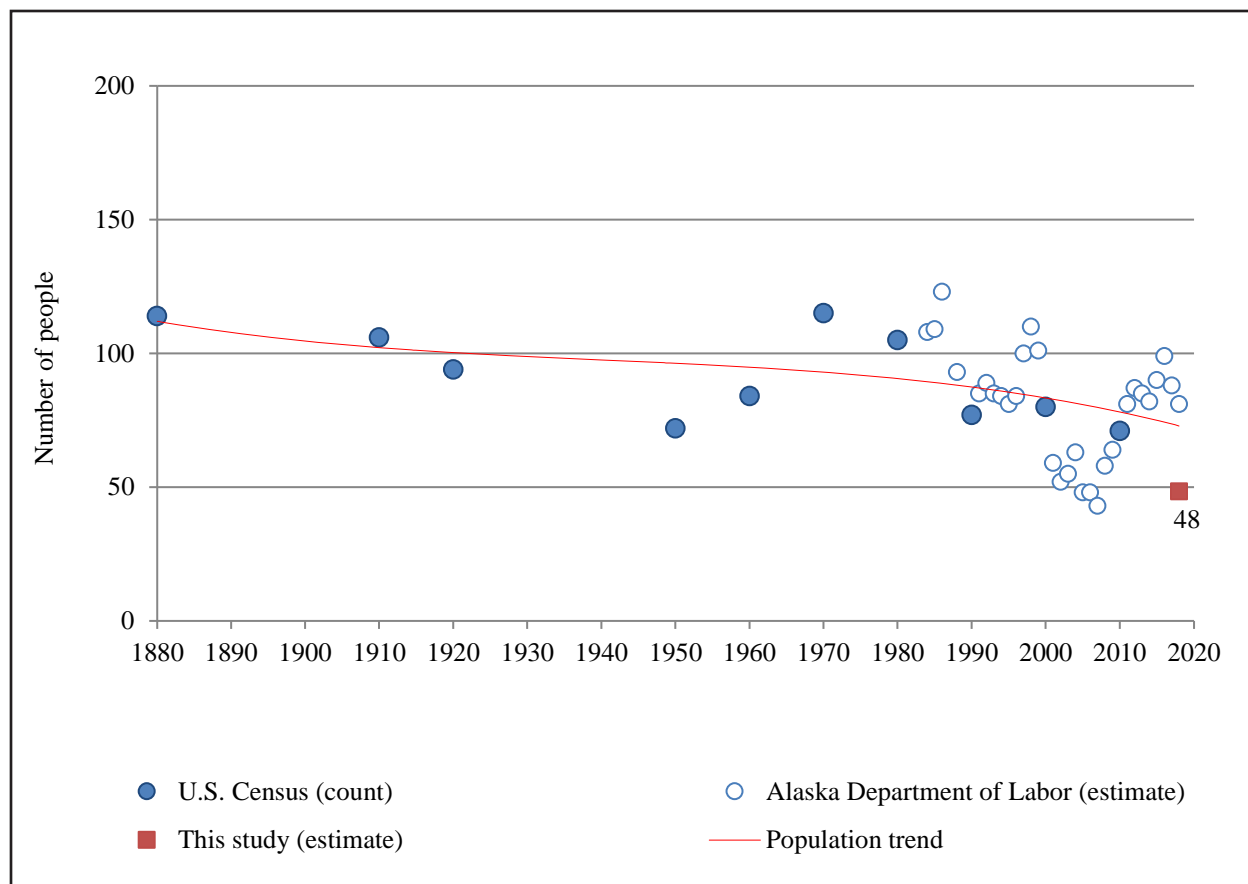


Figure 2-3.—Historical population estimates, Akhiok, 1880–2018.

Table 2-2.—Sample and demographic characteristics, Akhiok, 2018.

Characteristics	Community
	Akhiok
Sampled households	11
Eligible households	14
Percentage sampled	78.6%
Sampled population	38
Estimated community population	48.4
Household size	
Mean	3.5
Minimum	2.0
Maximum	6.0
Age	
Mean	31.4
Minimum ^a	1.0
Maximum	85.0
Median	32
Length of residency	
Total population	
Mean	23.0
Minimum ^a	1.0
Maximum	72.0
Heads of household	
Mean	29.3
Minimum ^a	6.0
Maximum	68.0
Alaska Native	
Estimated households ^b	
Number	12.7
Percentage	90.9%
Estimated population	
Number	43.3
Percentage	89.5%

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

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 2-3.–Population profile, Akhiok, 2018.

Age	Male			Female			Total		
	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	3.8	15.0%	15.0%	0.0	0.0%	0.0%	3.8	7.9%	7.9%
5–9	1.3	5.0%	20.0%	3.8	16.7%	16.7%	5.1	10.5%	18.4%
10–14	1.3	5.0%	25.0%	1.3	5.6%	22.2%	2.5	5.3%	23.7%
15–19	1.3	5.0%	30.0%	2.5	11.1%	33.3%	3.8	7.9%	31.6%
20–24	2.5	10.0%	40.0%	1.3	5.6%	38.9%	3.8	7.9%	39.5%
25–29	0.0	0.0%	40.0%	1.3	5.6%	44.4%	1.3	2.6%	42.1%
30–34	2.5	10.0%	50.0%	1.3	5.6%	50.0%	3.8	7.9%	50.0%
35–39	1.3	5.0%	55.0%	0.0	0.0%	50.0%	1.3	2.6%	52.6%
40–44	3.8	15.0%	70.0%	1.3	5.6%	55.6%	5.1	10.5%	63.2%
45–49	0.0	0.0%	70.0%	2.5	11.1%	66.7%	2.5	5.3%	68.4%
50–54	2.5	10.0%	80.0%	1.3	5.6%	72.2%	3.8	7.9%	76.3%
55–59	0.0	0.0%	80.0%	1.3	5.6%	77.8%	1.3	2.6%	78.9%
60–64	1.3	5.0%	85.0%	0.0	0.0%	77.8%	1.3	2.6%	81.6%
65–69	1.3	5.0%	90.0%	0.0	0.0%	77.8%	1.3	2.6%	84.2%
70–74	1.3	5.0%	95.0%	0.0	0.0%	77.8%	1.3	2.6%	86.8%
75–79	1.3	5.0%	100.0%	0.0	0.0%	77.8%	1.3	2.6%	89.5%
80–84	0.0	0.0%	100.0%	0.0	0.0%	77.8%	0.0	0.0%	89.5%
85–89	0.0	0.0%	100.0%	1.3	5.6%	83.3%	1.3	2.6%	92.1%
90–94	0.0	0.0%	100.0%	0.0	0.0%	83.3%	0.0	0.0%	92.1%
95–99	0.0	0.0%	100.0%	0.0	0.0%	83.3%	0.0	0.0%	92.1%
100–104	0.0	0.0%	100.0%	0.0	0.0%	83.3%	0.0	0.0%	92.1%
Missing	0.0	0.0%	100.0%	3.8	16.7%	100.0%	3.8	7.9%	100.0%
Total	25.5	100.0%	100.0%	22.9	100.0%	100.0%	48.4	100.0%	100.0%

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

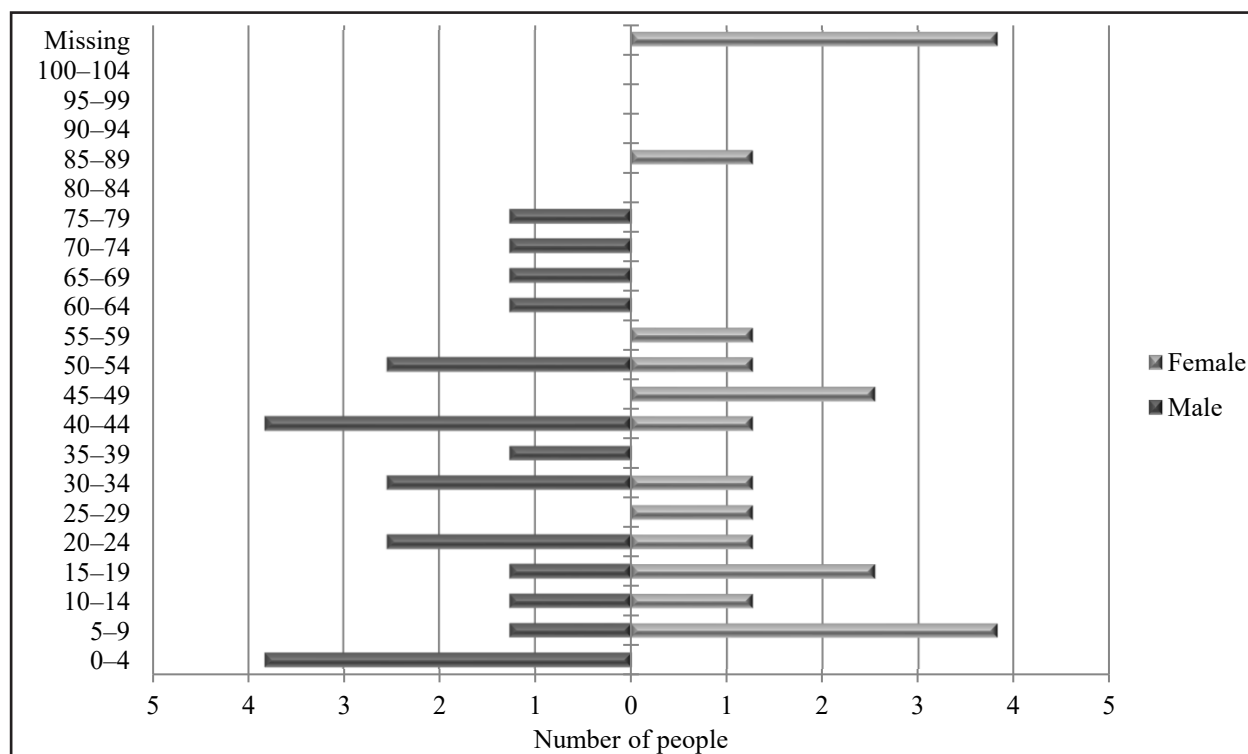


Figure 2-4.–Population profile, Akhiok, 2018.

Table 2-4.—Birthplaces of population, Akhiok, 2018.

Birthplace	Percentage
Akhiok	76.3%
Anchorage	2.6%
Old Harbor	2.6%
Kaguyak	2.6%
Alitak	5.3%
Other U.S.	10.5%

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

Note "Birthplace" means the place
of residence of the parents of the
individual when the individual was
born.

Table 2-5.—Birthplaces of household heads, Akhiok, 2018.

Birthplace	Percentage
Akhiok	68.4%
Old Harbor	5.3%
Alitak	5.3%
Other U.S.	21.1%

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

Note "Birthplace" means the place of
residence of the parents of the
individual when the individual was
born.

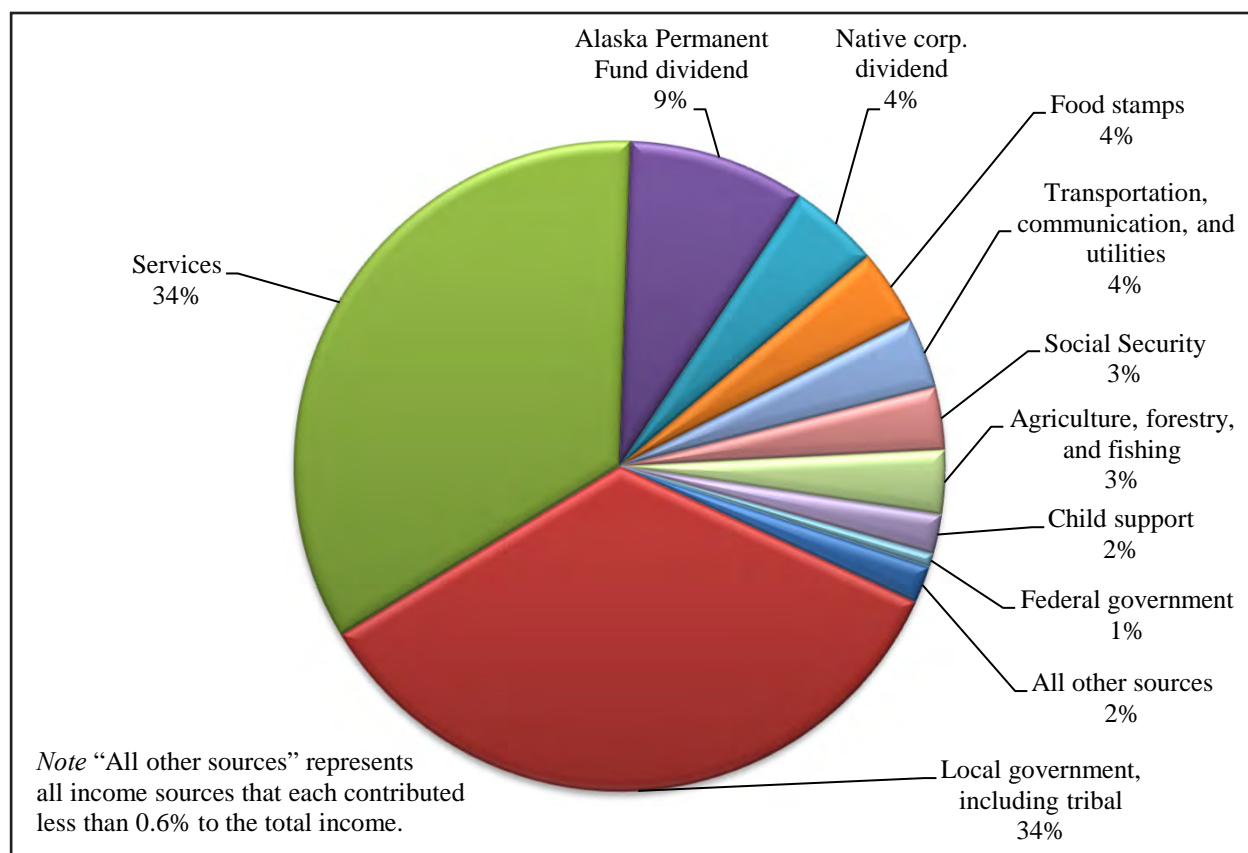


Figure 2-5.—Top income sources, Akhiok, 2018.

INCOME AND CASH EMPLOYMENT

In 2018, jobs in the services industry and the local government combined provided 68% of the total income of Akhiok households (Figure 2-5). The Alaska Permanent Fund dividend and dividends from Native corporations provided another 13% of community income. There were many other sources of income, but none contributed more than 4% to the total income (Table 2-6; Figure 2-5). Approximately 77% of the community income derived from employment-related wages and the remaining 23% came from other types of income such as dividends, Social Security, and child support (Table 2-6). The average amount of earned income for a household was \$43,484 with an additional average \$12,795 in other income bringing the total mean household income to \$56,280. The median income of a household in Akhiok in 2018 was \$52,293, which was higher than the 2013–2017 ACS average estimate but not significantly so (Figure 2-6). Compared to the state of Alaska, the median income in Akhiok was lower, being approximately three-quarters the statewide median. The per capita income was \$16,291, lower than that of the other two study communities (Table 1-8).

The largest percentage of wage earnings came from the local government sector (45%) and the services sector (44%) (Table 2-7). In local government, a large proportion of the income originated in positions within the school, followed by services occupations and administrative support occupations. Within the services sector, income was derived from jobs in health care, services occupations, and administrative support. The manufacturing sector contributed the smallest percentage of wage income to the community (0.2%). In terms of jobs, local government again contributed the most (41%), but jobs in the services industry accounted for only 22% of the jobs in town. The manufacturing; retail trade; and transportation, communication, and utilities sectors each contributed the smallest percentage of jobs to the community (4% each).

Table 2-6.—Estimated earned and other income, Akhiok, 2018.

Income source	Number of employed adults	Number of households	Total for community	-/+ 95% CI	Mean per household	Percentage of total community income
Earned income						
Local government, including tribal	12.4	7.6	\$271,592	\$50,987 – \$731,833	\$19,399	34.5%
Services	8.3	6.4	\$269,587	\$82,635 – \$525,523	\$19,256	34.2%
Transportation, communication, and utilities	1.4	1.3	\$27,608	\$11,198 – \$103,314	\$1,972	3.5%
Agriculture, forestry, and fishing	4.1	2.5	\$25,130	\$10,491 – \$57,976	\$1,795	3.2%
Federal government	2.8	2.5	\$5,191	\$1,319 – \$38,824	\$371	0.7%
Retail trade	1.4	1.3	\$4,601	\$1,877 – \$12,198	\$329	0.6%
State government	2.8	1.3	\$3,657	\$3,284 – \$7,910	\$261	0.5%
Manufacturing	1.4	1.3	\$1,416	\$1,303 – \$3,994	\$101	0.2%
Earned income subtotal	26.3	14.0	\$608,782	\$353,173 – \$1,124,937	\$43,484	77.3%
Other income						
Alaska Permanent Fund dividend		12.7	\$69,236	\$44,800 – \$95,709	\$4,945	8.8%
Native corp. dividend		11.5	\$35,311	\$14,467 – \$70,560	\$2,522	4.5%
Food stamps		3.8	\$29,690	\$23,328 – \$59,258	\$2,121	3.8%
Social Security		2.5	\$24,436	\$19,200 – \$58,036	\$1,745	3.1%
Child support		2.5	\$15,476	\$12,160 – \$33,193	\$1,105	2.0%
Longevity bonus		5.1	\$1,925	\$30 – \$5,775	\$138	0.2%
Heating assistance		2.5	\$1,273	\$1,000 – \$3,436	\$91	0.2%
Meeting honoraria		3.8	\$933	\$733 – \$1,867	\$67	0.1%
Pension/retirement		1.3	\$852	\$669 – \$3,436	\$61	0.1%
TANF (Temporary Cash Assistance for Needy Families)		0.0	\$0	\$0 – \$0	\$0	0.0%
Adult public assistance (OAA, APD)		0.0	\$0	\$0 – \$0	\$0	0.0%
Supplemental Security income		0.0	\$0	\$0 – \$0	\$0	0.0%
Workers' compensation/insurance		0.0	\$0	\$0 – \$0	\$0	0.0%
Unemployment		0.0	\$0	\$0 – \$0	\$0	0.0%
Disability		0.0	\$0	\$0 – \$0	\$0	0.0%
Veterans assistance		0.0	\$0	\$0 – \$0	\$0	0.0%
Other		0.0	\$0	\$0 – \$0	\$0	0.0%
Foster care		0.0	\$0	\$0 – \$0	\$0	0.0%
CITGO fuel voucher		0.0	\$0	\$0 – \$0	\$0	0.0%
Other income subtotal		3.8	\$179,133	\$121,691 – \$227,330	\$12,795	22.7%
Community income total			\$787,915	\$504,078 – \$1,209,907	\$56,280	100.0%

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

Note In cases where the lower bound of the CI would be less than the reported value, the reported value was used.

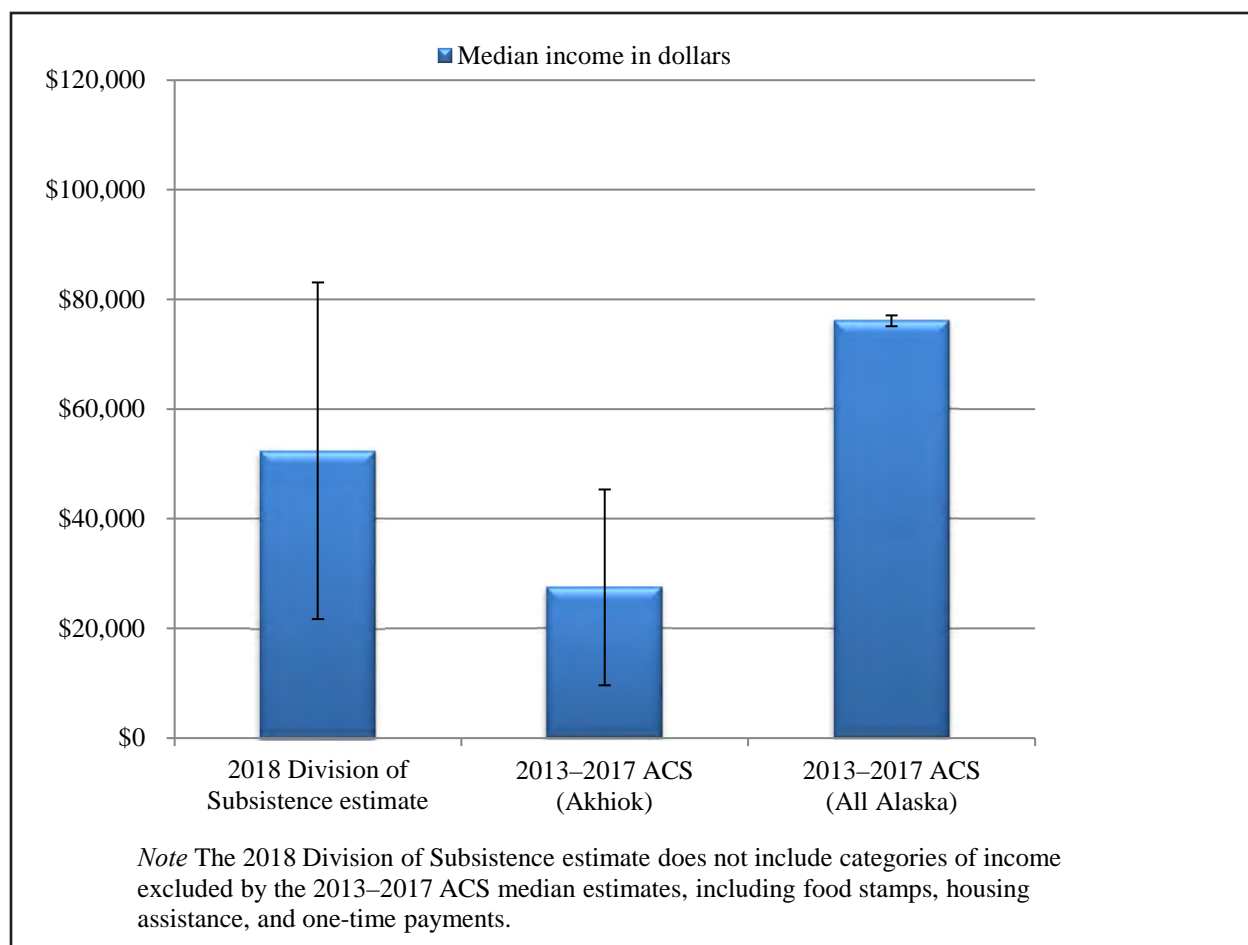


Figure 2-6.—Comparison of household median income estimates, Akhiok, 2018.

The job schedules associated with employment in 2018 were relatively evenly split between full time (37%), on-call (33%), and part time (30%) (Table 2-8). More people (53%) worked full-time schedules than part-time (37%) or on-call (37%) schedules, but equal numbers of households had jobs with these three schedules. In 2018, an estimated 26 adults in the community (76%) were employed; on average employed adults worked for 10 months of the year with 58% of employed adults working year-round (Table 2-9). One hundred percent of households were employed during the study year, with an average of 1.9 employed adults per household. Because employed adults worked, on average, 1.4 jobs in 2018, each household held 2.7 jobs on average.

Table 2-7.—Employment by industry, Akhiok, 2018.

Industry	Jobs	Employed households	Employed individuals	Percentage of wage earnings
Estimated total number	37.3	14.0	26.3	
Federal government	7.4%	18.2%	10.5%	0.9%
Executive, administrative, and managerial	7.4%	18.2%	10.5%	0.9%
State government	7.4%	9.1%	10.5%	0.6%
Construction and extractive occupations	3.7%	9.1%	5.3%	0.5%
Handlers, equipment cleaners, helpers, and laborers	3.7%	9.1%	5.3%	0.1%
Local government, including tribal	40.7%	54.5%	47.4%	44.6%
Teachers, librarians, and counselors	7.4%	9.1%	10.5%	29.1%
Administrative support occupations, including clerical	7.4%	18.2%	10.5%	5.8%
Service occupations	11.1%	27.3%	15.8%	6.4%
Precision production occupations	3.7%	9.1%	5.3%	1.9%
Handlers, equipment cleaners, helpers, and laborers	11.1%	27.3%	15.8%	1.4%
Agriculture, forestry, and fishing	11.1%	18.2%	15.8%	4.1%
Agricultural, forestry, and fishing occupations	11.1%	18.2%	15.8%	4.1%
Manufacturing	3.7%	9.1%	5.3%	0.2%
Writers, artists, entertainers, and athletes	3.7%	9.1%	5.3%	0.2%
Transportation, communication, and utilities	3.7%	9.1%	5.3%	4.5%
Administrative support occupations, including clerical	3.7%	9.1%	5.3%	4.5%
Retail trade	3.7%	9.1%	5.3%	0.8%
Handlers, equipment cleaners, helpers, and laborers	3.7%	9.1%	5.3%	0.8%
Services	22.2%	45.5%	31.6%	44.3%
Health technologists and technicians	7.4%	18.2%	10.5%	18.0%
Administrative support occupations, including clerical	7.4%	18.2%	10.5%	10.4%
Service occupations	7.4%	18.2%	10.5%	15.9%

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

Table 2-8.—Reported job schedules, Akhiok, 2018.

Schedule	Jobs		Employed persons		Employed households	
	Number	Percentage	Number	Percentage	Number	Percentage
Full time	13.1	37.0%	13.1	52.6%	7.6	54.5%
Part time	10.5	29.6%	9.1	36.8%	7.6	54.5%
On-call (occasional)	11.8	33.3%	9.1	36.8%	7.6	54.5%

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

Note Respondents who had more than one job in the study year could provide multiple responses, so the percentages may sum to more than 100%.

Table 2-9.—Employment characteristics, Akhiok, 2018.

Characteristic	Community
	Akhiok
All adults	
Number	34.5
Mean weeks employed	32.8
Employed adults	
Number	26.3
Percentage	76.0%
Jobs	
Number	37.3
Mean	1.4
Minimum	1
Maximum	4
Months employed	
Mean	9.9
Minimum	2
Maximum	12
Percentage employed year-round	57.9%
Mean weeks employed	43.1
Households	
Number	14.0
Employed	
Number	14.0
Percentage	100.0%
Jobs per employed household	
Mean	2.7
Minimum	1
Maximum	5
Employed adults	
Mean	
Employed households	1.9
Total households	1.9
Minimum	1
Maximum	3
Mean person-weeks of employment	80.8

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

Table 2-10.—Households’ assessments of food security conditions, Akhiok, 2018.

Statement	Percentage of sampled households
Had enough of the kinds of food desired	63.6%
Had enough food, but not the desired kind	27.3%
Sometimes, or often, did not have enough food	9.1%

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

FOOD SECURITY

Survey respondents were asked a set of questions intended to assess their household’s food security, defined as, “access by all people at all times to enough food for an active, healthy life” (Coleman-Jensen et al. 2012). The food security questions were modeled after those developed by the U.S. Department of Agriculture (USDA) but modified by ADF&G to account for differences in access to subsistence and store-bought foods. Based on their responses to these questions, households were broadly categorized as being food secure or food insecure following a USDA protocol (Bickel et al. 2000). Food secure households were broken down further into two subcategories—high or marginal food security. Food insecure households were also divided into two subcategories—low food security or very low food security.

Households with high food security did not report any food access problems or limitations. Households with marginal food security reported one or two instances of food access problems or limitations—typically anxiety over food sufficiency or a shortage of particular foods in the house—but gave little or no indication of changes in diets or food intake. Households with low food security reported reduced quality, variety, or desirability of their diet, but they, too, gave little indication of reduced food intake. Households classified as having very low food security were those that reported multiple instances of disrupted eating patterns and reduced food intake (Coleman-Jensen et al. 2012).

Overall, 64% of sampled Akhiok households had enough of the kinds of food they wanted to eat in 2018 (Table 2-10). Estimates summarized in Figure 2-7 are derived from core questions and responses from Akhiok households that did not have enough food or desired kinds of food. For this study, additional questions asked were designed to determine whether food insecurities, if any, were related to subsistence foods or store-bought foods. More households (27%) worried that they would run out of food, or did run out of subsistence food, than any other instance of food insecurity. Although an estimated 27% of households ran out of subsistence foods, and 18% ran out of store-bought foods, when considering the entirety of a household’s food supply, only 9% ran out of food and could not get more. Some households (18%) also lacked the resources they needed to get food, meaning that they did not have the needed equipment or money to harvest or purchase food. To determine the severity of food insecure conditions experienced by respondents, households were asked whether adults in the house ever experienced any of five scenarios because there was not enough food: skipping a meal or reducing meal size, eating less than they felt they should, being hungry but not eating, losing weight, or not eating for an entire day. The first condition was answered affirmatively by 18% of households and 9% experienced the other four conditions at some point in 2018. Responses to all of these questions, except for the ones asking specifically if a household ran out of subsistence or store-bought food, were used to calculate the overall food security score for a household.

Food security score results for Akhiok, the state of Alaska, and the United States are summarized in Figure 2-8. A smaller percentage of Akhiok households were considered to have high or marginal food security compared to the state of Alaska or the nation. Of the households considered food insecure, a smaller percentage had low food security (versus very low food security) than the state, but more than the nation. And more households in Akhiok were considered food insecure with very low food security than in the state or country. Food security results for the year overall obscure the seasonal differences most households experience in security based on factors like resource availability, time to harvest, weather, or cash flow fluctuations.

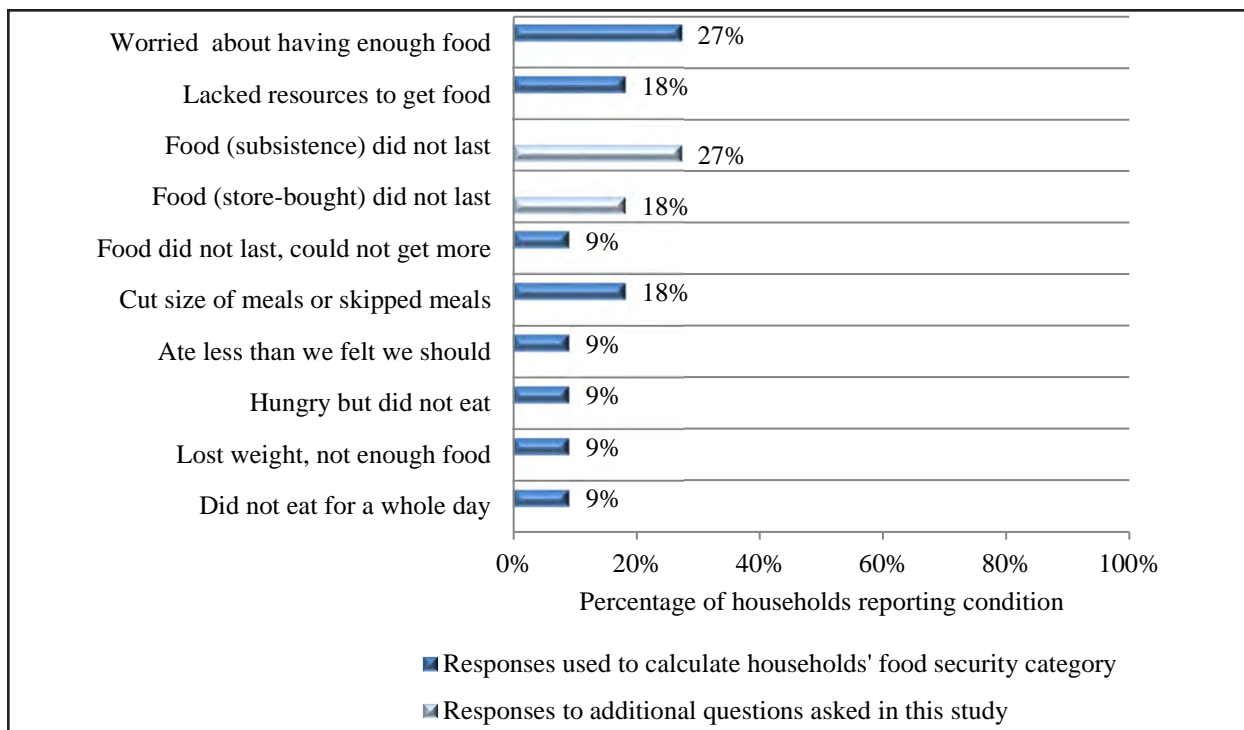


Figure 2-7.—Responses to questions about food insecure conditions, Akhiok, 2018.

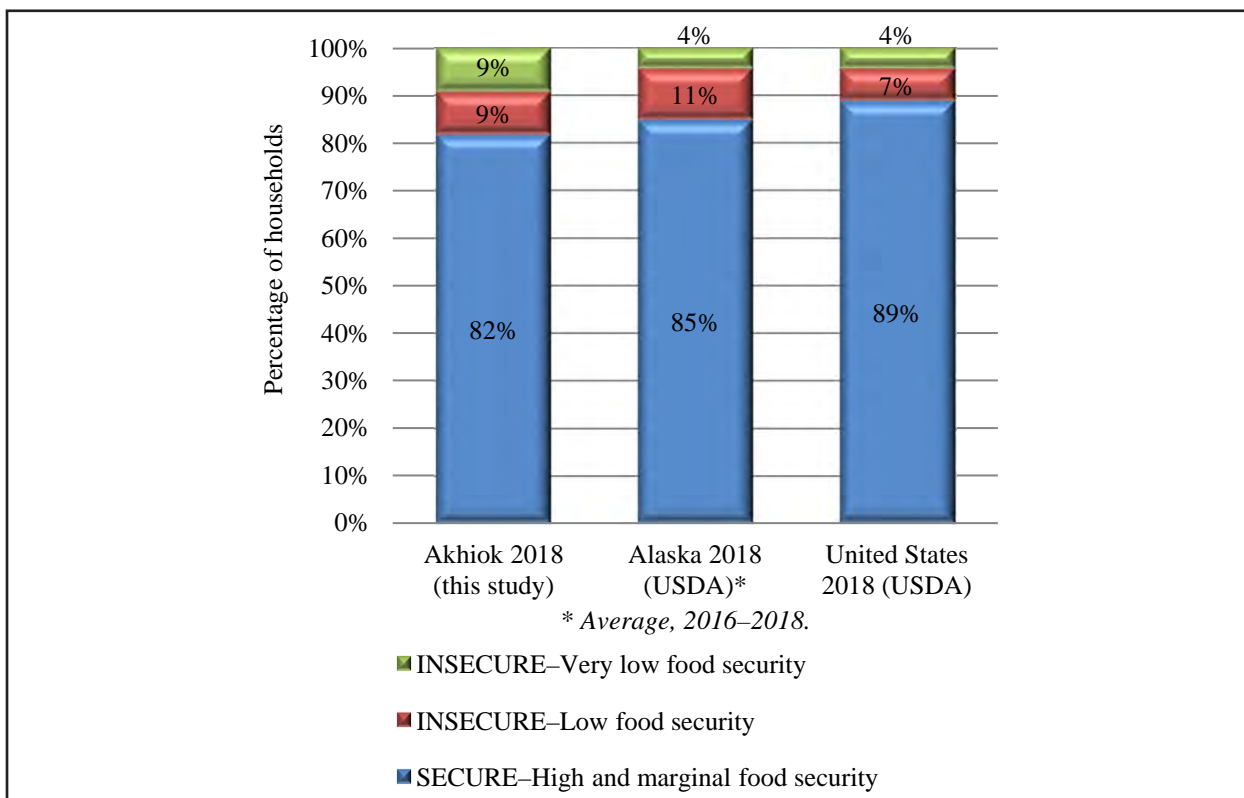


Figure 2-8.—Comparison of food security categories, Akhiok, Alaska, and United States, 2018.

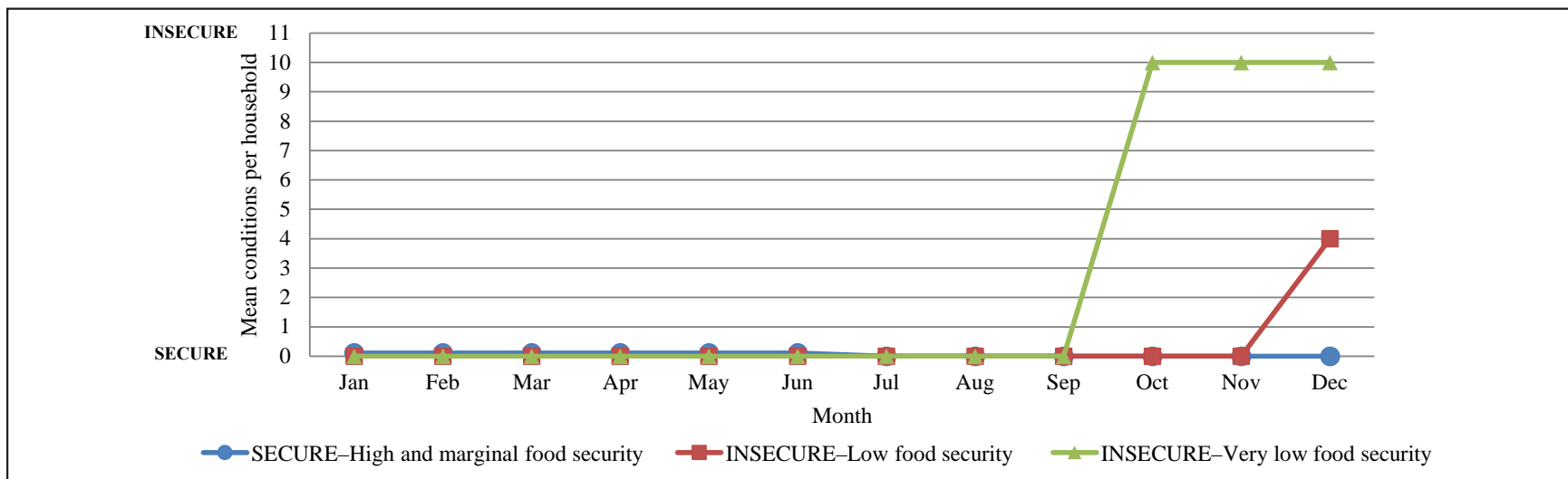


Figure 2-9.—Mean number of food insecure conditions by month and by household food security category, Akhiok, 2018.

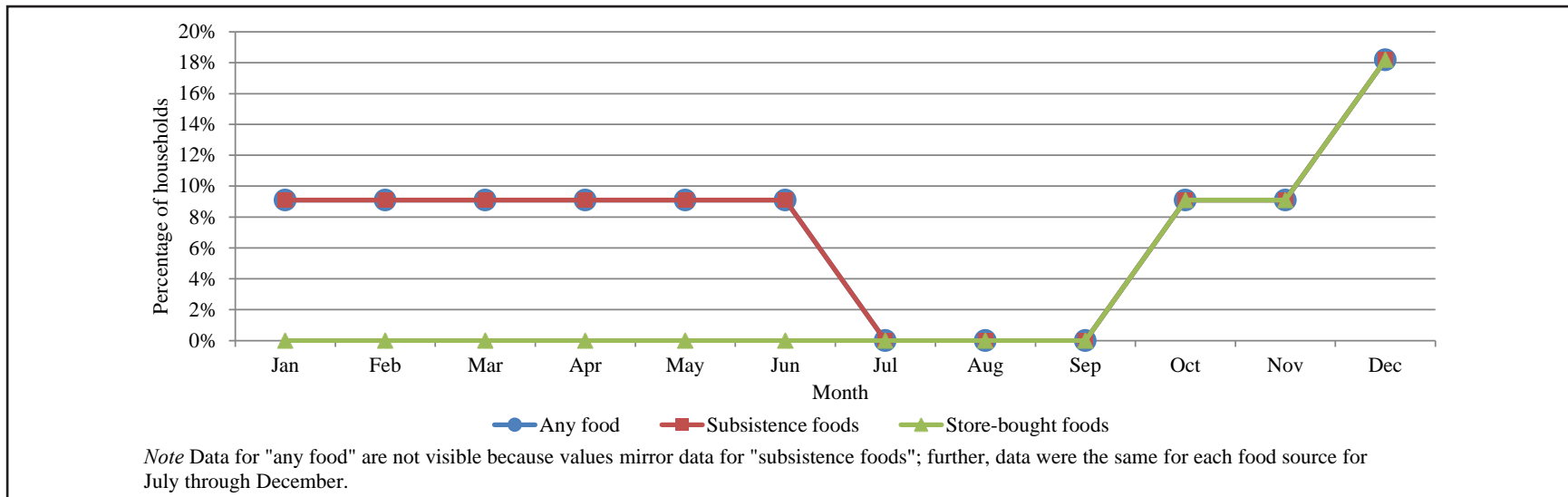


Figure 2-10.—Comparison of months when food did not last, Akhiok, 2018.

Figure 2-9 portrays the mean number of food insecure conditions per household by food security category by month. Figure 2-10 shows which months households reported foods not lasting. Very few food insecure conditions were experienced for the majority of the year: from January through September, food insecure households reported no insecure conditions and food secure households reported almost zero conditions on average (Figure 2-9). Beginning in October, insecure households with very low food security experienced the greatest number of insecure conditions, which continued until the end of the year. Insecure households with low food security only experienced insecure conditions at the end of the year in December. No household indicated store-bought foods not lasting through the first nine months of 2018 whereas 9% of households ran out of subsistence foods during the first half of the year (Figure 2-10). Unsurprisingly, no households reported food running out during the late summer months of July, August, and September. A wide variety of subsistence resources are available during the summer months and the weather is generally decent, allowing for pursuit of subsistence resources and access to store-bought foods, which are not available in Akhiok but are accessible from Kodiak city, which is a 30-minute plane ride away. From October through December, the same percentage of households indicated having run out of subsistence foods as store-bought foods (Figure 2-10).

SUMMARY OF HARVEST AND USE PATTERNS

Individual Participation in the Harvesting and Processing of Wild Resources

Table 2-11 and Figure 2-11 report the expanded levels of individual participation in the harvesting and processing of wild resources by all Akhiok residents in 2018. The majority of residents participated in harvesting (95%) or processing (92%) activities. More than three-fourths of community members gathered plants, berries, or other vegetation or collected marine invertebrates. These activities can be done with little equipment or travel needs and may be more accessible to more residents. Well more than one-half of the community fished (66%) while less than one-half (45%) hunted for large land mammals, primarily deer, or hunted for birds or collected eggs. The fewest people hunted marine mammals or hunted/trapped small land mammals. Marine mammal hunting requires equipment and specialized knowledge and is often not conducted by a majority of a community. Interestingly, for nearly all resource categories, more people were involved in harvesting the resources than processing. For most resources, oftentimes there is a smaller number of people who harvest a resource and more people come together to process. Only with large land mammals did slightly more people participate in processing (47%) than hunting (45%). Similar to the percentages of participation in harvesting activities, the most people processed vegetation and the fewest processed small land mammals. Fewer people processing vegetation than gathering it is a common characteristic; picking berries or plants is a family-friendly activity where people of all ages can easily participate but fewer people engage in the processing activities. In Akhiok, harvesting appears to be more of a communal activity engaging more of the community than processing activities.

Table 2-11.—Individual participation in subsistence harvesting and processing activities, Akhiok, 2018.

Total number of people	48.4
Fish	
Fish	
Number	31.8
Percentage	65.8%
Process	
Number	30.5
Percentage	63.2%
Large land mammals	
Hunt	
Number	21.6
Percentage	44.7%
Process	
Number	22.9
Percentage	47.4%
Small land mammals	
Hunt or trap	
Number	3.8
Percentage	7.9%
Process	
Number	1.3
Percentage	2.6%
Marine mammals	
Hunt	
Number	12.7
Percentage	26.3%
Process	
Number	10.2
Percentage	21.1%
Marine invertebrates	
Hunt	
Number	36.9
Percentage	76.3%
Process	
Number	29.3
Percentage	60.5%
Birds and eggs	
Hunt/gather	
Number	21.6
Percentage	44.7%
Process	
Number	16.5
Percentage	34.2%
Vegetation	
Gather	
Number	42.0
Percentage	86.8%
Process	
Number	34.4
Percentage	71.1%
Any resource	
Attempt harvest	
Number	45.8
Percentage	94.7%
Process	
Number	44.5
Percentage	92.1%

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

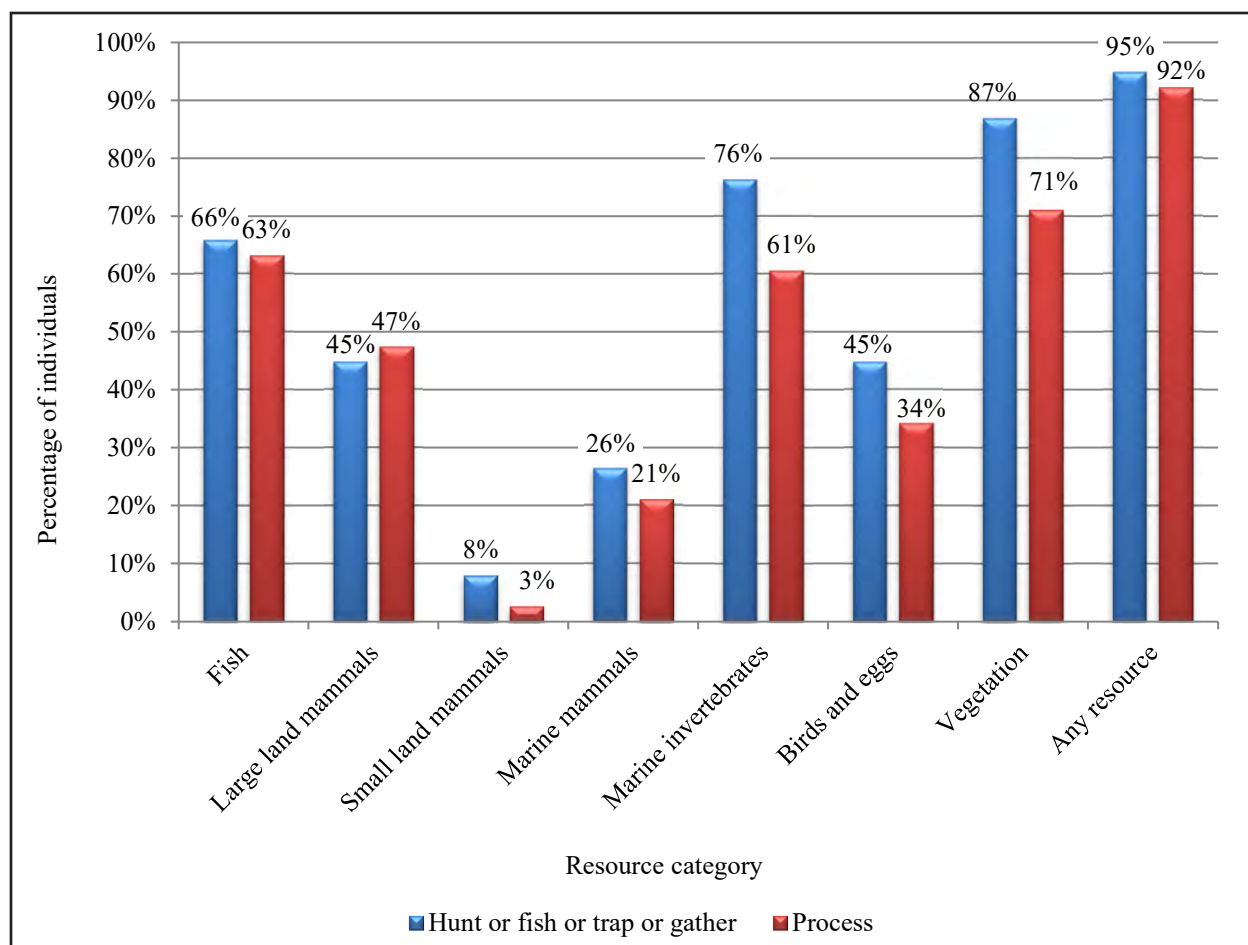


Figure 2-11.—Individual participation in subsistence harvesting and processing activities, Akhiok, 2018.

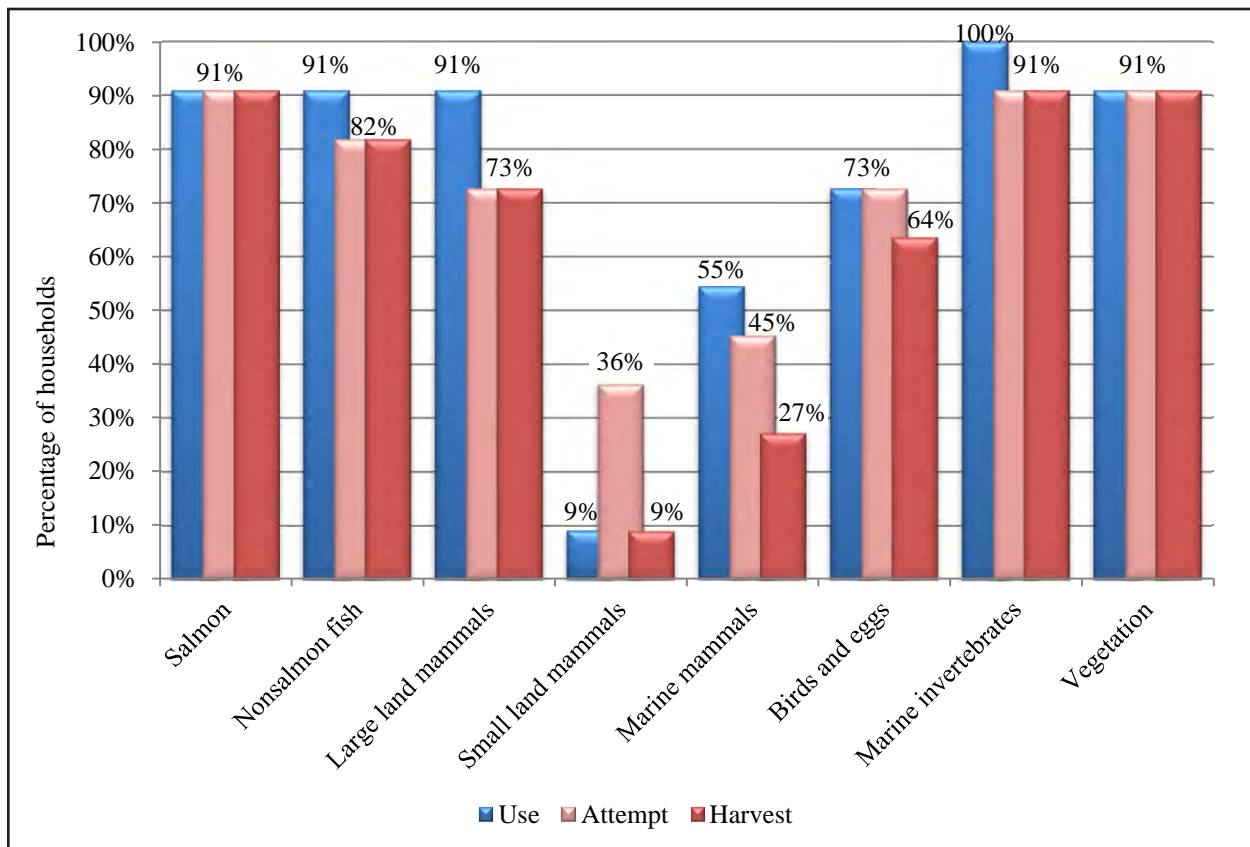


Figure 2-12.—Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Akhiok, 2018.

Harvest and Use of Wild Resources at the Household Level

Figure 2-12 shows by resource category the percentages of Akhiok households that used, attempted to harvest, and harvested wild foods. With the exceptions of marine mammals and small land mammals, the differences between households that used a resource category, attempted to harvest, and successfully harvested were small. Most households that attempted to harvest from a resource category were successful, and similar percentages of households that used a resource category also harvested it. These percentages for small land mammals and marine mammals are different: for small land mammals, 36% of households attempted to harvest these resources, but only 9% of community households were successful and 9% used these resources. A wider segment of the community used marine mammals (55%), but only 45% of households hunted marine mammals, and only 27% of community households successfully harvested one. Birds and eggs is the only other resource category for which more households hunted birds or searched for eggs (73%) than were successful in harvesting (64%). All households used marine invertebrates (100%), followed closely by salmon, nonsalmon fish, large land mammals, and vegetation (all with 91% of households using the category). More than 70% of households attempted to harvest most resource categories, except small land mammals and marine mammals; of note, more than 90% fished for salmon or gathered vegetation and marine invertebrates.

Table 2-12 summarizes resource harvest and use characteristics for Akhiok in 2018 at the household level. The average harvest was 1,277 lb usable weight per household and 370 lb per capita. During the study year, community households harvested an average of 16 kinds of resources and used an average of 19 kinds of resources. The maximum number of resources used by any household was 35. In addition, households gave away an average of 10 kinds of resources.

Table 2-12.—Resource harvest and use characteristics, Akhiok, 2018.

Characteristic	
Mean number of resources used per household	18.6
Minimum	2
Maximum	35
95% confidence limit (±)	17.7%
Median	19
Mean number of resources attempted to harvest per household	17.8
Minimum	1
Maximum	37
95% confidence limit (±)	21.0%
Median	15
Mean number of resources harvested per household	15.8
Minimum	0
Maximum	33
95% confidence limit (±)	21.6%
Median	13
Mean number of resources received per household	5.5
Minimum	0
Maximum	15
95% confidence limit (±)	31.4%
Median	3
Mean number of resources given away per household	10.1
Minimum	0
Maximum	24
95% confidence limit (±)	24.6%
Median	9
Household harvest (pounds)	
Minimum	0
Maximum	4,387
Mean	1,277.1
Median	827.5
Total harvest weight (lb)	17,878.9
Community per capita harvest (lb)	369.7
Percentage using any resource	100.0%
Percentage attempting to harvest any resource	100.0%
Percentage harvesting any resource	90.9%
Percentage receiving any resource	90.9%
Percentage giving away any resource	81.8%
Number of households in sample	11
Number of resources asked about and identified voluntarily by respondents	138

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

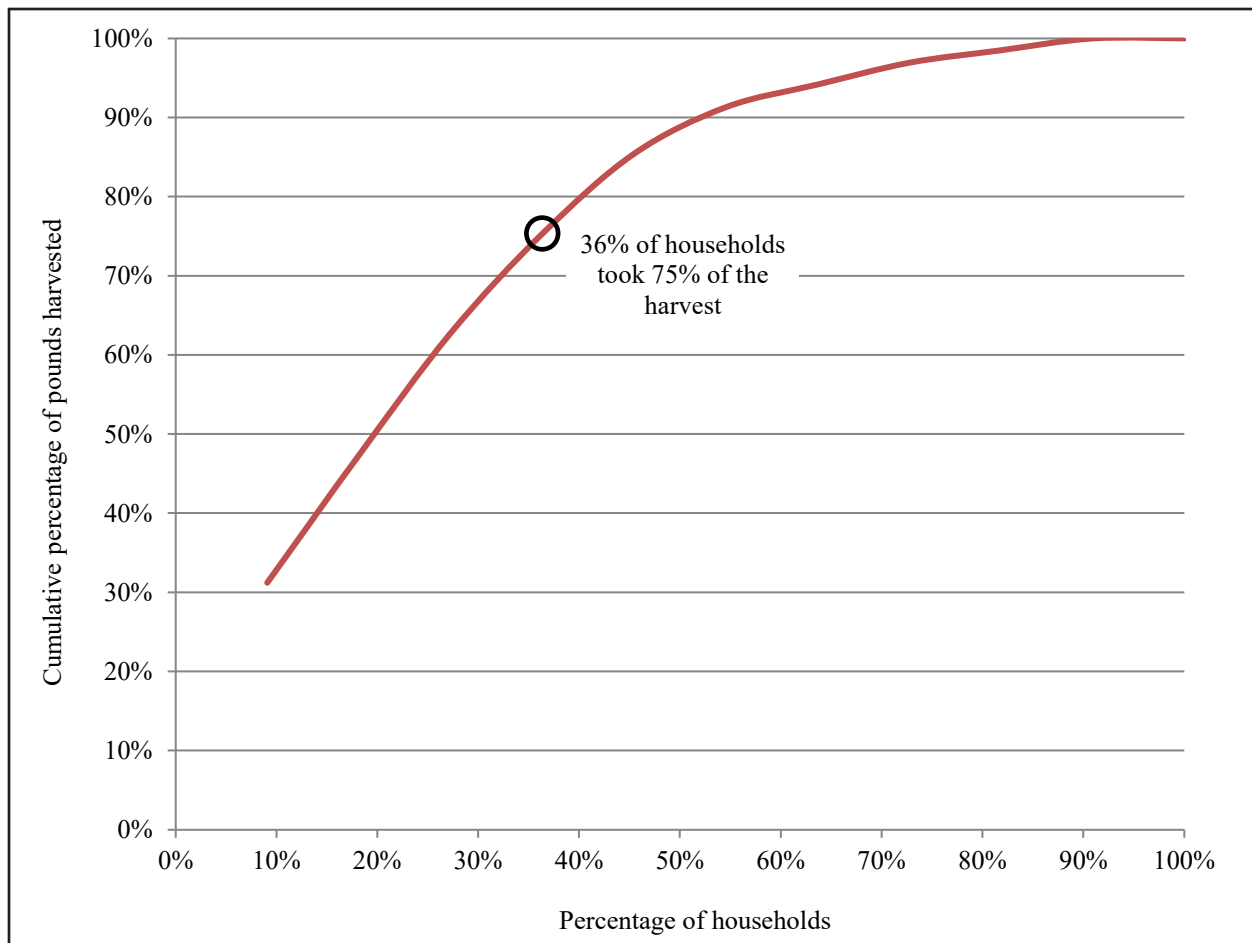


Figure 2-13.—Household specialization, Akhiok, 2018.

Household Specialization in Resource Harvesting

Previous studies (Wolfe 1987; Wolfe et al. 2010) have shown that in most rural Alaska communities, a relatively small portion of households produces most of the community's fish and wildlife harvests, which they share with other households. A study of 3,265 households in 66 rural Alaska communities found that about 33% of the households accounted for 76% of subsistence harvests (Wolfe et al. 2010). Although overall the set of very productive households was diverse, factors that were associated with higher levels of subsistence harvests included larger households with a pool of adult male labor, higher wage income, involvement in commercial fishing, and community location.

As shown in Figure 2-13, in the 2018 study year in Akhiok, about 75% of the harvests of wild resources as estimated in pounds usable weight were harvested by 36% of the community's households. Further analysis of the study findings, beyond the scope of this report, might identify characteristics of the highly productive households in Akhiok and the other study communities.

Harvest Quantities and Composition

Table 2-13 reports estimated wild resource harvests and uses by Akhiok residents in 2018 and is organized first by general category and then by species. All edible resources are reported in pounds usable weight (see Appendix D for conversion factors³). The harvest category includes resources harvested by any member of the surveyed household during the study year. The use category includes all resources harvested, given away, or used by a household, and resources acquired from other harvesters, either as gifts, by barter or customary trade, through hunting partnerships, or as meat given by hunting guides and non-local hunters. Purchased foods are not included, but resources such as firewood are included because they are an important part of the subsistence way of life. Differences between harvest and use percentages reflect sharing among households, which results in a wider distribution of wild foods.

Subsistence harvesting is an important activity in Akhiok. In 2018, Akhiok residents harvested 17,879 lb of wild resources (Table 2-13). Situated on the ocean, the community relies heavily on marine resources. This fact is reflected in the harvest weights of the various resource categories: harvests of salmon (11,437 lb total, or 237 lb per capita), nonsalmon fish (2,065 lb total, or 43 lb per capita), and marine invertebrates (1,757 lb total, or 36 lb per capita) composed 85% of the total harvest weight (Table 2-13; Figure 2-14). Harvests of large land mammals followed close behind marine invertebrates, composing 9% of the harvest with a total harvest weight of 1,540 lb, or 32 lb per capita. The remaining 6% of the harvest weight constituted vegetation (3%; 516 lb; 11 lb per capita), marine mammals (2%; 428 lb; 9 lb per capita), and birds and eggs (1%; 138 lb; 3 lb per capita). Note that no small land mammals were harvested for food, so no harvest weight was assigned to that resource category.

Seasonal Round

Even in the cold and dark months of a new year, there are resources to be harvested from the abundant landscape around Akhiok. Through the winter, tidal creatures such as clams, cockles, chitons, sea urchins, and octopus are harvested in nearby waters. Many of these animals will be harvested throughout the year, depending on the tides. With the end of winter and beginning of spring, Akhiok households turn to the nearby islands where black-legged kittiwakes, Arctic terns, and glaucous-winged gulls are returning and laying eggs. Plants like wild parsley (*petrushki*) and wild celery (*pushki*), harvested when their shoots are young, begin to grow.

By April, the first Chinook salmon are returning to area waters. Fishers will troll local waters in search of these salmon through July. Rod and reel gear will continue to be used to harvest chum and pink salmon, and later in the summer coho salmon as they return. Some residents will seine for chum and coho salmon, and gillnets will be used to target sockeye salmon especially. The last salmon are usually harvested in September or October, although if “lakefish” (spawned-out sockeye or coho salmon) are wanted, those are harvested from the lakes from October to January. Summer is also the time when Akhiok residents harvest marine nonsalmon fish like Pacific halibut, rockfish, and sablefish, and also freshwater fish such as Dolly Varden and steelhead. While king, Tanner, and Dungeness crab can be harvested year-round, summer months—with their better weather—are the most common time for people to set crab pots. As the summer progresses, berries ripen and are harvested opportunistically wherever people are. Salmonberries and wild strawberries are the first to be harvested, followed by cloudberries (referred to as mossberries) and blackberries (crowberries), and finally nagoonberries and lowbush cranberries.

3. Resources that are not eaten, such as firewood and some furbearers, are included in the table but are given a conversion factor of zero.

Table 2-13.—Estimated uses and harvests of fish, game, and vegetation resources, Akhiok, 2018.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount		95% confidence limit (±) harvest
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	
All resources	100.0	100.0	90.9	90.9	81.8	17,878.9	1,277.1	369.7	17,878.9 lb	1,277.1	31.5
Salmon	90.9	90.9	90.9	45.5	72.7	11,436.7	816.9	236.5	11,436.7 lb	816.9	33.8
Chum salmon	63.6	63.6	63.6	9.1	36.4	1,029.4	73.5	21.3	173.1 ind	12.4	34.8
Coho salmon	81.8	63.6	63.6	27.3	45.5	2,048.2	146.3	42.3	334.7 ind	23.9	46.0
Chinook salmon	36.4	36.4	27.3	9.1	18.2	137.6	9.8	2.8	28.0 ind	2.0	61.8
Pink salmon	81.8	63.6	63.6	27.3	54.5	1,404.3	100.3	29.0	501.5 ind	35.8	64.5
Sockeye salmon	90.9	81.8	81.8	45.5	54.5	6,817.2	486.9	141.0	1,816.2 ind	129.7	34.2
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Nonsalmon fish	90.9	81.8	81.8	36.4	63.6	2,065.0	147.5	42.7	2,065.0 lb	147.5	35.2
Pacific herring	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Pacific (gray) cod	18.2	18.2	18.2	0.0	0.0	65.2	4.7	1.3	20.4 ind	1.5	79.1
Unknown cod	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown flounder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Lingcod	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Pacific halibut	90.9	72.7	72.7	36.4	54.5	1,713.6	122.4	35.4	1,713.6 lb	122.4	38.4
Black rockfish	9.1	9.1	9.1	0.0	0.0	19.1	1.4	0.4	12.7 ind	0.9	103.1
Yelloweye rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Sablefish (black cod)	9.1	9.1	9.1	0.0	9.1	3.9	0.3	0.1	1.3 ind	0.1	103.1
Bullhead sculpin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown sculpin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Dogfish	9.1	9.1	9.1	0.0	0.0	45.8	3.3	0.9	5.1 ind	0.4	103.1
Skates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Dolly Varden	45.5	45.5	36.4	9.1	27.3	201.3	14.4	4.2	143.8 ind	10.3	51.4
Lake trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Arctic grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Rainbow trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Steelhead	27.3	27.3	27.3	0.0	0.0	16.0	1.1	0.3	22.9 ind	1.6	85.1
Unknown trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Large land mammals	90.9	72.7	72.7	54.5	63.6	1,539.5	110.0	31.8	1,539.5 lb	110.0	30.1
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Deer	90.9	72.7	72.7	45.5	63.6	1,539.5	110.0	31.8	35.6 ind	2.5	30.1
Elk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0

-continued-

Table 2-13.-Page 2 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount		95% confidence limit (±) harvest
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	
Large land mammals, continued											
Mountain goat	18.2	9.1	0.0	18.2	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Moose	9.1	9.1	0.0	9.1	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Feral animals	0.0	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0 lb	0.0	0.0
Reindeer-feral	0.0	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Small land mammals	9.1	36.4	9.1	0.0	0.0	0.0	0.0	0.0	0.0 lb	0.0	0.0
Beaver	9.1	9.1	9.1	0.0	0.0	0.0	0.0	0.0	2.5 ind	0.2	103.1
Red fox	9.1	9.1	9.1	0.0	0.0	0.0	0.0	0.0	7.6 ind	0.5	103.1
Snowshoe hare	0.0	27.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
River (land) otter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Gray wolf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Marine mammals	54.5	45.5	27.3	36.4	27.3	427.6	30.5	8.8	427.6 lb	30.5	34.4
Harbor seal	54.5	45.5	27.3	36.4	27.3	427.6	30.5	8.8	7.6 ind	0.5	34.4
Sea otter	9.1	9.1	9.1	0.0	0.0	0.0	0.0	0.0	5.1 ind	0.4	103.1
Steller sea lion	0.0	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown whale	9.1	0.0	0.0	9.1	9.1	0.0	0.0	0.0	0.0 ind	0.0	0.0
Birds and eggs	72.7	72.7	63.6	18.2	36.4	137.8	9.8	2.9	137.8 lb	9.8	43.3
Bufflehead	9.1	9.1	9.1	0.0	0.0	7.3	0.5	0.2	12.7 ind	0.9	103.1
Common eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
King eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Steller's eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown goldeneye	27.3	18.2	18.2	9.1	9.1	30.7	2.2	0.6	24.2 ind	1.7	82.1
Harlequin duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Mallard	9.1	9.1	9.1	0.0	9.1	4.1	0.3	0.1	2.5 ind	0.2	103.1
Merganser	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Northern pintail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown scap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Black scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Surf scoter	9.1	9.1	9.1	0.0	0.0	7.4	0.5	0.2	5.1 ind	0.4	103.1
White-winged scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Northern shoveler	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown teal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
American wigeon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0

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Table 2-13.-Page 3 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	limit (±) harvest
Birds and eggs, continued												
Unknown ducks	9.1	0.0	0.0	9.1	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Brant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Cackling goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Emperor goose	9.1	18.2	9.1	0.0	0.0	7.8	0.6	0.2	2.5 ind		0.2	103.1
White-fronted goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown swans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Sandhill crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Black oystercatcher	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown auklet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown cormorant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Glaucous-winged gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Herring gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Mew gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Sabine's gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Black-legged kittiwake	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown murre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown tern	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown ptarmigan	36.4	36.4	36.4	0.0	0.0	29.4	2.1	0.6	38.2 ind		2.7	48.4
Mallard eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Black oystercatcher eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Glaucous-winged gull eggs	54.5	54.5	54.5	0.0	27.3	31.8	2.3	0.7	156.5 ind		11.2	38.4
Herring gull eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Mew gull eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Black-legged kittiwake eggs	36.4	36.4	36.4	0.0	18.2	15.4	1.1	0.3	133.6 ind		9.5	59.4
Unknown murre eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown tern eggs	36.4	36.4	36.4	0.0	18.2	4.0	0.3	0.1	94.2 ind		6.7	45.7
Marine invertebrates	100.0	90.9	90.9	81.8	81.8	1,756.7	125.5	36.3	1,756.7 lb		125.5	44.7
Red (large) chitons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Black (small) chitons	72.7	63.6	63.6	27.3	54.5	361.5	25.8	7.5	90.4 gal		6.5	78.0
Butter clams	81.8	81.8	81.8	18.2	63.6	559.4	40.0	11.6	186.5 gal		13.3	39.0
Horse clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0

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Table 2-13.--Page 4 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95%
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	confidence limit (±) harvest
Marine invertebrates, continued												
Pacific littleneck clams (steamers)	36.4	36.4	36.4	0.0	27.3	68.7	4.9	1.4	22.9 gal		1.6	58.4
Razor clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Unknown clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Unknown cockles	18.2	18.2	18.2	0.0	18.2	61.1	4.4	1.3	20.4 gal		1.5	96.3
Dungeness crab	54.5	27.3	27.3	27.3	18.2	54.3	3.9	1.1	77.6 ind		5.5	72.3
Brown king crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Red king crab	81.8	54.5	54.5	63.6	36.4	304.4	21.7	6.3	132.4 ind		9.5	51.8
Tanner crab, bairdi	36.4	27.3	27.3	18.2	27.3	21.4	1.5	0.4	53.5 ind		3.8	56.6
Unknown Tanner crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Limpets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Blue mussels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Octopus	72.7	63.6	54.5	18.2	36.4	244.4	17.5	5.1	61.1 gal		4.4	45.2
Weathervane scallops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Unknown scallops	9.1	9.1	9.1	0.0	0.0	0.4	0.0	0.0	0.2 gal		0.0	103.1
Sea cucumber	9.1	9.1	9.1	0.0	0.0	0.4	0.0	0.0	0.2 gal		0.0	103.1
Red sea cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Sea urchin	81.8	81.8	81.8	36.4	63.6	80.8	5.8	1.7	161.6 gal		11.5	41.3
Shrimp	0.0	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Snails	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Vegetation	90.9	90.9	90.9	27.3	54.5	515.5	36.8	10.7	515.5 lb		36.8	47.4
Blueberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Lowbush cranberry	18.2	36.4	18.2	0.0	9.1	3.8	0.3	0.1	1.0 gal		0.1	73.7
Highbush cranberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Crowberry	9.1	36.4	9.1	0.0	9.1	25.5	1.8	0.5	6.4 gal		0.5	103.1
Elderberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Cloudberry	36.4	45.5	36.4	0.0	9.1	26.7	1.9	0.6	6.7 gal		0.5	52.8
Raspberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Salmonberry	81.8	81.8	81.8	27.3	45.5	384.4	27.5	7.9	96.1 gal		6.9	53.3
Strawberry	9.1	9.1	9.1	0.0	0.0	6.4	0.5	0.1	1.6 gal		0.1	103.1
Twisted stalk berry (watermelon berry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0

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Table 2-13.–Page 5 of 5.

Table 2-18: Pages 5-13.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount		95% confidence limit (±) harvest	
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit		Mean per household
Vegetation, continued												
Other wild berry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Goose tongue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Wild rhubarb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Fiddlehead ferns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Nettle	9.1	9.1	9.1	0.0	9.1	3.8	0.3	0.1	3.8 gal		0.3	103.1
Sourdock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Wild celery	18.2	18.2	18.2	0.0	9.1	1.9	0.1	0.0	1.9 gal		0.1	73.7
Wild parsley	36.4	36.4	36.4	0.0	36.4	13.4	1.0	0.3	13.4 gal		1.0	60.3
Wild rose hips	9.1	9.1	9.1	9.1	9.1	25.5	1.8	0.5	6.4 gal		0.5	103.1
Fireweed	18.2	18.2	18.2	9.1	9.1	24.2	1.7	0.5	24.2 gal		1.7	82.1
Sea lovage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Beach greens	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Bull kelp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Unknown seaweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Wood	54.5	45.5	45.5	0.0	36.4	0.0	0.0	0.0	0.0 cord		0.0	0.0

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

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

Note Resources harvested for purposes other than food consumption show a non-zero harvest amount with a zero harvest weight.

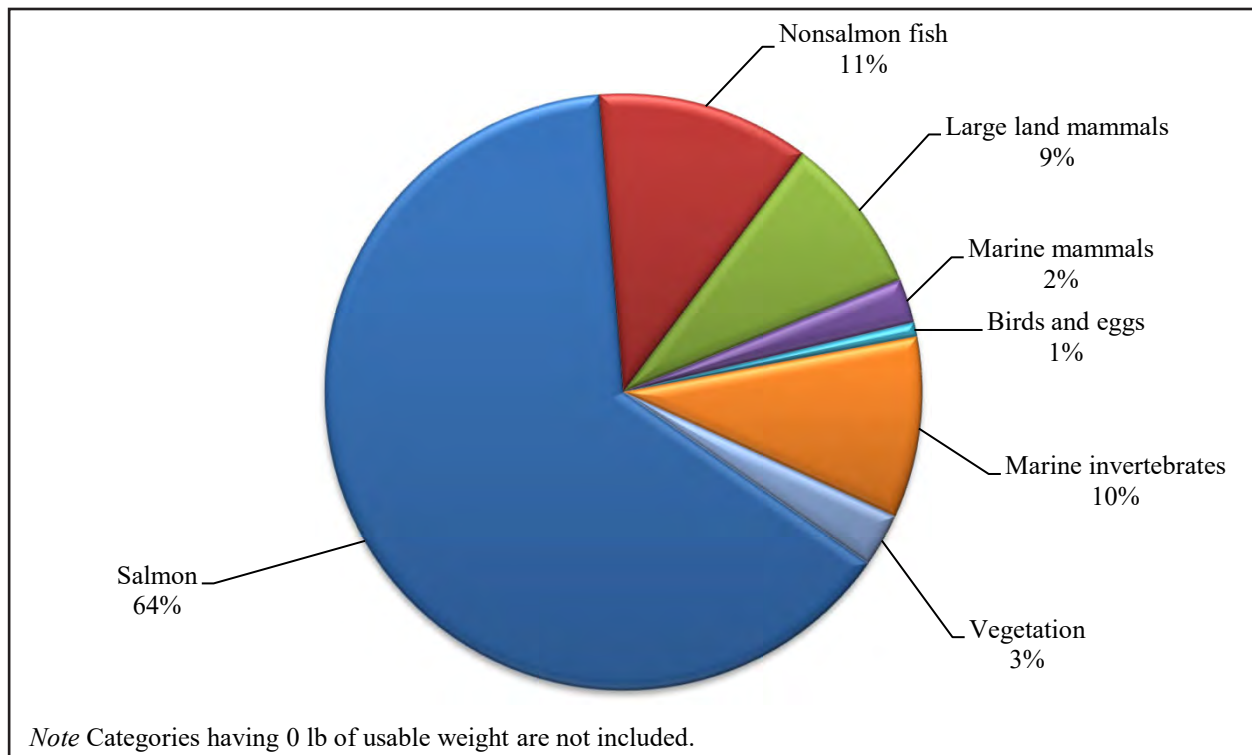


Figure 2-14.—Composition of harvest in pounds usable weight, by resource category, Akhiok, 2018.

In the fall and early winter, hunting begins on land and water. Deer, ducks, and ptarmigan are available locally, and some residents will travel varying distances to hunt moose (not available on Kodiak Island), goats, or feral reindeer. Marine mammals are most often hunted in the fall, though occasionally in the spring as well. Furbearers are taken, for food or fur, in the winter months of November and December.

While harvesting resources by boat is common and provides greater access to resources for harvesters, many of the desired resources are available within walking or vehicle distance of the community. Many of Akhiok households' harvesting activities are centered on the local area. Although each surveyed household was asked to provide spatial data, not every household participated in that portion of the survey effort and Figure 2-15 is a partial representation of the areas used in 2018 for fishing, hunting, and gathering. Further, subsequent maps in this chapter identify in the legend the specific sample size for the mapping component of the survey for each resource category.

Use and Harvest Characteristics by Resource Category

As noted above, more households used resources in 2018 than harvested them. For some resources, households may lack the time, knowledge, or equipment necessary to successfully harvest, and other resources may not be locally available and are only obtained through sharing. For all resources combined, 82% of households in Akhiok shared resources in 2018 and 91% received resources (Table 2-13). At the resource category level, differences in sharing emerge, perhaps reflecting the importance of sharing with residents of other communities on the island or elsewhere. Indicative of the pattern in 2018, for five of seven resource categories, more households gave away resources than received them. Small land mammals and feral animals were the only resource categories that were not given or received. The greatest percentage of households both gave and received marine invertebrates (82%). The fewest percentage of households gave away marine mammals (27%) and birds and eggs (36%). More than one-half of households gave away vegetation (55%), nonsalmon fish and large land mammals (64%), and salmon (73%). After marine invertebrates, the most households received large land mammals (55%); no other resource category was received by more than 45% of the community's households.

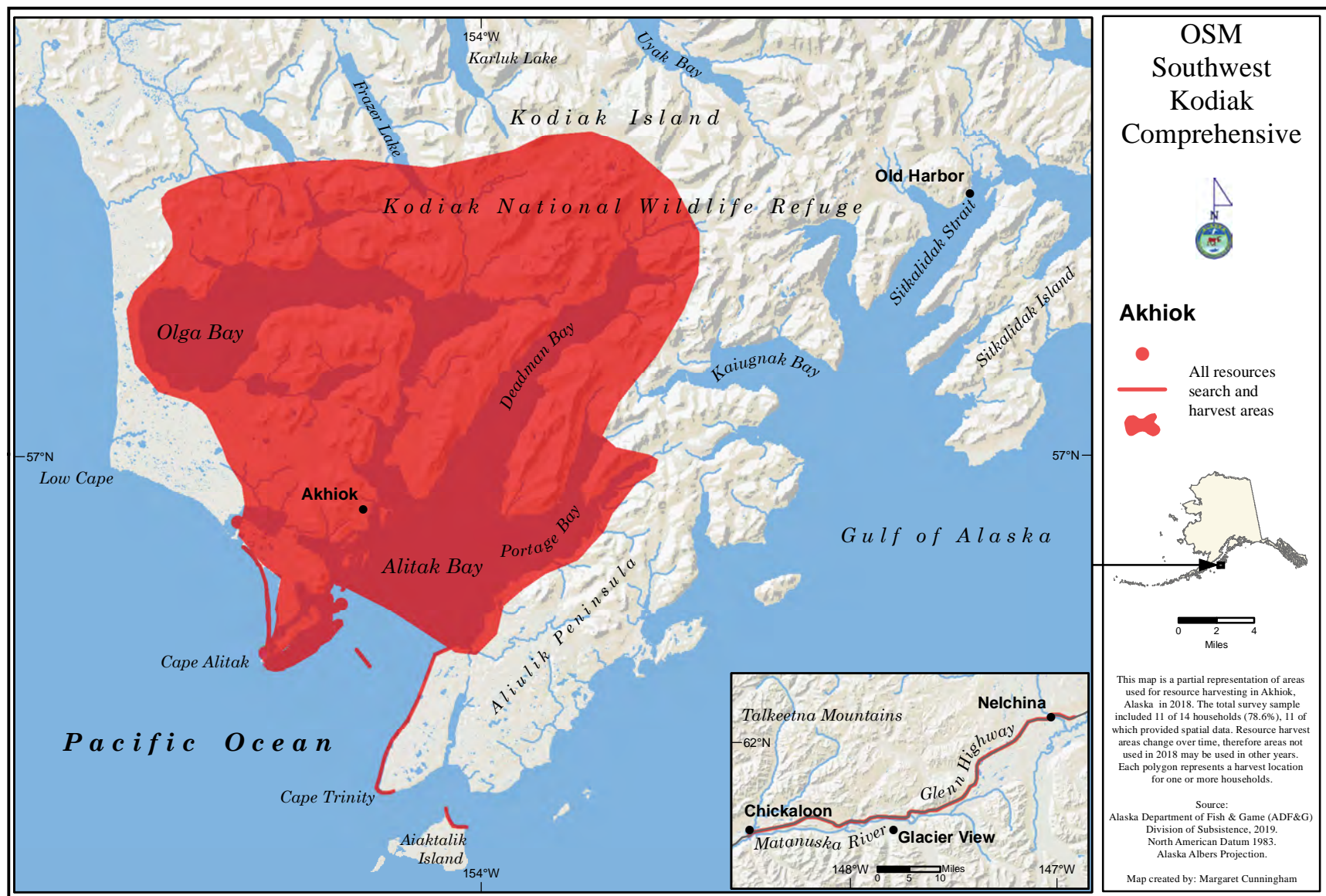


Figure 2-15.—Wild resources search and harvest areas, Akhiok, 2018.

Table 2-14.—Top ranked resources used by households, Akhiok, 2018.

Rank ^a	Resource	Percentage of households using
1.	Sockeye salmon	90.9%
1.	Pacific halibut	90.9%
1.	Deer	90.9%
4.	Coho salmon	81.8%
4.	Pink salmon	81.8%
4.	Butter clams	81.8%
4.	Red king crab	81.8%
4.	Sea urchin	81.8%
4.	Salmonberry	81.8%
10.	Black (small) chitons	72.7%

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

a. Resources used by the same percentage of households share the highest rank value instead of having sequential rank values.

Table 2-14 lists the top ranked resources used by households and Figure 2-16 shows the species with the highest harvests during the 2018 study year. In terms of both harvest and use, marine resources dominated the subsistence foods that sustained Akhiok residents. Four of the five salmon species alone composed 63% of the total harvest, with Pacific halibut accounting for another 10% of the harvest (Figure 2-16). Deer (9%) and salmonberry (2%) were the only terrestrial species included among the highest harvests. Butter clams, black chitons, and harbor seals rounded out the top species harvested, each accounting for 2%–3% of the harvest. There was a lot of overlap between the most harvested and most used species; however, chum salmon and harbor seals were among the most harvested species, but not the most used species (Table 2-14). Red king crab and sea urchins were used by 82% of Akhiok households but the overall harvest weight of either species was less than 2% of the total harvest.

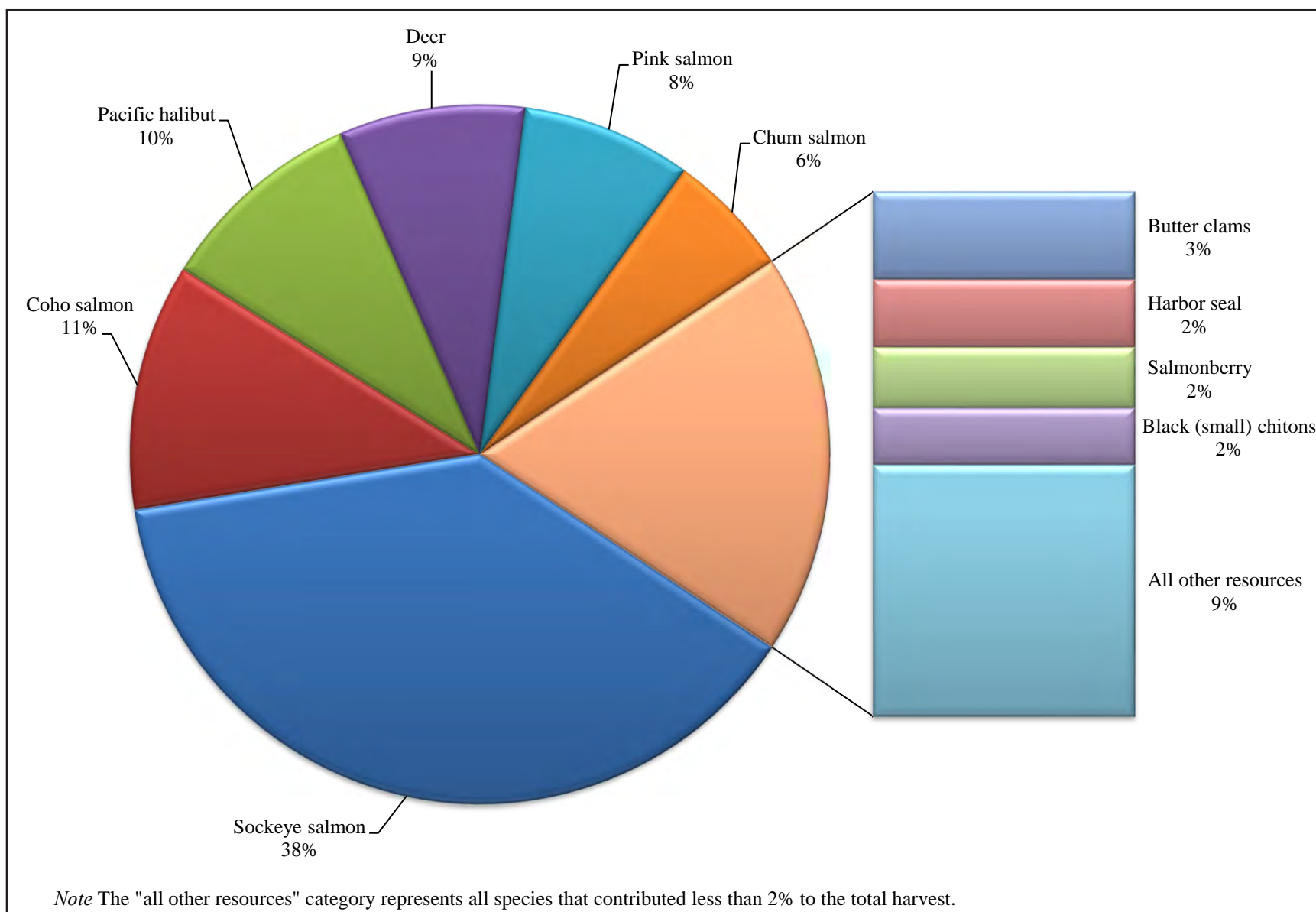


Figure 2-16.—Top resources harvested by percentage of total harvest in pounds usable weight, Akhiok, 2018.

Salmon

Akhiok residents harvested 11,437 lb of salmon in 2018, equaling a per capita harvest of 237 lb (Table 2-13). The majority (60%) of this harvest was sockeye salmon (6,817 lb, or 141 lb per capita), followed distantly by coho salmon, with 2,048 lb harvested (42 lb per capita; 18% of total harvest) (Figure 2-17). Pink and chum salmon were harvested in similar amounts (by weight) and together accounted for 21% of the total harvest. Residents harvested about 3 lb per capita of Chinook salmon, totaling 28 salmon (1% of total harvest). As might be expected, sockeye salmon were used (91%) and harvested (82%) by the most households, but perhaps surprisingly the same percentage of households (64%) harvested coho, chum, and pink salmon. While 82% of households also used pink and coho salmon, only 64% used chum salmon. More residents shared pink and sockeye salmon (55%) than any other species. The next most commonly shared species was coho salmon (46%), followed by chum salmon (36%). More households received sockeye salmon (46%), followed by pink and coho salmon (27%). Chinook salmon were used and harvested by the fewest households (36% and 27%, respectively) and was the only salmon species for which more households fished than harvested. The fewest households also gave away Chinook salmon (18%) and an equal percentage of households (9%) received Chinook or chum salmon.

Figure 2-18 is a visual representation of the salmon harvest in pounds by species and gear type. Set gillnets were the predominant gear used to harvest salmon in 2018. Akhiok households also harvested all salmon species with rod and reel gear, chum and coho salmon were caught in seines, and pink salmon by hand (Table 2-15). For each salmon species, except Chinook salmon, the majority of the harvest was caught in set gillnets. For example, 1,784 sockeye salmon were harvested by gillnet out of a total harvest of 1,816 fish. The harvest of sockeye salmon composed the majority of the overall setnet harvest: 72% of the setnet harvest amount was composed of sockeye salmon, followed by pink salmon accounting for 13% (Table 2-16). Overall, Akhiok residents used setnets to harvest 87% of the salmon catch in 2018. Rod and reel was used to harvest an additional 11% of the total salmon caught; most of the rod and reel harvest was of pink salmon (58%), followed by coho salmon (15%). Seines were used to harvest almost all of the remainder (2%) salmon harvested and almost all of the seine harvest was of coho salmon (94%).

Salmon fishing occurred all around Akhiok: as far north as Olga Bay and as far south as Cape Alitak (Figure 2-19). Households trolled for salmon from Lazy Bay to Cape Alitak, along Akhiok Bay, and up into Deadman Bay. According to respondents, setnets and rod and reel gear were used throughout Olga and Moser bays, adjacent to the community, and south into Kempff and Lazy bays. Fishing locations and gear types are chosen based on species of salmon sought, time of year, and time and equipment available to the harvester.

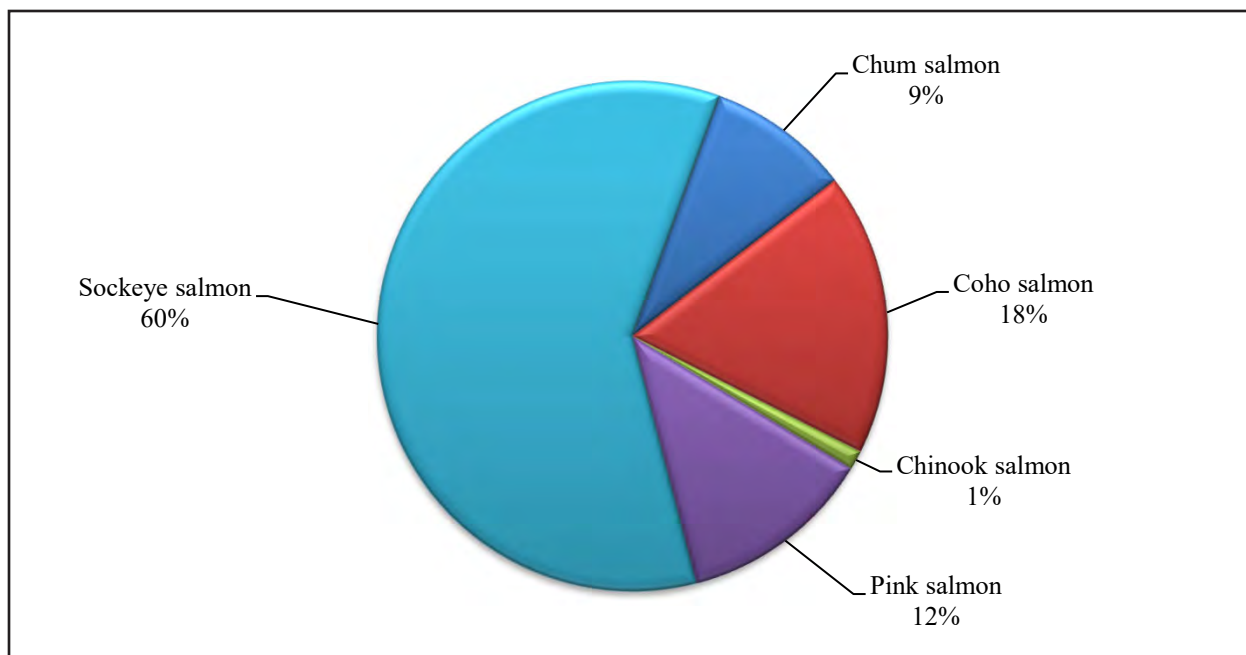


Figure 2-17.—Composition of salmon harvest in pounds usable weight, Akhiok, 2018.

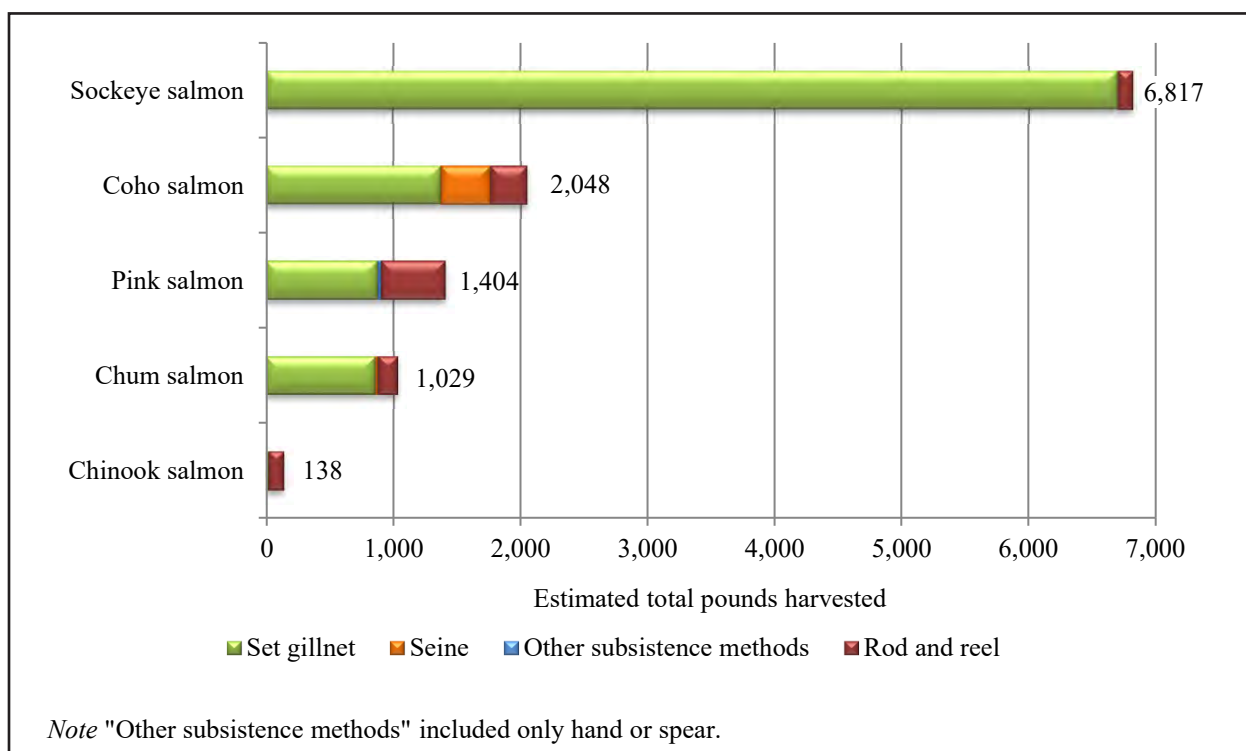


Figure 2-18.—Estimated harvests of salmon in pounds usable weight by gear type and resource, Akhiok, 2018.

Table 2-15.—Estimated harvests of salmon by gear type and resource, Akhiok, 2018.

Resource	Subsistence methods															
	Removed from commercial catch		Subsistence gear, any method										Rod and reel		Any method	
			Drift gillnet		Set gillnet		Seine		Other method ^a							
	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	0.0	0.0	0.0	0.0	2,467.8	9,815.8	67.5	412.1	10.2	28.5	2,545.5	10,256.4	308.0	1,180.3	2,853.5	11,436.7
Chum salmon	0.0	0.0	0.0	0.0	143.8	855.3	3.8	22.7	0.0	0.0	147.6	878.0	25.5	151.4	173.1	1,029.4
Coho salmon	0.0	0.0	0.0	0.0	224.0	1,370.6	63.6	389.4	0.0	0.0	287.6	1,760.0	47.1	288.1	334.7	2,048.2
Chinook salmon	0.0	0.0	0.0	0.0	3.8	18.8	0.0	0.0	0.0	0.0	3.8	18.8	24.2	118.8	28.0	137.6
Pink salmon	0.0	0.0	0.0	0.0	311.8	873.3	0.0	0.0	10.2	28.5	322.0	901.8	179.5	502.6	501.5	1,404.3
Sockeye salmon	0.0	0.0	0.0	0.0	1,784.4	6,697.8	0.0	0.0	0.0	0.0	1,784.4	6,697.8	31.8	119.4	1,816.2	6,817.2
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

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

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

a. Methods included only hand or spear.

Table 2-16.—Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Akhiok, 2018.

		Subsistence methods																											
		Removed from commercial catch				Drift gillnet				Set gillnet				Seine				Other method ^a				Subsistence gear, any method				Rod and reel		Any method	
Resource	Percentage base	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds				
Salmon	Gear type	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%				
	Resource	0.0%	0.0%	0.0%	0.0%	86.5%	85.8%	2.4%	3.6%	0.4%	0.2%	89.2%	89.7%	10.8%	10.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%				
	Total	0.0%	0.0%	0.0%	0.0%	86.5%	85.8%	2.4%	3.6%	0.4%	0.2%	89.2%	89.7%	10.8%	10.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%				
Chum salmon	Gear type	0.0%	0.0%	0.0%	0.0%	5.8%	8.7%	5.7%	5.5%	0.0%	0.0%	5.8%	8.6%	8.3%	12.8%	6.1%	9.0%												
	Resource	0.0%	0.0%	0.0%	0.0%	83.1%	83.1%	2.2%	2.2%	0.0%	0.0%	85.3%	85.3%	14.7%	14.7%	100.0%	100.0%												
	Total	0.0%	0.0%	0.0%	0.0%	5.0%	7.5%	0.1%	0.2%	0.0%	0.0%	5.2%	7.7%	0.9%	1.3%	6.1%	9.0%												
Coho salmon	Gear type	0.0%	0.0%	0.0%	0.0%	9.1%	14.0%	94.3%	94.5%	0.0%	0.0%	11.3%	17.2%	15.3%	24.4%	11.7%	17.9%												
	Resource	0.0%	0.0%	0.0%	0.0%	66.9%	66.9%	19.0%	19.0%	0.0%	0.0%	85.9%	85.9%	14.1%	14.1%	100.0%	100.0%												
	Total	0.0%	0.0%	0.0%	0.0%	7.9%	12.0%	2.2%	3.4%	0.0%	0.0%	10.1%	15.4%	1.7%	2.5%	11.7%	17.9%												
Chinook salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	7.9%	10.1%	1.0%	1.2%												
	Resource	0.0%	0.0%	0.0%	0.0%	13.6%	13.6%	0.0%	0.0%	0.0%	0.0%	13.6%	13.6%	86.4%	86.4%	100.0%	100.0%												
	Total	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.8%	1.0%	1.0%	1.2%												
Pink salmon	Gear type	0.0%	0.0%	0.0%	0.0%	12.6%	8.9%	0.0%	0.0%	100.0%	100.0%	12.7%	8.8%	58.3%	42.6%	17.6%	12.3%												
	Resource	0.0%	0.0%	0.0%	0.0%	62.2%	62.2%	0.0%	0.0%	2.0%	2.0%	64.2%	64.2%	35.8%	35.8%	100.0%	100.0%												
	Total	0.0%	0.0%	0.0%	0.0%	10.9%	7.6%	0.0%	0.0%	0.4%	0.2%	11.3%	7.9%	6.3%	4.4%	17.6%	12.3%												
Sockeye salmon	Gear type	0.0%	0.0%	0.0%	0.0%	72.3%	68.2%	0.0%	0.0%	0.0%	0.0%	70.1%	65.3%	10.3%	10.1%	63.6%	59.6%												
	Resource	0.0%	0.0%	0.0%	0.0%	98.2%	98.2%	0.0%	0.0%	0.0%	0.0%	98.2%	98.2%	1.8%	1.8%	100.0%	100.0%												
	Total	0.0%	0.0%	0.0%	0.0%	62.5%	58.6%	0.0%	0.0%	0.0%	0.0%	62.5%	58.6%	1.1%	1.0%	63.6%	59.6%												
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%												
	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%												
	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%												

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

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

a. Methods included only hand or spear.

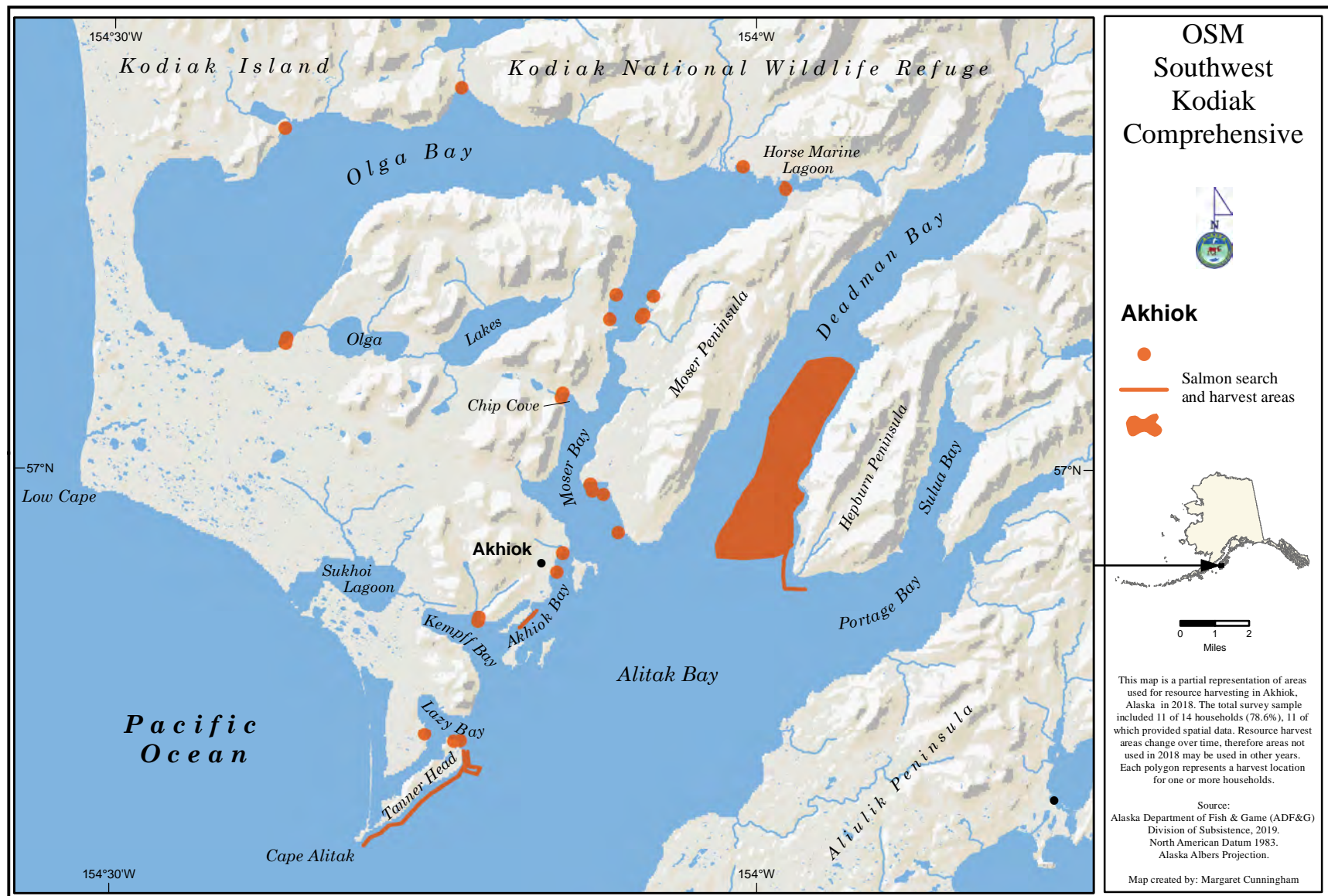


Figure 2-19.—Fishing and harvest locations of all salmon, Akhiok, 2018.

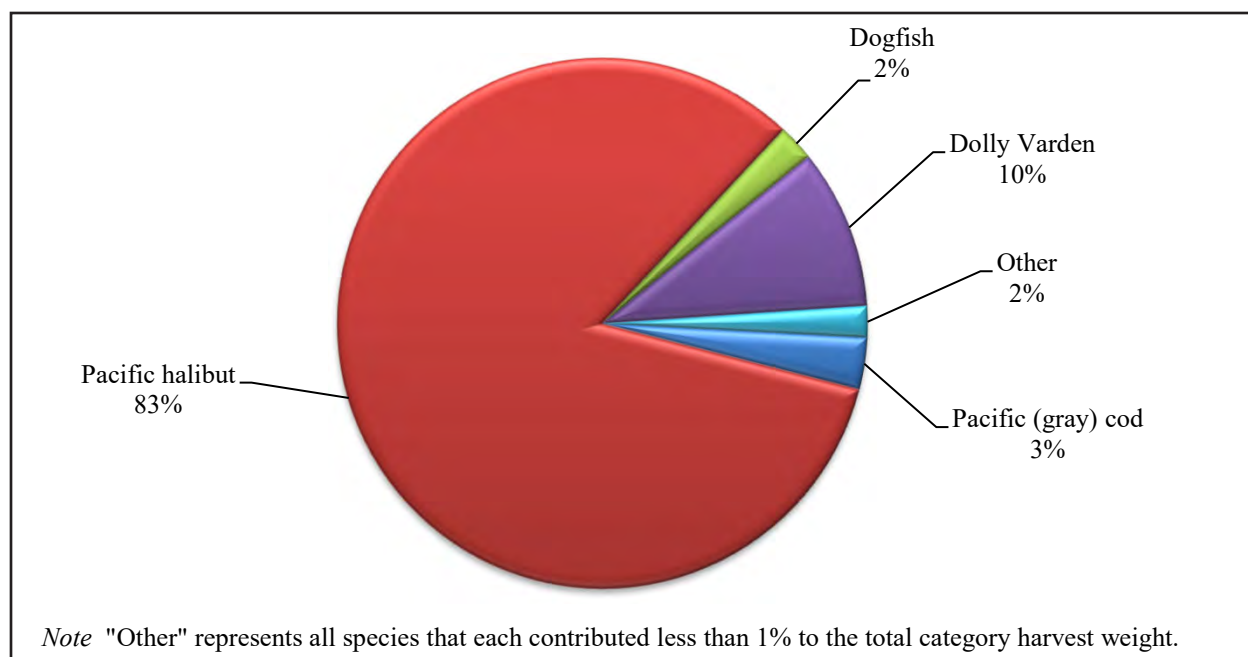


Figure 2-20.—Composition of nonsalmon fish harvest in pounds usable weight, Akhiok, 2018.

Nonsalmon Fish

Households in Akhiok harvested several other types of fish in addition to salmon, but Pacific halibut dominated this harvest, accounting for 83% of the total nonsalmon fish harvest weight (Figure 2-20). The overall harvest of nonsalmon fish totaled 2,065 lb, or 43 lb per person, and the Pacific halibut harvest accounted for 1,714 lb, or 35 lb per capita (Table 2-13). Other species harvested included Dolly Varden (10%); Pacific cod (3%); dogfish (2%); and black rockfish, steelhead, and sablefish (black cod) (2% combined) (Figure 2-20; Table 2-13). Unsurprisingly, the most households fished for and used Pacific halibut (73% and 91%, respectively), followed by Dolly Varden (46% used and fished) (Table 2-13). Although steelhead accounted for a small proportion of the overall harvest, 27% of households fished for this resource and used steelhead, which was more so than any other nonsalmon fish besides Pacific halibut and Dolly Varden. Nonsalmon fish were not highly shared among Akhiok households. For all species, except for Pacific halibut, the same percentage of households that used a resource also fished for that resource. All households were successful fishing, except for Dolly Varden where only 36% of community households harvested. Households documented both sharing and receiving only Pacific halibut (55% and 36%, respectively) and Dolly Varden (27% and 9%). In addition, 9% of households shared sablefish, but no Akhiok households received it, indicating it may have gone to another community.

Figure 2-21 is a visual representation of the nonsalmon fish harvest weight caught by species and by gear type. Set gillnets, longline, handline, and rod and reel gear were all used to harvest nonsalmon fish in 2018. Set gillnets were used only to harvest Dolly Varden and steelhead, which were incidental harvests during salmon fishing, and handlines were only used to harvest Pacific cod and halibut (Table 2-17). Pacific halibut was the main nonsalmon species caught in 2018, and it dominated the harvest by almost any gear type used: halibut composed the majority of the handline harvest (98%), the longline harvest (81%), and the rod and reel harvest (68%) (Table 2-18). The majority of Pacific halibut weight (54%) was harvested with handline, followed by longline (28%), and rod and reel (18%). Black rockfish, sablefish, and dogfish were all harvested with only longlines. Set gillnets were used to take the majority of the steelhead harvest weight (94%) with the remainder being harvested with rod and reel; conversely, the majority of the Dolly Varden harvest (70%) came from rod and reel use and the remaining 30% of the harvest was caught with setnets.

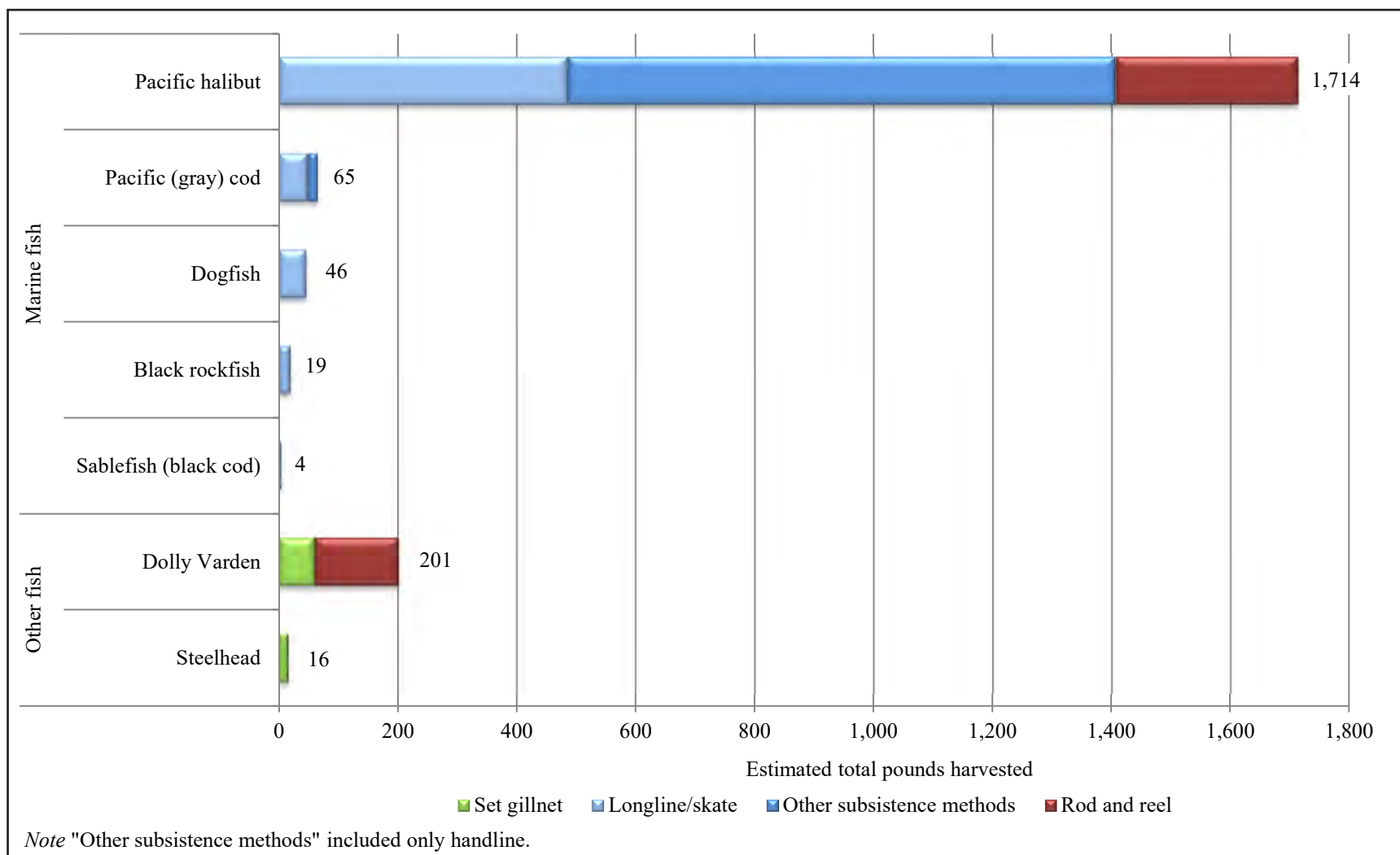


Figure 2-21.—Estimated harvest of nonsalmon fish in pounds usable weight by gear type and resource, Akhiok, 2018.

Table 2-17.—Estimated harvests of nonsalmon fish by gear type and resource, Akhiok, 2018.

Resource	Unit ^a	Subsistence methods																	
		Removed from commercial catch		Subsistence methods															
		Number ^a	Pounds	Drift gillnet		Set gillnet		Seine		Longline/skate		Other method ^b		Subsistence gear, any method		Rod and reel		Any method	
		Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds
Nonsalmon fish			0.0		0.0		75.7		0.0		603.4		937.2		1,616.4		448.6		2,065.0
Pacific herring	gal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific (gray) cod	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.3	48.9	5.1	16.3	20.4	65.2	0.0	0.0	20.4	65.2
Unknown cod	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown flounder	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lingcod	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific halibut	lb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	485.7	485.7	920.9	920.9	1,406.6	1,406.6	307.0	307.0	1,713.6	1,713.6
Black rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	19.1	0.0	0.0	12.7	19.1	0.0	0.0	12.7	19.1
Yelloweye rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sablefish (black cod)	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.9	0.0	0.0	1.3	3.9	0.0	0.0	1.3	3.9
Bullhead sculpin	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown sculpin	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dogfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	45.8	0.0	0.0	5.1	45.8	0.0	0.0	5.1	45.8
Skates	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dolly Varden	ind	0.0	0.0	0.0	0.0	43.3	60.6	0.0	0.0	0.0	0.0	0.0	0.0	43.3	60.6	100.5	140.8	143.8	201.3
Lake trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arctic grayling	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rainbow trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steelhead	ind	0.0	0.0	0.0	0.0	21.6	15.1	0.0	0.0	0.0	0.0	0.0	0.0	21.6	15.1	1.3	0.9	22.9	16.0
Unknown trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

Note The summary row that includes incompatible units of measure has been left blank.

a. The harvested number of each resource is measured by the unit in which the resource harvest information was collected; the unit of measurement is provided for each resource.

b. Method included only handline.

Table 2-18.—Estimated percentages of nonsalmon fish harvested in pounds usable weight by gear type, resource, and total nonsalmon fish harvest, Akhiok, 2018.

Resource	Percentage base	Removed from commercial catch	Subsistence methods					Subsistence gear, any method	Rod and reel	Any method
			Drift gillnet	Set gillnet	Seine	Longline/skate	Other method ^a			
Nonsalmon fish	Gear type	0.0%	0.0%	100.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Resource	0.0%	0.0%	3.7%	0.0%	29.2%	45.4%	78.3%	21.7%	100.0%
	Total	0.0%	0.0%	3.7%	0.0%	29.2%	45.4%	78.3%	21.7%	100.0%
Pacific herring	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pacific (gray) cod	Gear type	0.0%	0.0%	0.0%	0.0%	8.1%	1.7%	4.0%	0.0%	3.2%
	Resource	0.0%	0.0%	0.0%	0.0%	75.0%	25.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	2.4%	0.8%	3.2%	0.0%	3.2%
Unknown cod	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unknown flounder	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Lingcod	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pacific halibut	Gear type	0.0%	0.0%	0.0%	0.0%	80.5%	98.3%	87.0%	68.4%	83.0%
	Resource	0.0%	0.0%	0.0%	0.0%	28.3%	53.7%	82.1%	17.9%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	23.5%	44.6%	68.1%	14.9%	83.0%
Black rockfish	Gear type	0.0%	0.0%	0.0%	0.0%	3.2%	0.0%	1.2%	0.0%	0.9%
	Resource	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.9%	0.0%	0.9%
Yelloweye rockfish	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

-continued-

Table 2-18.—Page 2 of 3.

Resource	Percentage base	Removed from commercial catch	Subsistence methods					Subsistence gear, any method	Rod and reel	Any method
			Drift gillnet	Set gillnet	Seine	Longline/ skate	Other method ^a			
Unknown rockfish	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sablefish (black cod)	Gear type	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.2%	0.0%	0.2%
	Resource	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%	0.0%	0.2%
Bullhead sculpin	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unknown sculpin	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Dogfish	Gear type	0.0%	0.0%	0.0%	0.0%	7.6%	0.0%	2.8%	0.0%	2.2%
	Resource	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	2.2%	0.0%	2.2%
Skates	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Dolly Varden	Gear type	0.0%	0.0%	80.0%	0.0%	0.0%	0.0%	3.7%	31.4%	9.8%
	Resource	0.0%	0.0%	30.1%	0.0%	0.0%	0.0%	30.1%	69.9%	100.0%
	Total	0.0%	0.0%	2.9%	0.0%	0.0%	0.0%	2.9%	6.8%	9.8%
Lake trout	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Arctic grayling	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

-continued-

Table 2-18.—Page 3 of 3.

Resource	Percentage base	Removed from commercial catch	Subsistence methods					Subsistence gear, any method	Rod and reel	Any method
			Drift gillnet	Set gillnet	Seine	Longline/ skate	Other method ^a			
Rainbow trout	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Steelhead	Gear type	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.9%	0.2%	0.8%
	Resource	0.0%	0.0%	94.4%	0.0%	0.0%	0.0%	94.4%	5.6%	100.0%
	Total	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	0.7%	0.0%	0.8%
Unknown trout	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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

a. Method included only handline.

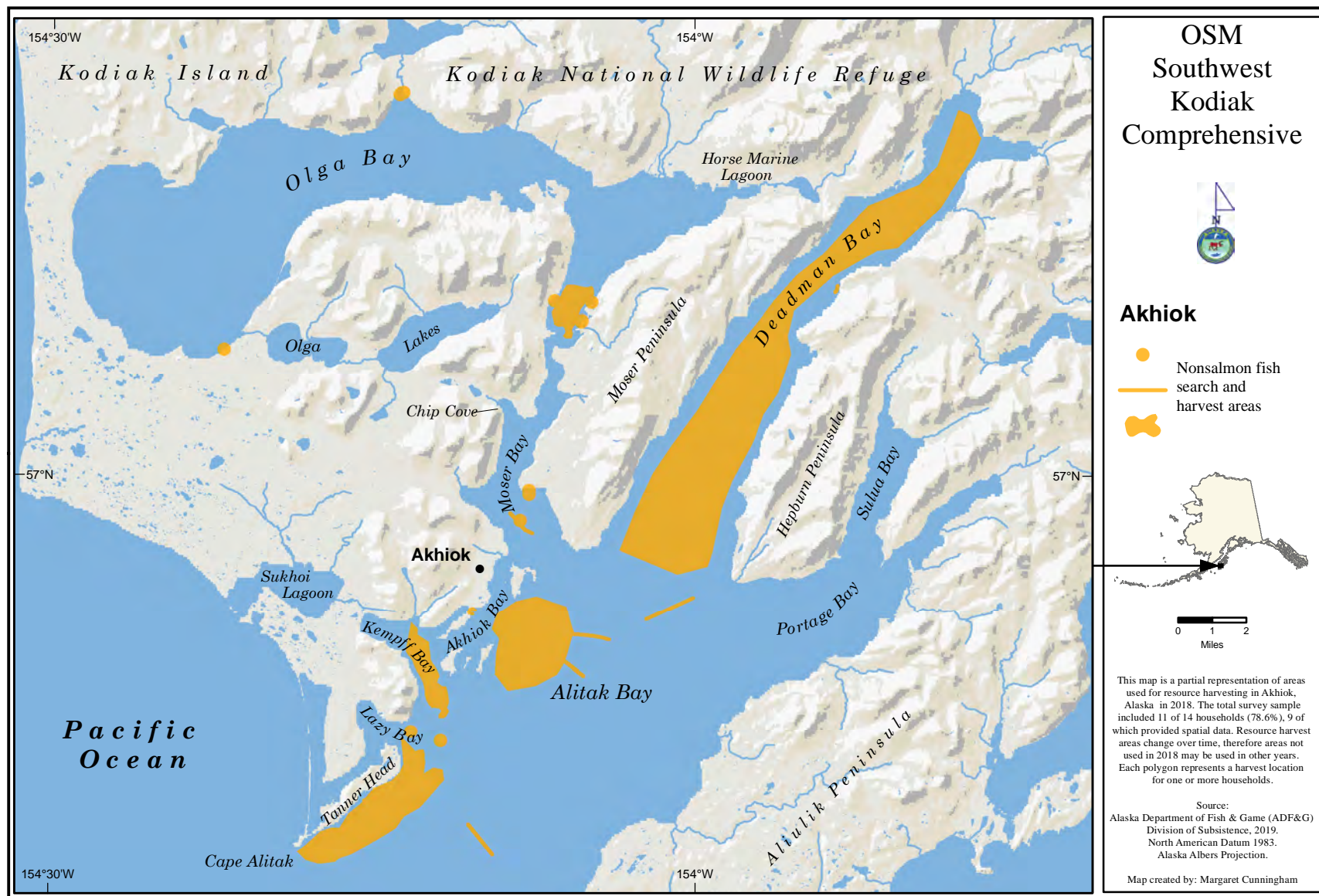


Figure 2-22.—Fishing and harvest locations of all nonsalmon fish, Akhiok, 2018.

Akhiok households traveled to the same general locations to fish for nonsalmon fish as they did for salmon fishing (Figure 2-22). There was more extensive use of the water bodies that are more open to the Pacific Ocean, such as Alitak, Kempff, and Deadman bays, and fewer locations were used in Olga and Moser bays. Akhiok residents did not harvest any freshwater nonsalmon fish, and the two anadromous species harvested, Dolly Varden and steelhead, were harvested in marine waters, explaining the lack of search areas in freshwater systems.

Large Land Mammals

Deer was the only large land mammal species harvested by Akhiok households in 2018, although 18% of households hunted feral reindeer and 9% of households also hunted for mountain goats and moose (Table 2-13). Despite all those households being unsuccessful, 18% of households used mountain goats and 9% used moose, all having received these resources from other households, likely from outside the community since no households reported sharing these resources. For deer, 73% of households hunted and all were successful. Most households (91%) used deer in 2018 and shared them; 64% of households gave deer away and 46% of households received deer. A total of 36 deer were harvested, which converted to 1,540 lb of deer, or 32 lb per person. Households hunted deer every month of deer season but were most successful in December (12 deer) and September (nine deer) (Table 2-19). The fewest deer (one) were harvested in January.

Akhiok households hunted large land mammals all around the community: from Cape Alitak in the south, up and around the shores of Olga Bay and Deadman Bay and into the surrounding hills (Figure 2-23). The northern extent of the hunting area reached up into Frazer and Red lakes. Hunting areas continued south from Deadman Bay, covering the shores of Portage Bay and Alitak Bay. In addition, in 2018, some hunting occurred in Interior Alaska along the Glenn Highway. Hunters used a combination of boats, cars, four-wheelers, and foot to pursue large land mammals.

Table 2-19.—Estimated large land mammal harvests by month and sex, Akhiok, 2018.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
All large land mammals	1.3	0.0	0.0	0.0	0.0	0.0	0.0	5.1	8.9	3.8	5.1	11.5	0.0	35.6
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	0.0	0.0	0.0	0.0	0.0	0.0
Caribou, male	0.0	0.0	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, 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
Deer	1.3	0.0	0.0	0.0	0.0	0.0	0.0	5.1	8.9	3.8	5.1	11.5	0.0	35.6
Deer, male	1.3	0.0	0.0	0.0	0.0	0.0	0.0	5.1	8.9	3.8	5.1	11.5	0.0	35.6
Deer, 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
Deer, 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
Elk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elk, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elk, 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
Elk, 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
Mountain goat	0.0	0.0	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
Reindeer—feral	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

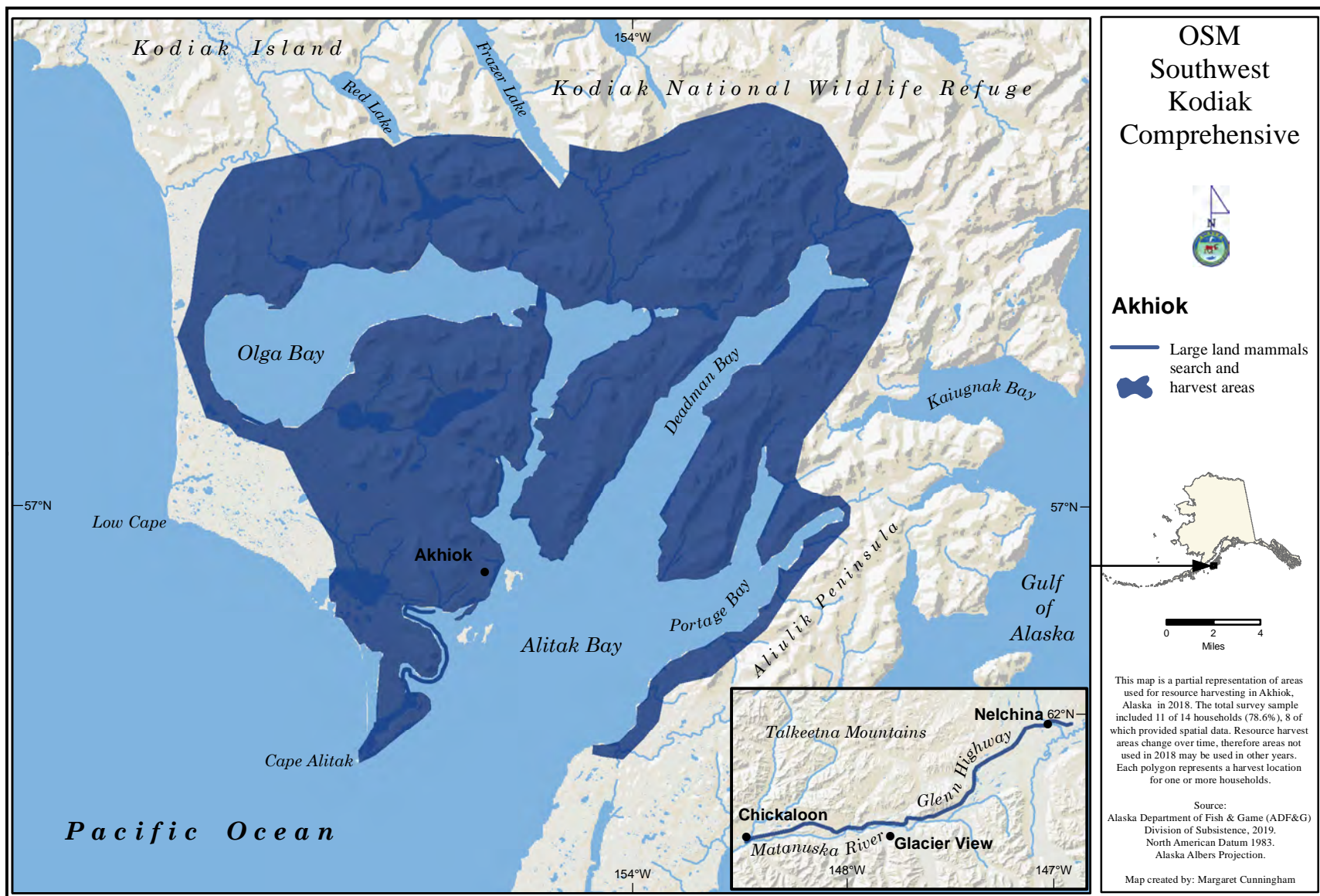


Figure 2-23.—Hunting locations of all large land mammals, Akhiok, 2018.

Small Land Mammals/Furbearers

Snowshoe hares, red foxes, and beavers were all hunted or trapped in Akhiok in 2018 (Table 2-13). More households hunted snowshoe hares (27%) than foxes or beavers, but none were successful and no households used snowshoe hares. Approximately 9% of households used foxes and beavers, and 9% attempted to harvest these resources and all were successful. No households shared or received any type of small land mammal or furbearer. Eight red foxes (75% of the total harvest) and three beavers (25%) were harvested, all for their fur, so no harvest weight was assigned to these species (Figure 2-24; Table 2-13). The foxes were harvested in December and the harvest timing for the beavers was unknown (Table 2-20).

Akhiok households stayed close to home when hunting for or trapping small land mammals in 2018 (Figure 2-25). Mapped locations for this resource category included the area of land southwest of the community, heading toward Kempff Bay.

Marine Mammals

Akhiok residents hunted for harbor seals, Steller sea lions, and sea otters during 2018 (Table 2-13). More harbor seals were harvested than sea otters (Figure 2-26). More households hunted harbor seals (46%) than Steller sea lions (18%) or sea otters (9%), but while the sea otter hunters were all successful, no households harvested Steller sea lions and 27% of community households harvested harbor seals (Table 2-13). A total of eight male harbor seals and five sea otters were harvested; all sea otters were harvested in November, while harbor seals were harvested during multiple months in the fall and winter with the most having been taken in December (Table 2-21). Because sea otters are not eaten, only the harbor seal harvest was converted into pounds usable weight. The total harvest in Akhiok was 428 lb of harbor seal meat, a per capita harvest of 9 lb (Table 2-13). Harbor seal was also the only harvested marine mammal resource shared or received by Akhiok households: 27% gave seals away and 36% received seals from another household. It is unsurprising, then, that more households (55%) used harbor seals than any other marine mammal resource.

Deadman Bay was used extensively in the search for marine mammals in 2018 (Figure 2-27). Other areas also searched included Olga Bay, Lazy Bay, Alitak Bay, and Sukhoi Lagoon.

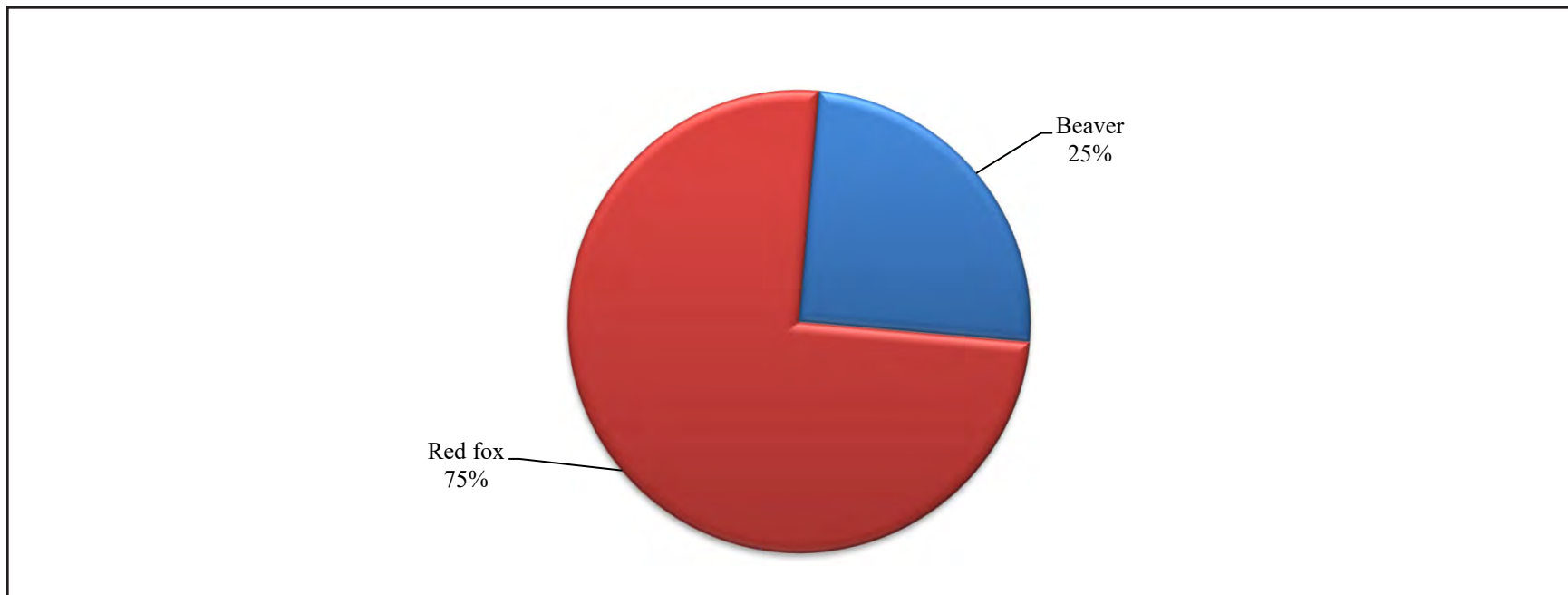


Figure 2-24.—Composition of small land mammal/furbearer harvest by individual animals harvested, Akhiok, 2018.

Table 2-20.—Estimated small land mammal/furbearer harvests by month, Akhiok, 2018.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
All small land mammals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	2.5	10.2
Beaver	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5
Red fox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.0	7.6
Snowshoe hare	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
River (land) otter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gray wolf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

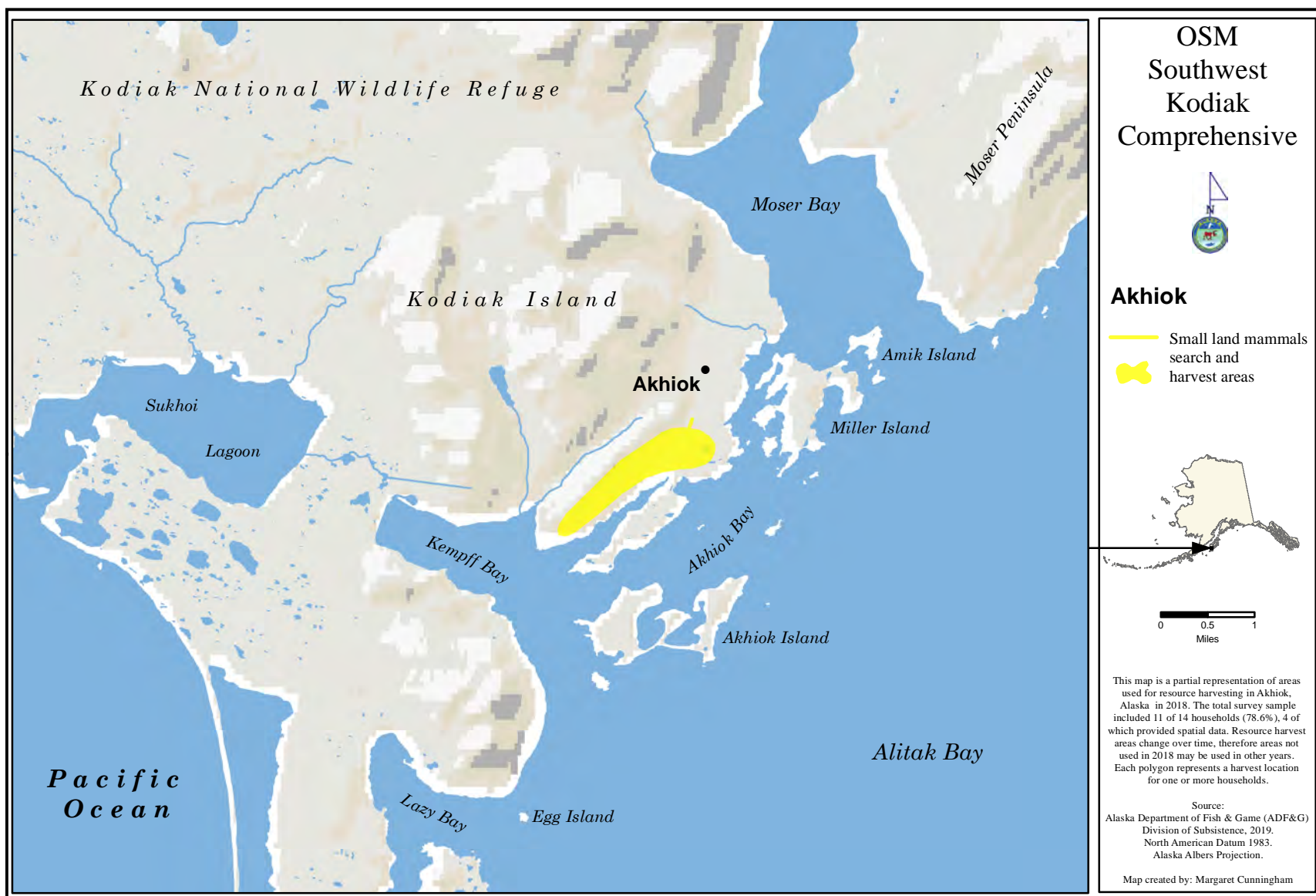


Figure 2-25.—Hunting and trapping locations of all small land mammals/furbearers, Akhiok, 2018.

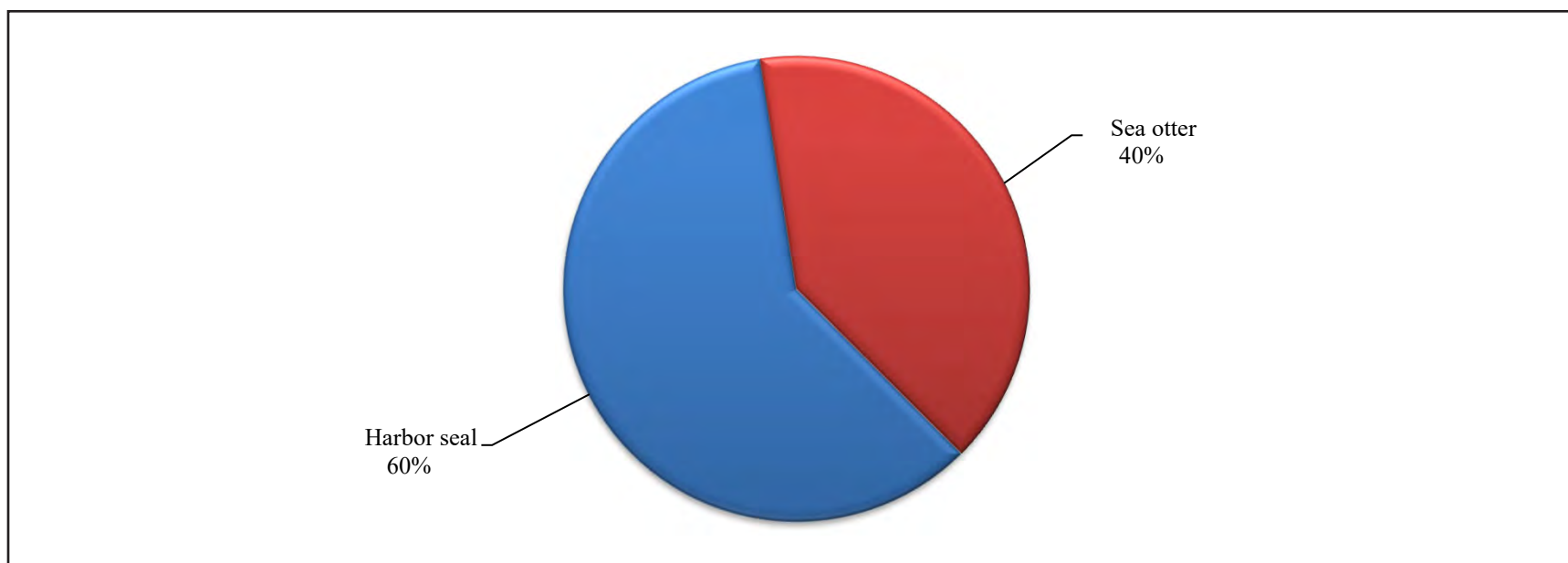


Figure 2-26.—Composition of marine mammal harvest by individual animals harvested, Akhiok, 2018.

Table 2-21.—Estimated marine mammal harvests by month and sex, Akhiok, 2018.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
All marine mammals	1.3	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3	0.0	6.4	2.5	0.0	12.7
Harbor seal	1.3	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3	0.0	1.3	2.5	0.0	7.6
Harbor seal, male	1.3	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3	0.0	1.3	2.5	0.0	7.6
Harbor seal, 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
Harbor seal, 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
Sea otter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	0.0	0.0	5.1
Steller sea lion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steller sea lion, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steller sea lion, 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
Steller sea lion, 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
Unknown whale	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

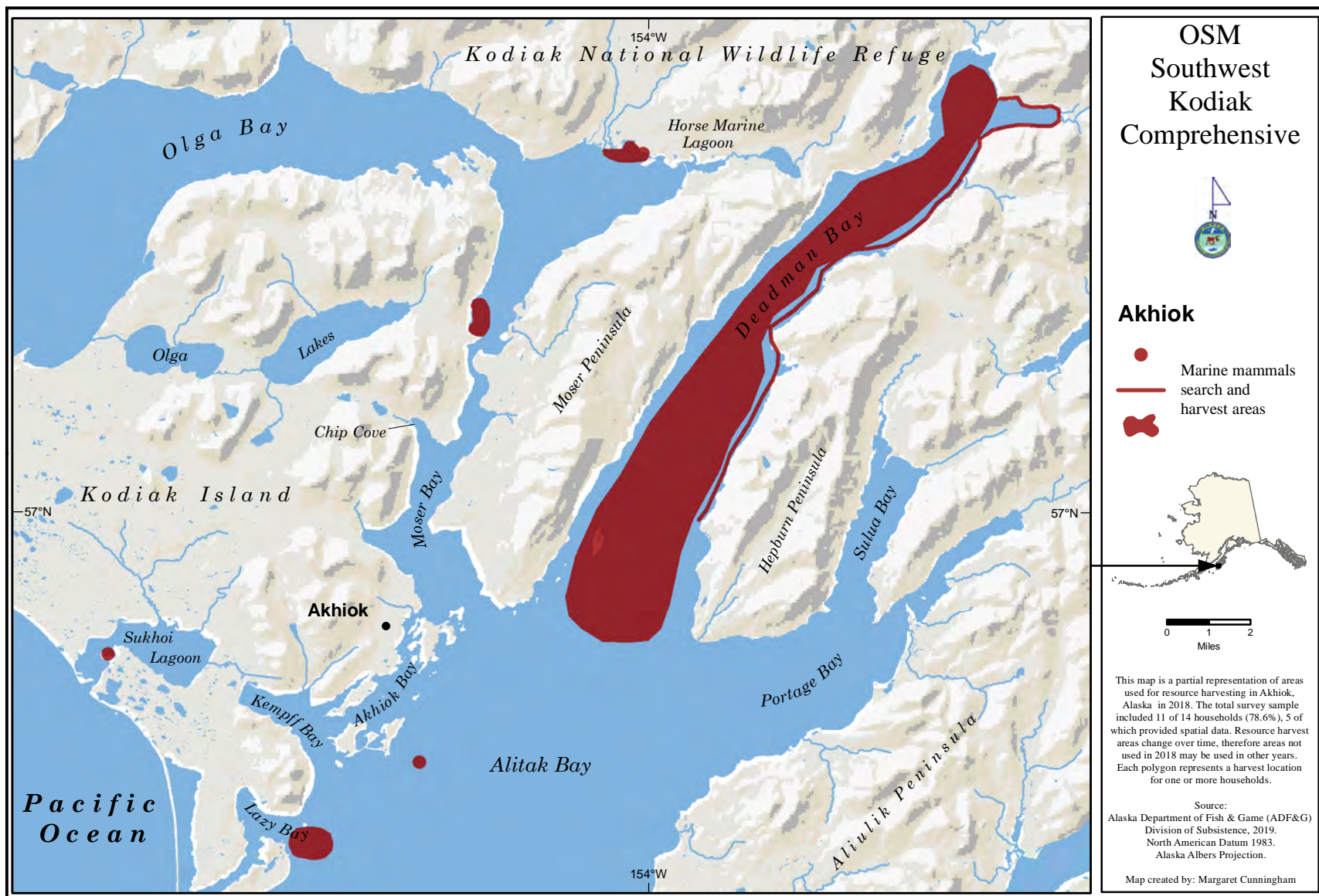


Figure 2-27.—Hunting locations of all marine mammals, Akhiok, 2018.

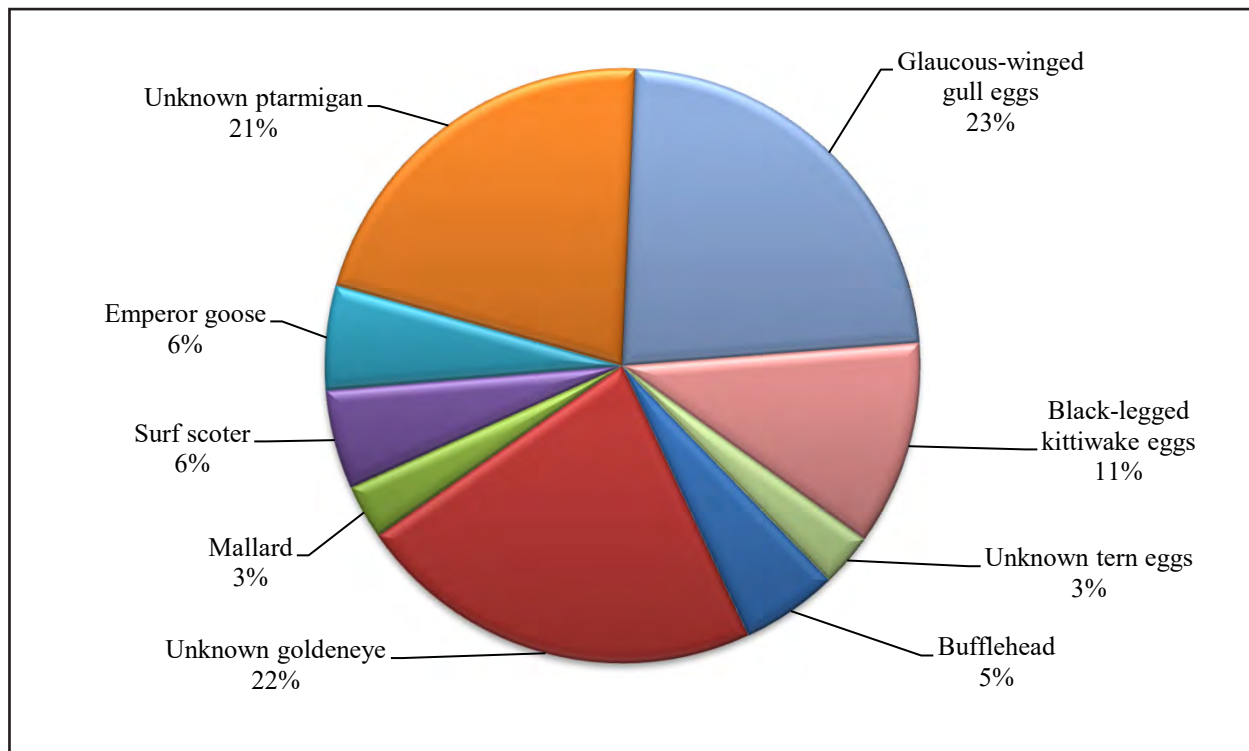


Figure 2-28.—Composition of bird and bird egg harvest in pounds usable weight, Akhiok, 2018.

Birds and Eggs

Several species of birds and bird eggs were harvested in 2018. No single resource accounted for a majority of the harvest weight, but three—glaucous-winged gull eggs (23%), unspecified types of goldeneye (22%), and ptarmigans (21%)—composed two-thirds of the harvest weight (Figure 2-28). Other resources harvested included black-legged kittiwake eggs (11%), surf scoters (6%), emperor geese (6%), and buffleheads (5%). Mallards and tern eggs rounded out the birds and eggs harvest, contributing 3% each to the total harvest weight. The total harvest weight of all birds and eggs harvested equaled 138 lb; no species was harvested in an amount that converted to greater than 1 lb per capita (Table 2-13). Despite low harvest amounts, almost three-quarters of households used birds and eggs. The most households used glaucous-winged gull eggs (55%), followed by 36% of households that used tern eggs, black-legged kittiwake eggs, and ptarmigans. Goldeneyes were used by 27% of households. No other species was used by more than 10% of households. Generally, the percentage of households using a resource was similar to the percentage of households hunting for that resource and, except for emperor geese, households were successful when hunting. Bird eggs are available and harvested in May and June. All birds were harvested during the winter season (November through March) (Table 2-22). Specific types of birds and eggs were not widely shared. As with household use, the most households (27%) shared glaucous-winged gull eggs, 18% of households shared tern and kittiwake eggs, and 9% of households shared goldeneyes and mallards. Interestingly, very few households received these resources. Only 9% of households received goldeneyes and unspecified types of ducks, indicating that resources from this category are likely shared outside of the community, perhaps because Akhiok enjoys some of the easiest access to bird eggs on the island.

Search and harvest areas for birds and bird eggs were focused on the islands to the south and east of Akhiok (Figure 2-29). Additional locations included Moser Bay and Egg Island near Lazy Bay.

Table 2-22.—Estimated bird harvests by season, Akhiok, 2018.

Resource	Estimated harvest by season					Total
	Spring	Summer	Fall	Winter	Season unknown	
All birds	0.0	0.0	0.0	85.3	0.0	85.3
Bufflehead	0.0	0.0	0.0	12.7	0.0	12.7
Common eider	0.0	0.0	0.0	0.0	0.0	0.0
King eider	0.0	0.0	0.0	0.0	0.0	0.0
Steller's eider	0.0	0.0	0.0	0.0	0.0	0.0
Unknown goldeneye	0.0	0.0	0.0	24.2	0.0	24.2
Harlequin duck	0.0	0.0	0.0	0.0	0.0	0.0
Mallard	0.0	0.0	0.0	2.5	0.0	2.5
Merganser	0.0	0.0	0.0	0.0	0.0	0.0
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0
Northern pintail	0.0	0.0	0.0	0.0	0.0	0.0
Unknown scap	0.0	0.0	0.0	0.0	0.0	0.0
Black scoter	0.0	0.0	0.0	0.0	0.0	0.0
Surf scoter	0.0	0.0	0.0	5.1	0.0	5.1
White-winged scoter	0.0	0.0	0.0	0.0	0.0	0.0
Northern shoveler	0.0	0.0	0.0	0.0	0.0	0.0
Unknown teal	0.0	0.0	0.0	0.0	0.0	0.0
American wigeon	0.0	0.0	0.0	0.0	0.0	0.0
Unknown ducks	0.0	0.0	0.0	0.0	0.0	0.0
Brant	0.0	0.0	0.0	0.0	0.0	0.0
Cackling goose	0.0	0.0	0.0	0.0	0.0	0.0
Emperor goose	0.0	0.0	0.0	2.5	0.0	2.5
White-fronted goose	0.0	0.0	0.0	0.0	0.0	0.0
Unknown swans	0.0	0.0	0.0	0.0	0.0	0.0
Sandhill crane	0.0	0.0	0.0	0.0	0.0	0.0
Black oystercatcher	0.0	0.0	0.0	0.0	0.0	0.0
Unknown auklet	0.0	0.0	0.0	0.0	0.0	0.0
Unknown cormorant	0.0	0.0	0.0	0.0	0.0	0.0
Glaucous-winged gull	0.0	0.0	0.0	0.0	0.0	0.0
Herring gull	0.0	0.0	0.0	0.0	0.0	0.0
Mew gull	0.0	0.0	0.0	0.0	0.0	0.0
Sabine's gull	0.0	0.0	0.0	0.0	0.0	0.0
Black-legged kittiwake	0.0	0.0	0.0	0.0	0.0	0.0
Unknown murre	0.0	0.0	0.0	0.0	0.0	0.0
Unknown tern	0.0	0.0	0.0	0.0	0.0	0.0
Unknown ptarmigan	0.0	0.0	0.0	38.2	0.0	38.2

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

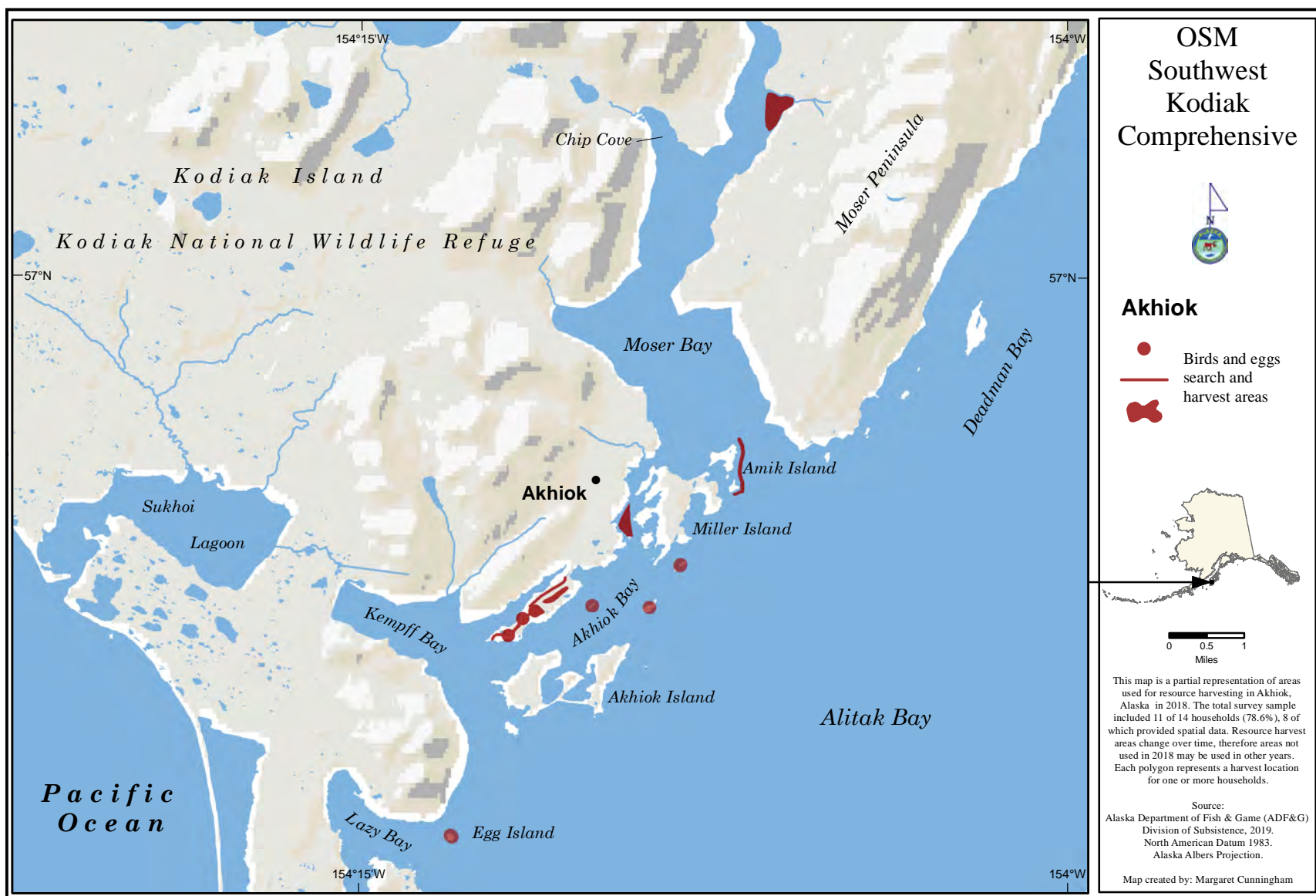


Figure 2-29.—Hunting and gathering locations of all birds and bird eggs, Akhiok, 2018.

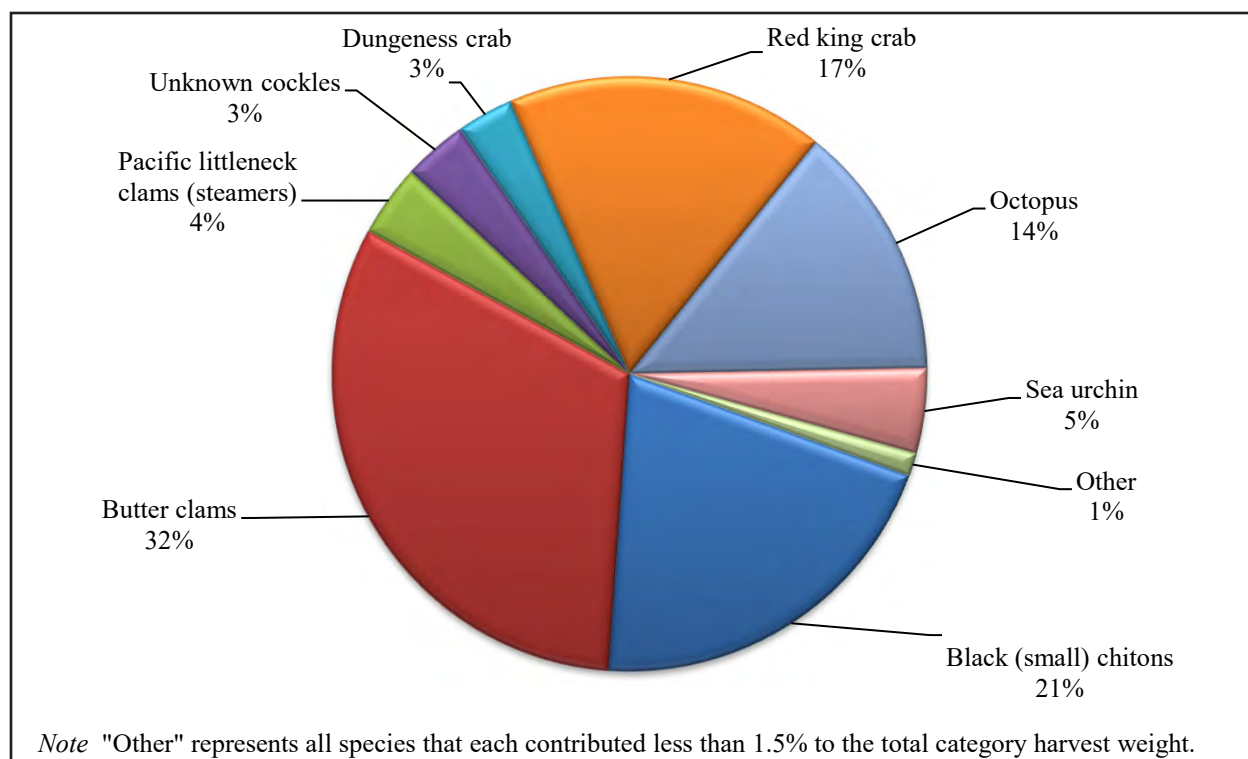


Figure 2-30.—Composition of marine invertebrate harvest in pounds usable weight, Akhiok, 2018.

Marine Invertebrates

Many different types of marine invertebrates were harvested in 2018. Butter clams composed the largest proportion (32%), followed by black chitons (21%); red king crab (17%); octopus (14%); sea urchins (5%); Pacific littleneck clams (4%); cockles and Dungeness crab (3% each); and Tanner crab, scallops, and sea cucumber (1% combined) (Figure 2-30). A total of 1,757 lb of marine invertebrates were harvested. The highest per capita harvests ranged from 12 lb of butter clams and 8 lb of black chitons and 6 lb of red king crab to 5 lb of octopus (Table 2-13). Marine invertebrates were generally widely used, harvested, and shared. The species with the most household use were butter clams, red king crab, and sea urchins (all used by 82% of households), with the same percentage of households also harvesting sea urchins and butter clams. The next most used species were octopus and black chitons with 73% of households using, but only 64% of households attempted to gather these resources. The fewest households attempted to harvest shrimp, sea cucumber, and scallops (9%). In general, households were successful in their harvest attempts; however, not all households that targeted octopus and shrimp were successful. All harvested resources were given away, except for scallops and sea cucumbers. Most harvested resources were also received, again except for scallops and sea cucumbers and also cockles and Pacific littleneck clams. The highest percentage of households gave away sea urchins and butter clams (64%) and the most households received sea urchins (36%) and red king crab (64%). Cockles and Dungeness crab were shared by the fewest households (18%) and butter clams, Tanner crab, and octopus were all received by only 18% of households.

The islands and nearshore waters south and east of Akhiok were used for the search and harvest of marine invertebrates in 2018 (Figure 2-31). Additionally, some harvesters traveled to the northern shore of Olga Bay and into Portage Bay in their search for marine invertebrates.

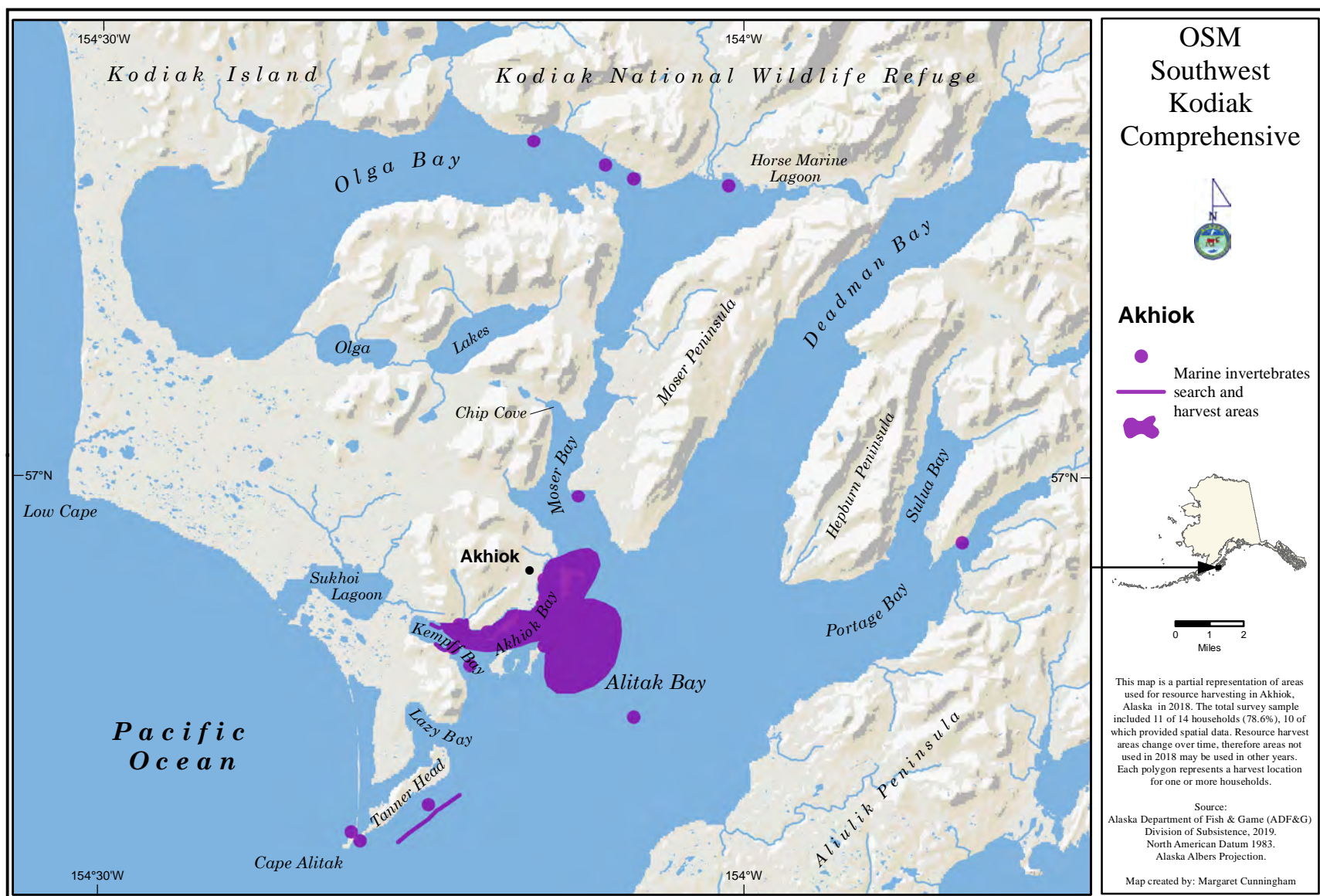


Figure 2-31.—Search and harvest locations of all marine invertebrates, Akhiok, 2018.

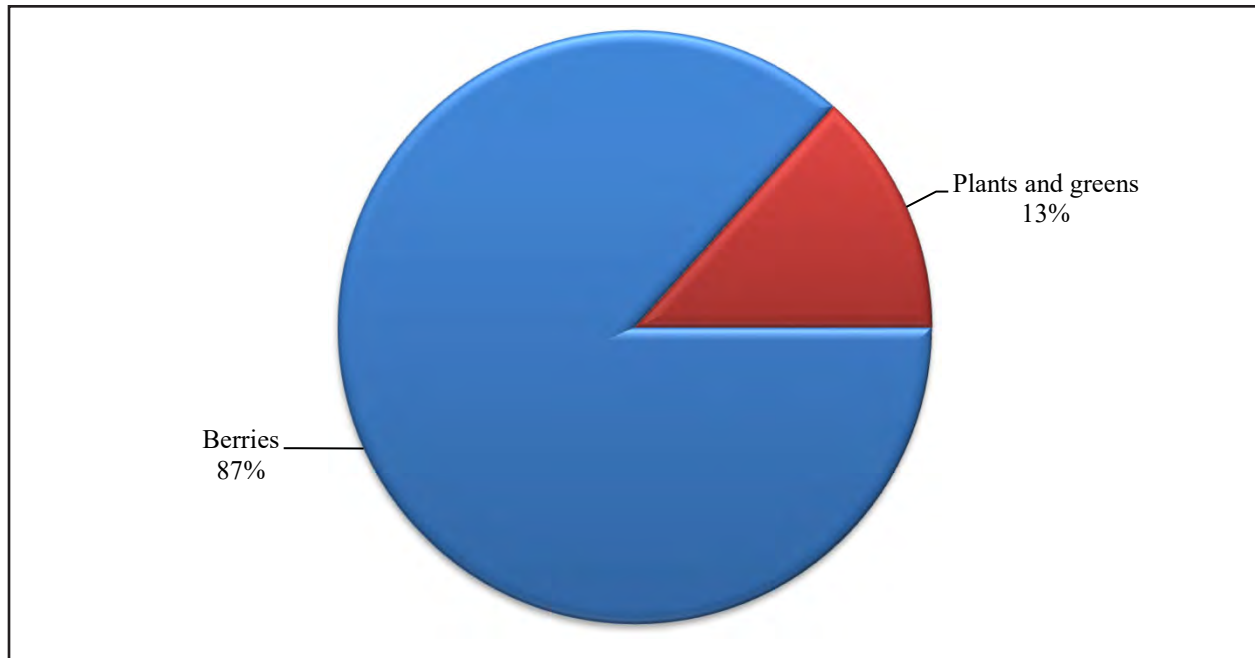


Figure 2-32.—Composition of vegetation harvest by type in pounds usable weight, Akhiok, 2018.

Vegetation

The vegetation harvest weight consisted of berries (87%) and plants and greens (13%); no seaweed was harvested for consumption (Figure 2-32). Overall, 516 lb of vegetation were harvested, along with firewood, the harvest for which was not converted to pounds usable weight (Table 2-13). Households harvested five different kinds of berries: salmonberry (96 gallons; 8 lb per capita); cloudberry, locally referred to as mossberry (seven gallons); crowberry, locally referred to as blackberry (six gallons); strawberry (two gallons); and lowbush cranberry (one gallon). Except salmonberries, harvests of berries each yielded less than 1 lb per capita. Five types of plants and greens were also harvested for food, but none had a per capita harvest exceeding 1 lb: fireweed (24 gallons harvested in total), wild parsley (13 gallons), wild rose hips (six gallons), nettles (four gallons), and wild celery (two gallons).

Overall, 91% of Akhiok households used and harvested plants and berries. Use rates for individual species ranged from a high of 82% of households using salmonberry to a low of 9% of households using crowberry, strawberry, nettles, and wild rose hips. In general, the percentage of households using a particular type of plant or berry equaled the percentage attempting to harvest; the exceptions were lowbush cranberry, crowberry, and cloudberry. For each of these species, some households were unsuccessful in their harvest attempts and the percent of households using those berries equaled the percent of households that successfully harvested them. Berries and plants were not widely shared. Salmonberries, used and harvested by the most households, were also shared the most, with 46% of households giving them away and 27% receiving them. Wild parsley and fireweed followed with 36% of households sharing. All other harvested types of plants and berries were shared by 9% of households, except strawberries, which were not shared. Apart from salmonberries, only wild rose hips and fireweed were received by Akhiok households (by 9% each). Wood—harvested for firewood, smokehouses, or banyas (a traditional Russian steam bath)—was harvested by 46% of households, used by 55%, and given away by 36%. Generally, the wood that is harvested in Akhiok is driftwood because trees are not abundant.

Harvesting plants and berries tended to be an activity that occurred close to home (Figure 2-33). The shores of Akhiok Bay and the near islands were popular harvesting areas. Additionally, harvesters traveled to Cape Alitak, Moser Bay, and into Olga Bay in their search for plants and berries in 2018.

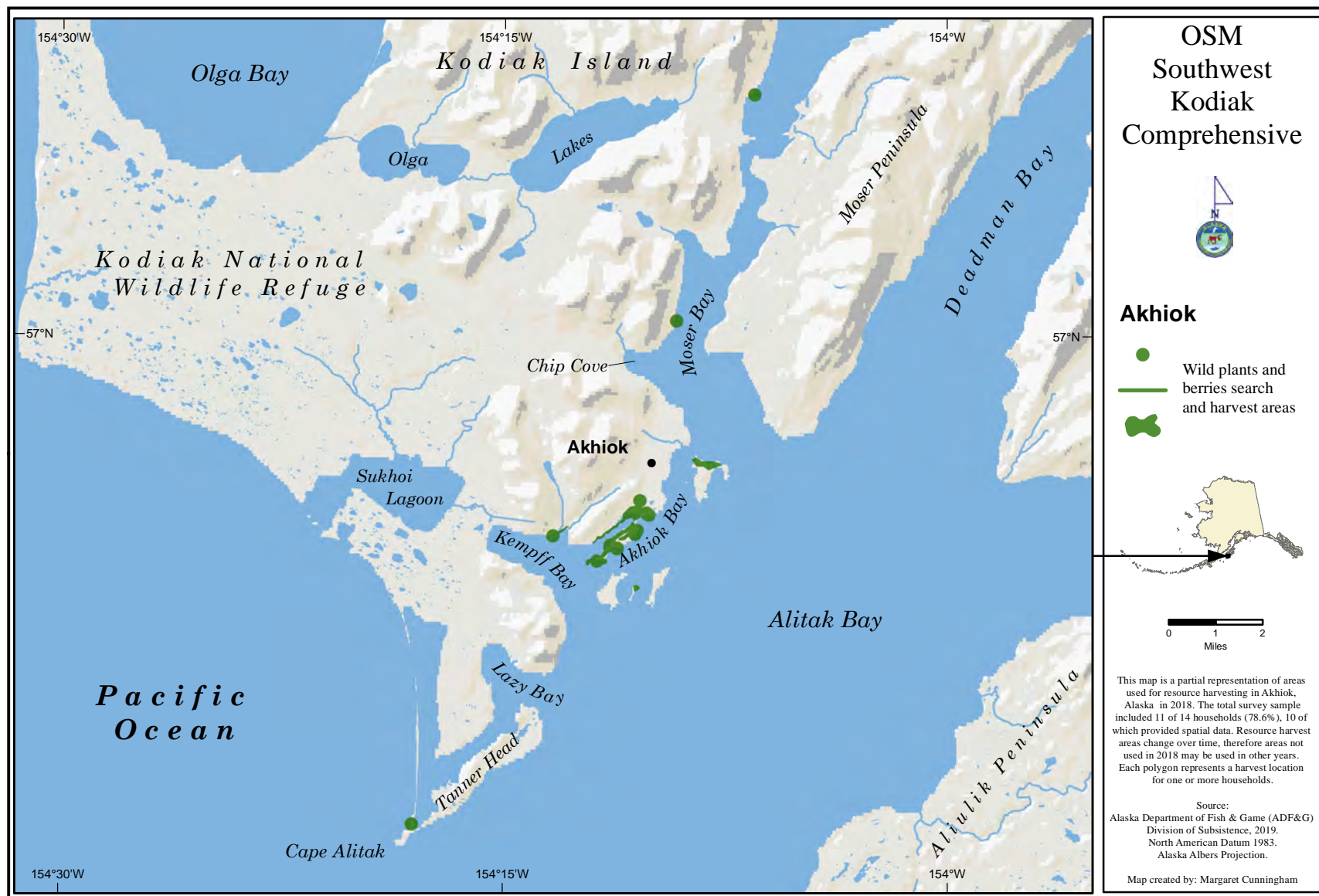


Figure 2-33.—Search and harvest locations of wild plants and berries, Akhiok, 2018.

COMPARING USES AND HARVESTS IN 2018 WITH PREVIOUS YEARS

Use Assessments

Researchers asked respondents to assess their own harvests in two ways: whether they used more, less, or about the same amount of nine resource categories and all wild resources overall in 2018 compared to the past five years, and whether they got “enough” of each of the nine resource categories and all wild resources overall. Households also were asked to provide reasons if their use was different or if they were unable to get enough of a resource. If they did not get enough of a resource, they were asked to evaluate the severity of the impact to their household as a result of not getting enough. They were further asked whether they did anything differently (such as supplement with store-bought food or switch to a different subsistence resource) because they did not get enough. Because not everyone uses all resource categories, some households did not respond to the assessment questions. Additionally, some households that do typically use a resource category simply did not answer questions. This section discusses responses to those questions.

For most resource categories, a greater percentage of households used the same amount in 2018 as in recent years, compared to households reporting that they used less or more (Figure 2-34; Table 2-23). Only for the resource categories of nonsalmon fish and vegetation did more households respond that they used less compared to the proportion of households that used same or more. A majority of households (73%) said they used about the same amount of marine invertebrates as in recent years; this was the highest percentage of households reporting the same use of resources. More commonly, 36% of households used the same amount of resources in 2018 (for salmon, large land mammals, marine mammals, and birds) or 27% did (for nonsalmon fish, bird eggs, and vegetation). The fewest number of households said they used the same amount of small land mammals in 2018, but also the fewest households used this resource at all. Generally, fewer than 20% of households said they used less of any resource category, the exceptions being vegetation and nonsalmon fish (46% of households responding for each) and salmon (27% of households). Similarly, for most resource categories, fewer than 20% of households replied that they used more in 2018. For large land mammals, 36% of households used more in 2018 and 27% of households used more salmon in 2018.

More households cited that resources were less available as the reason for their decreased use in 2018 than any other reason. Six households provided this response with regard to decreased use of nonsalmon fish, birds, marine invertebrates, and vegetation (Table 2-24). For each resource category, some responses were given more frequently than others. Family/personal reasons were cited for salmon, nonsalmon fish, large land mammals, and vegetation. Less common, but still given as a reason for less use of three types of resources, were lack of equipment (cited for salmon, nonsalmon fish, small land mammals) and unsuccessful (cited for nonsalmon fish, large land mammals, and marine mammals). For vegetation, 80% of households that used less explained that resources were less available; as an additional comment during the surveys, respondents noted that while 2018 was a particularly bad berry year, there had been an ongoing drastic decline in crowberries, cloudberries, and lowbush cranberries, perhaps because of changes in snow patterns. For nonsalmon fish, 40% of households that used less also explained that it was due to resources being less available while 20% gave family/personal reasons, lack of equipment, unsuccessful effort, and working/no time as reasons for less use.

As noted above, few households used more of any resource category in 2018 than in recent years, but for those that did, increased effort was the reason given for the most resource categories (Table 2-25). Provided for slightly fewer resources categories, but given by the same number of households, was the explanation that they needed more. More households used more large land mammals than any other resource category; for these households, the main reasons why, provided by two households each, was that they increased effort and received more of the resource. Other reasons for more use given by one household each were that the household either fixed or got new equipment and “other.”

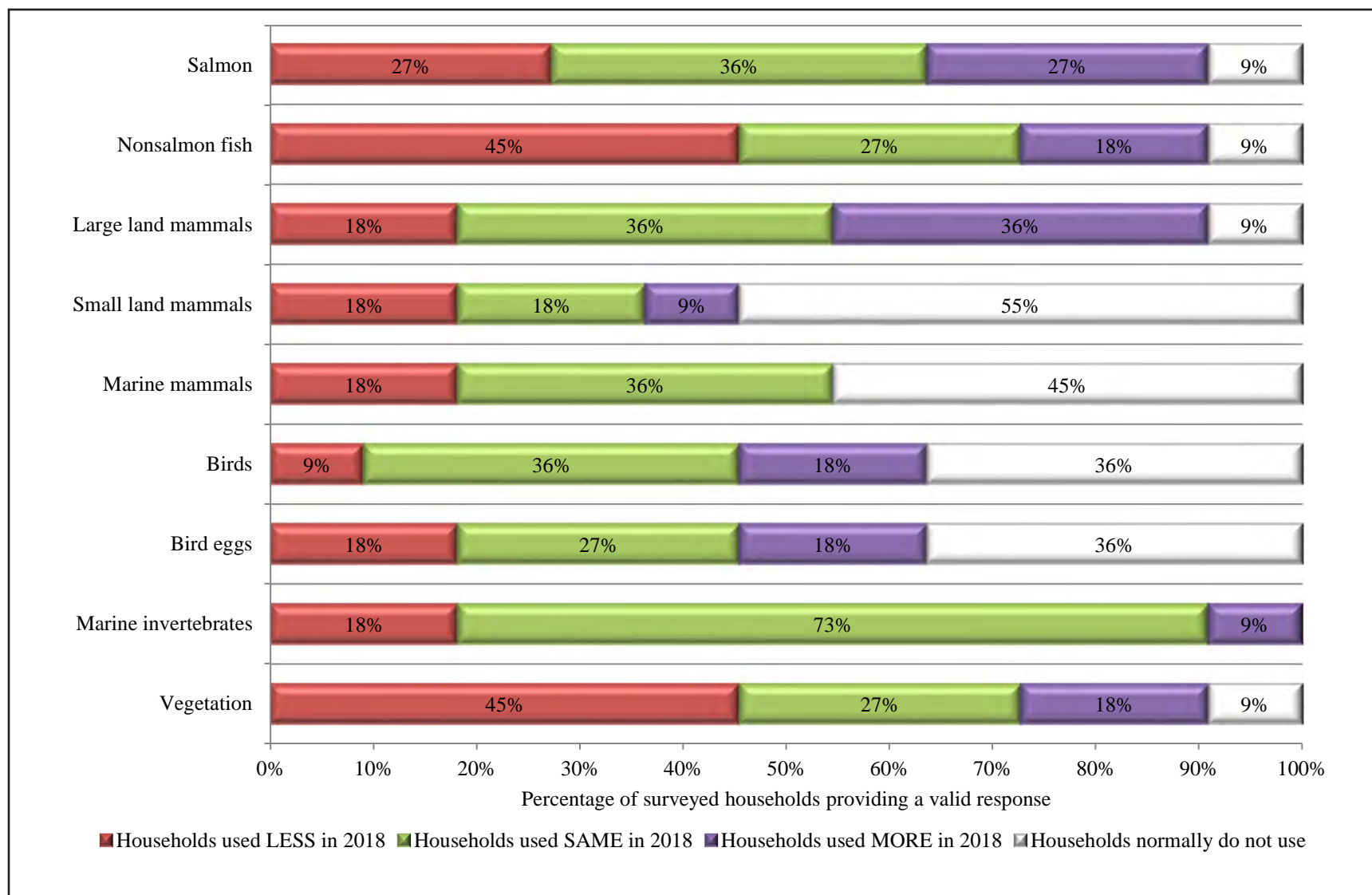


Figure 2-34.—Changes in household uses of resources compared to recent years, Akhiok, 2018.

Table 2-23.—Changes in household uses of resources compared to recent years, Akhiok, 2018.

Resource category	Sampled households	Valid responses ^a	Households reporting use								Households not using	
			Total households		Less		Same		More			
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	11	11	11	100.0%	10	90.9%	9	81.8%	7	63.6%		
All resources	11	11	11	100.0%	7	63.6%	3	27.3%	1	9.1%	0	0.0%
Salmon	11	11	10	90.9%	3	27.3%	4	36.4%	3	27.3%	1	9.1%
Nonsalmon fish	11	11	10	90.9%	5	45.5%	3	27.3%	2	18.2%	1	9.1%
Large land mammals	11	11	10	90.9%	2	18.2%	4	36.4%	4	36.4%	1	9.1%
Small land mammals	11	11	5	45.5%	2	18.2%	2	18.2%	1	9.1%	6	54.5%
Marine mammals	11	11	6	54.5%	2	18.2%	4	36.4%	0	0.0%	5	45.5%
Birds	11	11	7	63.6%	1	9.1%	4	36.4%	2	18.2%	4	36.4%
Bird eggs	11	11	7	63.6%	2	18.2%	3	27.3%	2	18.2%	4	36.4%
Marine invertebrates	11	11	11	100.0%	2	18.2%	8	72.7%	1	9.1%	0	0.0%
Vegetation	11	11	10	90.9%	5	45.5%	3	27.3%	2	18.2%	1	9.1%

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

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

In Akhiok, for all resources except small land mammals, more sampled households got enough of each resource category than did not (Figure 2-35). Percentages of sampled households responding that they got enough of a resource ranged from 18% for small land mammals to 73% for salmon and 82% for marine invertebrates. Nonsalmon fish is the resource type for which the largest percentage of households (36%) shared that they did not get enough in 2018, followed closely by vegetation, large land mammals, and small land mammals cited by 27% each. The fewest sampled households (9%) responded that they did not get enough birds.

For households that responded that they did not get enough resources, most answered the follow-up question to rate the impact of not getting enough (Table 2-26). The impact for most households from not having enough resources ranged from minor or major; a few responses indicated the impact was not noticeable (small land mammals) or severe (bird eggs). Generally, for households that did not get enough of a resource category and answered the follow-up question, they adapted by buying more commercial foods (Table 2-27). Other responses given by a small percentage of households were increasing harvest effort and replacing the needed resources with other subsistence foods.

When asked about wild resources in general that were used overall during 2018, 27% of households explained that they used the same amount of resources as they did in previous years, 64% reported that they used less, and 9% said they used more (Table 2-23). When asked why they used less, 57% of households indicated that they did so due to resources being less available (Table 2-24). Other stated reasons for using less resources, provided by one household each, were family/personal reasons, working/no time, lack of effort, and weather/environment. For the one household that used more overall resources in the study year, the reasons given were that they got or fixed equipment, increased effort, and other, uncategorized reasons (Table 2-25). In Akhiok, 36% of sampled respondents stated that they did not get enough resources overall (Table 2-26). When these households were asked to evaluate the impact of not getting enough, 75% (three households) described it as major and 25% said it was not noticeable (Table 2-26). Households that did not get enough resources overall adapted by using more commercial foods (Table 2-27). More households (36%) listed Pacific halibut as a resource they did not get enough of in 2018 than any other resource (Table 2-28). Snowshoe hare were a close second, with 27% of households listing that species, and then 18% of households also listed several species of berries, black chitons, gull eggs, Steller sea lions, and deer. No other species was listed by more than 10% of households.

Table 2-24.—Reasons for less household uses of resources compared to recent years, Akhiok, 2018.

Resource category	Valid responses ^a	Households reporting reasons for less use	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	11	10	1	10.0%	6	60.0%	0	0.0%	2	20.0%	0	0.0%	2	20.0%	2	20.0%	2	20.0%
All resources	11	7	1	14.3%	4	57.1%	0	0.0%	0	0.0%	0	0.0%	1	14.3%	0	0.0%	1	14.3%
Salmon	11	3	1	33.3%	0	0.0%	0	0.0%	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	11	5	1	20.0%	2	40.0%	0	0.0%	1	20.0%	0	0.0%	0	0.0%	1	20.0%	0	0.0%
Large land mammals	11	2	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Small land mammals	11	1	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	11	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%
Birds	11	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	11	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%
Marine invertebrates	11	2	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%
Vegetation	11	5	1	20.0%	4	80.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	20.0%

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Table 2-24.—Continued.

Resource category	Valid responses ^a	Households reporting reasons for less use	Other reasons		Working/ no time		Regulations		Small/ diseased animals		Needed less		Equipment/ fuel expense		Used other resources		Competition	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	11	10	0	0.0%	1	10.0%	0	0.0%	1	10.0%	2	20.0%	0	0.0%	0	0.0%	0	0.0%
All resources	11	7	0	0.0%	1	14.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Salmon	11	3	0	0.0%	1	33.3%	0	0.0%	0	0.0%	1	33.3%	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	11	5	0	0.0%	1	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	11	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%
Small land mammals	11	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	11	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%
Birds	11	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	11	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	11	2	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	11	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%

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

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

Table 2-25.—Reasons for more household uses of resources compared to recent years, Akhiok, 2018.

Resource category	Valid responses ^a	Households reporting reasons for more use	Family/personal		Increased availability		Used other resources		Favorable weather		Received more		Needed more		Increased effort		Regulations	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	11	7	0	0.0%	3	42.9%	0	0.0%	0	0.0%	2	28.6%	4	57.1%	4	57.1%	0	0.0%
All resources	11	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Salmon	11	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	66.7%	1	33.3%	0	0.0%
Nonsalmon fish	11	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Large land mammals	11	4	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	50.0%	0	0.0%	2	50.0%	0	0.0%
Small land mammals	11	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Marine mammals	11	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	11	2	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Bird eggs	11	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Marine invertebrates	11	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Vegetation	11	2	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%

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Table 2-25.—Continued.

Resource category	Valid responses ^a	Households reporting reasons for more use	Traveled farther		More success		Had more time		Store-bought expense		Got/ fixed equipment		Substitute for unavailable resource(s)		Had more help		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	11	7	0	0.0%	1	14.3%	0	0.0%	0	0.0%	1	14.3%	0	0.0%	0	0.0%	1	14.3%
All resources	11	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	1	100.0%
Salmon	11	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	33.3%
Nonsalmon fish	11	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%
Large land mammals	11	4	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	25.0%	0	0.0%	0	0.0%	1	25.0%
Small land mammals	11	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	11	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	11	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%
Bird eggs	11	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%
Marine invertebrates	11	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	11	2	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%

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

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

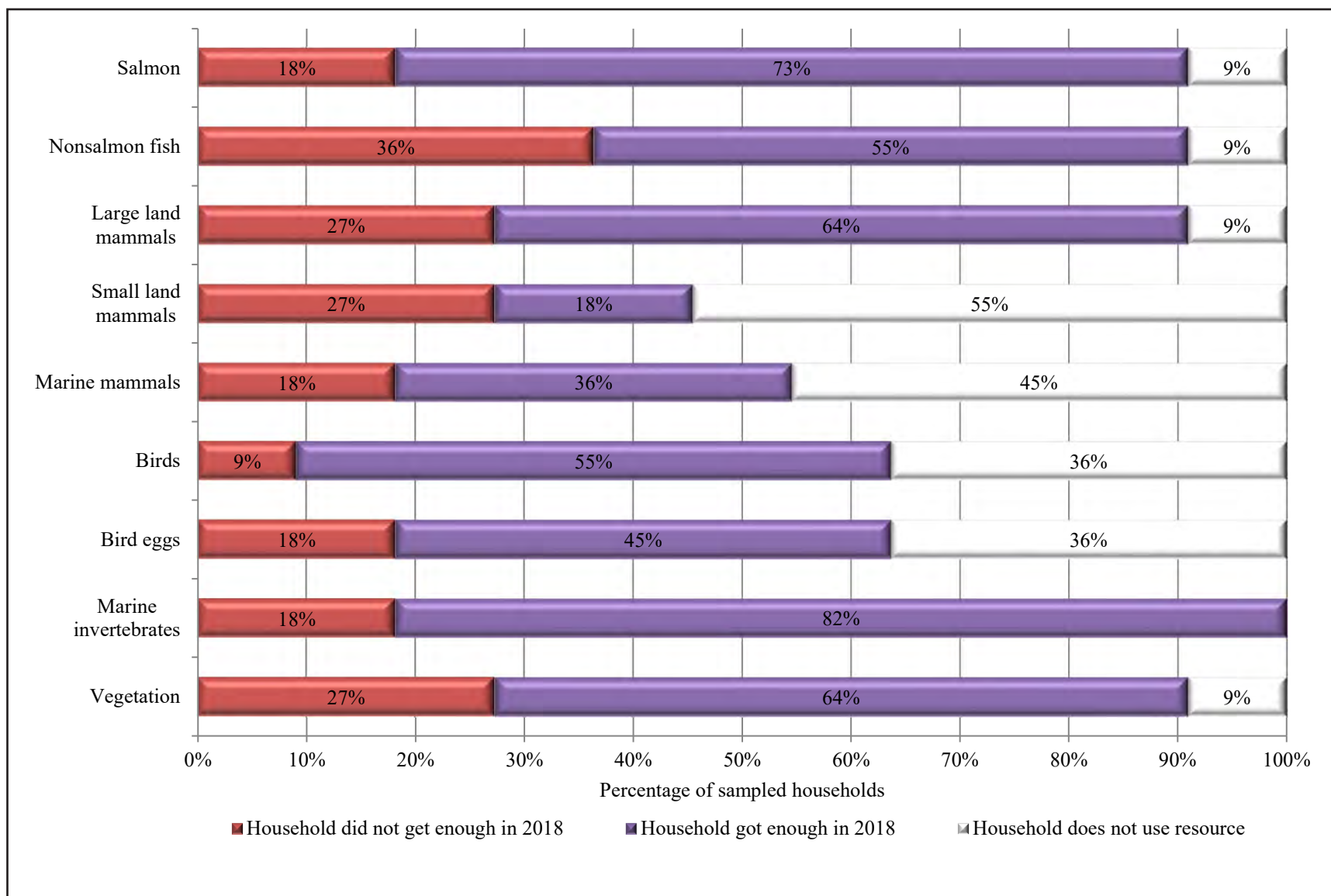


Figure 2-35.—Percentage of sampled households reporting whether they had enough resources, Akhiok, 2018.

Table 2-26.—Reported impact to households reporting that they did not get enough of a type of resource, Akhiok, 2018.

Resource category	Sampled households	Households not getting enough _____ .				Impact to those not getting enough _____ .									
		Valid responses ^a		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	11	11	100.0%	4	36.4%	0	0.0%	1	25.0%	0	0.0%	3	75.0%	0	0.0%
Salmon	11	10	90.9%	2	20.0%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Nonsalmon fish	11	10	90.9%	4	40.0%	0	0.0%	0	0.0%	2	50.0%	2	50.0%	0	0.0%
Large land mammals	11	10	90.9%	3	30.0%	0	0.0%	0	0.0%	1	33.3%	2	66.7%	0	0.0%
Small land mammals	11	5	45.5%	3	60.0%	1	33.3%	2	66.7%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	11	6	54.5%	2	33.3%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Birds	11	7	63.6%	1	14.3%	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	11	7	63.6%	2	28.6%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	1	50.0%
Marine invertebrates	11	11	100.0%	2	18.2%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Vegetation	11	10	90.9%	3	30.0%	0	0.0%	0	0.0%	1	33.3%	2	66.7%	0	0.0%

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

a. Does not include households failing to respond to the question and those households that did not use the resource.

Table 2-27.—Things households reported doing differently as the result of not getting enough of a type of resource, Akhiok, 2018.

Resource category	Valid responses ^a	Bought/bartered		Used more commercial foods		Replaced with other subsistence foods		Asked others for help		Made do without	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	3	0	0.0%	3	100.0%	0	0.0%	0	0.0%	0	0.0%
Salmon	2	0	0.0%	1	50.0%	1	50.0%	0	0.0%	0	0.0%
Nonsalmon fish	2	0	0.0%	1	50.0%	1	50.0%	0	0.0%	0	0.0%
Large land mammals	3	0	0.0%	2	66.7%	0	0.0%	0	0.0%	0	0.0%
Small land mammals	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	3	0	0.0%	3	100.0%	0	0.0%	0	0.0%	0	0.0%

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Table 2-27.—Continued.

Resource category	Valid responses ^a	Increased effort to harvest		Got a job		Obtained food from other sources		Got public assistance		Did not share as much	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Salmon	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Small land mammals	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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

a. Does not include households failing to respond to the question and those households that did not use the resource.

Table 2-28.—Resources that households reported needing, Akhiok, 2018.

Resource	Households needing	Percentage of households
Pacific halibut	4	36.4%
Snowshoe hare	3	27.3%
Deer	2	18.2%
Steller sea lion	2	18.2%
Glaucous-winged gull eggs	2	18.2%
Black (small) chitons	2	18.2%
Lowbush cranberry	2	18.2%
Crowberry	2	18.2%
Cloudberry	2	18.2%
Salmonberry	2	18.2%
Pink salmon	1	9.1%
Sockeye salmon	1	9.1%
Pacific (gray) cod	1	9.1%
Mountain goat	1	9.1%
Harbor seal	1	9.1%
Ptarmigan	1	9.1%
Butter clams	1	9.1%
Octopus	1	9.1%
Sea urchin	1	9.1%
Berries	1	9.1%
Wood	1	9.1%

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

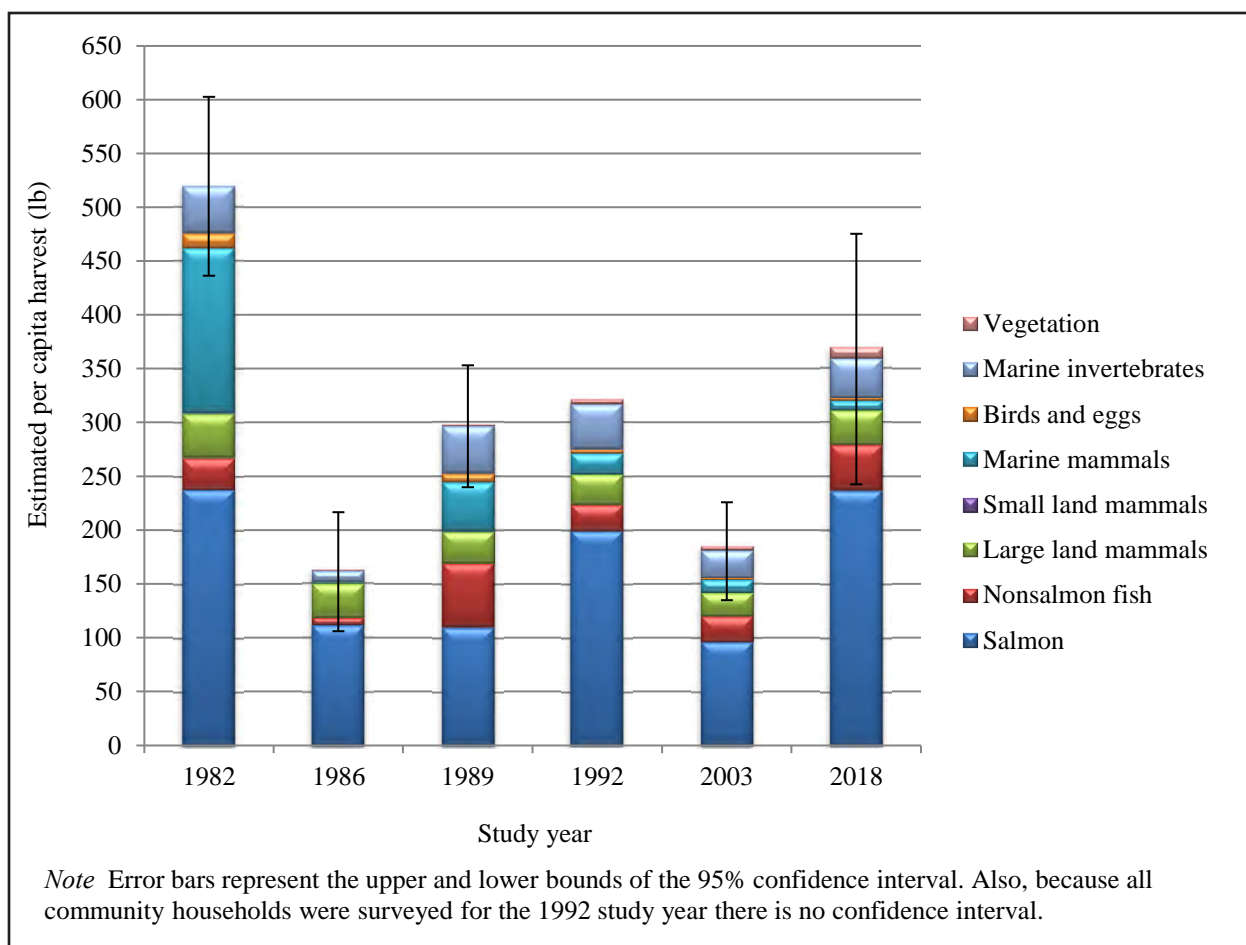


Figure 2-36.—Composition of harvest in pounds per capita, by resource category, Akhiok, 1982, 1986, 1989, 1992, 2003, and 2018.

Harvest Data

Changes in the harvest of resources by Akhiok residents can also be discerned through comparisons with findings from other study years. Table 1-3 summarizes previous studies and identifies which resource categories were surveyed in the past. Tables and figures in this section draw from previous reports published by the Division of Subsistence. Baseline comprehensive subsistence harvest surveys were conducted in Akhiok in 1983 for the 1982 study year spanning June 1982 through May 1983 (Schroeder et al. 1987); follow-up comprehensive surveys were conducted in 1987 for the 1986 calendar year (Fall and Walker 1993), and again in 1990 for the 1989 calendar year (Fall 1991), in 1993 for the 1992 study year spanning April 1992 through March 1993 (Fall and Utermohle 1995a), and finally in 2004 for the 2003 calendar year (Fall 2006). A study focused only on salmon and nonsalmon fish harvests was conducted in Akhiok in 2005 for the 2004 study year (Williams et al. 2010). Also, studies for harbor seal and sea lion harvests occurred from 1992–1998 and 2000–2008 and 2011 (Wolfe et al. 2012).

The overall per capita harvest in Akhiok has been variable over the years and shows no definite trend for total harvest over the six study years (Figure 2-36). The 1989, 1992, and 2018 study years do not differ significantly from each other. The first study year of 1982 estimated the highest per capita harvest of any study year but the 1982 and 2018 survey years do not have significantly different estimates either. Study years 1986 and 2003 stand out as particularly low harvest years; however, Fall and Walker (1993) caution that there is uncertainty in the 1986 data because of questions that arose during data analysis coupled with

Table 2-29.—Comparison of estimated total and per capita harvests in pounds usable weight, by resource category, Akhiok, 1982, 1986, 1989, 1992, 2003, and 2018.

Resource category	Estimated harvest in pounds usable weight								
	1982			1986			1989		
	Total	Per capita	CI (%)	Total	Per capita	CI (%)	Total	Per capita	CI (%)
All resources	53,431.0	519.5	16.0%	19,782.0	162.4	34.0%	16,641.0	297.7	19.0%
Salmon	24,469.0	237.9	12.0%	13,559.0	111.3	41.0%	6,151.0	110.0	26.0%
Nonsalmon fish	3,031.0	29.5	34.0%	859.0	7.1	85.0%	3,320.0	59.4	35.0%
Large land mammals	4,221.0	41.0	20.0%	3,799.0	31.2	66.0%	1,629.0	29.1	26.0%
Small land mammals	26.0	0.3	92.0%	0.0	0.0	—	5.0	0.1	70.0%
Marine mammals	15,768.0	153.3	32.0%	184.0	1.5	109.0%	2,548.0	45.6	35.0%
Birds and eggs	1,380.0	13.4	28.0%	43.0	0.4	93.0%	434.0	7.8	60.0%
Marine invertebrates	4,536.0	44.1	20.0%	1,219.0	10.0	47.0%	2,488.0	44.5	22.0%
Vegetation				119.0	1.0	54.0%	66.0	1.2	40.0%

-continued-

Table 2-29.—Continued.

Table 2-29. Continued.

Resource category	Estimated harvest in pounds usable weight									Average total harvest (lb) ^a
	1992			2003			2018			
	Total	Per capita	CI (%)	Total	Per capita	CI (%)	Total	Per capita	CI (%)	
All resources	25,735.0	321.7	0.0%	13,096.7	184.7	24.7%	17,878.9	369.7	31.5%	25,984.7
Salmon	15,961.0	199.5	0.0%	6,825.3	96.3	26.4%	11,436.7	236.5	33.8%	14,450.2
Nonsalmon fish	1,948.0	24.4	0.0%	1,678.4	23.7	35.1%	2,065.0	42.7	35.2%	1,916.3
Large land mammals	2,246.0	28.1	0.0%	1,531.6	21.6	32.3%	1,539.5	31.8	30.1%	2,667.4
Small land mammals	2.0	0.0	0.0%	0.0	0.0	—	0.0	0.0	—	5.6
Marine mammals	1,552.0	19.4	0.0%	850.9	12.0	77.2%	427.6	8.8	34.4%	3,756.5
Birds and eggs	277.0	3.5	0.0%	111.3	1.6	43.6%	137.8	2.9	43.3%	389.8
Marine invertebrates	3,371.0	42.1	0.0%	1,793.7	25.3	31.8%	1,756.7	36.3	44.7%	2,535.3
Vegetation	377.0	4.7	0.0%	305.5	4.3	27.5%	515.5	10.7	47.4%	329.2

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

Note Blank cells indicate harvest amounts were not collected during the survey for the resource category.

Note "—" indicates no confidence interval could be calculated due to no harvest.

a. The average excludes the estimated harvests from 1989, the year of the *Exxon Valdez* oil spill.

Table 2-30.—Estimated per capita harvests of salmon in pounds usable weight and by percent of salmon harvest, Akhiok, 1982, 1986, 1989, 1992, 2003, and 2018.

Study year	Chum salmon		Coho salmon		Chinook salmon		Pink salmon		Sockeye salmon	
	Per capita (lb)	Percentage	Per capita (lb)	Percentage	Per capita (lb)	Percentage	Per capita (lb)	Percentage	Per capita (lb)	Percentage
1982	27.4	11.5%	56.8	23.9%	0.0	0.0%	58.9	24.7%	94.9	39.9%
1986	5.9	5.3%	51.0	45.9%	0.0	0.0%	9.6	8.6%	44.8	40.3%
1989	12.1	11.0%	37.7	34.3%	0.0	0.0%	15.5	14.1%	44.7	40.6%
1992	20.7	10.4%	70.8	35.5%	1.3	0.6%	10.8	5.4%	96.1	48.1%
2003	4.6	4.8%	21.6	22.4%	0.0	0.0%	9.6	9.9%	60.5	62.9%
2004	2.0	1.6%	10.2	8.4%	0.2	0.2%	20.8	17.1%	88.7	72.8%
2018	21.3	9.0%	42.3	17.9%	2.8	1.2%	29.0	12.3%	141.0	59.6%

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

project staff turnover and a time-lag between collecting the data and analyzing it. While there are likely multiple factors contributing to the lower 2003 survey data, Fall (2006:140) highlights that the community in 2003 had a very young population with many subsistence households just starting out: people aged 14 and younger constituted 35% of the population and the average age of a resident was 24 years old. The population has aged in the intervening years and now has an average age of 31 and 24% of the population is aged 14 or younger (Table 2-2; Table 2-3). In addition, the 2003 study documented a narrower breadth of resource harvest and use than in previous study years: the mean number of resources used by a household in 2003 was 15 and the total number of resources harvested was 29 (Fall 2006:18, 155–158). The current study documented use and harvest characteristics more in line with the 1992 study year (Fall 2006:144) (Table 2-12).

At the resource category level, salmon shows the greatest variability among study years, with per capita harvests increasing or decreasing by 50% or more when comparing between most consecutive study years, although the per capita harvest of salmon in 2018 was nearly identical to that of 1982: 237 lb and 238 lb, respectively (Table 2-29). Sockeye salmon made up a greater percentage of the total salmon harvest in 2018 (60%) than in 1982 (40%) and coho and pink salmon made up slightly less (Table 2-30). Commercial removals of salmon were not common in the 1980s, though they were documented extensively in the 1992 study year (Fall 2006:144), but once again in 2018, residents reported using subsistence gear to harvest salmon rather than commercial removals (Table 2-15). Compared to 2003, salmon harvests increased nearly 150%, with substantial per capita harvest increases in every species of salmon harvested (Table 2-29; Table 2-30).

Nonsalmon fish harvests have generally increased since 1982, when 30 lb per capita was harvested (Table 2-29). A similar amount was documented in 2003 (24 lb per capita) before increasing 80% to 43 lb per capita in 2018. A change in regulations that allowed the use of longline gear and increased bag limits for subsistence harvests of Pacific halibut in 2003 contributed to this increased harvest (Fall et al. 2004:1). Pacific halibut has generally made up the majority of the nonsalmon harvests of Akhiok residents (CSIS). In contrast, per capita harvests of large land mammals showed a decreasing trend from 1982 through the 2003 study year but showed an increase of nearly 50% between 2003 and 2018. Increasing competition from non-local sport hunters using the southern end of the island is one factor attributed to the declining harvests in 2003 (Fall 2006). Weather is a major driver of deer populations and according to a local resident, there was a very bad winter in 1997 and the deer population did not start recovering until the mid-2000s. The years prior to the 2018 study year had been mild, which would have been conducive to strong deer populations. The continuing increase of non-local sport hunters is still of concern for some local residents due to their perceived effect on localized deer populations and the perception that the hunting is done for sport and not for harvesting meat.

The per capita harvest of marine mammals showed a marked decrease from 1982 to 1986 before rebounding to approximately one-third the harvest of 1982 and then steadily decreasing each subsequent study year. The overall decline in harvests is supported by other studies specific to marine mammal hunting conducted during the 1990s and early 2000s (Wolfe et al. 2009a) (Table 1-3). There has been a statewide decline in seal harvests in this time period, likely associated with declining participation and a complex array of other local factors, such as changes in hunter success, local resource abundance, and changing community demographics affecting demand for marine mammals. Per capita harvests of birds and eggs also decreased over the survey years, from 13 lb per capita in 1982 to 3 lb per capita in 2018. The main decrease seems to have occurred during the 1980s because the per capita harvest was the same in 2018 as it was in 1992, rebounding from a slight dip in 2003. Without more information than is available about the harvests of birds and eggs during the 1980s, it is difficult to draw many conclusions about this decrease in the per capita birds and egg harvest, but one possible reason is the collapse of the emperor goose population and the subsequent closure of subsistence hunting from 1987 through 2017. Emperor geese were seen on the beaches around Akhiok while researchers were in town in 2018, but no one surveyed or interviewed chose to discuss them, or contemporary or historical bird harvesting more generally.

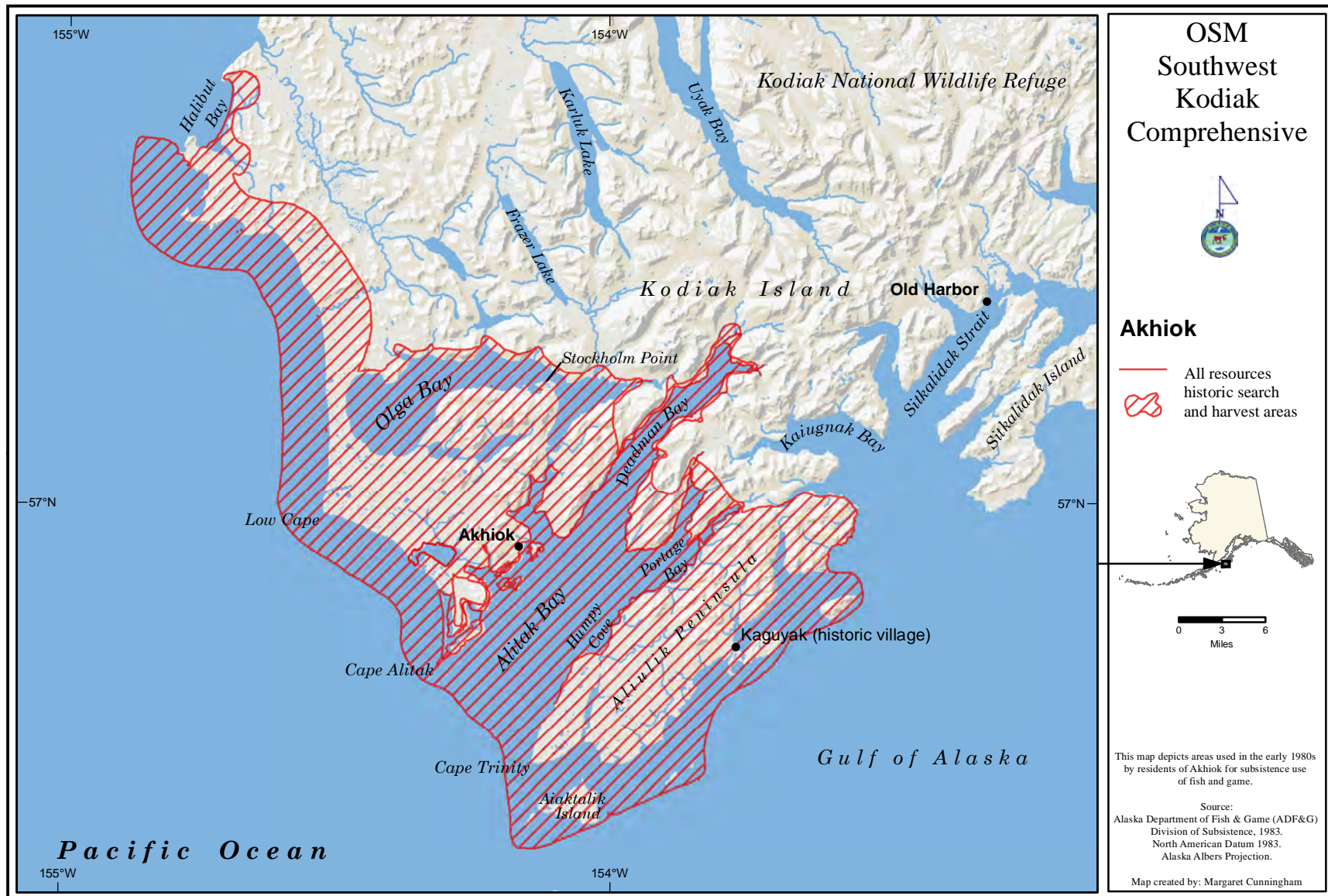


Figure 2-37.—Wild resources search and harvest areas, Akhiok, 1982.

Current and Historical Harvest Areas

Of the five previous comprehensive harvest surveys that have been conducted in Akhiok, only one conducted mapping exercises—the 1982 study year survey (Schroeder et al. 1987). For the 1982 study year, researchers mapped community residents' contemporary resource use areas (Figure 2-37). The areas documented for searching for and harvesting resources during the former study were fairly similar to those areas used in 2018 (Figure 2-15). In general, the southern portion of the island has been used by Akhiok residents. Researchers found that, for 1982, the resource harvesting area intensively used by Akhiok residents included the bays and inlets of Alitak Bay, Deadman Bay and Olga Bay. This area is where residents harvested most of their salmon, Pacific halibut and other marine fish, clams and other marine invertebrates, and deer, while the other coastal areas were regularly used for the harvest of seals and Steller sea lions, and for salmon harvesting when areas closer to the community were poor (Schroeder et al. 1987:470). During the earlier research, the coastline extending northwest to Halibut Bay was used, but this area was lacking use as depicted on the 2018 map (Figure 2-15). In 2018, less extensive use of the Aliulik Peninsula was documented, and residents did not travel as far along the western coast in 2018 as in the past. In contrast, more expansive searches for resources occurred in 2018 inland of Olga Bay toward Karluk and Frazer lakes and Uyak Bay. Most of this area was used for deer harvesting, which may be related to the perceived competition for deer with guided, non-local sport hunters, as discussed during key respondent interviews. The contraction from the farther-flung areas used in 1982 may be a result of the decline in marine mammal harvesting over the study years. More research focusing on changes in harvest areas over time is necessary to fully understand the reasons for these apparent changes.

LOCAL COMMENTS AND CONCERNS

Following is a summary of local observations of wild resource populations and trends that were recorded during the surveys in Akhiok. Some households did not offer any additional information during the survey interviews, so not all households are represented in the summary.

Fish

Survey respondents in Akhiok offered more comments about fish than any other resource. These comments addressed a range of concerns. For example, a respondent expressed concern about the effect the 2011 earthquake-related Fukushima nuclear power plant disaster has had on fish and the North Pacific in general. In particular, this respondent noted white streaks in some of their fish when they filleted them and was concerned for what that indicated about the health of the fish. Another respondent felt that commercial fishermen come too close to town while fishing and that there should be an area that is off limits to the fishermen to provide “breathing room” to the local fishing residents. Several respondents questioned whether the commercial trawlers and longliners were even allowed in Alitak Bay or if they were supposed to stay further out. Another respondent noted that years with lots of salmonberries usually predicted a good salmon year.

Birds and Eggs

One respondent noted that he opportunistically hunts ptarmigans if he sees them but has not seen any recently. Another respondent commented on the presence of lemmings on the main islands typically used for egg gathering. As far as the respondent could remember, the lemmings have always been on these islands, but the respondent recalled a grandfather burning the islands every five years to keep the population of lemmings down. That practice is not allowed now, so the respondent believes there are more lemmings and fewer eggs available as a result.

Marine Invertebrates

One respondent commented on competition with the commercial fishermen in Alitak Bay; this respondent believed commercial fishermen would illegally check local residents' crab pots, harvesting any crab that had been captured and returning the empty pot to the water.

Marine Mammals

One respondent commented that the population of sea otters was growing and getting to be too large.

Vegetation

One respondent remarked that recently there have not been as many berries available and suggested that the reason why was perhaps less snow in the winter. Another respondent shared that it was harder to get firewood recently, not because it was less abundant but because he had to go further and it took more time.

3. OLD HARBOR

COMMUNITY BACKGROUND

Old Harbor is located on the Gulf of Alaska, in the well-protected waters of Sitkalidak Strait, on the southeast coast of Kodiak Island (Figure 3-1). The town stretches along the water for four miles, bisected by a creek known as Big Creek. The backdrop to this relatively treeless town is high, snow-capped mountains. Old Harbor has a mild and rainy climate, with few days dropping below freezing and less wind than some other towns on the island because of its protected location. The name of the town derives from the early days of Russian occupation when Three Saints Bay, a sea otter trading post, became the first Russian colony in Alaska. After several earthquakes in the late 1700s, the community relocated to what became Kodiak and was the new harbor for Russian ships (Fall 2006)¹. A community was reestablished near Three Saints Bay in 1884 and called *Staruigavan*, meaning “old harbor” in Russian; in Sugt’sun, the community is known as *Nuniahq*.² For an extensive history of Old Harbor, see Mishler (2001); however, drawing on Mishler (2001), below are highlights of several significant historical events that shaped the contemporary community of Old Harbor.

Archaeological evidence suggests that the region around Old Harbor has been occupied by a series of prehistoric populations over several thousands of years, and while direct continuity has not been established, it is possible that these inhabitants are the ancestors of Koniags living in the area today (Mishler 2001). At the time of historical contact, there was no settlement at Old Harbor, but the southeast side of Kodiak Island was the most heavily populated part of the archipelago. The Russian merchant Gregorii Shelikhov arrived in the area in 1784 with the intention of establishing a sea otter hunter colony. He and his men were met

1. *Alaska Community Database Online*, s.v. “Interactive Applications: Community Story Maps; Communities O-T; Old Harbor Community Storymap” (by Alaska Department of Community and Regional Affairs), <https://dcra-cdo-dccd.opendata.arcgis.com/> (accessed September 8, 2020).
2. *Alaska Community Database Online*, s.v. “Interactive Applications: Community Story Maps; Communities O-T; Old Harbor Community Storymap” (by Alaska Department of Community and Regional Affairs), <https://dcra-cdo-dccd.opendata.arcgis.com/> (accessed September 8, 2020).



Photo by Lauren A. Sill, ADF&G

Plate 3-1.—Old Harbor small boat harbor.



Figure 3-1.—Community study area, Old Harbor.

with resistance from the local Alutiiqs but the Russian's superior artillery put a bloody end to this resistance during a massacre at Refuge Rock (Fall 2006; Mishler 2001). After the original Russian community at Three Saints Bay was relocated to Kodiak, the Russian explorer Lisianskii explored the eastern side of Kodiak Island in 1805 and found seven Alutiiq communities within 15 miles of Old Harbor and another 10 on the coast between Kiliuda and Ugak bays (Mishler 2001:18). The population of the area may have been around 8,000 Koniag Alutiiq, but during the first three decades of Russian colonization, this population may have been cut in half (Clark 1987:123). Further trauma to the population came in the form of a smallpox epidemic in the late 1830s that killed another 736 Alutiiqs and prompted the Russians to provide emergency provisions to widows and orphans (Mishler 2001:19). To further Russian attempts at managing the Alutiiq population, the Russians forced people to consolidate from 65 communities into seven. Old Harbor was not one of these seven villages, but it was well established by 1868.

With the American purchase of Alaska in 1867, the Alaska Commercial Company assumed the role of the Russian American Company in perpetuating sea otter hunting. However, by the end of the 19th century, the sea otter populations around Kodiak were depleted. About this same time, gold was discovered elsewhere in Alaska and the focus of the territorial economy shifted away from fur and toward mineral extraction, a shift accompanied by a decline in the number of ships calling on Kodiak. Gold was never discovered on Kodiak. Rather, fisheries took on more importance in the local economy, with a cod saltery on Sitkalidak Island and a herring saltery built in Three Saints Bay (Mishler 2001). Kodiak Fisheries built a salmon cannery at Shearwater Bay in the mid-1920s that was operated off and on for the next four decades. From the 1920s to 1940s, a whaling station on Sitkalidak Island also provided employment for some Old Harbor people. Commercial fishing was conducted using fish traps and beach seines; the commercial beach seines were adapted for subsistence fishing with the result that beach seining is still a popular method for obtaining subsistence salmon today. In the early 1930s, two Scandinavian immigrants arrived in Old Harbor on a sailing ship and ended up marrying local Alutiiq women and living in the region for the rest of their lives. The Christiansens and the Haakansons are two of the largest families in Old Harbor today. Commercial fishing during the summer and fur trapping through the winter continued in importance through the 1930s and 1940s (Mishler 2001).

The 1940s were a time of change in Old Harbor. The strong economy of the post-war years allowed many commercial fishermen to purchase their own boats, although many still fished on cannery-owned vessels. The Kodiak National Wildlife Refuge was created in 1941 and encompassed most of the lands around Old Harbor, curtailing land development around the community. Most of the communities around Kodiak Island began to get electric generators and the short-wave radios that sustained contact with the outside world that came with them (Mishler 2001). During this time there were also outbreaks of tuberculosis, influenza, and pneumonia. In 1964 the Good Friday earthquake destroyed the community, leaving only the church standing. The earthquake also destroyed the Shearwater Bay cannery, which never reopened. The economic devastation resulting from the earthquake changed the future of the community. As the community rebuilt after the earthquake, the new housing was prefabricated, giving a more uniform look to the community. As community members returned, two new families moved in from Kaguyak, another community south of Old Harbor that was destroyed by the earthquake. Old Harbor's population and town grew into the three distinct parts of the contemporary town. Downtown is the original townsite that was rebuilt after the earthquake. Middle Town, and New Town, also known as Uptown, were built through U.S. Housing and Urban Development (HUD) housing grants in the late 1970s and early 1980s (Fall and Utermohle 1995a:XI-1).

After the earthquake, the most traumatic event for residents of Old Harbor was the *Exxon Valdez* oil spill. In March of 1989 the *Exxon Valdez* oil tanker ran aground at Bligh Reef in Prince William Sound and by the end of May, the spilled oil had reached Old Harbor. Oil continued arriving through the summer; commercial fisheries were shut down that summer and subsistence practices were curtailed that year due to concerns about resource contamination (Fall and Utermohle 1995b:I-23; Mishler 2001:55). Little oil contamination actually occurred in residents' traditional harvesting areas, and no major changes in use areas were documented. Subsistence uses rebounded by the second post-spill year. At the time fieldwork was conducted for this project, gravel roads connected all parts of town. A small boat harbor (Plate 3-1)



Photo by Matthew Sill

Plate 3-2.—U.S. Post Office in Old Harbor.

was built after the earthquake and a multi-use dock facility was built in 2012 that accommodates the Alaska Marine Highway System ferries and other large vessels. The original airstrip was built along the waterfront in the downtown area but was moved to its current location in the 1990s. Old Harbor received twice daily flight service from Kodiak city most days of the week. Residents lived in each of the three parts of town but remained socially connected. Public buildings were almost all downtown, including the post office (Plate 3-2); a community room, which was provided by the tribal council for the Alutiiq Tribe of Old Harbor; and the Russian Orthodox church. The Kodiak Area Native Association operated a health clinic in town. There were lodges and bed-and-breakfasts for visitors to stay in and two grocery stores provided food and other goods.

POPULATION ESTIMATES AND DEMOGRAPHIC INFORMATION

This study estimated the population of Old Harbor in 2018 to be 203 residents living in 67 households (Table 3-1). Approximately 88% of the community's residents were Alaska Native. Other population estimates identified a larger population in Old Harbor: the 2010 federal census identified 84 households in Old Harbor with 218 residents, and the ACS estimated average population from 2014–2018 was 83 residences housing 249 people. While estimates of total number of Alaska Natives in the community differ, the percentage of the community estimated as being Alaska Native in this study is similar to that estimated by the U.S. Census Bureau (89%) but is higher than the ACS estimate of 77%. Estimates based on this study and the ACS-produced estimates are not significantly different from each other (Figure 3-2). The U.S. Census Bureau results may be higher than this study's in part because the population of Old Harbor has been experiencing

Table 3-1.—Population estimates, Old Harbor, 2010 and 2018.

	Census (2010)	5-year American Community Survey (2014–2018)		This study (2018)	
		Estimate	Range ^a	Estimate	Range ^b
Total population					
Households	84	83.0	59 – 107	67.0	
Population	218	249.0	178 – 320	203.2	178 – 229
Alaska Native					
Population	194	192.0	127 – 257	178.7	153 – 204
Percentage	89.0%	77.1%	51.0%-100.0%	87.9%	75.3% – 100.0%

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

Note Division of Subsistence household survey eligibility 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.

a general population decline since the 1980s (Figure 3-3). Population growth in Old Harbor in the early 1900s was likely related to the growth of salmon fisheries and associated infrastructure; enterprises like the Kodiak fisheries salmon cannery located in town attracted residents from other communities such as Aiaktalik, which was a village formerly located on Aiaktalik Island in southern Kodiak; or people came from Eagle Harbor in Ugak Bay (Mishler 2001). A whaling station at Port Hobrok on Sitkalidak Island also provided some employment for local residents from the 1920s through the 1940s. Old Harbor continued to grow steadily from the 1940s through 1980; by this time Old Harbor was the only remaining community on the east side of Kodiak. In the 1960s and 1970s, a salmon processing ship docked in town, providing electricity and employment to residents. In 1975, the vessel burned and the community lost that source of employment (Mishler 2001). Weakening of commercial fisheries and out-migration to larger towns for employment and health services have likely contributed to the declining population since the 1980s.

Approximately 45% of the population lived in one of the 30 sampled households during this study (Table 3-2). From this sampled population, it was estimated that the average household contained three residents with a minimum household size of one and a maximum of five. The average resident of Old Harbor in 2018 was 31 years old but the median age was substantially younger at 24 years. The eldest resident sampled was 84 years old. Of the total population, the average resident had lived in Old Harbor for 21 years and the longest-residing resident had been there for 84 years. Among just heads of households, the average length of residency was longer at 32 years and the minimum length of residency was five years. Looking at the general population, 60% of residents were born in Old Harbor (Table 3-3). The next most common birthplace was Anchorage, where 11% of the population was born, then another U.S. state (10%). From 1% to 3% of residents were born in each of six other Kodiak Island communities, in Egegik, or in a foreign country. Focusing only on household heads, the same communities served as birthplaces, but the percentage of household heads listing one of the top three locations are different: approximately 49% of household heads were born in Old Harbor, followed by 17% in another U.S. state and 9% in Anchorage (Table 3-4). The population of Old Harbor in 2018 was relatively young, with 50% of its residents being 24 years of age or younger (Table 3-5). About the same number of males as females were living in the community, but there were more boys of 4 years of age or younger than girls, and more girls between the ages of 5 and 14 than boys (Figure 3-4). Other age cohorts were generally balanced between genders.

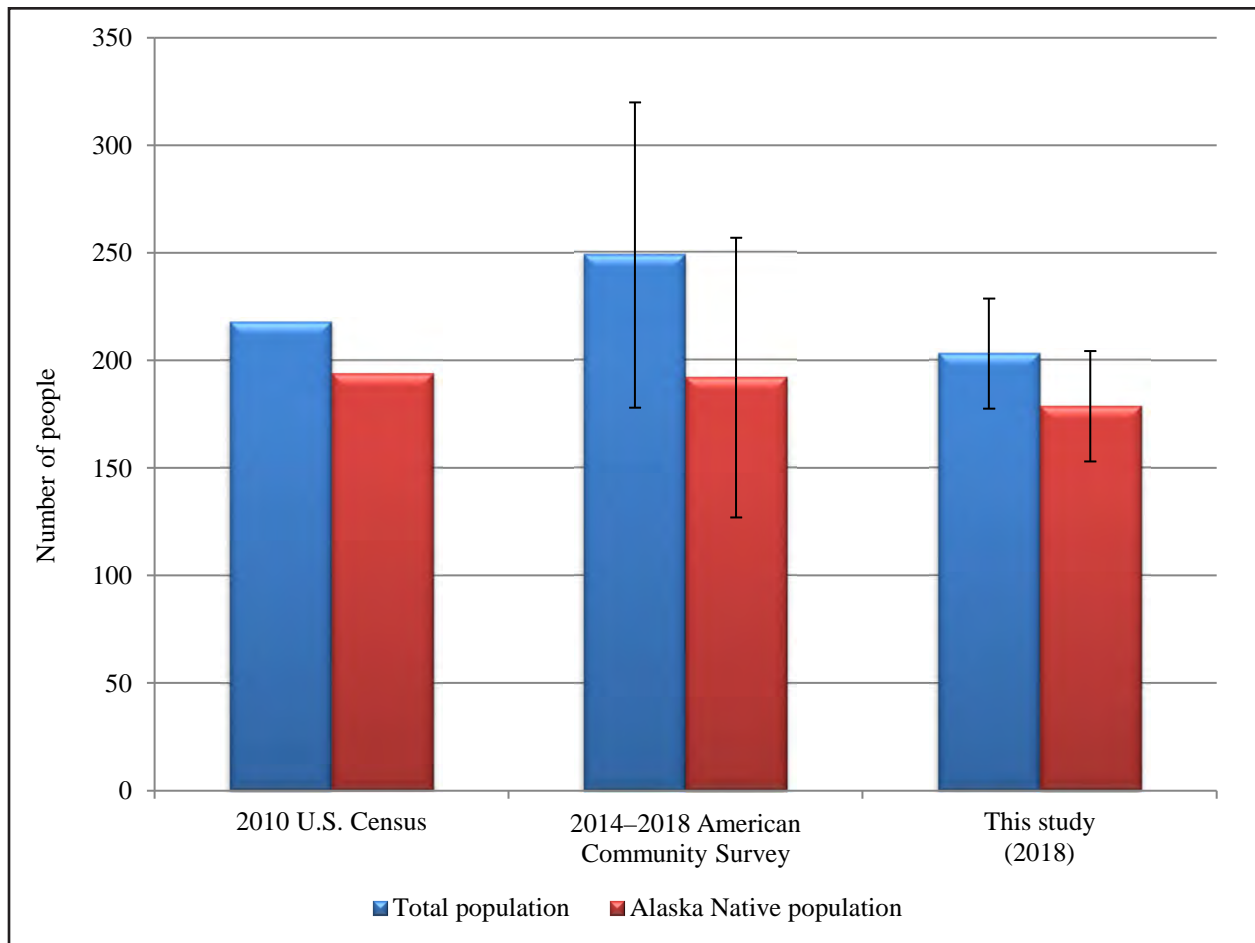


Figure 3-2.–Alaska Native and overall population estimates, Old Harbor, 2010 and 2018.

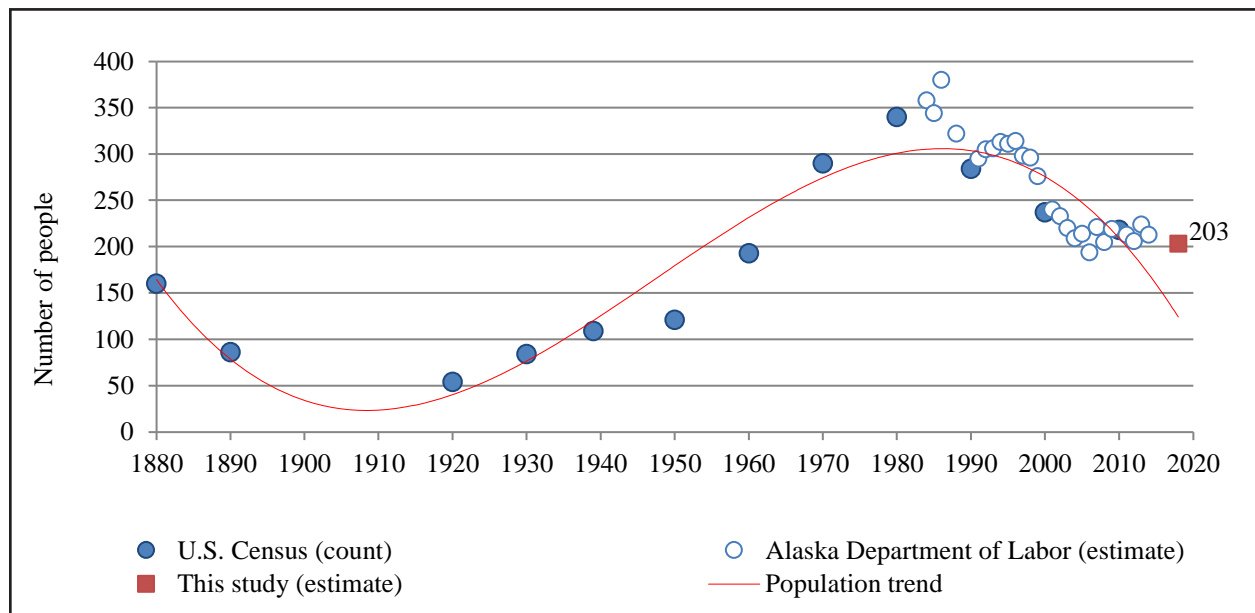


Figure 3-3.–Historical population estimates, Old Harbor, 1880–2018.

Table 3-2.—Sample and demographic characteristics, Old Harbor, 2018.

Characteristics	Community Old Harbor
Sampled households	30
Eligible households	67
Percentage sampled	44.8%
Sampled population	91
Estimated community population	203.2
Household size	
Mean	3.0
Minimum	1.0
Maximum	5.0
Age	
Mean	30.5
Minimum ^a	0.0
Maximum	84.0
Median	24
Length of residency	
Total population	
Mean	20.9
Minimum ^a	0.0
Maximum	84.0
Heads of household	
Mean	31.9
Minimum ^a	5.0
Maximum	84.0
Alaska Native	
Estimated households ^b	
Number	60.3
Percentage	90.0%
Estimated population	
Number	178.7
Percentage	87.9%

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

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 3-3.—Birthplaces of population, Old Harbor, 2018.

Birthplace	Percentage
Missing	2.2%
Akhiok	1.1%
Anchorage	11.0%
Egegik	3.3%
Kodiak City	3.3%
Old Harbor	60.4%
Ouzinkie	2.2%
Afognak Village	1.1%
Kaguyak	2.2%
Shearwater Bay	2.2%
Other U.S.	9.9%
Foreign	1.1%

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

Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 3-4.—Birthplaces of household heads, Old Harbor, 2018.

Birthplace	Percentage
Missing	2.1%
Akhiok	2.1%
Anchorage	8.5%
Egegik	2.1%
Kodiak City	4.3%
Old Harbor	48.9%
Ouzinkie	2.1%
Afognak Village	2.1%
Kaguyak	4.3%
Shearwater Bay	4.3%
Other U.S.	17.0%
Foreign	2.1%

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

Note "Birthplace" means the place of residence of the parents of the individual when the individual was born.

Table 3-5.–Population profile, Old Harbor, 2018.

Age	Male			Female			Total		
	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	20.1	20.0%	20.0%	8.9	8.7%	8.7%	29.0	14.3%	14.3%
5–9	4.5	4.4%	24.4%	17.9	17.4%	26.1%	22.3	11.0%	25.3%
10–14	4.5	4.4%	28.9%	11.2	10.9%	37.0%	15.6	7.7%	33.0%
15–19	2.2	2.2%	31.1%	2.2	2.2%	39.1%	4.5	2.2%	35.2%
20–24	17.9	17.8%	48.9%	13.4	13.0%	52.2%	31.3	15.4%	50.5%
25–29	2.2	2.2%	51.1%	6.7	6.5%	58.7%	8.9	4.4%	54.9%
30–34	4.5	4.4%	55.6%	4.5	4.3%	63.0%	8.9	4.4%	59.3%
35–39	6.7	6.7%	62.2%	2.2	2.2%	65.2%	8.9	4.4%	63.7%
40–44	6.7	6.7%	68.9%	4.5	4.3%	69.6%	11.2	5.5%	69.2%
45–49	4.5	4.4%	73.3%	6.7	6.5%	76.1%	11.2	5.5%	74.7%
50–54	6.7	6.7%	80.0%	2.2	2.2%	78.3%	8.9	4.4%	79.1%
55–59	8.9	8.9%	88.9%	13.4	13.0%	91.3%	22.3	11.0%	90.1%
60–64	2.2	2.2%	91.1%	2.2	2.2%	93.5%	4.5	2.2%	92.3%
65–69	2.2	2.2%	93.3%	2.2	2.2%	95.7%	4.5	2.2%	94.5%
70–74	2.2	2.2%	95.6%	2.2	2.2%	97.8%	4.5	2.2%	96.7%
75–79	2.2	2.2%	97.8%	0.0	0.0%	97.8%	2.2	1.1%	97.8%
80–84	2.2	2.2%	100.0%	2.2	2.2%	100.0%	4.5	2.2%	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	100.5	100.0%	100.0%	102.7	100.0%	100.0%	203.2	100.0%	100.0%

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

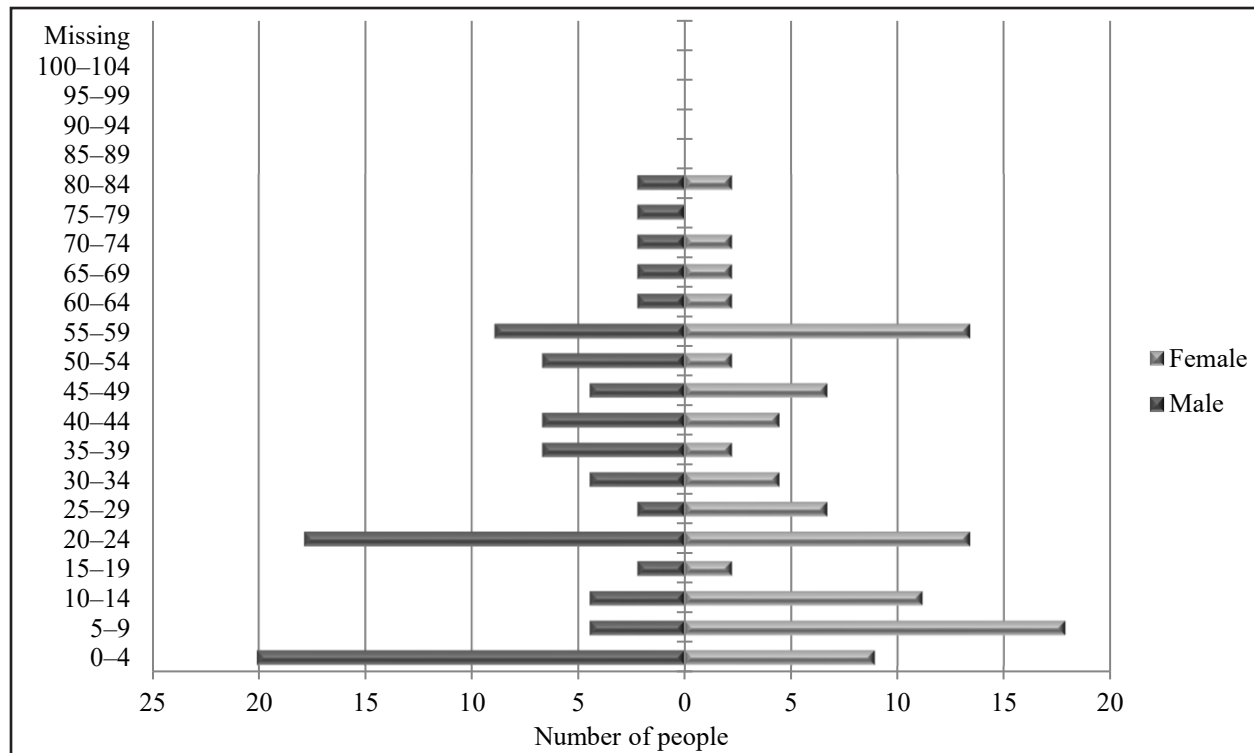


Figure 3-4.–Population profile, Old Harbor, 2018.

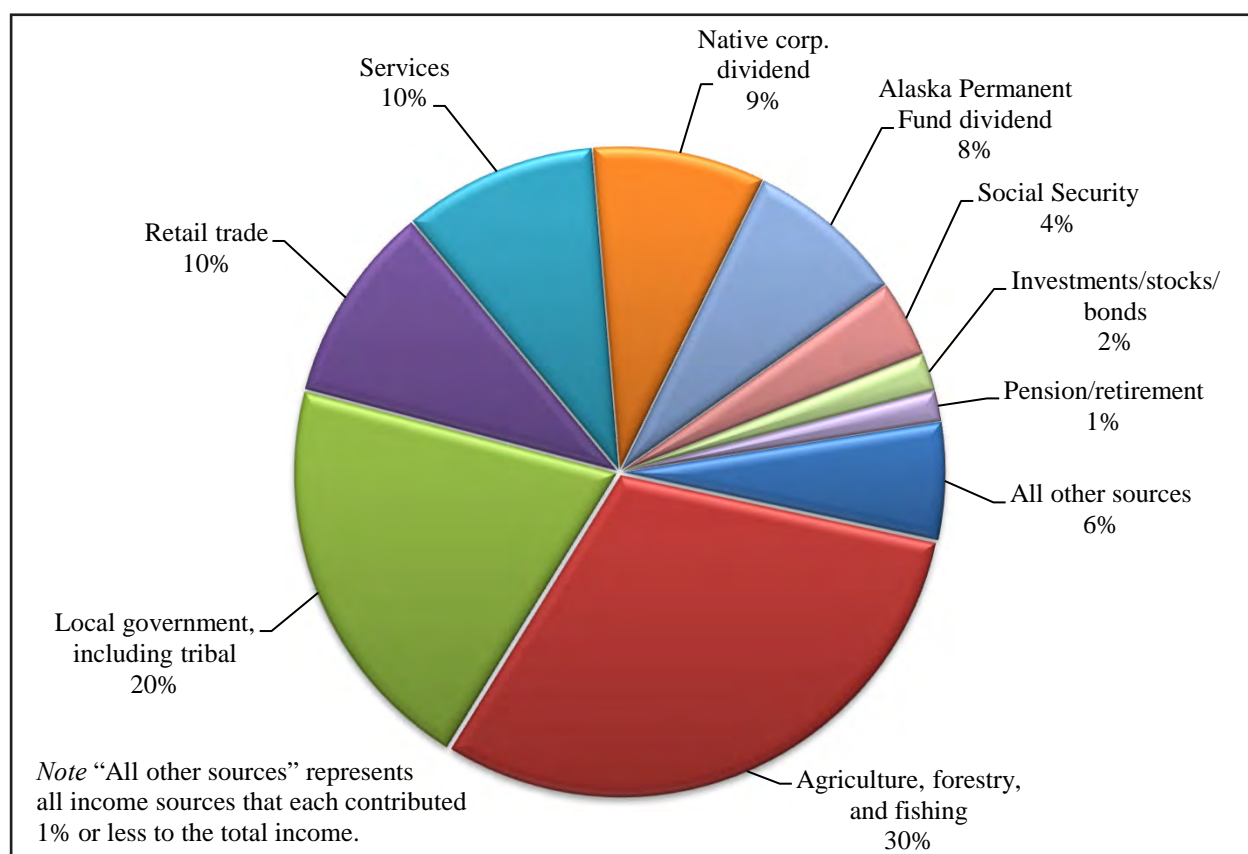


Figure 3-5.—Top income sources, Old Harbor, 2018.

INCOME AND CASH EMPLOYMENT

Nearly three-quarters (70%) of the total income of Old Harbor residents in 2018 came from four sources: employment in the agriculture, forestry and fishing sector; employment with local government organizations; or employment in retail trade or in services (Figure 3-5). Other income sources contributing more than 5% to the total community income included dividends from Native corporations (9%) or the Alaska Permanent Fund (8%). Of the \$3.5 million total community income, approximately 74% originated in employment while 26% was other income (Table 3-6), which is a similar ratio to the other study communities. Top sources of other income were dividends from Native corporations (\$4,593 per household) and the Alaska Permanent Fund (\$4,248 per household), and Social Security (\$2,047 per household). The median household income in 2018 was \$35,750 based on household surveys, which was similar to the ACS 2014–2018³ average estimate for Old Harbor, and about one-half of the ACS estimate for all of Alaska (Figure 3-6). At \$53,343, the average household income was substantially higher than the median household income (Table 3-6). Per capita income in 2018 was \$17,585 (Table 1-8).

3. Note that the median income average for 2014–2018 was available only for Old Harbor; for Akhiok and Larsen Bay, the median income average for 2013–2017 was available from ACS.

Table 3-6.—Estimated earned and other income, Old Harbor, 2018.

Income source	Number of employed adults	Number of households	Total for community	-/+ 95% CI	Mean per household	Percentage of total community income
Earned income						
Agriculture, forestry, and fishing	42.9	31.3	\$1,088,848	\$273,258 – \$2,699,013	\$16,251	30.5%
Local government, including tribal	52.0	40.2	\$723,254	\$379,683 – \$1,319,899	\$10,795	20.2%
Retail trade	9.0	6.7	\$354,069	\$32,723 – \$1,171,824	\$5,285	9.9%
Services	38.4	31.3	\$345,960	\$118,750 – \$849,357	\$5,164	9.7%
Transportation, communication, and utilities	9.0	8.9	\$51,048	\$10,574 – \$152,234	\$762	1.4%
Federal government	2.3	2.2	\$44,688	\$34,549 – \$122,704	\$667	1.3%
Manufacturing	2.3	2.2	\$25,782	\$19,950 – \$76,220	\$385	0.7%
Earned income subtotal	115.2	64.8	\$2,633,650	\$1,747,877 – \$4,180,022	\$39,308	73.7%
Other income						
Native corp. dividend		53.6	\$307,704	\$159,675 – \$534,499	\$4,593	8.6%
Alaska Permanent Fund dividend		67.0	\$284,634	\$236,579 – \$325,173	\$4,248	8.0%
Social Security		17.9	\$137,127	\$30,912 – \$368,805	\$2,047	3.8%
Investments/stocks/bonds		2.2	\$67,000	\$30,000 – \$134,000	\$1,000	1.9%
Pension/retirement		4.5	\$55,448	\$24,828 – \$172,286	\$828	1.6%
Other		4.5	\$36,180	\$16,200 – \$103,180	\$540	1.0%
Supplemental Security income		4.5	\$23,798	\$10,656 – \$54,886	\$355	0.7%
Food stamps		4.5	\$7,125	\$3,190 – \$22,139	\$106	0.2%
Heating assistance		11.2	\$5,753	\$1,323 – \$11,991	\$86	0.2%
Disability		2.2	\$5,360	\$2,400 – \$10,720	\$80	0.1%
Meeting honoraria		4.5	\$5,360	\$2,400 – \$10,720	\$80	0.1%
Longevity bonus		2.2	\$2,037	\$912 – \$4,074	\$30	0.1%
Unemployment		2.2	\$1,431	\$641 – \$6,632	\$21	0.0%
Rental assistance		2.2	\$1,340	\$600 – \$2,680	\$20	0.0%
TANF (Temporary Cash Assistance for Needy Families)		0.0	\$0	\$0 – \$0	\$0	0.0%
Adult public assistance (OAA, APD)		0.0	\$0	\$0 – \$0	\$0	0.0%
Workers' compensation/insurance		0.0	\$0	\$0 – \$0	\$0	0.0%
Veterans assistance		0.0	\$0	\$0 – \$0	\$0	0.0%
Child support		0.0	\$0	\$0 – \$0	\$0	0.0%
Foster care		0.0	\$0	\$0 – \$0	\$0	0.0%
CITGO fuel voucher		0.0	\$0	\$0 – \$0	\$0	0.0%
Other income subtotal		67.0	\$940,298	\$616,825 – \$1,546,014	\$14,034	26.3%
Community income total			\$3,573,948	\$2,468,038 – \$5,534,802	\$53,343	100.0%

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

Note In cases where the lower bound of the CI would be less than the reported value, the reported value was used.

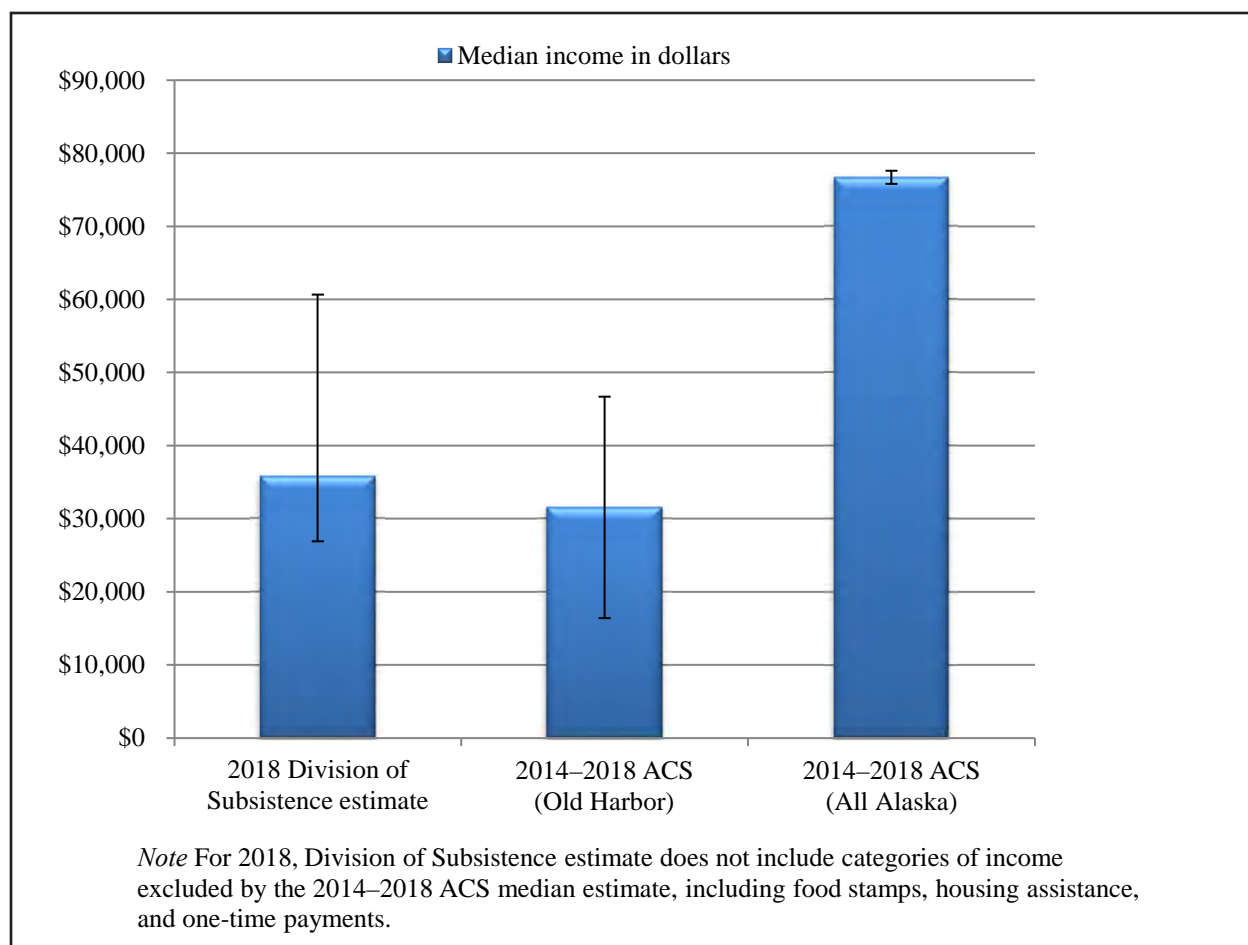


Figure 3-6.—Comparison of household median income estimates, Old Harbor, 2018.

Employment in the agriculture, forestry, and fishing sector (primarily commercial fishing) contributed 41% of the wage earnings in Old Harbor but contributed 25% of total jobs in the community (Table 3-7). The local government provided the greatest proportion of jobs (39%) but the second largest proportion of wage earnings (28%). Jobs in the manufacturing sector accounted for the smallest percentage of wage earnings (1%) and tied with the federal government for providing the smallest percentage of jobs in the community (1%). Jobs in the community were equally divided among full-time (32% of jobs), part-time (32%), and on-call (33%) schedules (Table 3-8). Employed persons were also relatively equally apportioned among those job schedules, with a slightly smaller proportion holding part-time jobs (39%) and larger percentage with on-call jobs (43%). More households had part-time jobs (59%) than full-time or on-call (52%). Eighty-five percent of adults in the community were employed in 2018 and the average length of employment was nine months in the year (Table 3-9). An employed adult held an average of 1.5 jobs during the year, with a maximum of four jobs. Nearly all households (97%) were employed and each employed household held 2.6 jobs on average.

Table 3-7.—Employment by industry, Old Harbor, 2018.

Industry	Jobs	Employed households	Employed individuals	Percentage of wage earnings
Estimated total number	169.4	64.8	115.2	
Federal government	1.3%	3.4%	2.0%	1.7%
Executive, administrative, and managerial	1.3%	3.4%	2.0%	1.7%
Local government, including tribal	38.7%	62.1%	45.1%	27.5%
Executive, administrative, and managerial	5.3%	13.8%	7.8%	2.0%
Teachers, librarians, and counselors	6.7%	17.2%	9.8%	10.8%
Marketing and sales occupations	2.7%	6.9%	3.9%	0.6%
Administrative support occupations, including clerical	6.7%	17.2%	9.8%	5.5%
Service occupations	9.3%	24.1%	13.7%	3.8%
Transportation and material moving occupations	4.0%	10.3%	5.9%	2.4%
Handlers, equipment cleaners, helpers, and laborers	2.7%	6.9%	3.9%	1.5%
Occupation not indicated	1.3%	3.4%	2.0%	0.9%
Agriculture, forestry, and fishing	25.3%	48.3%	37.3%	41.3%
Agricultural, forestry, and fishing occupations	25.3%	48.3%	37.3%	41.3%
Manufacturing	1.3%	3.4%	2.0%	1.0%
Writers, artists, entertainers, and athletes	1.3%	3.4%	2.0%	1.0%
Transportation, communication, and utilities	5.3%	13.8%	7.8%	1.9%
Executive, administrative, and managerial	1.3%	3.4%	2.0%	0.0%
Administrative support occupations, including clerical	1.3%	3.4%	2.0%	1.2%
Transportation and material moving occupations	2.7%	6.9%	3.9%	0.7%
Retail trade	5.3%	10.3%	7.8%	13.4%
Executive, administrative, and managerial	5.3%	10.3%	7.8%	13.4%
Services	22.7%	48.3%	33.3%	13.1%
Executive, administrative, and managerial	4.0%	6.9%	5.9%	2.9%
Social scientists, social workers, religious workers, and lawyers	1.3%	3.4%	2.0%	0.6%
Health technologists and technicians	2.7%	6.9%	3.9%	2.0%
Technologists and technicians, except health	2.7%	6.9%	3.9%	4.1%
Administrative support occupations, including clerical	1.3%	3.4%	2.0%	0.2%
Service occupations	8.0%	20.7%	11.8%	2.3%
Agricultural, forestry, and fishing occupations	1.3%	3.4%	2.0%	0.1%
Handlers, equipment cleaners, helpers, and laborers	1.3%	3.4%	2.0%	1.0%

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

Table 3-8.—Reported job schedules, Old Harbor, 2018.

Schedule	Jobs		Employed persons		Employed households	
	Number	Percentage	Number	Percentage	Number	Percentage
Full time	54.2	32.0%	47.4	41.2%	33.5	51.7%
Part time	54.2	32.0%	45.2	39.2%	38.0	58.6%
On-call (occasional)	56.5	33.3%	49.7	43.1%	33.5	51.7%
Schedule not reported	4.5	2.7%	4.5	3.9%	4.5	6.9%

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

Note Respondents who had more than one job in the study year could provide multiple responses, so the percentages may sum to more than 100%.

Table 3-9.—Employment characteristics, Old Harbor, 2018.

Characteristic	Community
	Old Harbor
All adults	
Number	136.2
Mean weeks employed	32.5
Employed adults	
Number	115.2
Percentage	84.6%
Jobs	
Number	169.4
Mean	1.5
Minimum	1
Maximum	4
Months employed	
Mean	8.9
Minimum	2
Maximum	12
Percentage employed year-round	44.9%
Mean weeks employed	38.4
Households	
Number	67.0
Employed	
Number	64.8
Percentage	96.7%
Jobs per employed household	
Mean	2.6
Minimum	1
Maximum	7
Employed adults	
Mean	
Employed households	1.8
Total households	1.7
Minimum	1
Maximum	4
Mean person-weeks of employment	66.0

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

Table 3-10.—Households’ assessments of food security conditions, Old Harbor, 2018.

Statement	Percentage of sampled households
Had enough of the kinds of food desired	43.3%
Had enough food, but not the desired kind	50.0%
Sometimes, or often, did not have enough food	6.7%

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

FOOD SECURITY

Survey respondents were asked a set of questions intended to assess their household’s food security, defined as, “access by all people at all times to enough food for an active, healthy life” (Coleman-Jensen et al. 2012). The food security questions were modeled after those developed by the U.S. Department of Agriculture (USDA) but modified by ADF&G to account for differences in access to subsistence and store-bought foods. Based on their responses to these questions, households were broadly categorized as being food secure or food insecure following a USDA protocol (Bickel et al. 2000). Food secure households were broken down further into two subcategories—high or marginal food security. Food insecure households were also divided into two subcategories—low food security or very low food security.

Households with high food security did not report any food access problems or limitations. Households with marginal food security reported one or two instances of food access problems or limitations—typically anxiety over food sufficiency or a shortage of particular foods in the house—but gave little or no indication of changes in diets or food intake. Households with low food security reported reduced quality, variety, or desirability of their diet, but they, too, gave little indication of reduced food intake. Households classified as having very low food security were those that reported multiple instances of disrupted eating patterns and reduced food intake (Coleman-Jensen et al. 2012).

Overall, 43% of sampled households in Old Harbor assessed that they had enough of the kinds of food they wanted to eat in 2018; 50% said they had enough food, but not necessarily of the kinds they wanted to eat; and 7% of households said they did not have enough food to eat (Table 3-10). Estimates summarized in Figure 3-7 are derived from core questions and responses from Old Harbor households that did not have enough food or desired kinds of food. For this study, additional questions asked were designed to determine whether food insecurities, if any, were related to subsistence foods or store-bought foods. Responses to the last five conditions depicted on Figure 3-7 were used to assess the severity of food insecure conditions experienced by the household. More households (30%) responded that they ran out of subsistence foods at some point during 2018 than answered affirmatively to any other question. While subsistence foods ran out, only 10% of households responded that their store-bought food did not last through 2018 and 10% of households reported that the household’s food overall did not last. The next question with the highest positive response rate asked whether a household lacked the resources to get food, with 27% of households indicating this was a problem during 2018. Lacking resources means that the household did not have what was needed to hunt, fish, or gather food, or enough money to purchase food. Thirteen percent of households worried that they would run out of food during 2018; no other question garnered affirmative responses from more than 10% of households.

Food security score results for Old Harbor, the state of Alaska, and the United States are summarized in Figure 3-8. More households were considered food secure in Old Harbor (93%) than in Alaska overall (85%) or the nation as a whole (89%). Fewer households in Old Harbor experienced low (3%) or very low (3%) food security in 2018 than households in Alaska or the nation overall. Food security results for the year may obscure the seasonal differences many households experience in security, based on factors like resource availability, time to harvest, weather, or cash flow fluctuations.

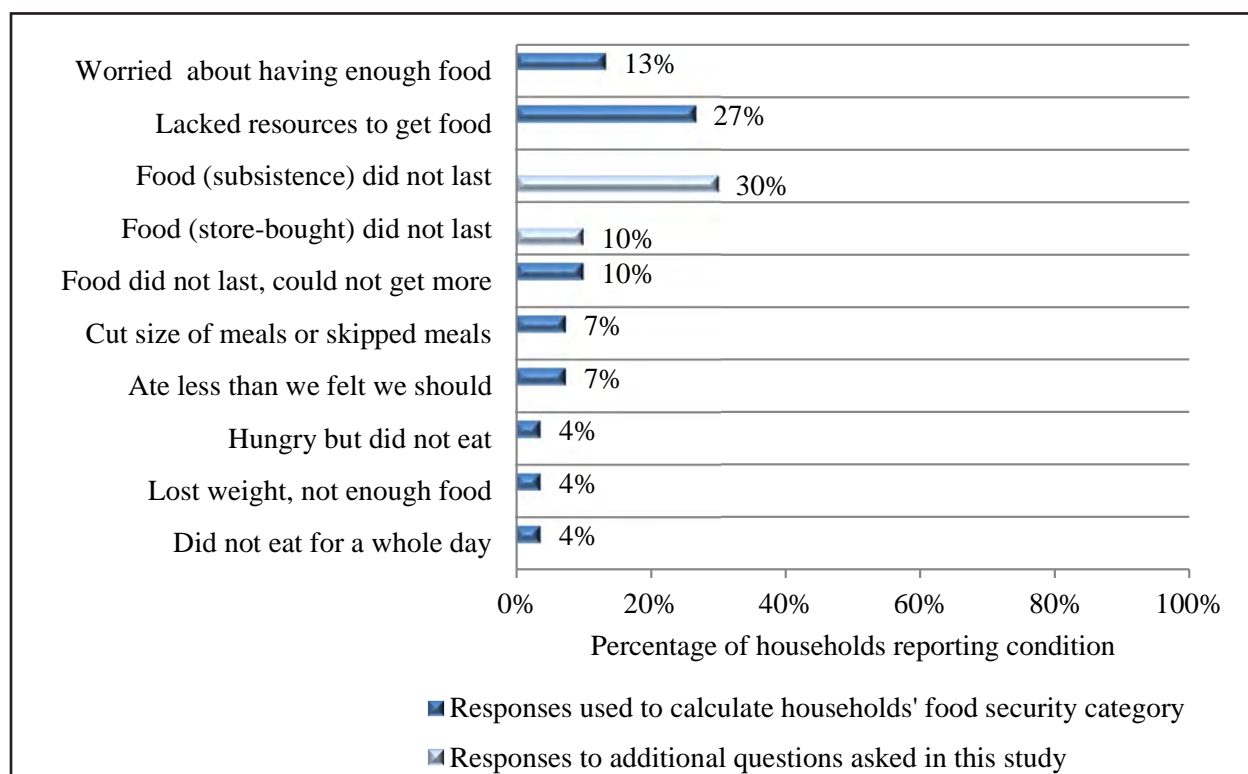


Figure 3-7.—Responses to questions about food insecure conditions, Old Harbor, 2018.

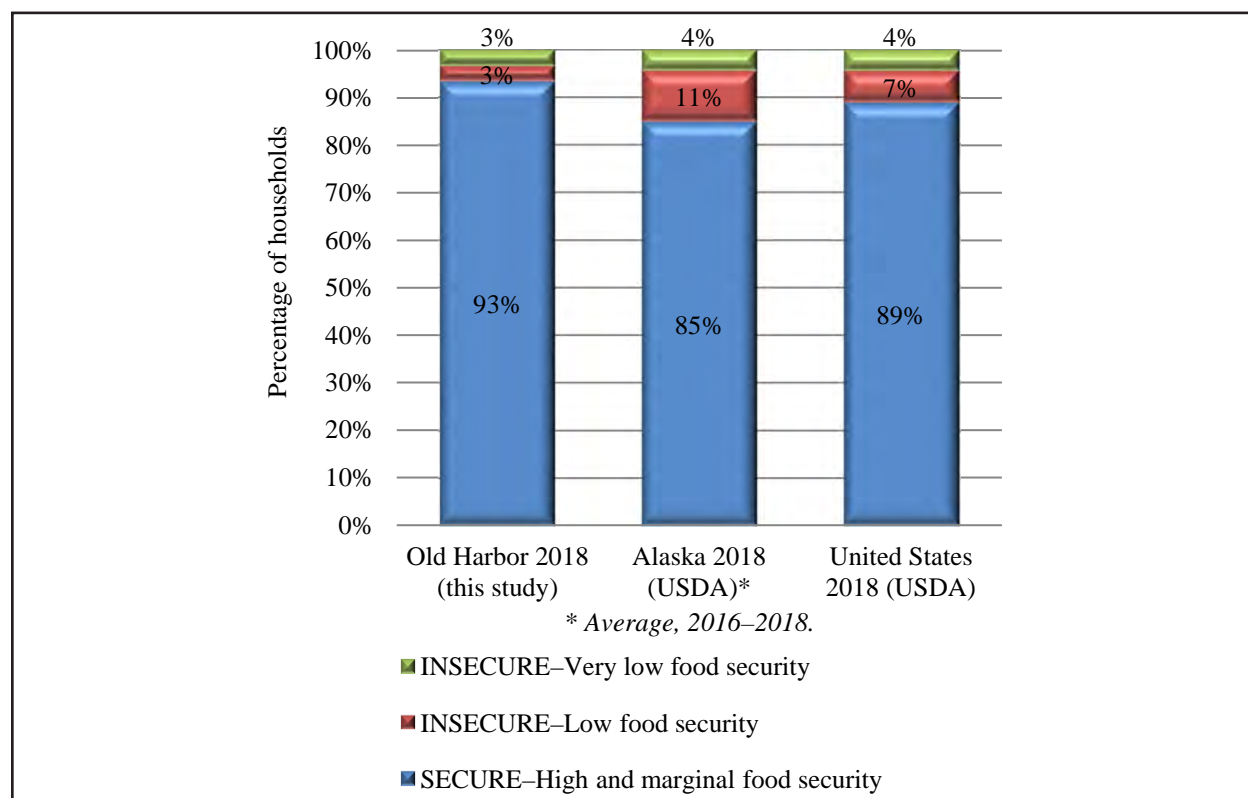


Figure 3-8.—Comparison of food security categories, Old Harbor, Alaska, and United States, 2018.

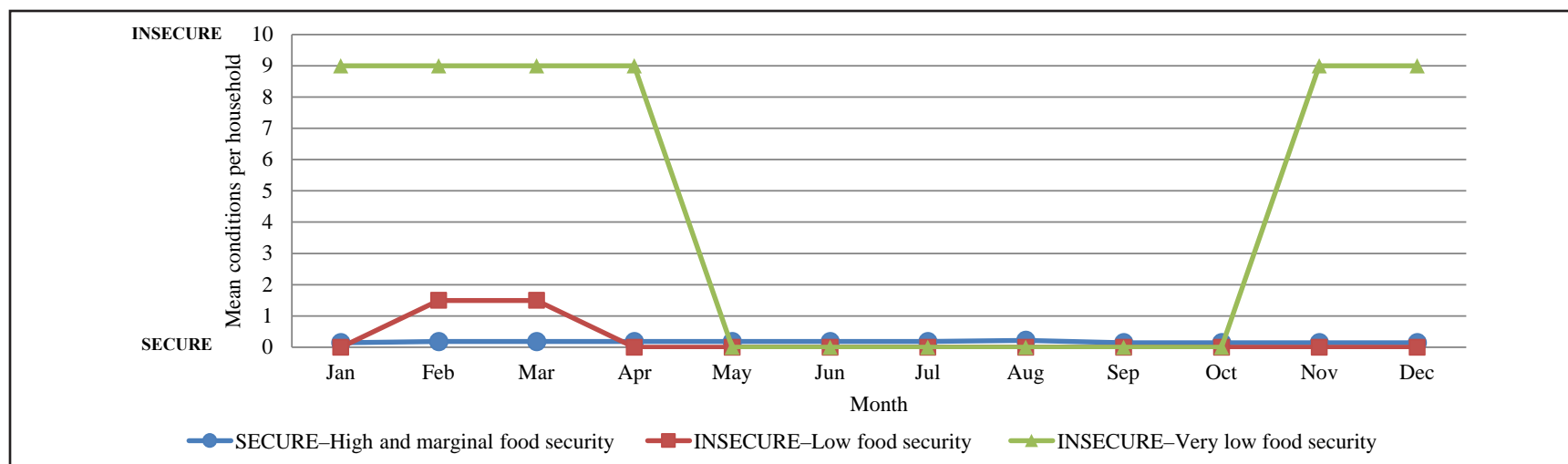


Figure 3-9.—Mean number of food insecure conditions by month and by household food security category, Old Harbor, 2018.



Figure 3-10.—Comparison of months when food did not last, Old Harbor, 2018.

Figure 3-9 portrays the mean number of food insecure conditions per household by food security category by month. Figure 3-10 shows which months households reported foods not lasting. As can be seen, there was minimal seasonal variability. Households generally experienced greater food security from May through October; very few insecure conditions were experienced during those months and fewer households reported subsistence or store-bought foods not lasting in comparison to the winter months of 2018 (Figure 3-9; Figure 3-10). Food secure households reported no seasonal variability in their food security (Figure 3-9). Food insecure households with low food security experienced slightly more insecure conditions in February and March. Food insecure households with very low food security experienced the same number of food insecure conditions in all the months outside of May through October.

In looking at months when food did not last for a household, this happened less frequently for store-bought foods in comparison to for subsistence foods: 3% of households reported occurrences in January through April, August, November, and December (Figure 3-10). For subsistence foods, more households reported running out in February and March than in January, then fewer households reported this condition in April through May. Another bump in households reporting running out of subsistence foods occurred in July and August, and again in November and December. It is unsurprising that some households run out of subsistence foods during the winter months when there are fewer resources available and the weather is generally less favorable; it is more interesting to observe that there was an increase in households where any food did not last in August. Salmon and berries are the main subsistence resources available to Old Harbor households in August; 2018 was a poor berry year and the coho salmon run was later than average, according to one respondent, which may explain the slight uptick in food insecurity in August.

SUMMARY OF HARVEST AND USE PATTERNS

Individual Participation in the Harvesting and Processing of Wild Resources

Table 3-11 and Figure 3-11 report the expanded levels of individual participation in the harvesting and processing of wild resources by Old Harbor residents in 2018. Most Old Harbor residents participate in harvesting and processing activities: 88% of the population hunted, fished, or gathered resources and 88% participated in processing resources. For most resource categories, more individuals participated in processing activities than in harvesting activities. It is relatively common for a smaller number of people with the time, skills, and resources to harvest more resources than are needed in order to share with others. Once the harvest is complete, a larger component of the community contributes to processing harvests. This is particularly true for more specialized harvests, as is evidenced in Old Harbor with a low percentage of people harvesting large land mammals and birds and eggs, but many more processing them. Harvesting marine mammals is another highly specialized activity and a small percentage of residents harvested them in 2018. Only slightly more residents aided in processing, which could be an indication of a concentration of the skills and knowledge necessary for processing. In contrast, some resources are more readily available to everyone or tend to be more of a family activity to pursue, such as gathering plants and berries or harvesting salmon, in Old Harbor. More residents participated in harvesting and processing these two resource categories than any other, and there was little disparity between the percentage of individuals harvesting and the percentage processing.

Table 3-11.—Individual participation in subsistence harvesting and processing activities, Old Harbor, 2018.

Total number of people	203.2
Fish	
Fish	
Number	164.4
Percentage	80.9%
Process	
Number	166.7
Percentage	82.0%
Large land mammals	
Hunt	
Number	84.5
Percentage	41.6%
Process	
Number	121.0
Percentage	59.6%
Small land mammals	
Hunt or trap	
Number	36.5
Percentage	18.0%
Process	
Number	36.5
Percentage	18.0%
Marine mammals	
Hunt	
Number	66.2
Percentage	32.6%
Process	
Number	82.2
Percentage	40.4%
Marine invertebrates	
Hunt	
Number	98.2
Percentage	48.3%
Process	
Number	114.2
Percentage	56.2%
Birds and eggs	
Hunt/gather	
Number	66.2
Percentage	32.6%
Process	
Number	107.3
Percentage	52.8%
Vegetation	
Gather	
Number	153.0
Percentage	75.3%
Process	
Number	157.6
Percentage	77.5%
Any resource	
Attempt harvest	
Number	178.7
Percentage	87.9%
Process	
Number	178.7
Percentage	87.9%

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

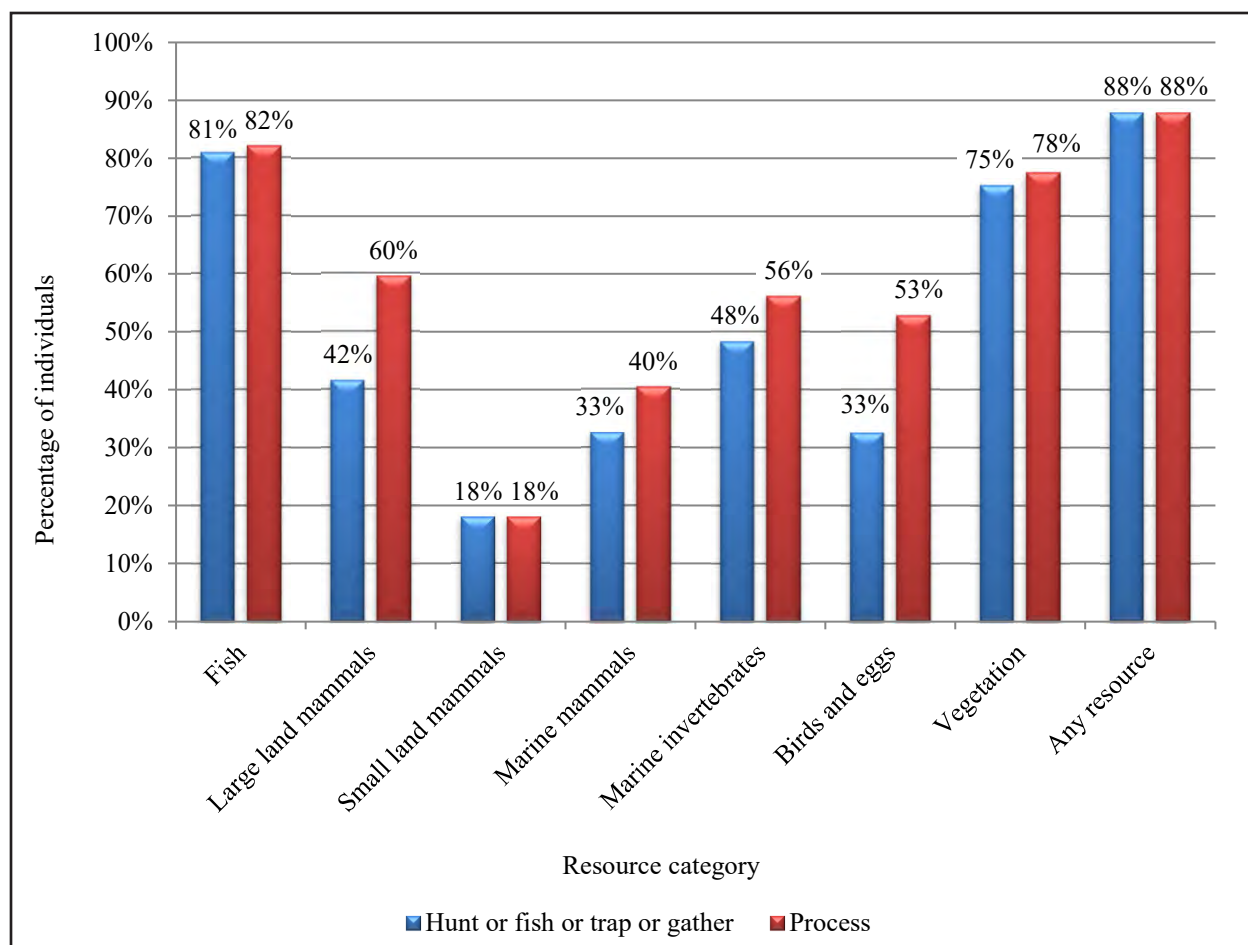


Figure 3-11.—Individual participation in subsistence harvesting and processing activities, Old Harbor, 2018.

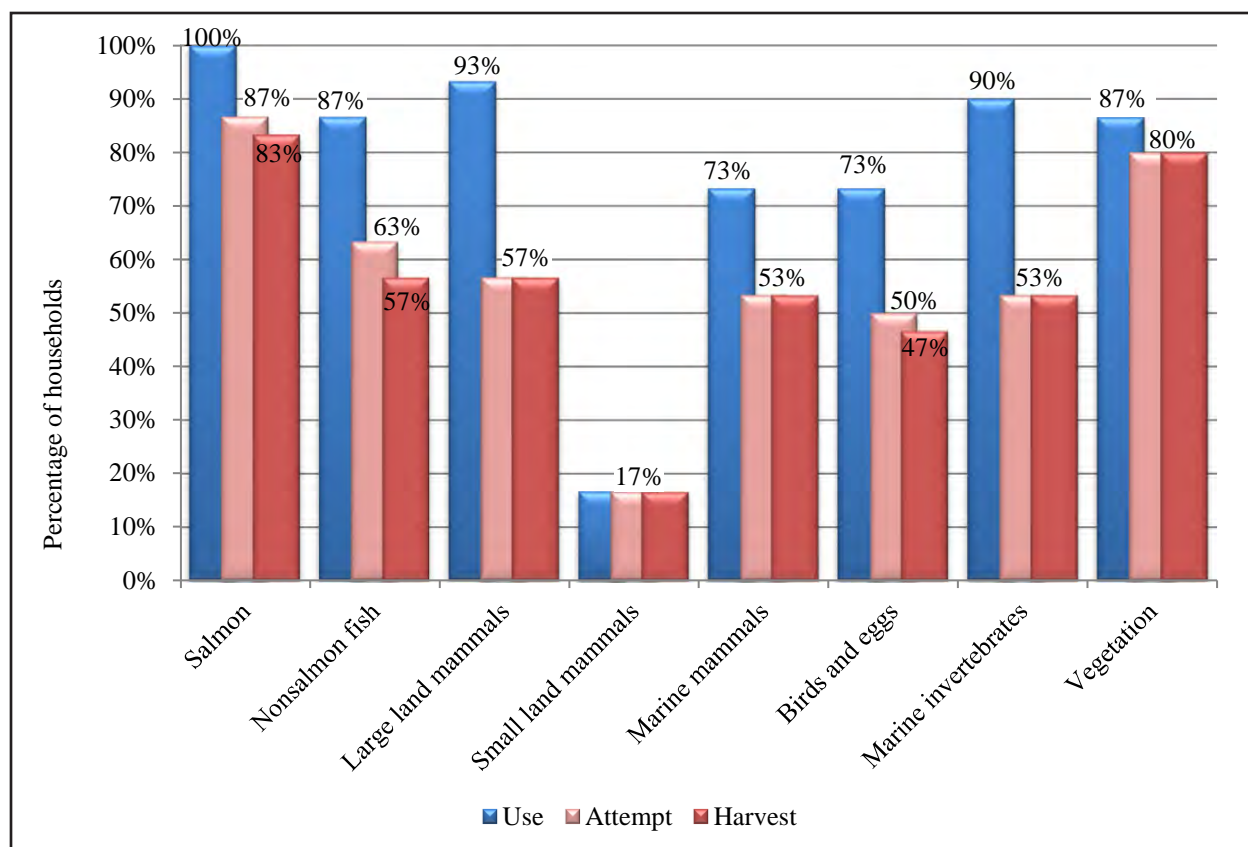


Figure 3-12.—Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Old Harbor, 2018.

Harvest and Use of Wild Resources at the Household Level

Figure 3-12 shows by resource category the percentages of households that used, attempted to harvest, and harvested wild foods. High levels of use were documented for most resource categories. Except for small land mammals, all resource categories were used by at least three-quarters of community households. All, or nearly all, households used salmon, large land mammals, and marine invertebrates. Around one-half, or more, households in the community harvested resources from each category, except small land mammals, and most households that attempted harvests were successful. The greatest difference in the percent of households attempting versus successfully harvesting is seen in nonsalmon fish. In general, more households used resources than harvested them, illustrating how harvested resources are shared within a community. The most notable differences between the percent of households harvesting a resource and percent using are for large land mammals and marine invertebrates. As discussed above, hunting large land mammals is a specialized activity and it is common for a few hunters to share meat widely within a community. Many marine invertebrates are easily available on the beach, but resources like Tanner and king crab require specific equipment such as boats and hydraulic pot pullers to harvest, leading to fewer households harvesting them.

Table 3-12 summarizes resource harvest and use characteristics for Old Harbor in 2018 at the household level. The average harvest was 1,755 lb usable weight per household, or 579 lb per capita. During the study year, community households harvested an average of 14 kinds of resources and used an average of 20 kinds of resources. The maximum number of resources used by any household was 56. In addition, households gave away an average of 11 kinds of resources.

Table 3-12.—Resource harvest and use characteristics, Old Harbor, 2018.

Characteristic	
Mean number of resources used per household	19.7
Minimum	3
Maximum	56
95% confidence limit (\pm)	16.1%
Median	18.5
Mean number of resources attempted to harvest per household	14.5
Minimum	0
Maximum	55
95% confidence limit (\pm)	24.4%
Median	12.5
Mean number of resources harvested per household	14.3
Minimum	0
Maximum	55
95% confidence limit (\pm)	24.9%
Median	11.5
Mean number of resources received per household	9.7
Minimum	0
Maximum	25
95% confidence limit (\pm)	19.8%
Median	9.5
Mean number of resources given away per household	10.9
Minimum	0
Maximum	46
95% confidence limit (\pm)	26.4%
Median	7
Household harvest (pounds)	
Minimum	0
Maximum	15,051
Mean	1,754.7
Median	520.9
Total harvest weight (lb)	117,561.8
Community per capita harvest (lb)	578.5
Percentage using any resource	100.0%
Percentage attempting to harvest any resource	93.3%
Percentage harvesting any resource	93.3%
Percentage receiving any resource	96.7%
Percentage giving away any resource	93.3%
Number of households in sample	30
Number of resources asked about and identified voluntarily by respondents	145

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

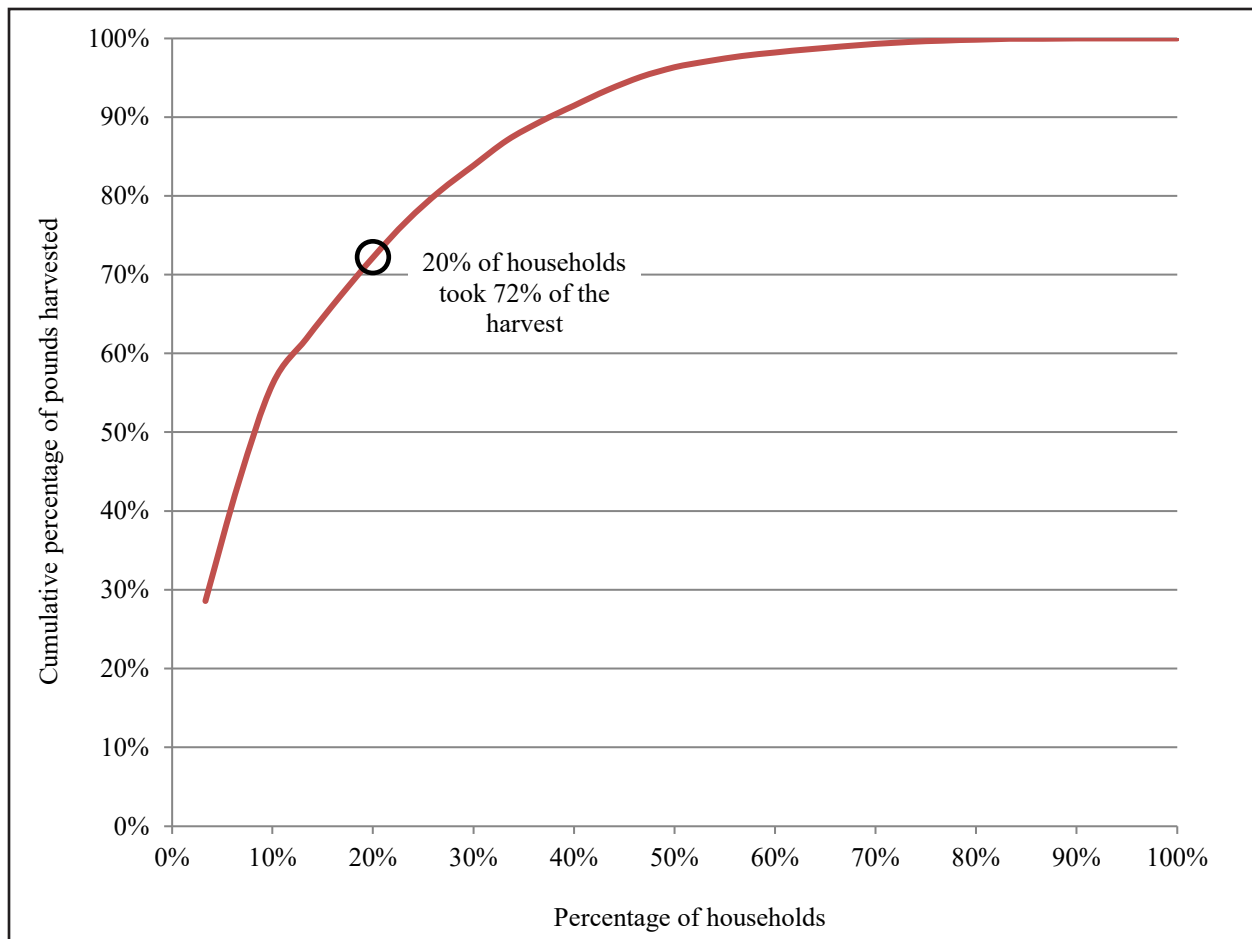


Figure 3-13.—Household specialization, Old Harbor, 2018.

Household Specialization in Resource Harvesting

Previous studies (Wolfe 1987; Wolfe et al. 2010) have shown that in most rural Alaska communities, a relatively small portion of households produces most of the community’s fish and wildlife harvests, which they share with other households. A study of 3,265 households in 66 rural Alaska communities found that about 33% of the households accounted for 76% of subsistence harvests (Wolfe et al. 2010). Although overall the set of very productive households was diverse, factors that were associated with higher levels of subsistence harvests included larger households with a pool of adult male labor, higher wage income, involvement in commercial fishing, and community location.

As shown in Figure 3-13, in the 2018 study year in Old Harbor, about 72% of the harvests of wild resources as estimated in pounds usable weight were harvested by 20% of the community’s households. Further analysis of the study findings, beyond the scope of this report, might identify characteristics of the highly productive households in Old Harbor and the other study communities.

Harvest Quantities and Composition

Table 3-13 reports estimated wild resource harvests and uses by Old Harbor residents in 2018 and is organized first by general category and then by species. All edible resources are reported in pounds usable weight (see Appendix D for conversion factors⁴). The harvest category includes resources harvested by

4. Resources that are not eaten, such as firewood and some furbearers, are included in the table but are given a conversion factor of zero.

any member of the surveyed household during the study year. The use category includes all resources harvested, given away, or used by a household, and resources acquired from other harvesters, either as gifts, by barter or customary trade, through hunting partnerships, or as meat given by hunting guides and non-local hunters. Purchased foods are not included, but resources such as firewood are included because they are an important part of the subsistence way of life. Differences between harvest and use percentages reflect sharing among households, which results in a wider distribution of wild foods.

More than 100,000 lb of wild resources were harvested by Old Harbor households in 2018, which equated to a per capita harvest of 579 lb (Table 3-13). Fish harvests dominated the community's harvest weight, with salmon accounting for 64% and nonsalmon fish 11% overall (Figure 3-14). A total of 75,232 lb of salmon were harvested (370 lb per capita) as well as 12,448 lb of nonsalmon fish (61 lb per capita) (Table 3-13). Old Harbor households harvested 11,195 lb of large land mammals (55 lb per capita) accounting for 10% of the total community harvest weight (Table 3-13; Figure 3-14). Marine mammal and marine invertebrate harvests each composed 6% of the total harvest, with harvests of approximately 7,500 lb (37 lb per capita). Two percent of the total harvest came from birds and eggs harvests and 1% from vegetation harvests. Approximately 1,993 lb of birds and eggs were harvested (10 lb per capita) along with 1,624 lb of vegetation (8 lb per capita). Small land mammals were harvested in the least amount, with a total harvest of 80 lb usable weight (some small land mammals were harvested only for fur and therefore were not included in the harvest weight estimate).

Seasonal Round

Craig Mishler, a former ADF&G Division of Subsistence staff member who spent much time on Kodiak Island in the 1990s, particularly in Old Harbor and Ouzinkie, wrote a detailed ethnography of life in these communities (Mishler 2001). Based on key respondent interviews and surveys conducted for this 2018 study, the seasonal round Mishler discussed is still the general pattern of harvesting. Fall and winter are the slowest times of year for subsistence activities, but people are far from inactive during these months. The weather in those seasons is generally the worse that it will be all year, so safety concerns keep people home more than other seasons. However, as noted by Mishler (2001), local residents said stormy weather makes for good duck hunting, which is a popular activity in the late fall and early winter. Most people use boats to access favorite duck hunting areas, but some places are accessible by foot or truck. Duck hunting and large land mammal hunting often occur at the same time. Although the deer season begins in August, many people choose to wait until later in the fall when the snow pushes deer out of the alpine areas and into more accessible locations. Boats, trucks, and 4-wheelers are used to access deer hunting areas and, especially later in the winter, boats are used to search shorelines for deer. Duck hunting continues past deer season and through late February. Although elk are not available on the southern end of the island, some Old Harbor residents will participate in the elk hunt on Afognak or Raspberry islands in the fall time. Winter months are also the time to dig clams and harvest other shellfish, such as sea urchins and chitons. Most trapping or hunting for small land mammals, such as snowshoe hares, happens during the winter months. Some activities occur in the winter and all year round. Dungeness, king, and Tanner crabs are fished for in the winter as well as the summer. Households fish for Pacific halibut and lingcod any time of the year, though especially in the summer through early winter. Marine mammals are also hunted throughout the year; they are hunted from boats or from shore or rocks in the water. If seals or Steller sea lions are encountered during other subsistence activities, such as fishing, they may be opportunistically harvested as well.

As spring comes around, residents focus their attention on salmon fishing, but spring is also a time to gather bird eggs and hunt brown bears. As spring turns into summer, households go fishing once the salmon begin returning to the area, from about mid-May through mid-October. While all species of salmon are available in the Old Harbor area, coho is one of the most important species because it is locally abundant, returning to the Big Creek watershed near town, and can be put up in quantity for the winter. Sockeye and Chinook salmon do not have local runs, so to harvest these fish requires going farther from town, plus Chinook salmon are harder to dry because of their high oil content. Pink and chum salmon are harvested, but they are smaller than coho salmon. Brown bear hunting used to be a very important part of the Old Harbor

Table 3-13.—Estimated uses and harvests of fish, game, and vegetation resources, Old Harbor, 2018.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount		95% confidence limit (±) harvest
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	
All resources	100.0	93.3	93.3	96.7	93.3	117,561.8	1,754.7	578.5	117,561.8 lb	1,754.7	49.6
Salmon	100.0	86.7	83.3	76.7	76.7	75,232.4	1,122.9	370.2	75,232.4 lb	1,122.9	61.8
Chum salmon	60.0	46.7	46.7	33.3	40.0	10,027.6	149.7	49.3	1,686.2 ind	25.2	65.9
Coho salmon	93.3	76.7	76.7	60.0	70.0	36,022.5	537.6	177.2	5,887.1 ind	87.9	58.7
Chinook salmon	70.0	43.3	43.3	40.0	30.0	2,216.6	33.1	10.9	451.1 ind	6.7	65.4
Pink salmon	56.7	40.0	36.7	33.3	36.7	7,693.1	114.8	37.9	2,747.0 ind	41.0	81.9
Sockeye salmon	86.7	60.0	60.0	60.0	43.3	19,272.7	287.7	94.8	5,134.4 ind	76.6	89.8
Unknown salmon	3.3	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Nonsalmon fish	86.7	63.3	56.7	70.0	56.7	12,448.4	185.8	61.3	12,448.4 lb	185.8	52.5
Pacific herring	16.7	10.0	10.0	13.3	13.3	2,724.7	40.7	13.4	454.1 gal	6.8	90.6
Rainbow smelt	3.3	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Pacific (gray) cod	53.3	33.3	30.0	33.3	23.3	1,679.5	25.1	8.3	524.8 ind	7.8	75.2
Unknown cod	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown flounder	3.3	3.3	3.3	0.0	3.3	100.5	1.5	0.5	33.5 ind	0.5	152.0
Lingcod	20.0	16.7	16.7	6.7	13.3	321.6	4.8	1.6	80.4 ind	1.2	71.2
Pacific halibut	86.7	60.0	53.3	63.3	46.7	4,695.4	70.1	23.1	4,816.5 lb	71.9	49.5
Black rockfish	33.3	33.3	33.3	10.0	10.0	2,093.8	31.3	10.3	1,395.8 ind	20.8	121.6
Yelloweye rockfish	26.7	23.3	23.3	6.7	10.0	419.9	6.3	2.1	105.0 ind	1.6	68.2
Dusky rockfish	3.3	3.3	3.3	0.0	3.3	67.0	1.0	0.3	44.7 ind	0.7	152.0
Unknown rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Sablefish (black cod)	3.3	3.3	3.3	0.0	3.3	207.7	3.1	1.0	67.0 ind	1.0	152.0
Bullhead sculpin	10.0	10.0	10.0	0.0	6.7	44.7	0.7	0.2	89.3 ind	1.3	102.0
Unknown sculpin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Skates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Dolly Varden	6.7	6.7	6.7	0.0	6.7	34.4	0.5	0.2	24.6 ind	0.4	106.1
Lake trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Arctic grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Rainbow trout	6.7	6.7	6.7	0.0	3.3	12.5	0.2	0.1	17.9 ind	0.3	118.9
Steelhead	3.3	3.3	3.3	3.3	0.0	46.9	0.7	0.2	67.0 ind	1.0	152.0
Unknown trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Large land mammals	93.3	56.7	56.7	63.3	56.7	11,195.3	167.1	55.1	11,195.3 lb	167.1	44.1
Brown bear	13.3	13.3	13.3	0.0	13.3	1,259.6	18.8	6.2	8.9 ind	0.1	72.0
Caribou	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Deer	93.3	56.7	56.7	60.0	56.7	8,104.3	121.0	39.9	187.6 ind	2.8	38.8
Elk	13.3	3.3	3.3	10.0	3.3	502.5	7.5	2.5	2.2 ind	0.0	152.0

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Table 3-12.-Page 2 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	limit (±) harvest
Large land mammals, continued												
Mountain goat	6.7	3.3	3.3	3.3	3.3	323.8	4.8	1.6	4.5 ind		0.1	152.0
Moose	6.7	3.3	3.3	3.3	3.3	1,005.0	15.0	4.9	2.2 ind		0.0	152.0
Small land mammals	16.7	16.7	16.7	0.0	3.3	80.4	1.2	0.4	80.4 lb		1.2	95.3
Beaver	3.3	3.3	3.3	0.0	3.3	0.0	0.0	0.0	2.2 ind		0.0	152.0
Red fox	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	26.8 ind		0.4	105.6
Snowshoe hare	10.0	10.0	10.0	0.0	0.0	80.4	1.2	0.4	40.2 ind		0.6	95.3
River (land) otter	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	22.3 ind		0.3	101.0
Gray wolf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Marine mammals	73.3	53.3	53.3	36.7	60.0	7,557.6	112.8	37.2	7,557.6 lb		112.8	44.5
Harbor seal	70.0	53.3	53.3	23.3	60.0	4,877.6	72.8	24.0	87.1 ind		1.3	33.2
Sea otter	20.0	20.0	20.0	0.0	6.7	0.0	0.0	0.0	469.0 ind		7.0	113.0
Steller sea lion	40.0	13.3	13.3	26.7	30.0	2,680.0	40.0	13.2	13.4 ind		0.2	84.7
Unknown whale	6.7	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Birds and eggs	73.3	50.0	46.7	53.3	50.0	1,993.3	29.8	9.8	1,993.3 lb		29.8	52.1
Bufflehead	13.3	10.0	10.0	3.3	10.0	29.3	0.4	0.1	51.4 ind		0.8	92.0
Common eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
King eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Steller's eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Gadwall	3.3	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Barrow's goldeneye	3.3	3.3	3.3	0.0	3.3	175.5	2.6	0.9	134.0 ind		2.0	152.0
Unknown goldeneye	20.0	13.3	13.3	10.0	16.7	144.7	2.2	0.7	113.9 ind		1.7	86.5
Harlequin duck	3.3	3.3	3.3	0.0	0.0	9.5	0.1	0.0	11.2 ind		0.2	152.0
Mallard	46.7	30.0	30.0	33.3	33.3	467.4	7.0	2.3	290.3 ind		4.3	57.9
Merganser	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Northern pintail	16.7	10.0	10.0	6.7	10.0	44.8	0.7	0.2	38.0 ind		0.6	90.6
Unknown scap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Black scoter	16.7	10.0	10.0	6.7	13.3	185.5	2.8	0.9	122.8 ind		1.8	94.2
Surf scoter	3.3	3.3	3.3	0.0	3.3	16.3	0.2	0.1	11.2 ind		0.2	152.0
White-winged scoter	3.3	3.3	3.3	0.0	3.3	17.5	0.3	0.1	6.7 ind		0.1	152.0
Northern shoveler	3.3	3.3	3.3	0.0	0.0	1.9	0.0	0.0	2.2 ind		0.0	152.0
Unknown teal	13.3	10.0	10.0	3.3	6.7	17.8	0.3	0.1	38.0 ind		0.6	99.3
American wigeon	10.0	6.7	6.7	3.3	6.7	112.6	1.7	0.6	107.2 ind		1.6	128.3

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Table 3-12.-Page 3 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount		95% confidence limit (±)	
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	harvest
Birds and eggs, continued												
Unknown ducks	6.7	3.3	3.3	3.3	3.3	117.8	1.8	0.6	89.3	ind	1.3	152.0
Brant	3.3	3.3	3.3	0.0	3.3	8.4	0.1	0.0	4.5	ind	0.1	152.0
Cackling goose	36.7	23.3	23.3	20.0	23.3	336.1	5.0	1.7	78.2	ind	1.2	64.6
Emperor goose	10.0	10.0	10.0	0.0	10.0	96.3	1.4	0.5	31.3	ind	0.5	88.0
White-fronted goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown geese	3.3	3.3	3.3	0.0	3.3	86.4	1.3	0.4	22.3	ind	0.3	152.0
Unknown swans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Sandhill crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Black oystercatcher	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown auklet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown cormorant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Glaucous-winged gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Herring gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Mew gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Sabine's gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Black-legged kittiwake	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown murre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown tern	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown ptarmigan	3.3	3.3	3.3	0.0	3.3	20.6	0.3	0.1	26.8	ind	0.4	152.0
Mallard eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Black oystercatcher eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Glaucous-winged gull eggs	43.3	33.3	30.0	20.0	30.0	102.5	1.5	0.5	504.7	ind	7.5	52.2
Herring gull eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Mew gull eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Black-legged kittiwake eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown murre eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown tern eggs	10.0	10.0	10.0	0.0	0.0	2.3	0.0	0.0	55.8	ind	0.8	94.2
Marine invertebrates	90.0	53.3	53.3	80.0	60.0	7,430.9	110.9	36.6	7,430.9	lb	110.9	67.7
Red (large) chitons	6.7	6.7	6.7	3.3	6.7	40.2	0.6	0.2	13.4	gal	0.2	128.3
Black (small) chitons	20.0	13.3	13.3	10.0	6.7	111.7	1.7	0.5	27.9	gal	0.4	86.6
Butter clams	60.0	46.7	46.7	36.7	46.7	2,137.3	31.9	10.5	712.4	gal	10.6	54.7

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Table 3-12.-Page 4 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95%
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	confidence limit (±) harvest
Marine invertebrates, continued												
Horse clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Pacific littleneck clams	23.3	16.7	16.7	20.0	16.7	368.5	5.5	1.8	122.8 gal		1.8	73.0
Razor clams	23.3	20.0	20.0	20.0	16.7	603.0	9.0	3.0	201.0 gal		3.0	66.1
Unknown clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Unknown cockles	3.3	0.0	0.0	3.3	3.3	0.0	0.0	0.0	0.0 gal		0.0	0.0
Dungeness crab	46.7	26.7	26.7	36.7	26.7	1,407.0	21.0	6.9	2,010.0 ind		30.0	67.3
Brown king crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Red king crab	60.0	23.3	23.3	53.3	30.0	559.9	8.4	2.8	243.4 ind		3.6	76.4
Tanner crab, <i>bairdi</i>	73.3	33.3	33.3	63.3	33.3	1,764.3	26.3	8.7	4,410.8 ind		65.8	115.3
Unknown Tanner crab	6.7	6.7	6.7	0.0	6.7	58.1	0.9	0.3	145.2 ind		2.2	108.6
Unknown crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Limpets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Blue mussels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Octopus	33.3	26.7	23.3	16.7	16.7	259.1	3.9	1.3	64.8 gal		1.0	72.5
Weathervane scallops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Unknown scallops	3.3	3.3	3.3	0.0	0.0	18.3	0.3	0.1	11.2 gal		0.2	152.0
Sea cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Red sea cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Sea urchin	53.3	33.3	33.3	23.3	33.3	58.9	0.9	0.3	117.8 gal		1.8	66.0
Shrimp	3.3	3.3	3.3	3.3	3.3	44.7	0.7	0.2	44.7 gal		0.7	152.0
Snails	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Vegetation	86.7	80.0	80.0	40.0	70.0	1,623.6	24.2	8.0	1,623.6 lb		24.2	37.5
Blueberry	10.0	10.0	10.0	0.0	3.3	53.6	0.8	0.3	13.4 gal		0.2	107.2
Lowbush cranberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Highbush cranberry	13.3	13.3	13.3	0.0	3.3	44.7	0.7	0.2	11.2 gal		0.2	85.6
Crowberry	10.0	6.7	6.7	3.3	3.3	53.6	0.8	0.3	13.4 gal		0.2	128.3
Elderberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Cloudberry	3.3	3.3	3.3	0.0	3.3	44.7	0.7	0.2	11.2 gal		0.2	152.0
Raspberry	13.3	10.0	10.0	3.3	0.0	120.6	1.8	0.6	30.2 gal		0.5	135.1
Salmonberry	80.0	73.3	73.3	23.3	26.7	1,076.5	16.1	5.3	269.1 gal		4.0	50.9
Strawberry	26.7	23.3	23.3	3.3	6.7	87.1	1.3	0.4	21.8 gal		0.3	59.6
Twisted stalk berry (watermelon berry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0

-continued-

Table 3-12.--Page 5 of 5.

Table 3-12. Page 3 of 3.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount		95% confidence limit (±) harvest
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	
Vegetation, continued											
Other wild berry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Goose tongue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Wild rhubarb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Fiddlehead ferns	20.0	20.0	20.0	3.3	0.0	13.4	0.2	0.1	13.4 gal	0.2	64.7
Nettle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Sourdock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Wild celery	33.3	33.3	33.3	0.0	3.3	31.2	0.5	0.2	31.2 gal	0.5	55.0
Wild parsley	23.3	23.3	23.3	0.0	6.7	21.2	0.3	0.1	21.2 gal	0.3	72.3
Wild rose hips	6.7	6.7	6.7	0.0	3.3	53.6	0.8	0.3	13.4 gal	0.2	128.3
Unknown mushrooms	3.3	3.3	3.3	0.0	3.3	11.2	0.2	0.1	11.2 gal	0.2	152.0
Fireweed	13.3	13.3	13.3	0.0	3.3	12.3	0.2	0.1	12.3 gal	0.2	80.7
Sea lovage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Beach greens	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Bull kelp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Seaweed/kelp used for	10.0	10.0	10.0	0.0	3.3	0.0	0.0	0.0	553.9 gal	8.3	124.1
Unknown seaweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Wood	63.3	63.3	63.3	23.3	46.7	0.0	0.0	0.0	0.0 cord	0.0	0.0

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

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

Note Resources harvested for purposes other than food consumption show a non-zero harvest amount with a zero harvest weight.

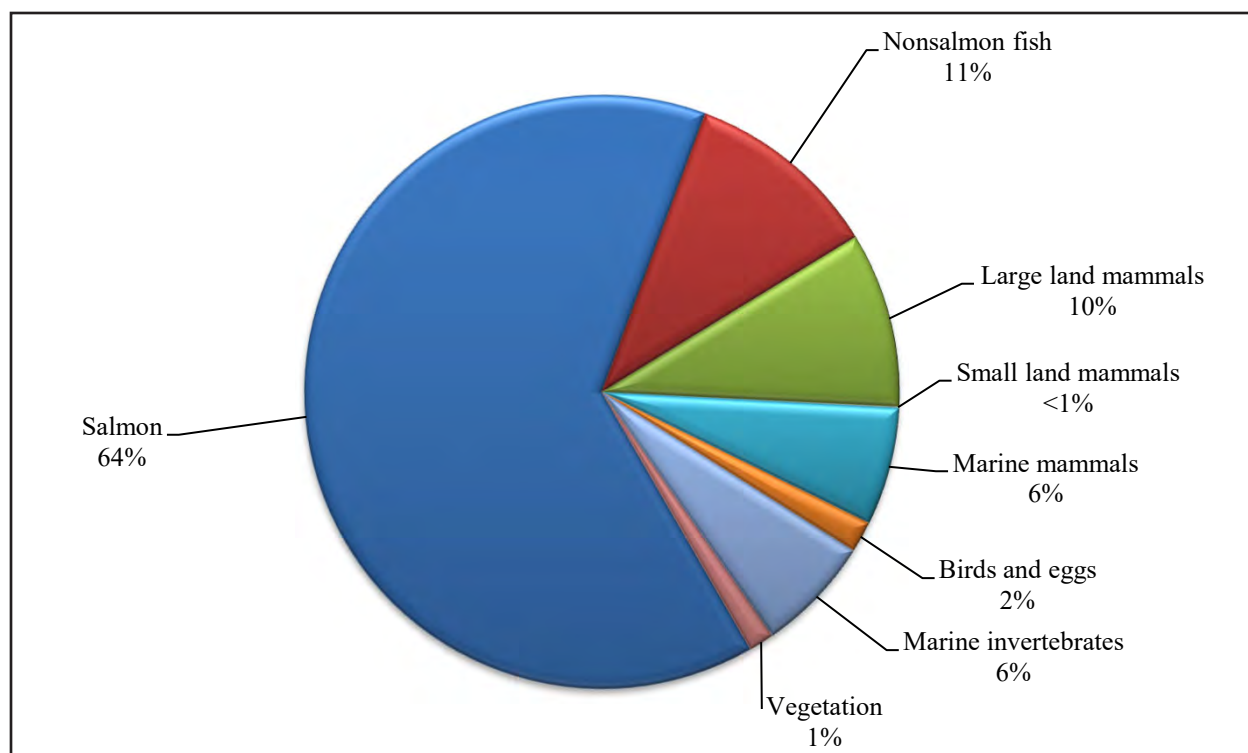


Figure 3-14.—Composition of harvest in pounds usable weight, by resource category, Old Harbor, 2018.

subsistence way of life, but it has diminished in importance to the local diet today.⁵ Harvesting of wild plants like fiddlehead ferns, wild celery (*pushki*), and wild parsley (*petrushki*) starts in May and continues all through the summer. Berries ripen starting in June and different species are harvested as they ripen, from wild strawberries in June to highbush cranberries in September. Firewood is collected throughout the year.

Old Harbor residents focus their subsistence activities in the areas around the community, particularly Sitkalidak Island and Strait, and Barling, Midway, and Three Saints bays located along the shoreline adjacent to Old Harbor. Residents maintain ties with Ouzinkie residents, in particular, and some harvesting activities take place around that community as well. Figure 3-15 is a partial representation of the areas used in 2018 for fishing, hunting, and gathering. Households were asked during the survey to provide spatial data concerning their harvest activities. Because not every household did so, the area represented in Figure 3-15 is considered a minimum use area. Subsequent maps in this chapter identify in the legend the specific sample size for the mapping component of the survey for each resource category.

5. Mishler (2001:164–167) reported that subsistence brown bear hunting was closed from 1959 through 1996, affecting traditional practices and transmission of the skills and knowledge necessary for hunting and processing harvests.



Figure 3-15.—Wild resources search and harvest areas, Old Harbor, 2018.

Table 3-14.—Top ranked resources used by households, Old Harbor, 2018.

Rank ^a	Resource	Percentage of households using
1.	Coho salmon	93.3%
1.	Deer	93.3%
3.	Sockeye salmon	86.7%
3.	Pacific halibut	86.7%
5.	Salmonberry	80.0%
6.	Tanner crab, <i>bairdi</i>	73.3%
7.	Chinook salmon	70.0%
7.	Harbor seal	70.0%
9.	Chum salmon	60.0%
9.	Butter clams	60.0%
9.	Red king crab	60.0%

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

a. Resources used by the same percentage of households share the highest rank value instead of having sequential rank values.

Use and Harvest Characteristics by Resource Category

As noted above, generally more households use resources than harvest them. For some resources, households may lack the time, knowledge, or equipment necessary to successfully harvest, and other resources may not be locally available and are only obtained through sharing or other exchanges. In 2018, 93% of Old Harbor households shared subsistence resources and 97% of households received subsistence resources (Table 3-13). Not all sharing necessarily occurred within the community; resources are sent to other communities and households from outside Old Harbor send resources to Old Harbor households. At the resource category level, with the exception of small land mammals, 50% or more of households shared resources; the most households shared salmon (77%), followed by vegetation (70%), marine invertebrates and marine mammals (60% each), then nonsalmon fish and large land mammals (57% each), and birds and eggs (50%). Which resource categories were shared the most did not necessarily translate to which categories were received the most. More households received marine invertebrates (80%) than any other resource category. Salmon followed with 77% of households receiving resources, then nonsalmon fish (70%), large land mammals (63%), birds and eggs (53%), vegetation (40%), and marine mammals (37%). Small land mammals were shared the least of all resource categories: only 3% of households gave away these resources and no households reported receiving any.

Table 3-14 lists the top ranked resources used by households and Figure 3-16 shows the species with the highest harvests during the 2018 study year. With the exceptions of deer and salmonberries, all of the top resources used by Old Harbor households came from the sea, reflecting the general marine orientation of this community (Table 3-14). Of these resources, four of the five salmon species found in Alaska were represented, along with several types of marine invertebrates. There are similarities between the most used species and the highest harvested species. Again, the majority of the most heavily harvested species were marine resources, with deer being the only terrestrial species that made the list (Figure 3-16). Four of the five species of salmon were among the most harvested; pink salmon accounted for 7% of the total harvest weight but did not appear on the top used list, whereas Chinook salmon did not contribute much to the harvest weight but ranked seventh on the top species used list. Salmonberries and Tanner crab, while among the most used species, were not harvested in sufficient weights to make the most harvested list. Pacific halibut was ranked third in use but of the most harvested species contributed a lower proportion to the harvest.

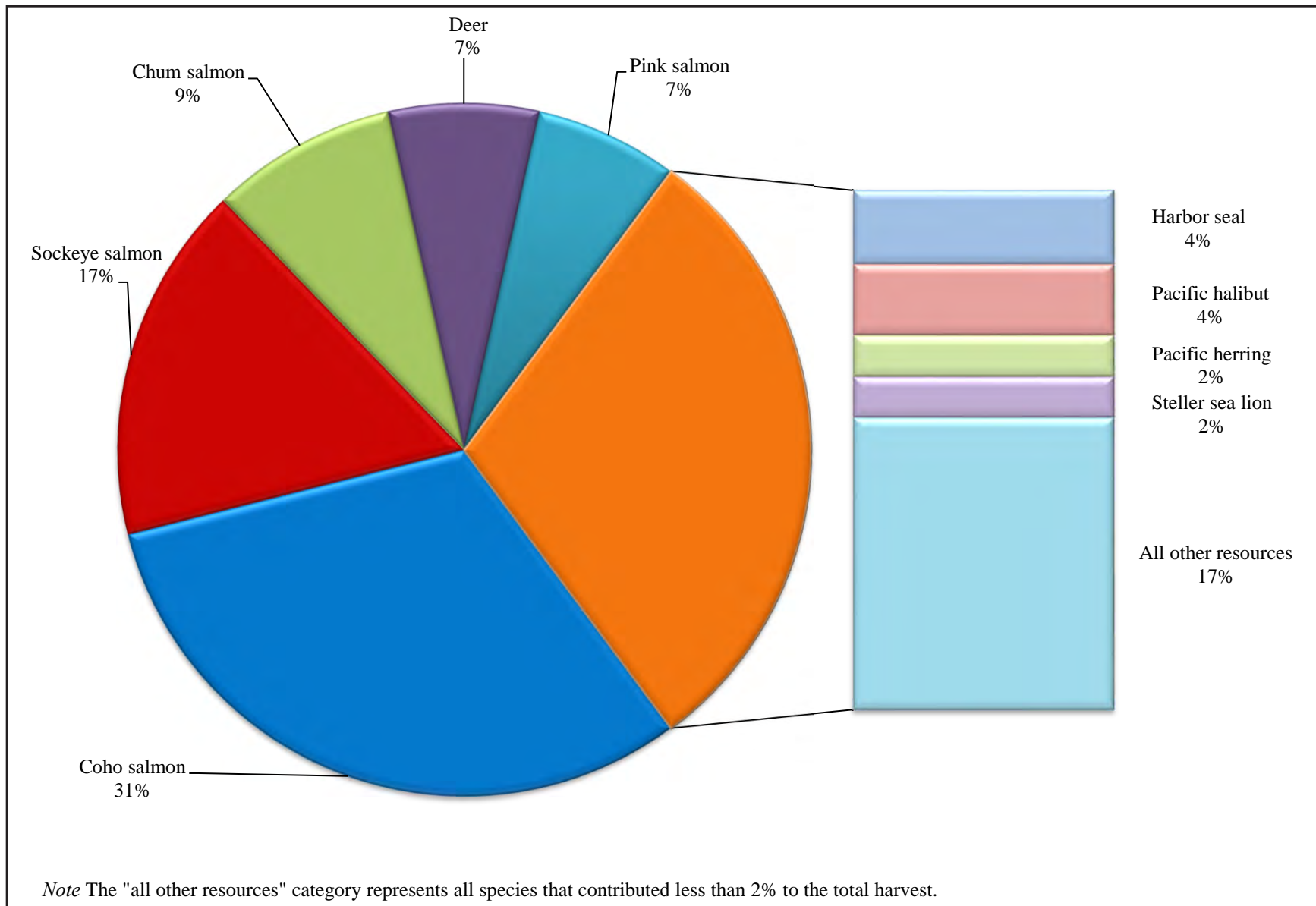


Figure 3-16.—Top resources harvested by percentage of total harvest in pounds usable weight, Old Harbor, 2018.

Salmon

Of the total salmon harvest weight, as depicted in Figure 3-17, two species composed nearly 75%: coho salmon (48%) and sockeye salmon (26%). Chum and pink salmon composed much of the remaining 25% while Chinook salmon contributed 3%. Old Harbor households harvested a total of 75,232 lb of salmon in 2018 (Table 3-13). While coho salmon was the most harvested species at 36,023 lb (177 lb per capita), the number of coho salmon (5,887 fish) was not much greater than the number of sockeye salmon harvested. Because of their smaller size, the 5,134 sockeye salmon harvested converted to 19,273 lb, or 95 lb per capita (Appendix D; Table 3-13). Similarly, more pink salmon were harvested than chum salmon, but because of size differences in the species, the 1,686 chum salmon equaled more than 10,000 lb of meat, while the 2,747 pink salmon harvested converted to just less than 8,000 lb usable weight. Similar to harvest weights, coho and sockeye salmon were also the most used, fished for, harvested, and shared salmon species. Pink salmon was generally the least used, fished for, harvested, or received salmon species. Whereas all households used salmon in general, for individual species between 57% (pink salmon) to 93% (coho salmon) of households used salmon resources; also, somewhere from 40% (pink salmon) to 77% (coho salmon) of households fished for specific salmon species. All households that fished for salmon were successful, except a small percentage that fished unsuccessfully for pink salmon. In contrast to accounting for the lowest harvested weight of salmon, Chinook salmon were harvested by more households than pink salmon. Seventy percent of households shared coho salmon and 43% shared sockeye salmon, while 60% of households received each type of those species. Chinook salmon were shared by the fewest households (30%) but were received by the most households (40%) after coho and sockeye salmon. Pink and chum salmon were shared and received by similar percentages of households (between 30%–40%).

Figure 3-18 is a visual representation of the salmon harvest weight caught by species and by gear type. Most species of salmon were harvested with multiple gear types. Approximately equal numbers and pounds of fish were harvested through commercial removals and with subsistence gear (Table 3-15). Significantly fewer numbers of fish were harvested with rod and reel gear, but likely because most Chinook salmon were harvested with rod and reel, the total weight of the rod and reel harvest was about one-half that of commercial removals or subsistence gear. About one-third each of the coho salmon harvest weight was harvested through commercial removals, subsistence gear, and rod and reel (Table 3-16). No other species' harvest was distributed as evenly among gear types. Harvest methods for Chinook salmon were the least diverse with 93% of the harvest weight being taken with rod and reel. Harvests of sockeye salmon followed closely in that 77% of the harvest weight of this species came from commercial removals and the majority of the rest through subsistence gear. The majority of pink and chum salmon harvests were taken with subsistence gear.

Looking at harvests by gear type, sockeye salmon and coho salmon were the main species harvested through commercial removals, accounting for 49% and 38% of the weight of commercial removals. Coho salmon was the major species harvested with rod and reel gear, composing 66% of the rod and reel harvest weight. The subsistence gear harvest weight comprised coho salmon (49%), followed by chum salmon (23%), then sockeye and pink salmon (14% each). If specific subsistence gear types are considered, however, the harvest weight by seines was predominantly composed of coho salmon (89%), whereas chum salmon (58%) and pink salmon (35%) contributed most to set gillnet harvests; sockeye salmon (47%) as well as pink, chum, and coho salmon (between 15%–20% for each species) composed the drift gillnet harvest weight.

Old Harbor residents fished for salmon mostly around the community, going as far as Kiliuda Bay in the northeast, Cape Barnabas to the east, and Cape Kasiak in the south (Figure 3-19). Some salmon fishing also occurred near the community of Ouzinkie on the northern end of Kodiak Island, likely by individuals visiting friends and family in that community. Close to town, Sitkalidak Strait was a popular fishing location, as was Big Creek. According to Marchioni et al. (2016), the most productive spot for subsistence salmon fishing in 2012 was Big Creek; Marchioni et al. (2016) also noted that Old Harbor residents fished at Three Sisters Rocks and Barling Bay for sockeye salmon with gillnets from late May through July and trolled for coho salmon in these bays in August and September.

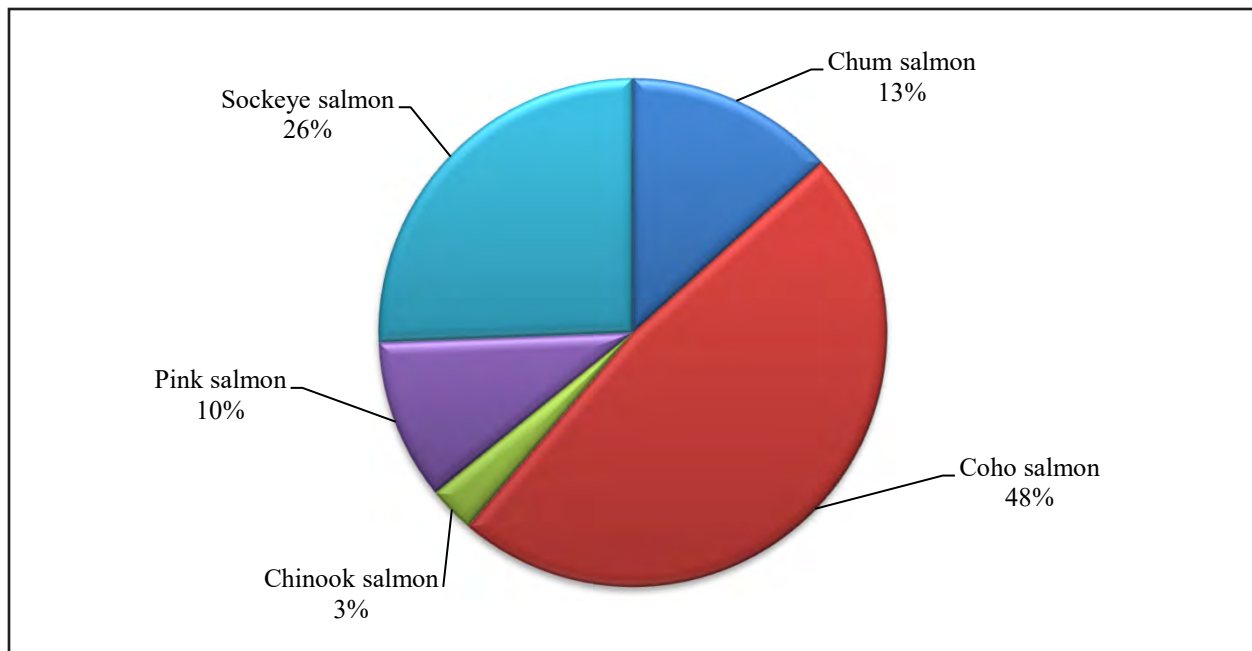


Figure 3-17.—Composition of salmon harvest in pounds usable weight, Old Harbor, 2018.

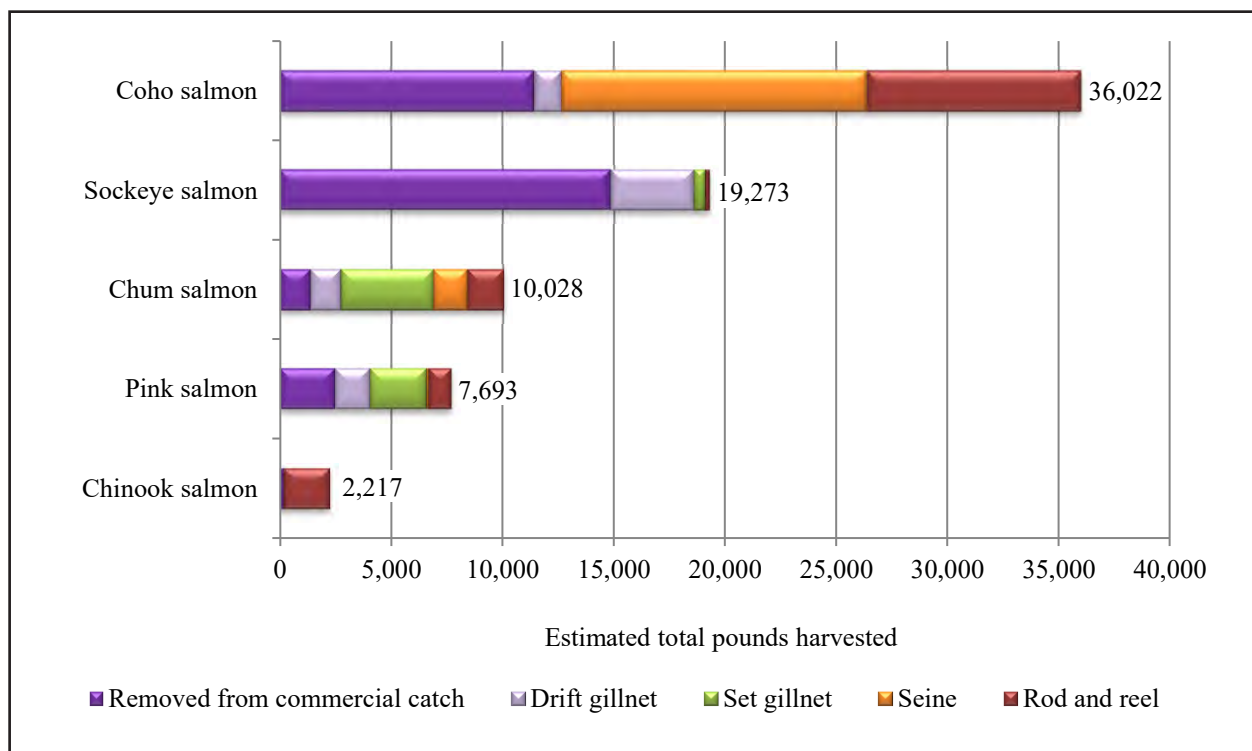


Figure 3-18.—Estimated harvests of salmon in pounds usable weight by gear type and resource, Old Harbor, 2018.

Table 3-15.—Estimated harvests of salmon by gear type and resource, Old Harbor, 2018.

Resource	Subsistence methods															
	Removed from commercial catch		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
Salmon	6,963.5	30,252.3	1,983.2	7,892.0	1,739.8	7,196.7	2,534.8	15,355.1	0.0	0.0	6,257.8	30,443.8	2,684.5	14,536.3	15,905.8	75,232.4
Chum salmon	227.8	1,354.7	230.0	1,368.0	696.8	4,143.8	256.8	1,527.4	0.0	0.0	1,183.7	7,039.2	274.7	1,633.6	1,686.2	10,027.6
Coho salmon	1,867.1	11,424.4	201.0	1,229.9	0.0	0.0	2,244.5	13,733.9	0.0	0.0	2,445.5	14,963.8	1,574.5	9,634.2	5,887.1	36,022.5
Chinook salmon	33.5	164.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	417.6	2,052.0	451.1	2,216.6
Pink salmon	882.2	2,470.5	558.3	1,563.6	904.5	2,533.1	33.5	93.8	0.0	0.0	1,496.3	4,190.5	368.5	1,032.0	2,747.0	7,693.1
Sockeye salmon	3,953.0	14,838.0	993.8	3,730.5	138.5	519.8	0.0	0.0	0.0	0.0	1,132.3	4,250.2	49.1	184.4	5,134.4	19,272.7
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

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

Table 3-16.—Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Old Harbor, 2018.

Resource	Percentage base	Subsistence methods															
		Removed from commercial catch		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
Salmon	Gear type	100.0%	100.0%	100.0%	100.0%	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	43.8%	40.2%	12.5%	10.5%	10.9%	9.6%	15.9%	20.4%	0.0%	0.0%	39.3%	40.5%	16.9%	19.3%	100.0%	100.0%
	Total	43.8%	40.2%	12.5%	10.5%	10.9%	9.6%	15.9%	20.4%	0.0%	0.0%	39.3%	40.5%	16.9%	19.3%	100.0%	100.0%
Chum salmon	Gear type	3.3%	4.5%	11.6%	17.3%	40.1%	57.6%	10.1%	9.9%	0.0%	0.0%	18.9%	23.1%	10.2%	11.2%	10.6%	13.3%
	Resource	13.5%	13.5%	13.6%	13.6%	41.3%	41.3%	15.2%	15.2%	0.0%	0.0%	70.2%	70.2%	16.3%	16.3%	100.0%	100.0%
	Total	1.4%	1.8%	1.4%	1.8%	4.4%	5.5%	1.6%	2.0%	0.0%	0.0%	7.4%	9.4%	1.7%	2.2%	10.6%	13.3%
Coho salmon	Gear type	26.8%	37.8%	10.1%	15.6%	0.0%	0.0%	88.5%	89.4%	0.0%	0.0%	39.1%	49.2%	58.7%	66.3%	37.0%	47.9%
	Resource	31.7%	31.7%	3.4%	3.4%	0.0%	0.0%	38.1%	38.1%	0.0%	0.0%	41.5%	41.5%	26.7%	26.7%	100.0%	100.0%
	Total	11.7%	15.2%	1.3%	1.6%	0.0%	0.0%	14.1%	18.3%	0.0%	0.0%	15.4%	19.9%	9.9%	12.8%	37.0%	47.9%
Chinook salmon	Gear type	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	15.6%	14.1%	2.8%	2.9%
	Resource	7.4%	7.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	92.6%	92.6%	100.0%	100.0%
	Total	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	2.7%	2.8%	2.9%
Pink salmon	Gear type	12.7%	8.2%	28.2%	19.8%	52.0%	35.2%	1.3%	0.6%	0.0%	0.0%	23.9%	13.8%	13.7%	7.1%	17.3%	10.2%
	Resource	32.1%	32.1%	20.3%	20.3%	32.9%	32.9%	1.2%	1.2%	0.0%	0.0%	54.5%	54.5%	13.4%	13.4%	100.0%	100.0%
	Total	5.5%	3.3%	3.5%	2.1%	5.7%	3.4%	0.2%	0.1%	0.0%	0.0%	9.4%	5.6%	2.3%	1.4%	17.3%	10.2%
Sockeye salmon	Gear type	56.8%	49.0%	50.1%	47.3%	8.0%	7.2%	0.0%	0.0%	0.0%	0.0%	18.1%	14.0%	1.8%	1.3%	32.3%	25.6%
	Resource	77.0%	77.0%	19.4%	19.4%	2.7%	2.7%	0.0%	0.0%	0.0%	0.0%	22.1%	22.1%	1.0%	1.0%	100.0%	100.0%
	Total	24.9%	19.7%	6.2%	5.0%	0.9%	0.7%	0.0%	0.0%	0.0%	0.0%	7.1%	5.6%	0.3%	0.2%	32.3%	25.6%
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%
	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%
	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%

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

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

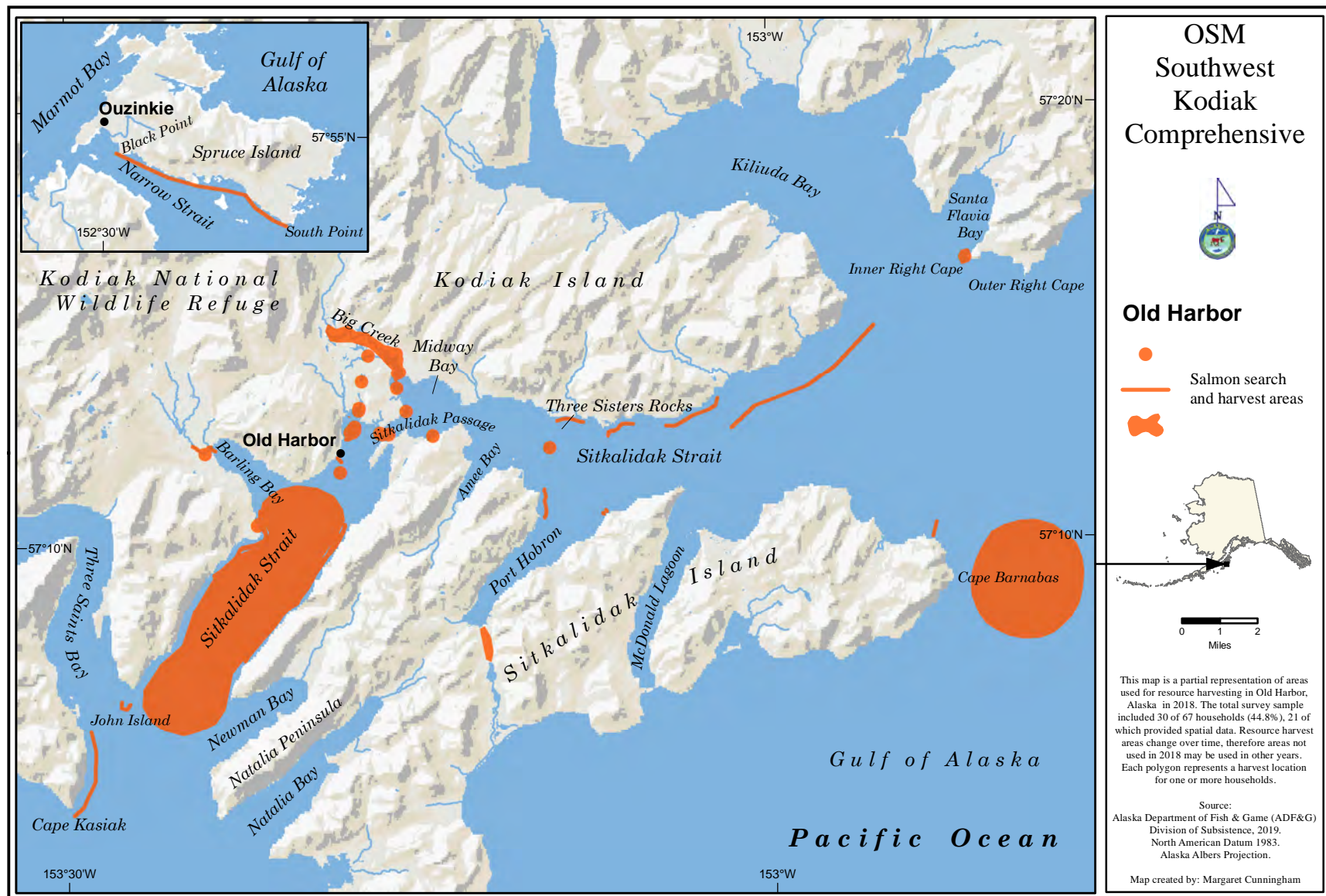


Figure 3-19.—Fishing and harvest locations of all salmon, Old Harbor, 2018.

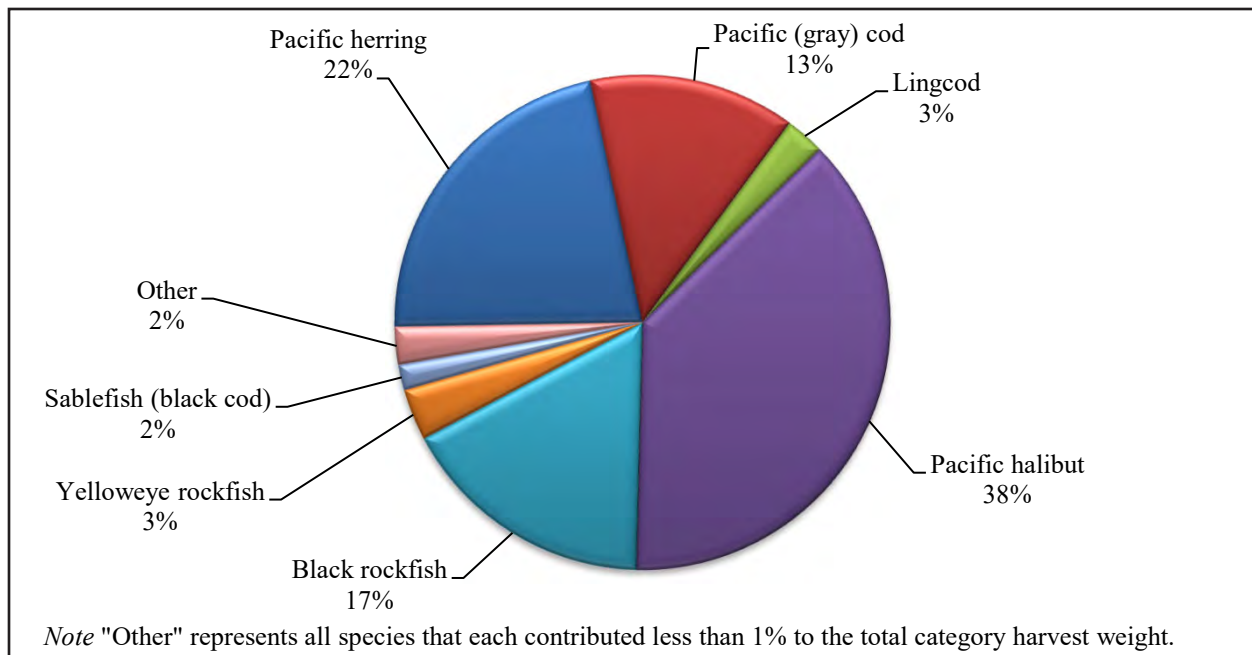


Figure 3-20.—Composition of nonsalmon fish harvest in pounds usable weight, Old Harbor, 2018.

Nonsalmon Fish

Many different types of nonsalmon fish composed the 2018 harvest of Old Harbor households (Figure 3-20). No one species dominated the harvest, but Pacific halibut (38% of the nonsalmon fish harvest weight) and Pacific herring (22%) combined composed the majority. Black rockfish (17%) and Pacific cod (13%) also contributed substantial weight. Yelloweye rockfish and lingcod, with 3% of the harvest each, and sablefish with 2%, round out most of the remainder; the other harvested species contributed less than 1% each to the overall harvest weight for this category. Compared to salmon, nonsalmon fish were harvested in much smaller amounts with a total of 12,448 lb (61 lb per capita) taken in 2018 (Table 3-13). Old Harbor residents harvested 4,695 lb of Pacific halibut, or 23 lb per capita, and 454 gallons of Pacific herring (2,725 lb; 13 lb per capita). More than 2,000 lb of black rockfish were also harvested (10 lb per capita); no other nonsalmon fish species was harvested in an amount that converted to greater than 10 lb per capita.

The percentage of households using nonsalmon fish varied greatly, depending on the species. At the resource category level, 87% of households used nonsalmon fish. At the species level, anywhere from 3% (rainbow smelt, flounder, dusky rockfish, sablefish, steelhead) to 87% (Pacific halibut) of households used the resource. No other species approached the rate of use of Pacific halibut; Pacific cod was the next closest, and only 53% of households used that species. For about one-half the species, the percent of households using the resource was the same as the percent fishing for or harvesting the resource. Overall, 63% of households fished for nonsalmon fish and 57% of community households harvested these resources. For Pacific herring, Pacific cod, lingcod, Pacific halibut, and yelloweye rockfish, a greater percentage of households used the resource than harvested. The difference between percent of households using and harvesting was slight in some instances: for example, 27% of households used yelloweye rockfish but 23% harvested this species. In other cases, the difference was substantial: while 87% of households used Pacific halibut, only 53% harvested this resource. Rainbow smelt was the only species used but not harvested.

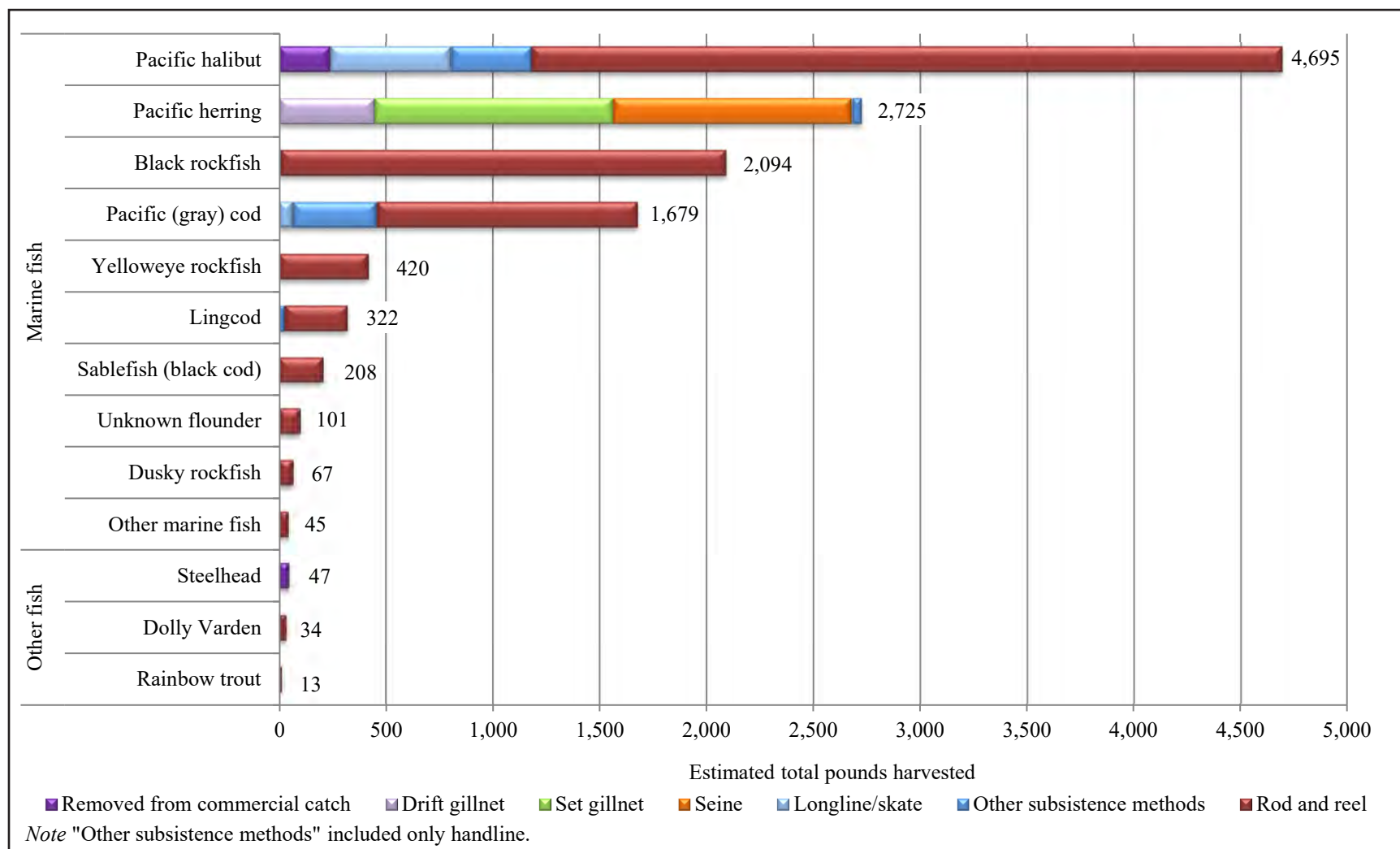


Figure 3-21.—Estimated harvest of nonsalmon fish in pounds usable weight by gear type and resource, Old Harbor, 2018.

Table 3-17.—Estimated harvests of nonsalmon fish by gear type and resource, Old Harbor, 2018.

Resource		Subsistence methods																	
		Removed from commercial catch		Subsistence gear, any method										Rod and reel		Any method			
				Drift gillnet		Set gillnet		Seine		Longline/skate		Other method ^b							
Unit ^a	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	
Nonsalmon fish			288.1		446.7		1,116.7		1,116.7		633.8		842.4		4,156.2		8,004.0		12,448.4
Pacific herring	gal	0.0	0.0	74.4	446.7	186.1	1,116.7	186.1	1,116.7	0.0	0.0	7.4	44.7	454.1	2,724.7	0.0	0.0	454.1	2,724.7
Rainbow smelt	gal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific (gray) cod	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	64.3	122.8	393.1	142.9	457.4	381.9	1,222.1	524.8	1,679.5
Unknown cod	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown flounder	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.5	100.5	33.5	100.5
Lingcod	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	26.8	6.7	26.8	73.7	294.8	80.4	321.6
Pacific halibut	lb	241.2	241.2	0.0	0.0	0.0	0.0	0.0	0.0	562.8	562.8	377.9	377.9	940.7	940.7	3,634.6	3,513.5	4,816.5	4,695.4
Black rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	6.7	0.0	0.0	4.5	6.7	1,391.4	2,087.1	1,395.8	2,093.8
Yelloweye rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	105.0	419.9	105.0	419.9
Dusky rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.7	67.0	44.7	67.0
Unknown rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sablefish (black cod)	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.0	207.7	67.0	207.7
Bullhead sculpin	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.3	44.7	89.3	44.7
Unknown sculpin	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skates	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dolly Varden	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.6	34.4	24.6	34.4
Lake trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arctic grayling	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rainbow trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.9	12.5	17.9	12.5
Steelhead	ind	67.0	46.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.0	46.9
Unknown trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

Note The summary row that includes incompatible units of measure has been left blank.

a. The harvested number of each resource is measured by the unit in which the resource harvest information was collected; the unit of measurement is provided for each resource.

b. Method included only handline.

Table 3-18.—Estimated percentages of nonsalmon fish harvested in pounds usable weight by gear type, resource, and total nonsalmon fish harvest, Old Harbor, 2018.

Resource	Percentage base	Removed from commercial catch	Subsistence methods							Any method
			Drift gillnet	Set gillnet	Seine	Longline/skate	Other method ^a	Subsistence gear, any method	Rod and reel	
Nonsalmon fish	Gear type	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Resource	2.3%	3.6%	9.0%	9.0%	5.1%	6.8%	33.4%	64.3%	100.0%
	Total	2.3%	3.6%	9.0%	9.0%	5.1%	6.8%	33.4%	64.3%	100.0%
Pacific herring	Gear type	0.0%	100.0%	100.0%	100.0%	0.0%	5.3%	65.6%	0.0%	21.9%
	Resource	0.0%	16.4%	41.0%	41.0%	0.0%	1.6%	100.0%	0.0%	100.0%
	Total	0.0%	3.6%	9.0%	9.0%	0.0%	0.4%	21.9%	0.0%	21.9%
Rainbow smelt	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pacific (gray) cod	Gear type	0.0%	0.0%	0.0%	0.0%	10.1%	46.7%	11.0%	15.3%	13.5%
	Resource	0.0%	0.0%	0.0%	0.0%	3.8%	23.4%	27.2%	72.8%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.5%	3.2%	3.7%	9.8%	13.5%
Unknown cod	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unknown flounder	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	0.8%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%
Lingcod	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	3.2%	0.6%	3.7%	2.6%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	8.3%	91.7%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	2.4%	2.6%
Pacific halibut	Gear type	83.7%	0.0%	0.0%	0.0%	88.8%	44.9%	22.6%	43.9%	37.7%
	Resource	5.1%	0.0%	0.0%	0.0%	12.0%	8.0%	20.0%	74.8%	100.0%
	Total	1.9%	0.0%	0.0%	0.0%	4.5%	3.0%	7.6%	28.2%	37.7%
Black rockfish	Gear type	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%	0.2%	26.1%	16.8%
	Resource	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%	99.7%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	16.8%	16.8%

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Table 3-18.—Page 2 of 3.

Resource	Percentage base	Removed from commercial catch	Subsistence methods					Subsistence gear, any method	Rod and reel	Any method
			Drift gillnet	Set gillnet	Seine	Longline/ skate	Other method ^a			
Yelloweye rockfish	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.2%	3.4%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.4%	3.4%
Dusky rockfish	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.5%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%
Unknown rockfish	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sablefish (black cod)	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	1.7%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	1.7%
Bullhead sculpin	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.4%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
Unknown sculpin	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Skates	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Dolly Varden	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.3%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
Lake trout	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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Table 3-18.—Page 3 of 3.

Resource	Percentage base	Removed from commercial catch	Subsistence methods							Any method
			Drift gillnet	Set gillnet	Seine	Longline/skate	Other method ^a	Subsistence gear, any method	Rod and reel	
Arctic grayling	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Rainbow trout	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Steelhead	Gear type	16.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
	Resource	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
Unknown trout	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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

a. Method included only handline.

With the exception of Pacific halibut and cod, all households that fished for a species were successful in their efforts. As may be surmised from the equal percentages of households using and harvesting many nonsalmon fish species, sharing of fish within this category was not widespread. Only four species were given away by more than 10% of households: Pacific halibut (47%), Pacific cod (23%), Pacific herring (13%), and lingcod (13%). Many species were not received by any households in Old Harbor. The most households received Pacific halibut (63%), then Pacific cod (33%), and Pacific herring (13%). The other species were received by 10% or fewer households.

Figure 3-21 depicts the nonsalmon fish harvest in pounds by species and gear type. As can be seen from the figure, rod and reel is a common gear type for harvesting nonsalmon fish used by Old Harbor households. Several gear types were used to harvest only one or two species of fish: only Pacific halibut and steelhead (caught incidentally during salmon fishing) were removed from commercial catches; seine and gillnets (set and drift) were only used to harvest Pacific herring (Table 3-17). Many other species were only caught on rod and reel: flounder, rockfishes, sablefish, sculpin, and freshwater fish except steelhead. The majority of the harvest weight of Pacific halibut was harvested using rod and reel (75%), with an additional 12% taken on a longline, 8% taken on a handline, and the remainder removed from commercial catches (Table 3-18). Looking at specific gear types, almost all the harvest weight taken on a longline was Pacific halibut (89%), with the remainder coming from Pacific cod (10%) and black rockfish (1%). Pacific cod (47%) and Pacific halibut (45%) composed the majority of the harvest weight caught by other subsistence methods (i.e., handline). Pacific herring and lingcod were also harvested by handline. Pacific halibut also composed nearly one-half (44%) of the total nonsalmon fish weight harvested using rod and reel. Black rockfish (26%) and Pacific cod (15%) made up most of the rest of the rod and reel harvest weight, with the other harvested species each accounting for 5% of harvest weight or less.

Most of the waters bordering Old Harbor and Sitkalidak Island were used for nonsalmon fishing (Figure 3-22). Sitkalidak Strait and Sitkalidak Passage, as well as Three Saints Bay and Barling Bay were commonly used. Fishers also traveled farther from the community to Rolling Bay and Two-Headed Island in the south and Kiliuda Bay in the north. Some freshwater fishers traveled to Spruce Island in pursuit of nonsalmon fish as well.



Figure 3-22.—Fishing and harvest locations of all nonsalmon fish, Old Harbor, 2018.

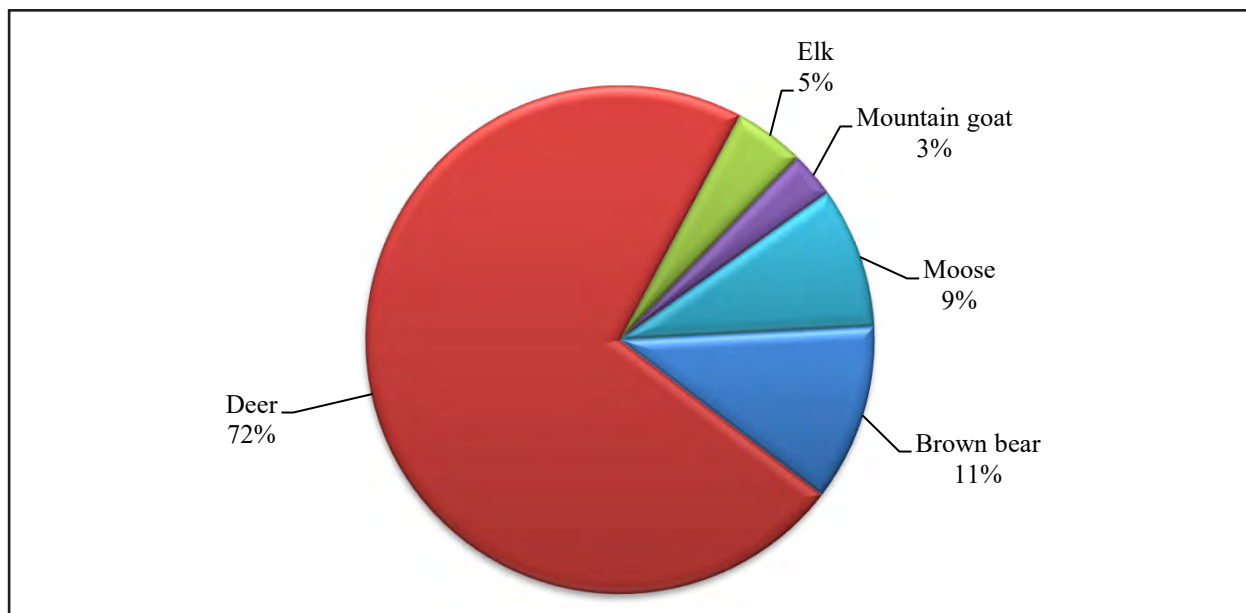


Figure 3-23.—Composition of large land mammal harvest in pounds usable weight, Old Harbor, 2018.

Large Land Mammals

Old Harbor residents harvested five species of large land mammals in 2018: deer (representing 72% of the harvest weight), brown bear (11%), moose (9%), elk (5%), and mountain goat (3%) (Figure 3-23). In total, 11,195 lb of game meat were harvested (Table 3-13). An estimated 40 lb per capita of deer meat was harvested from 188 animals; most of these harvests were bucks and more were harvested in December than any other month (Table 3-19). Approximately 29 does were harvested—most in December but a few in September as well. Bucks were harvested from August through December, with 98 of the 110 bucks harvested in November, December, or an unknown month. Respondents could not recall the sex of 49 harvested deer. No other large land animal was harvested in an amount greater than 10 lb per capita (Table 3-13). In April, seven brown bears were harvested and two more were taken in May for a total of nine brown bears, equaling a per capita harvest of 6 lb (Table 3-19; Table 3-13). Two bull moose were harvested (5 lb per capita) in December. The same number of elk were harvested but due to their smaller size provided an estimated 3 lb per capita. Both elk were female and both were harvested in October (Table 3-19). Finally, five mountain goats of unknown sex were harvested in December for a total of 2 lb per capita harvested.

Large land mammals were used by nearly all (93%) households in 2018 and were harvested by more than one-half (57%) (Table 3-13). All households that hunted large land mammals were successful. Deer was used by substantially more households than any other species: 93% of households used deer and only 13% of households used brown bears or elk and 7% of households used mountain goats or moose. A similar disparity is seen in the proportion of households hunting for these species. While 57% of households hunted deer, 13% hunted brown bears and 3% hunted any of the remaining species. Deer was also the main resource from this category shared in 2018: approximately 57% of households gave deer away and 60% of households received meat. Brown bears were shared by 13% of households, but no Old Harbor households reported receiving any bear meat or fat. For the remaining three species, 3% of households gave away some of each kind of meat and 3% of households received moose and mountain goat meat while 10% of households received elk.

The local waterways and nearby lands were used by Old Harbor households to hunt large land mammals (Figure 3-24). Note that hunting areas for moose, mountain goats, and elk are not included on this map since they were not recorded during household surveys. Moose are not found on Kodiak Island and elk

Table 3-19.—Estimated large land mammal harvests by month and sex, Old Harbor, 2018.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
All large land mammals	0.0	0.0	0.0	6.7	2.2	0.0	0.0	8.9	6.7	13.4	29.0	80.4	58.1	205.5
Brown bear	0.0	0.0	0.0	6.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9
Caribou	0.0	0.0	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, male	0.0	0.0	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, 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
Deer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	6.7	11.2	29.0	73.7	58.1	187.6
Deer, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	2.2	2.2	20.1	44.7	33.5	109.4
Deer, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	24.6	0.0	29.0
Deer, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	8.9	8.9	4.5	24.6	49.1
Elk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	2.2
Elk, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elk, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	2.2
Elk, 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
Mountain goat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	4.5
Moose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	2.2
Moose, bull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	2.2
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, 2019.

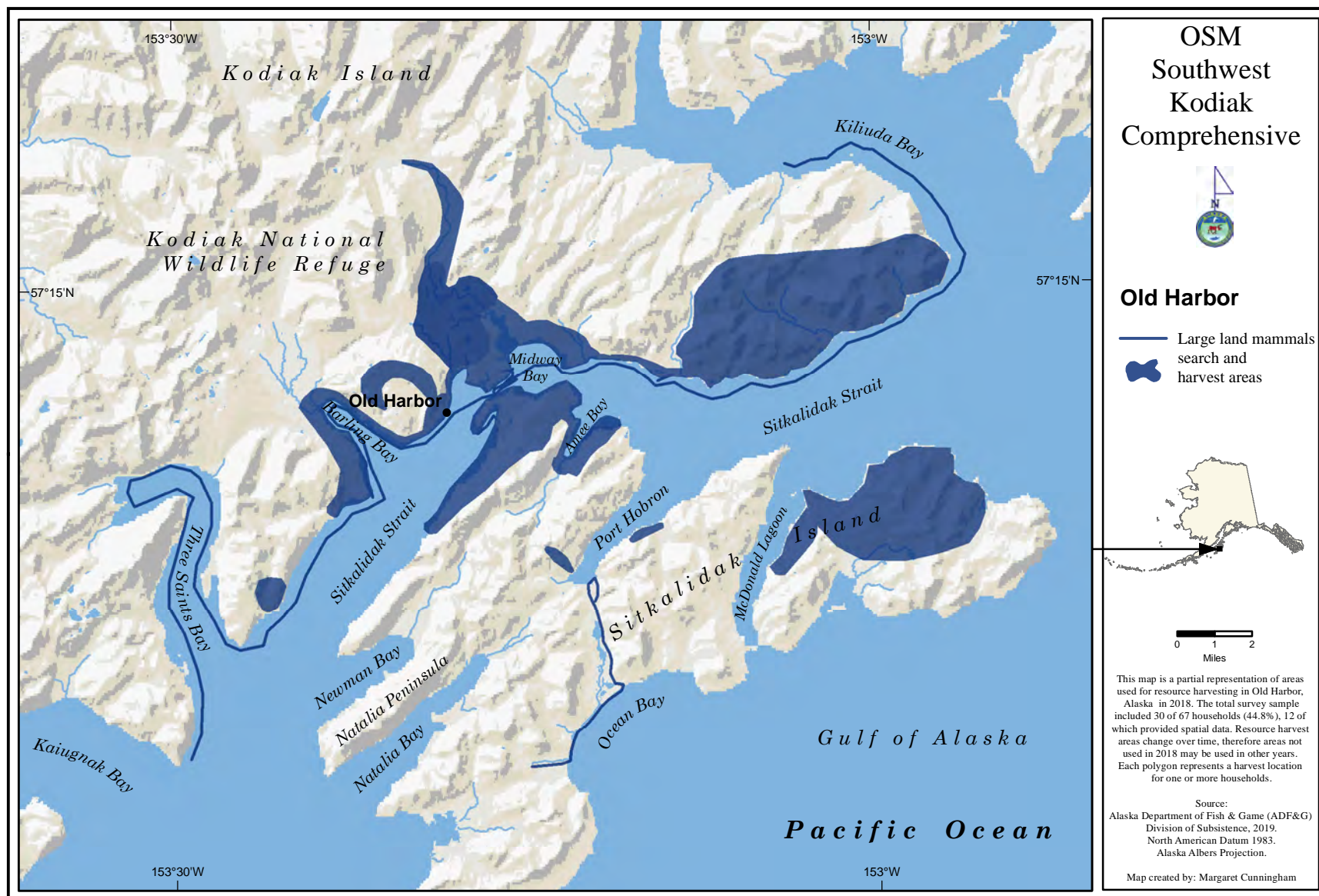


Figure 3-24.—Hunting locations of brown bear and deer, Old Harbor, 2018.

are found primarily only on Afognak and Raspberry islands. Hunting occurred by boat for other large land mammals from Three Saints Bay through Sitkalidak Strait into Barling Bay and up into Kiliuda Bay. The rivers around Old Harbor were also a focal area of hunting effort, as was Sitkalidak Island.

Small Land Mammals/Furbearers

Figure 3-25 shows the composition of the small land mammals harvest by number of animals rather than weight since most small land mammals were harvested for their fur rather than to eat. There were 40 snowshoe hares harvested—the one small land mammal harvested for food—which accounted for 44% of the total harvest (Table 3-13; Figure 3-25). Following hares were 27 red foxes (29%), 22 river otters (24%), and 2 beavers (3%) harvested by Old Harbor households. A total of 80 lb of snowshoe hares were harvested, which equaled less than 1 lb usable weight per capita. Small land mammals harvested for fur were not converted to a harvest weight in this table. Small land mammals were harvested from January through March and in November and December, but more were taken in December than any other month (Table 3-20). Small land mammals were not widely used by Old Harbor households in 2018 (Table 3-13). Overall, 17% of households used and hunted small land mammals, and all households that hunted were successful. By individual species, 10% of households used, hunted, and harvested red foxes, snowshoe hares, and river otters; also, 3% of households used, hunted, and harvested beavers. Three percent of households gave away beavers; no households reported giving any other species and no households reported receiving any species of small land mammal.

Small land mammals were generally hunted along the shoreline from Old Harbor into Midway Bay and on portions of Sitkalidak Island, particularly near Lagoon Point (Figure 3-26).

Marine Mammals

Old Harbor residents harvested three types of marine mammals in 2018—Steller sea lions, harbor seals, and sea otters (Figure 3-27). Although 469 sea otters were harvested, they were not eaten so those were not assigned a harvest weight (Table 3-13). Sea otters were harvested in January through April and October through December but nearly all of them (458) were taken in January through March (Table 3-21). Both harbor seals and Steller sea lions were harvested for meat as well as potentially their pelts. A total of 87 harbor seals were harvested for a total harvest weight of 4,878 lb, which was 24 lb per capita (Table 3-13). More male harbor seals were harvested than females, but some harbor seals were of unknown sex or the respondent could not recall (Table 3-21). Harbor seals were harvested nearly every month of the year and more than one-half of the harbor seals harvested in a known month were taken in the months of September through December. Fewer Steller sea lions were harvested in 2018: 13, most of unknown sex, were harvested (2,680 lb total; 13 lb per capita) (Table 3-21; Table 3-13). Two Steller sea lions were harvested during the months of January, May, and November while seven were harvested in March (Table 3-21).

Nearly three-fourths of Old Harbor households used marine mammals in 2018 and more than one-half hunted them (Table 3-13). All households that hunted (53%) were successful in harvesting. The most households (70%) used harbor seals compared to 40% of households using Steller sea lions, 20% using sea otters, and 7% using an unspecified species of whale. For sea otters, 20% of households also hunted and harvested this resource, whereas for harbor seals and Steller sea lions, more households used the resource than harvested. For harbor seals, 53% of households harvested while 13% harvested Steller sea lions. Both harbor seals and Steller sea lions were shared within the community: 60% of households gave away harbor seals and 30% gave away Steller sea lions. Interestingly, fewer households received harbor seals (23%) than received Steller sea lions (27%). Seven percent of households gave away sea otters, but no households reported receiving the resource. Since no households hunted whales, the 7% of households that used whale also received it.

Marine mammals were hunted around Old Harbor and around Ouzinkie (Figure 3-28). Around Old Harbor, hunting locations included Sitkalidak Strait; Barling, Midway, and Amee bays; and Port Hobron. Around Ouzinkie, search areas included Afognak Strait, Marmot Bay, and Kizhuyak Bay.

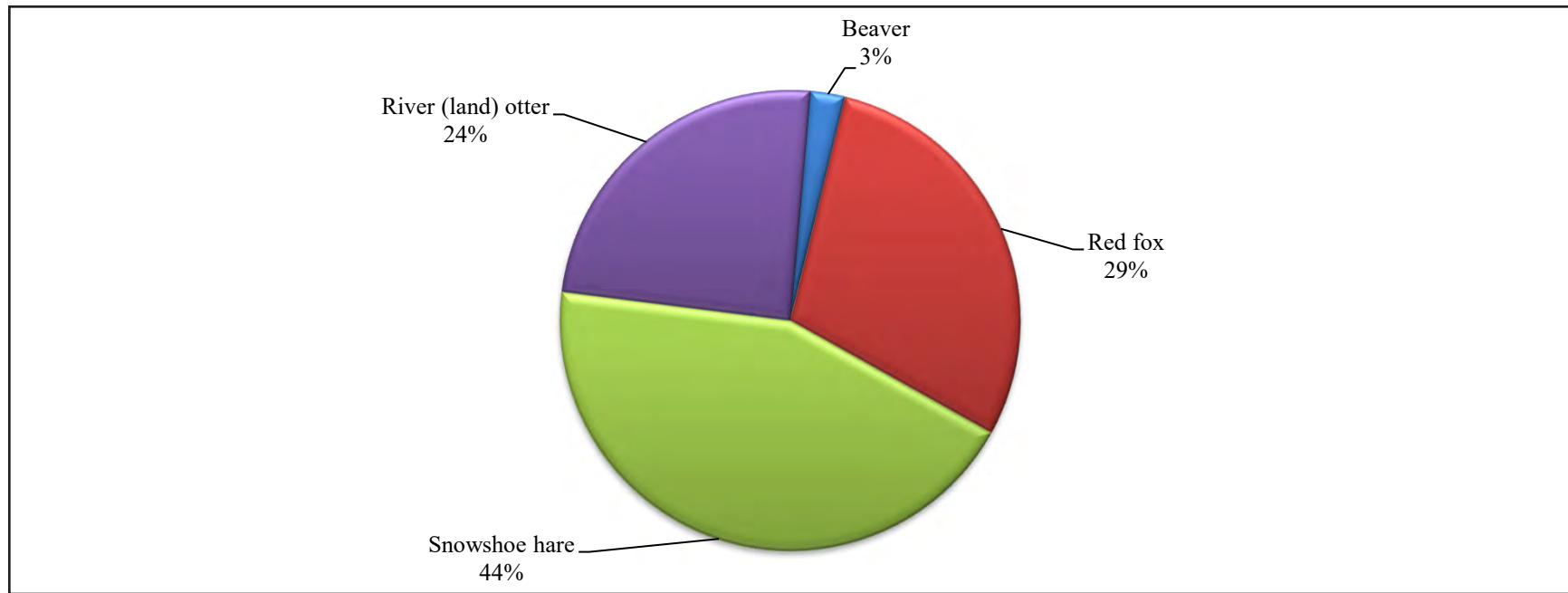


Figure 3-25.—Composition of small land mammal/furbearer harvest by individual animals harvested, Old Harbor, 2018.

Table 3-20.—Estimated small land mammal/furbearer harvests by month, Old Harbor, 2018.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
All small land mammals	11.2	13.4	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.3	35.7	6.7	91.6
Beaver	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2
Red fox	4.5	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	6.7	2.2	26.8
Snowshoe hare	6.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.9	13.4	0.0	40.2
River (land) otter	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	4.5	22.3
Gray wolf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

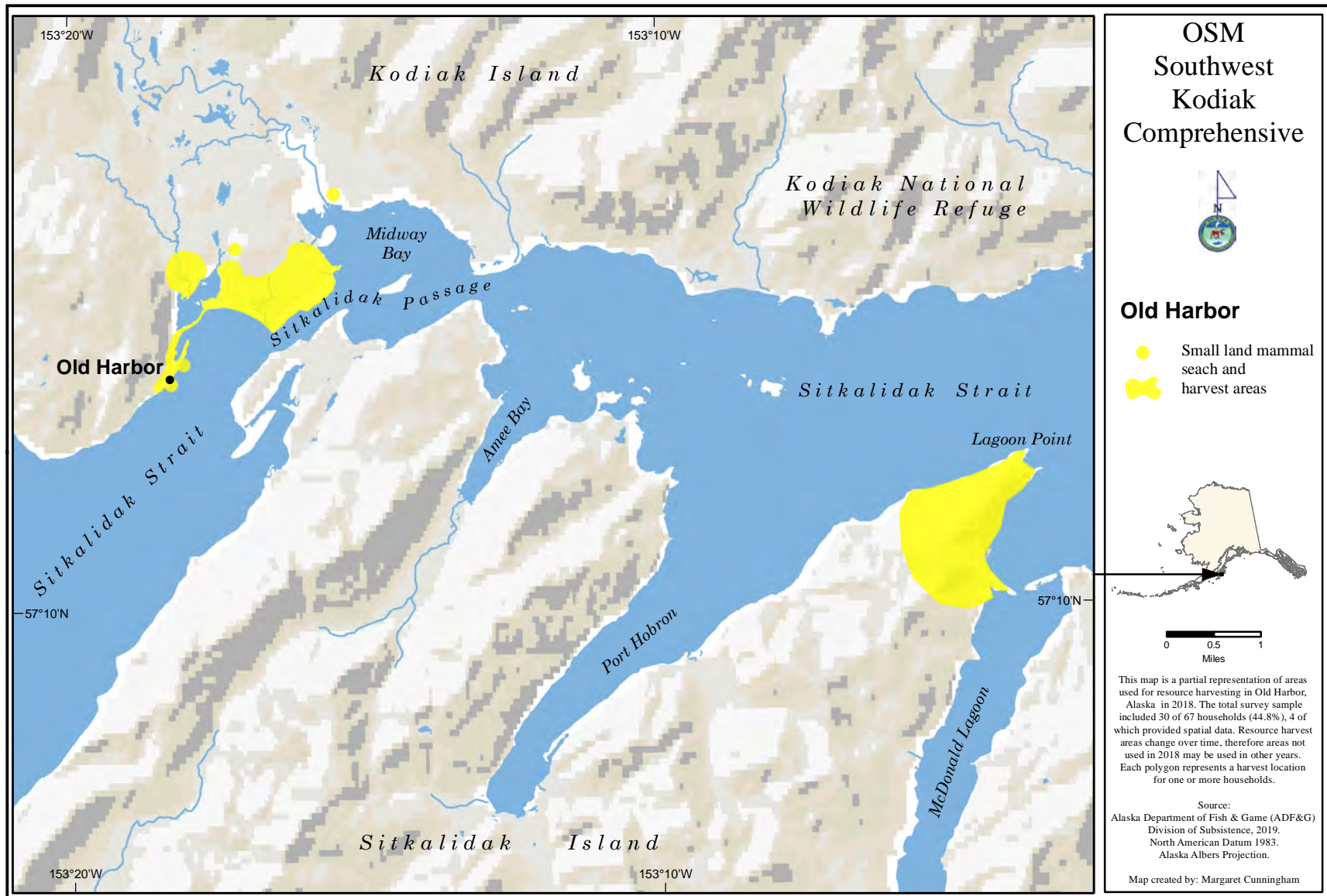


Figure 3-26.—Hunting and trapping locations of all small land mammals/furbearers, Old Harbor, 2018.

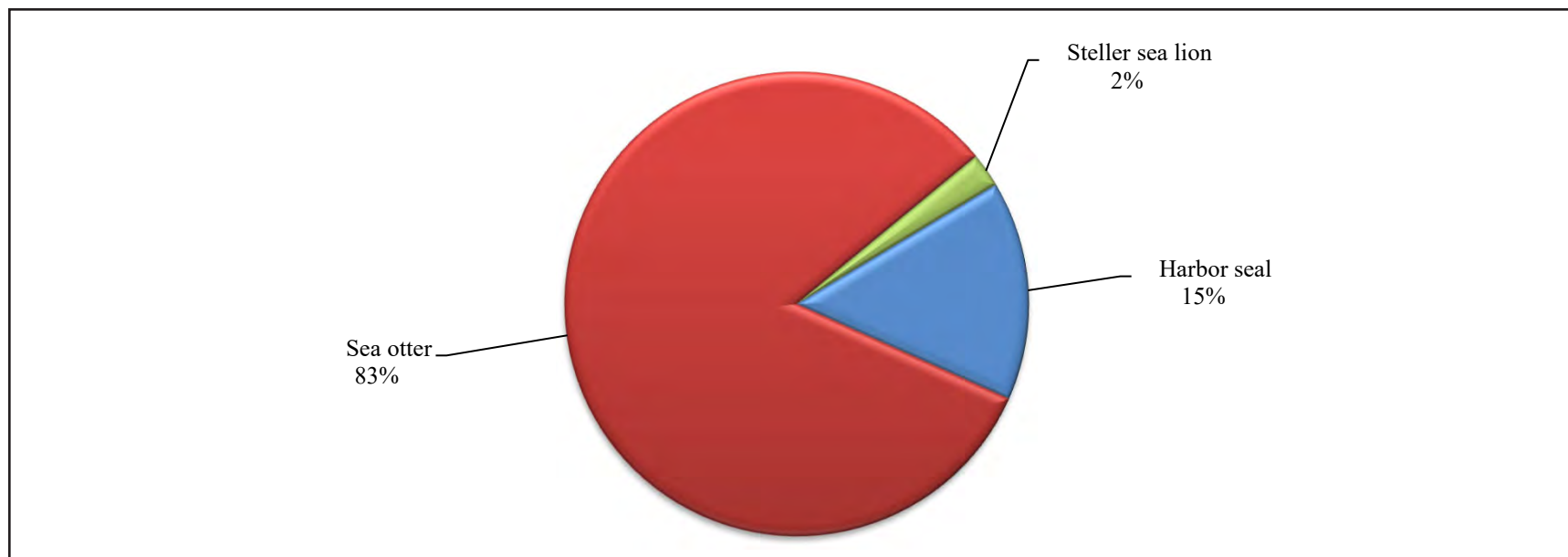


Figure 3-27.—Composition of marine mammal harvest by individual animals harvested, Old Harbor, 2018.

Table 3-21.—Estimated marine mammal harvests by month and sex, Old Harbor, 2018.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
All marine mammals	62.5	67.0	348.4	4.5	4.5	6.7	4.5	6.7	6.7	13.4	13.4	24.6	6.7	569.5
Harbor seal	4.5	6.7	0.0	2.2	2.2	6.7	4.5	6.7	6.7	11.2	8.9	20.1	6.7	87.1
Harbor seal, male	2.2	2.2	0.0	2.2	0.0	4.5	0.0	6.7	2.2	8.9	6.7	11.2	0.0	46.9
Harbor seal, female	2.2	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	2.2	0.0	11.2
Harbor seal, unknown sex	0.0	0.0	0.0	0.0	2.2	2.2	4.5	0.0	4.5	0.0	2.2	6.7	6.7	29.0
Sea otter	55.8	60.3	341.7	2.2	0.0	0.0	0.0	0.0	0.0	2.2	2.2	4.5	0.0	469.0
Steller sea lion	2.2	0.0	6.7	0.0	2.2	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	13.4
Steller sea lion, male	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2
Steller sea lion, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	2.2
Steller sea lion, unknown sex	2.2	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9
Unknown whale	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

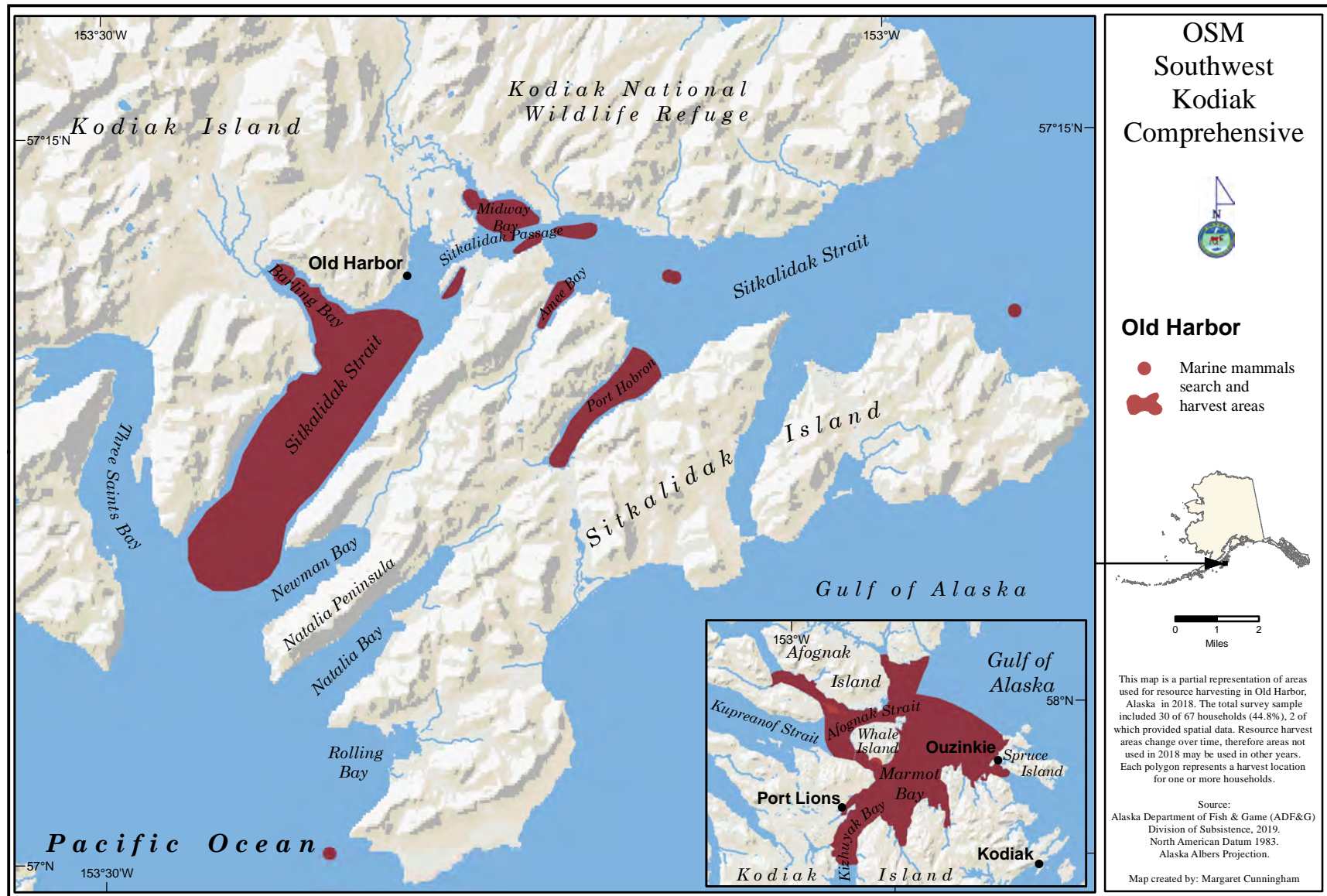


Figure 3-28.—Hunting locations of all marine mammals, Old Harbor, 2018.

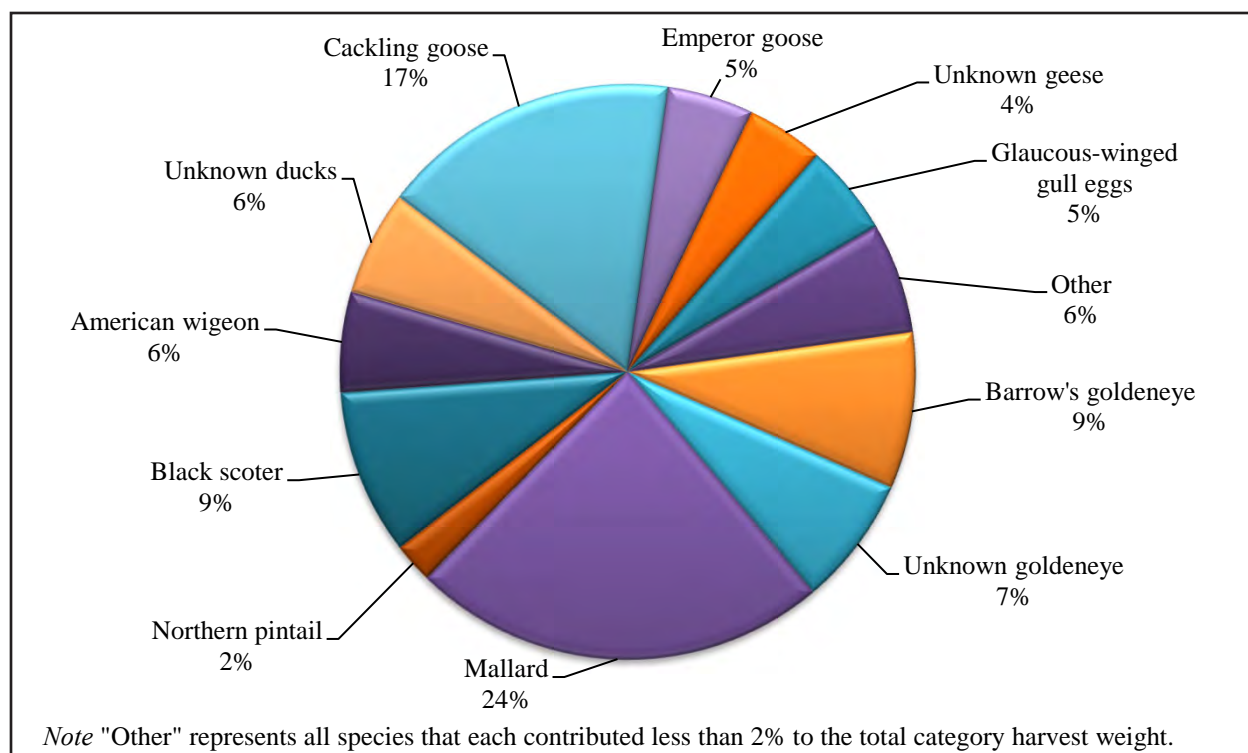


Figure 3-29.—Composition of bird and bird egg harvest in pounds usable weight, Old Harbor, 2018.

Birds and Eggs

Many species of birds and eggs composed the 2018 harvest, but no one resource dominated the harvest as measured by weight (Figure 3-29). Four species together accounted for just more than one-half of the harvest by weight: mallard (24%), cackling goose (17%), Barrow's goldeneye (9%), and black scoter (9%). Unspecified kinds of goldeneyes contributed 7% to the birds and eggs harvest, followed by unknown ducks and American wigeons, which each contributed 6%; no other single resource composed more than 5% of the harvest by weight. A total of 1,993 lb of birds and eggs were harvested, including 290 mallards (2 lb per capita); 248 Barrow's and unspecified goldeneyes (almost 2 lb per capita); and 123 black scoters and 107 American wigeons (both harvests equal to less than 1 lb per capita) (Table 3-13). Although fewer cackling geese were harvested, those 78 geese equated to almost 2 lb per capita of harvest weight. Two types of bird eggs were harvested: 505 glaucous-winged gull eggs and 56 tern eggs (each less than 1 lb per capita). Most birds were harvested in the winter (November through March) (Table 3-22). Buffleheads, mallards, and cackling geese were also harvested during the fall months (September and October), while ducks and geese of unspecified species were harvested only in the fall.

Birds and eggs were used by 73% of households and harvested by 47% (Table 3-13). The resources with the highest household use were mallards (47% of households), glaucous-winged gull eggs (43%), cackling geese (37%), and unspecified goldeneyes (20%). These same resources were also sought by the most households: 33% of households searched for glaucous-winged gull eggs, 30% hunted mallards, 23% of households hunted cackling geese, and 13% hunted generally for goldeneyes. All households that hunted any individual bird species were successful; however, note that a small proportion of households that attempted to harvest glaucous-winged gull eggs were not successful. Sharing of birds and eggs was also common in 2018, although not all resources were shared. Mallards were given by the most households (33%), followed by glaucous-winged gull eggs (30%), cackling geese (23%), unspecified goldeneyes (17%), and black scoters (13%). No other birds or eggs resources were given by more than 10% of households. Fewer households generally received any of these resources. Again, the most households received mallards (33%), followed

Table 3-22.—Estimated bird harvests by season, Old Harbor, 2018.

Resource	Estimated harvest by season					Total
	Spring	Summer	Fall	Winter	Season unknown	
All birds	0.0	0.0	174.2	1,005.0	0.0	1,179.2
Bufflehead	0.0	0.0	13.4	38.0	0.0	51.4
Common eider	0.0	0.0	0.0	0.0	0.0	0.0
King eider	0.0	0.0	0.0	0.0	0.0	0.0
Steller's eider	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	0.0	0.0	0.0	0.0	0.0	0.0
Barrow's goldeneye	0.0	0.0	0.0	134.0	0.0	134.0
Unknown goldeneye	0.0	0.0	0.0	113.9	0.0	113.9
Harlequin duck	0.0	0.0	0.0	11.2	0.0	11.2
Mallard	0.0	0.0	35.7	254.6	0.0	290.3
Merganser	0.0	0.0	0.0	0.0	0.0	0.0
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0
Northern pintail	0.0	0.0	0.0	38.0	0.0	38.0
Unknown scaup	0.0	0.0	0.0	0.0	0.0	0.0
Black scoter	0.0	0.0	0.0	122.8	0.0	122.8
Surf scoter	0.0	0.0	0.0	11.2	0.0	11.2
White-winged scoter	0.0	0.0	0.0	6.7	0.0	6.7
Northern shoveler	0.0	0.0	0.0	2.2	0.0	2.2
Unknown teal	0.0	0.0	0.0	38.0	0.0	38.0
American wigeon	0.0	0.0	0.0	107.2	0.0	107.2
Unknown ducks	0.0	0.0	89.3	0.0	0.0	89.3
Brant	0.0	0.0	0.0	4.5	0.0	4.5
Cackling goose	0.0	0.0	13.4	64.8	0.0	78.2
Emperor goose	0.0	0.0	0.0	31.3	0.0	31.3
White-fronted goose	0.0	0.0	0.0	0.0	0.0	0.0
Unknown geese	0.0	0.0	22.3	0.0	0.0	22.3
Unknown swans	0.0	0.0	0.0	0.0	0.0	0.0
Sandhill crane	0.0	0.0	0.0	0.0	0.0	0.0
Black oystercatcher	0.0	0.0	0.0	0.0	0.0	0.0
Unknown auklet	0.0	0.0	0.0	0.0	0.0	0.0
Unknown cormorant	0.0	0.0	0.0	0.0	0.0	0.0
Glaucous-winged gull	0.0	0.0	0.0	0.0	0.0	0.0
Herring gull	0.0	0.0	0.0	0.0	0.0	0.0
Mew gull	0.0	0.0	0.0	0.0	0.0	0.0
Sabine's gull	0.0	0.0	0.0	0.0	0.0	0.0
Black-legged kittiwake	0.0	0.0	0.0	0.0	0.0	0.0
Unknown murre	0.0	0.0	0.0	0.0	0.0	0.0
Unknown tern	0.0	0.0	0.0	0.0	0.0	0.0
Unknown ptarmigan	0.0	0.0	0.0	26.8	0.0	26.8

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

by cackling geese (20%), and glaucous-winged gull eggs (20%). No other resource was received by more than 10% of households.

Birds and eggs were hunted and collected mostly around Old Harbor, through most of Sitkalidak Strait, and on the far side of Sitkalidak Island near Ocean Bay (Figure 3-30). Bird hunters traveled farther from town as well, to Kiavak and Kaiugnak bays and to Shearwater Bay.



Figure 3-30.—Hunting and gathering locations of all birds and bird eggs, Old Harbor, 2018.

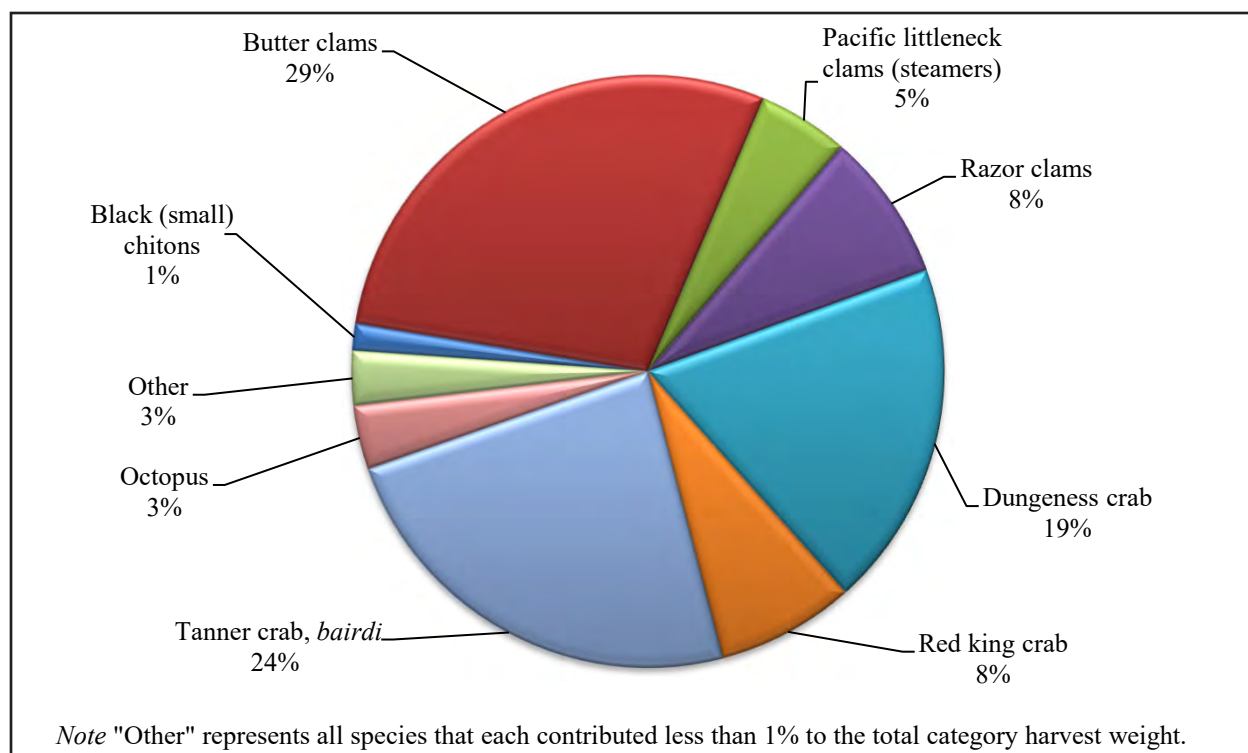


Figure 3-31.—Composition of marine invertebrate harvest in pounds usable weight, Old Harbor, 2018.

Marine Invertebrates

Butter clams, Tanner crab, and Dungeness crab were harvested in the greatest amounts by Old Harbor households in 2018 (Figure 3-31). Together, these three species contributed nearly 75% to the total harvest weight (29%, 24%, and 19%, respectively). A total of 7,431 lb of marine invertebrates were harvested, equaling 37 lb per capita (Table 3-13). Looking at individual species, 712 gallons of butter clams were harvested (2,137 lb; 11 lb per capita), as well as 4,411 Tanner crab (1,764 lb; 9 lb per capita) and 2,010 Dungeness crab (1,407 lb; 7 lb per capita). Species harvested in lesser amounts included razor clams (603 lb; 3 lb per capita), red king crab (560 lb; 3 lb per capita), Pacific littleneck clams (369 lb; 2 lb per capita), and octopus (259 lb; 1 lb per capita). No other species was harvested in an amount that contributed greater than 1 lb per capita. The marine invertebrates resource category was used by the third largest percentage of households (90%) and harvested by 53% of households (Figure 3-12). All households that attempted to harvest marine invertebrates were successful.

At the species level, the most households used Tanner crab (73%), followed by red king crab and butter clams (60% each), sea urchins (53%), and Dungeness crab (47%). The least used species were cockles, scallops, and shrimp (3% of households used each). For each harvested resource, approximately one-quarter or fewer households attempted harvests, with the exception of butter clams (47%), Tanner crab (33%), and sea urchins (33%). The least used species were also the least harvested. Most species of marine invertebrates that were harvested were also given away, except for scallops. The most households gave away butter clams (47%) and the fewest gave away shrimp and cockles (3%). More households received marine invertebrates than gave them away: 63% of households received Tanner crab, 53% received red king crab, and 37% received Dungeness crab or butter clams. Of species received, the fewest households received red chitons, cockles, and shrimp (3% each).

Marine invertebrates were harvested in Barling Bay, Sitkalidak Strait, especially in and around Midway Bay, and at the shorelines of multiple coves and bays on Sitkalidak Island (Figure 3-32). Other search areas further from shorelines included Alitak Bay and Sitkalidak Strait toward Kiliuda Bay.

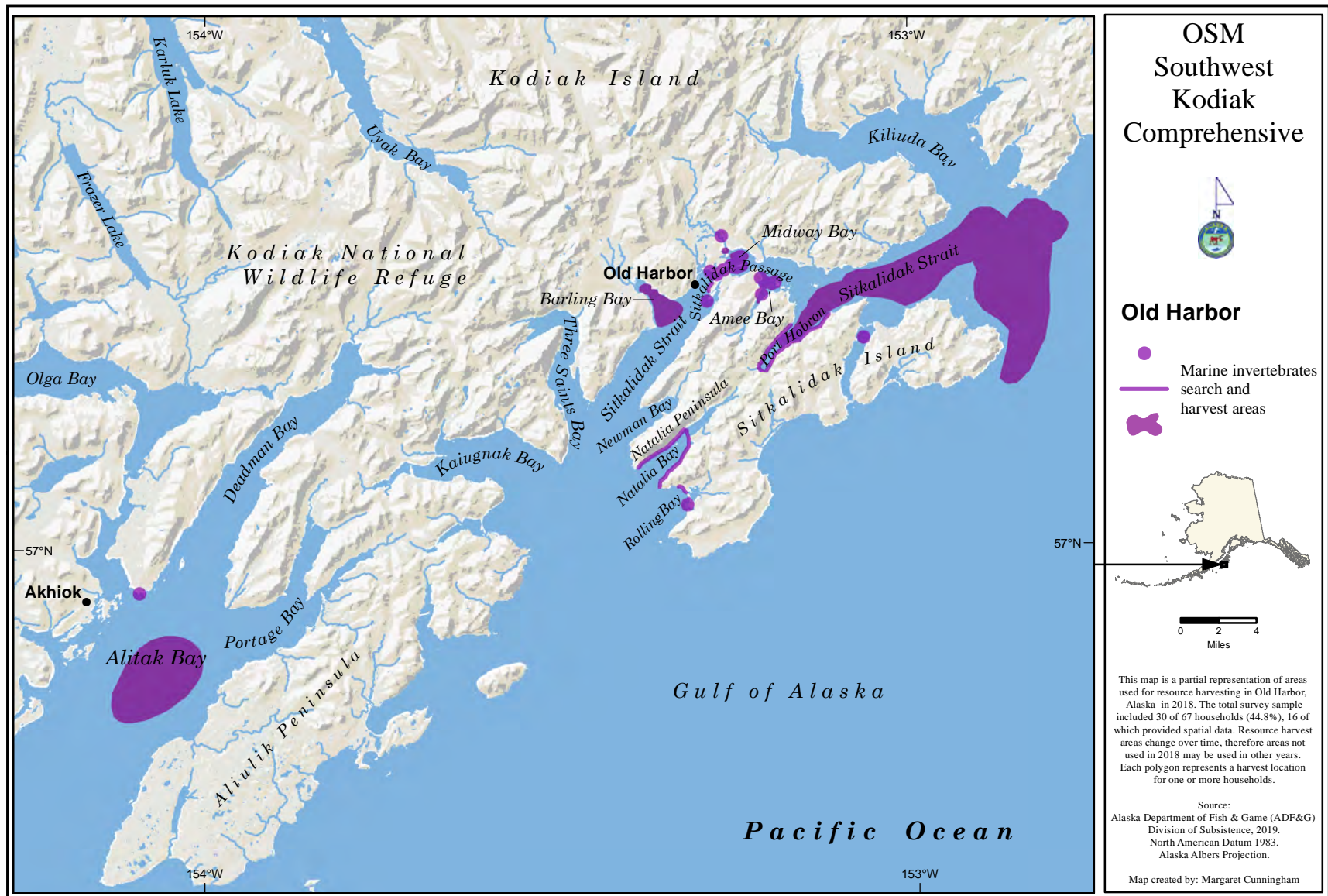


Figure 3-32.—Search and harvest locations of all marine invertebrates, Old Harbor, 2018.

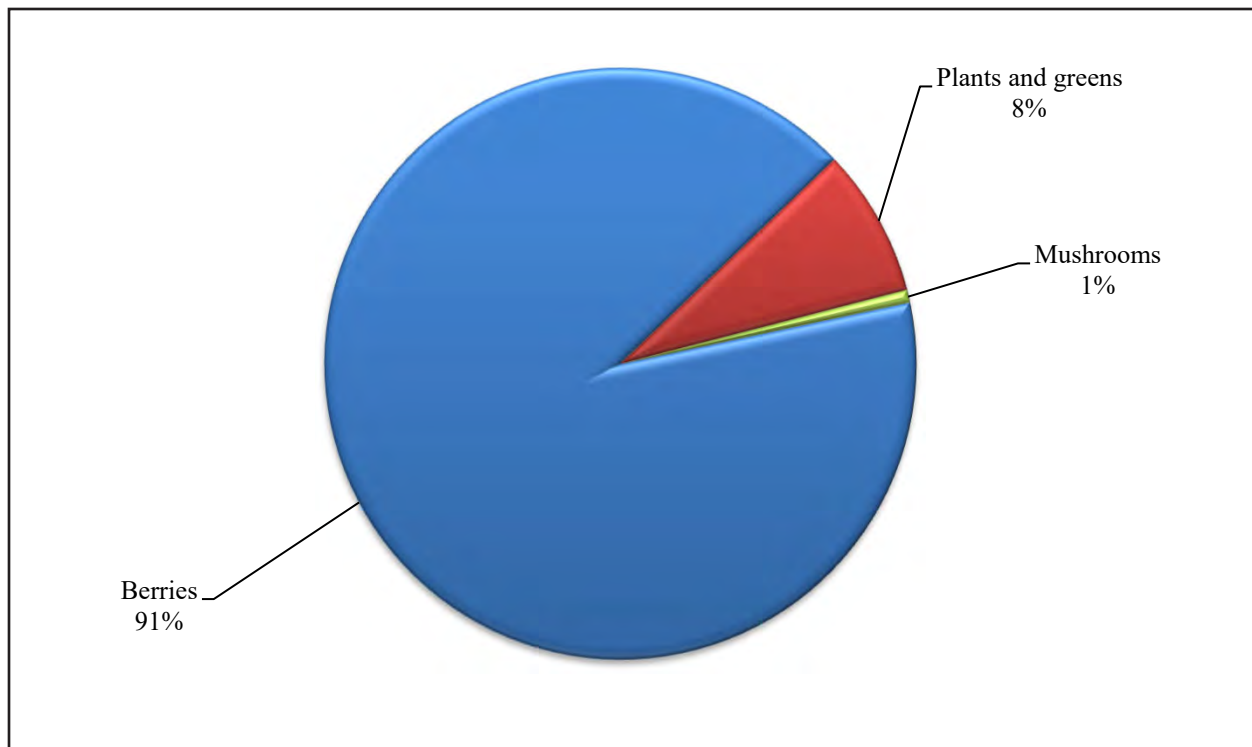


Figure 3-33.—Composition of vegetation harvest by type in pounds usable weight, Old Harbor, 2018.

Vegetation

Within the vegetation category, Old Harbor residents harvested mainly berries (91% of harvest as measured by weight), along with plants and greens (8%), and mushrooms (1%) (Figure 3-33). An estimated 1,624 lb of vegetation were harvested in 2018, including seven types of berries and five types of plants and greens (Table 3-13). Mushroom harvests were not collected by type. The salmonberry harvest was substantially larger than any other berry harvest: 269 gallons of salmonberries (1,077 lb; 5 lb per capita). The next largest harvest was an order of magnitude smaller: 30 gallons of raspberries, which equated to 121 lb, or less than 1 lb per capita. Every other berry harvest was less than 1 lb per capita. Perhaps unsurprisingly, salmonberries were used by far more households than any other berry. While 80% of households used salmonberries, the next most used type of berry was strawberry—used by 27% of households. Following strawberry in use level was highbush cranberry and raspberry (13%), blueberry and crowberry (10%), then cloudberry (3%). The percentage of households harvesting berries generally follows this same pattern of highest-to-lowest percentages. With the exception of salmonberries, berries were not widely shared or received. No households gave away raspberries and none received blueberries, highbush cranberries, or cloudberry. Twenty-seven percent of households gave away salmonberries and 23% received them. For strawberries, 7% of households gave them away and 3% received them. For crowberry, 3% of households gave away and received this resource.

Turning to plants and greens, each of which contributed less than 1 lb per capita, pushki was harvested in the greatest amount (31 gallons), followed by petrushki (21 gallons), wild rose hips (13 gallons), fiddlehead ferns (13 gallons), and then fireweed (12 gallons). Pushki was used by the most households (33%), followed by petrushki (23%), fiddlehead ferns (20%), and fireweed (13%). Wild rose hips and mushrooms were used by the fewest households. The same percentage of households used, attempted to harvest, and harvested each of these resources. Three percent of households gave away these species, except 7% of households gave away petrushki and no households gave away fiddlehead ferns. No households received any of these resources except fiddlehead ferns, which were received by 3% of households. Seaweed was harvested and

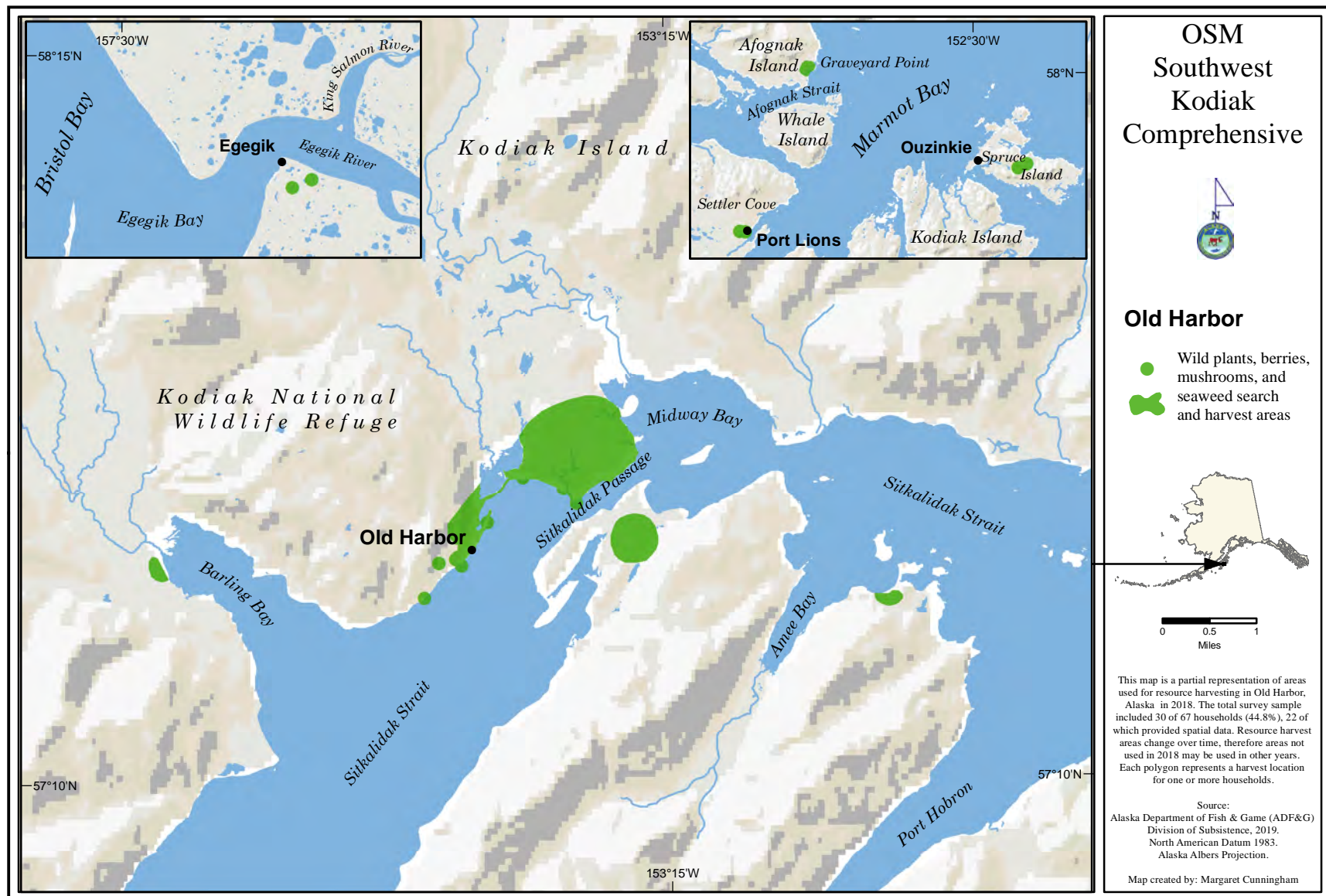


Figure 3-34.—Search and harvest locations of wild plants, berries, mushrooms, and seaweeds, Old Harbor, 2018.

used by 10% of households and because it was harvested for use as fertilizer it was not assigned a harvest weight. Wood was collected and used by 63% of households for use as heating fuel, for smoking sheds, or for banyas (a traditional Russian steam bath). Wood was given by 47% of households and received by 23%.

Plants, berries, mushrooms, and seaweeds were harvested from several areas of the state (Figure 3-34). Most of the harvests took place around Old Harbor, using the road system out to the area around the airport to access resources. Areas around Barling Bay and on Sitkalidak Island were also used. In other areas of the state, Old Harbor residents searched for vegetation resources around Ouzinkie, Port Lions, on Afognak Island, and near Egegik in Bristol Bay.

COMPARING USES AND HARVESTS IN 2018 WITH PREVIOUS YEARS

Use Assessments

Researchers asked respondents to assess their own harvests in two ways: whether they used more, less, or about the same amount of nine resource categories and all wild resources overall in 2018 compared to the past five years, and whether they got “enough” of each of the nine resource categories and all wild resources overall. Households also were asked to provide reasons if their use was different or if they were unable to get enough of a resource. If they did not get enough of a resource, they were asked to evaluate the severity of the impact to their household as a result of not getting enough. They were further asked whether they did anything differently (such as supplement with store-bought food or switch to a different subsistence resource) because they did not get enough. Because not everyone uses all resource categories, some households did not respond to the assessment questions. Additionally, some households that do typically use a resource category simply did not answer questions. This section discusses responses to those questions.

In general, more households reported using the same amount of resources for each category than reported using less or using more (Figure 3-35; Table 3-23). For no resource category did more households report using more resources than reported using the same amount; but, for salmon and nonsalmon fish, more households did report using fewer fish than used the same amount. Excluding the resource categories that were used the least (those with more than 10% of responding households reporting they do not normally use), 33%–57% of households reported using the same amount of these resources, 20%–50% reported less use of resources, and 7%–30% reported using more. Nonsalmon fish garnered the highest percentage (50%) of households reporting less use while the fewest households (20%) said the same about marine invertebrates. Conversely, 30% of households said they used more vegetation, a higher percentage than for any other resource category, while just 7% reported that they used more nonsalmon fish. The most households (57%) used the same amount of marine invertebrates as in recent years while the fewest (33%) used the same amount of vegetation resources.

Of the resources less widely used (small land mammals, marine mammals, birds, and bird eggs), the fewest households (less than 5%) reported less use of small land mammals and birds and the most households reported less use of bird eggs (23%). No households reported using more small land mammals during the study year and the most households used more marine mammals (25%).

Old Harbor residents provided many reasons for why resource use decreased (Table 3-24). Of the 30 sampled households, 80% (24 households) used less of at least one resource category or all resources combined and all of those households provided at least one reason for reduced use. The most often cited reason was that resources were less available, which was cited by one-half of the households. Interestingly, no households gave this as a reason for less use of land or marine mammals, or birds. Lack of effort was a more commonly cited reason for less use of marine and large land mammals and fish (20% of households that used less of each category), as well as vegetation (33%). Reasons for less use of salmon and large land mammals varied the most (nine reasons cited for each category), followed by five reasons cited for less use of either nonsalmon fish or bird eggs, and four reasons for marine invertebrates or vegetation. Two or fewer reasons were provided for less use of the remaining three resource categories. The least common reasons given were the weather (only one household explained this was a factor, and that was for less use of large land mammals) and that the household used other resources (one household provided this response

regarding salmon use). That households were working or did not have time was a reason given by at least one household for all resource categories except bird eggs and vegetation.

Households also provided variable responses for why they used more of a resource category (Table 3-25). The most common explanations households provided for why they used more of a resource category was that they received more, an answer given in response to questions about more use of salmon, marine mammals, birds, and marine invertebrates. Other more common reasons given were increased availability of the resource (especially for vegetation, but also for large land mammals and birds), and that the household needed more (particularly for salmon, but also marine mammals and vegetation). For large land mammals, more households responded that they used more because of increased success (80%) than any other reason. Increased effort was given as a reason for more use by at least one household in regard to marine mammals, bird eggs, marine invertebrates, and vegetation. The least common reasons provided included favorable weather (one household provided for marine mammals), store-bought expense was too great (one household each for nonsalmon fish and vegetation), and that the household got or fixed necessary equipment (one household for marine mammals).

For every resource category, more sampled households explained that they got enough wild resources than those that reported that they did not get enough (Figure 3-36). The resource categories that garnered the most responses of “not enough” were salmon (37%), nonsalmon fish (33%), and vegetation (33%); the categories that received the fewest responses of not having enough were small land mammals and marine mammals (less than 5% each).

Households that did not get enough of a resource were further asked what the impact to their household was from not getting enough. For most resource categories, the impact to households from not getting enough resources from a category was rated as minor or major (Table 3-26). A small percentage of households stated that the impact of not getting enough salmon or vegetation was severe, and slightly more households said the impact of not getting a variety of resource categories was not noticeable. Households that did not get enough of a particular resource category adapted in several ways (Table 3-27). The most common adaptations were for a household to use more commercial foods or to replace the needed resource with other subsistence foods. Other responses given included asking others for help, getting a job, obtaining food from other sources, or reducing the amount the household shared.

Households were also asked to assess their use of subsistence resources broadly in 2018, not just for particular resource categories. In response, 40% of households explained that they used the same amount of resources overall in 2018, 37% stated that they used fewer resources, and 23% said they used more (Table 3-23). When asked why they used fewer overall resources, 36% thought that it was due to family or personal reasons; 27% attributed it to resources being less available; 18% said it was due to lack of effort; and lack of equipment, less sharing, working/no time, or other uncategorized reasons were each cited by 9% of households (Table 3-24). For households that used more resources overall during the study year, 43% explained that it was because they had received more resources, 29% said that it was due to increased availability or increased effort, while 14% shared that it was because of family/personal reasons or having acquired or fixed equipment (Table 3-25). Five households reported that they did not get enough subsistence resources overall in 2018 (Table 3-26). Four of these households said that the impact of not getting enough was minor while one explained that it had a major impact. Of those five households that did not get enough, four compensated by using more commercial foods, while one household said someone in the household got a job and one household adapted by not sharing as much (Table 3-27).

Households that did not get enough of a resource during the study year were asked what resources they could have used more of. No resource was indicated as needed by more than 30% of sampled households (Table 3-28). The most households (27%) indicated needing Pacific halibut, followed by 20% needing salmonberries, and 17% needing deer, sockeye salmon, and coho salmon. No other resource was needed by more than 10% of households.

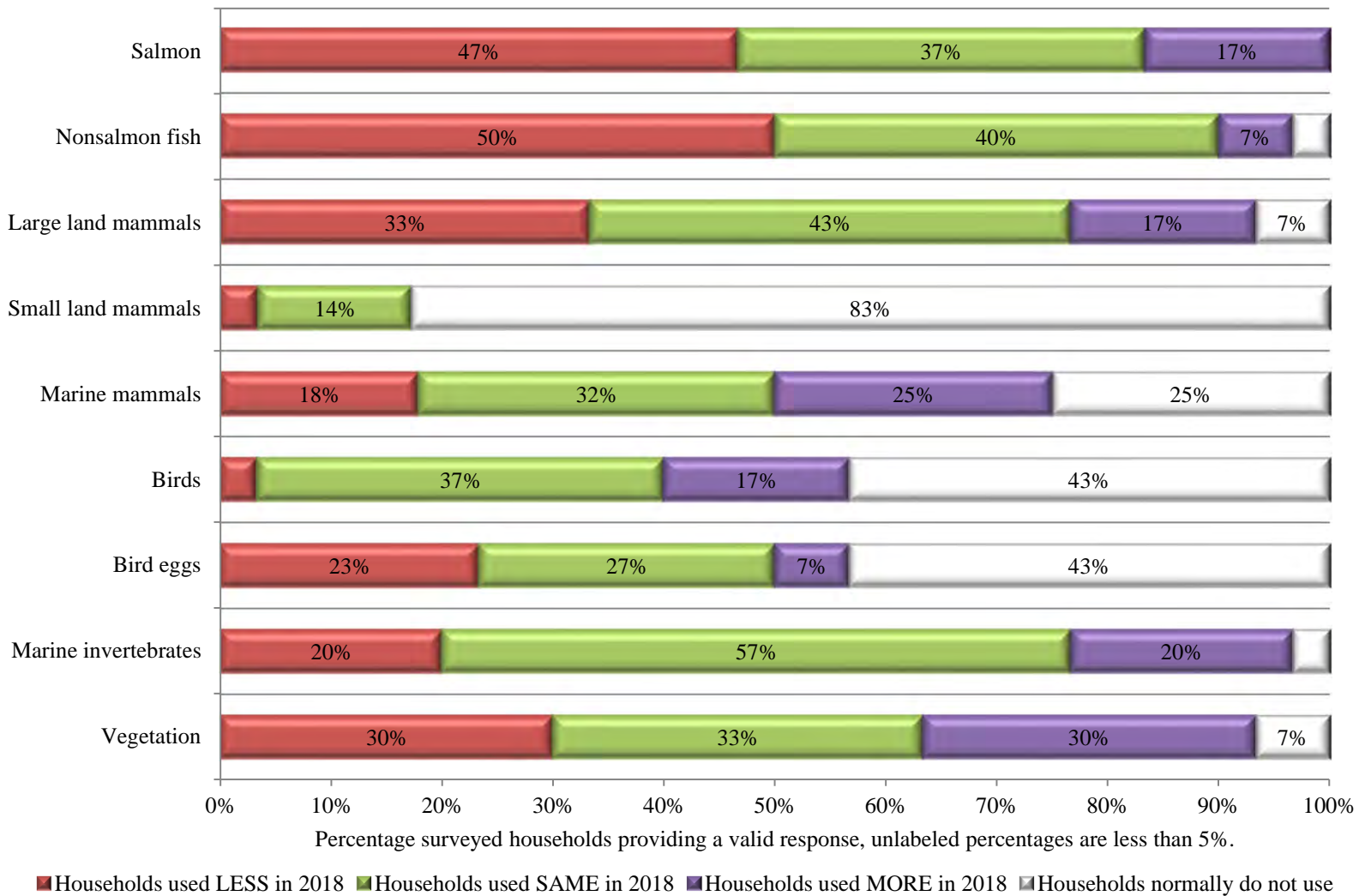


Figure 3-35.—Changes in household uses of resources compared to recent years, Old Harbor, 2018.

Table 3-23.—Changes in household uses of resources compared to recent years, Old Harbor, 2018.

Resource category	Sampled households	Valid responses ^a	Households reporting use								Households not using	
			Total households		Less		Same		More			
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	30	30	30	100.0%	24	80.0%	27	90.0%	22	73.3%		
All resources	30	30	30	100.0%	11	36.7%	12	40.0%	7	23.3%	0	0.0%
Salmon	30	30	30	100.0%	14	46.7%	11	36.7%	5	16.7%	0	0.0%
Nonsalmon fish	30	30	29	96.7%	15	50.0%	12	40.0%	2	6.7%	1	3.3%
Large land mammals	30	30	28	93.3%	10	33.3%	13	43.3%	5	16.7%	2	6.7%
Small land mammals	30	29	5	17.2%	1	3.4%	4	13.8%	0	0.0%	24	82.8%
Marine mammals	30	28	21	75.0%	5	17.9%	9	32.1%	7	25.0%	7	25.0%
Birds	30	30	17	56.7%	1	3.3%	11	36.7%	5	16.7%	13	43.3%
Bird eggs	30	30	17	56.7%	7	23.3%	8	26.7%	2	6.7%	13	43.3%
Marine invertebrates	30	30	29	96.7%	6	20.0%	17	56.7%	6	20.0%	1	3.3%
Vegetation	30	30	28	93.3%	9	30.0%	10	33.3%	9	30.0%	2	6.7%

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

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

Table 3-24.—Reasons for less household uses of resources compared to recent years, Old Harbor, 2018.

Resource category	Valid responses ^a	Households reporting reasons for less use	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	30	24	5	20.8%	12	50.0%	0	0.0%	3	12.5%	8	33.3%	7	29.2%	0	0.0%	1	4.2%
All resources	30	11	4	36.4%	3	27.3%	0	0.0%	1	9.1%	1	9.1%	2	18.2%	0	0.0%	0	0.0%
Salmon	30	14	2	14.3%	4	28.6%	0	0.0%	1	7.1%	1	7.1%	3	21.4%	0	0.0%	0	0.0%
Nonsalmon fish	30	15	1	6.7%	6	40.0%	0	0.0%	0	0.0%	3	20.0%	3	20.0%	0	0.0%	0	0.0%
Large land mammals	30	10	2	20.0%	0	0.0%	0	0.0%	1	10.0%	2	20.0%	2	20.0%	0	0.0%	1	10.0%
Small land mammals	29	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	28	5	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	20.0%	0	0.0%	0	0.0%
Birds	30	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	30	7	1	14.3%	1	14.3%	0	0.0%	0	0.0%	3	42.9%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	30	6	2	33.3%	0	0.0%	0	0.0%	0	0.0%	2	33.3%	0	0.0%	0	0.0%	0	0.0%
Vegetation	30	9	1	11.1%	5	55.6%	0	0.0%	1	11.1%	0	0.0%	3	33.3%	0	0.0%	0	0.0%

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Table 3-24.—Continued.

Resource category	Valid responses ^a	Households reporting reasons for less use	Other reasons		Working/ no time		Regulations		Small/ diseased animals		Needed less		Equipment/ fuel expense		Used other resources		Competition	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	30	24	4	16.7%	6	25.0%	0	0.0%	0	0.0%	6	25.0%	1	4.2%	1	4.2%	0	0.0%
All resources	30	11	1	9.1%	1	9.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Salmon	30	14	1	7.1%	1	7.1%	0	0.0%	0	0.0%	2	14.3%	0	0.0%	1	7.1%	0	0.0%
Nonsalmon fish	30	15	0	0.0%	3	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	30	10	1	10.0%	1	10.0%	0	0.0%	0	0.0%	1	10.0%	1	10.0%	0	0.0%	0	0.0%
Small land mammals	29	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Marine mammals	28	5	0	0.0%	2	40.0%	0	0.0%	0	0.0%	2	40.0%	0	0.0%	0	0.0%	0	0.0%
Birds	30	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	30	7	1	14.3%	0	0.0%	0	0.0%	0	0.0%	1	14.3%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	30	6	1	16.7%	2	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	30	9	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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

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

Table 3-25.—Reasons for more household uses of resources compared to recent years, Old Harbor, 2018.

Resource category	Valid responses ^a	Households reporting reasons for more use	Family/personal		Increased availability		Used other resources		Favorable weather		Received more		Needed more		Increased effort		Regulations	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	30	22	3	13.6%	7	31.8%	0	0.0%	1	4.5%	8	36.4%	7	31.8%	6	27.3%	0	0.0%
All resources	30	7	1	14.3%	2	28.6%	0	0.0%	0	0.0%	3	42.9%	0	0.0%	2	28.6%	0	0.0%
Salmon	30	5	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	20.0%	4	80.0%	0	0.0%	0	0.0%
Nonsalmon fish	30	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%
Large land mammals	30	5	0	0.0%	1	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Small land mammals	29	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	28	7	0	0.0%	0	0.0%	0	0.0%	1	14.3%	3	42.9%	2	28.6%	1	14.3%	0	0.0%
Birds	30	5	0	0.0%	1	20.0%	0	0.0%	0	0.0%	2	40.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	30	2	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Marine invertebrates	30	6	1	16.7%	0	0.0%	0	0.0%	0	0.0%	4	66.7%	0	0.0%	1	16.7%	0	0.0%
Vegetation	30	9	0	0.0%	6	66.7%	0	0.0%	0	0.0%	0	0.0%	1	11.1%	3	33.3%	0	0.0%

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Table 3-25.—Continued.

Resource category	Valid responses ^a	Households reporting reasons for more use	Traveled farther		More success		Had more time		Store-bought expense		Got/ fixed equipment		Substitute for unavailable resource(s)		Had more help		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	30	22	0	0.0%	5	22.7%	3	13.6%	2	9.1%	2	9.1%	0	0.0%	0	0.0%	1	4.5%
All resources	30	7	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	14.3%	0	0.0%	0	0.0%	0	0.0%
Salmon	30	5	0	0.0%	0	0.0%	1	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	30	2	0	0.0%	1	50.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	30	5	0	0.0%	4	80.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Small land mammals	29	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	28	7	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	14.3%	0	0.0%	0	0.0%	1	14.3%
Birds	30	5	0	0.0%	0	0.0%	2	40.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	30	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%
Marine invertebrates	30	6	0	0.0%	1	16.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	30	9	0	0.0%	0	0.0%	0	0.0%	1	11.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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

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

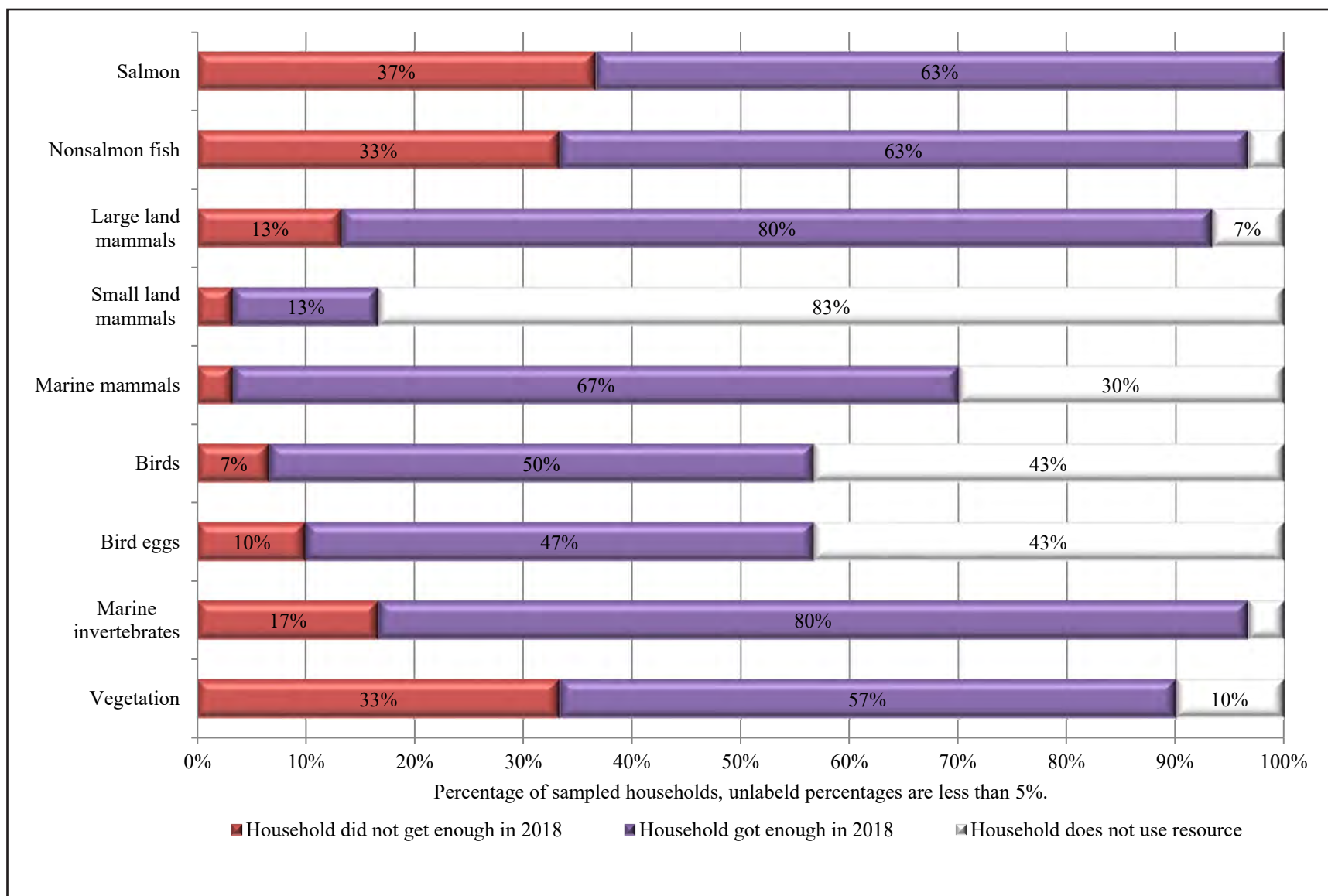


Figure 3-36.—Percentage of sampled households reporting whether they had enough resources, Old Harbor, 2018.

Table 3-26.—Reported impact to households reporting that they did not get enough of a type of resource, Old Harbor, 2018.

Resource category	Sampled households	Households not getting enough _____.				Impact to those not getting enough _____.									
		Valid responses ^a		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	30	29	96.7%	5	17.2%	0	0.0%	0	0.0%	4	80.0%	1	20.0%	0	0.0%
Salmon	30	30	100.0%	11	36.7%	0	0.0%	1	9.1%	7	63.6%	2	18.2%	1	9.1%
Nonsalmon fish	30	29	96.7%	10	34.5%	0	0.0%	0	0.0%	8	80.0%	2	20.0%	0	0.0%
Large land mammals	30	28	93.3%	4	14.3%	0	0.0%	0	0.0%	1	25.0%	3	75.0%	0	0.0%
Small land mammals	30	5	16.7%	1	20.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	30	21	70.0%	1	4.8%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Birds	30	17	56.7%	2	11.8%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Bird eggs	30	17	56.7%	3	17.6%	0	0.0%	0	0.0%	2	66.7%	1	33.3%	0	0.0%
Marine invertebrates	30	29	96.7%	5	17.2%	0	0.0%	2	40.0%	1	20.0%	2	40.0%	0	0.0%
Vegetation	30	27	90.0%	10	37.0%	0	0.0%	3	30.0%	3	30.0%	3	30.0%	1	10.0%

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

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

Table 3-27.—Things households reported doing differently as the result of not getting enough of a type of resource, Old Harbor, 2018.

Resource category	Valid responses ^a	Bought/bartered		Used more commercial foods		Replaced with other subsistence foods		Asked others for help		Made do without	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	5	0	0.0%	4	80.0%	0	0.0%	0	0.0%	0	0.0%
Salmon	10	0	0.0%	5	50.0%	4	40.0%	1	10.0%	0	0.0%
Nonsalmon fish	7	0	0.0%	3	42.9%	3	42.9%	0	0.0%	0	0.0%
Large land mammals	3	0	0.0%	2	66.7%	0	0.0%	0	0.0%	0	0.0%
Small land mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	2	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%
Vegetation	3	0	0.0%	1	33.3%	1	33.3%	0	0.0%	0	0.0%

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Table 3-27.—Continued.

Resource category	Valid responses ^a	Increased effort to harvest		Got a job		Obtained food from other sources		Got public assistance		Did not share as much	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	5	0	0.0%	1	20.0%	0	0.0%	0	0.0%	1	20.0%
Salmon	10	0	0.0%	1	10.0%	0	0.0%	0	0.0%	1	10.0%
Nonsalmon fish	7	0	0.0%	0	0.0%	2	28.6%	0	0.0%	0	0.0%
Large land mammals	3	0	0.0%	2	66.7%	0	0.0%	0	0.0%	0	0.0%
Small land mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%
Vegetation	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	33.3%

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

a. Does not include households failing to respond to the question and those households that did not use the resource.

Table 3-28.—Resources that households reported needing, Old Harbor, 2018.

Resource	Households needing	Percentage of households
Pacific halibut	8	26.7%
Salmonberry	6	20.0%
Coho salmon	5	16.7%
Sockeye salmon	5	16.7%
Deer	5	16.7%
Glaucous-winged gull eggs	3	10.0%
Salmon	2	6.7%
Pacific (gray) cod	2	6.7%
Chitons (bidarkis, gumboots)	2	6.7%
Crabs	2	6.7%
King crab	2	6.7%
Sea urchin	2	6.7%
Berries	2	6.7%
All resources	1	3.3%
Rockfish	1	3.3%
River (land) otter	1	3.3%
Sea otter	1	3.3%
Mallard	1	3.3%
Geese	1	3.3%
Highbush cranberry	1	3.3%
Plants, greens, and mushrooms	1	3.3%
Cottonwood buds	1	3.3%

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

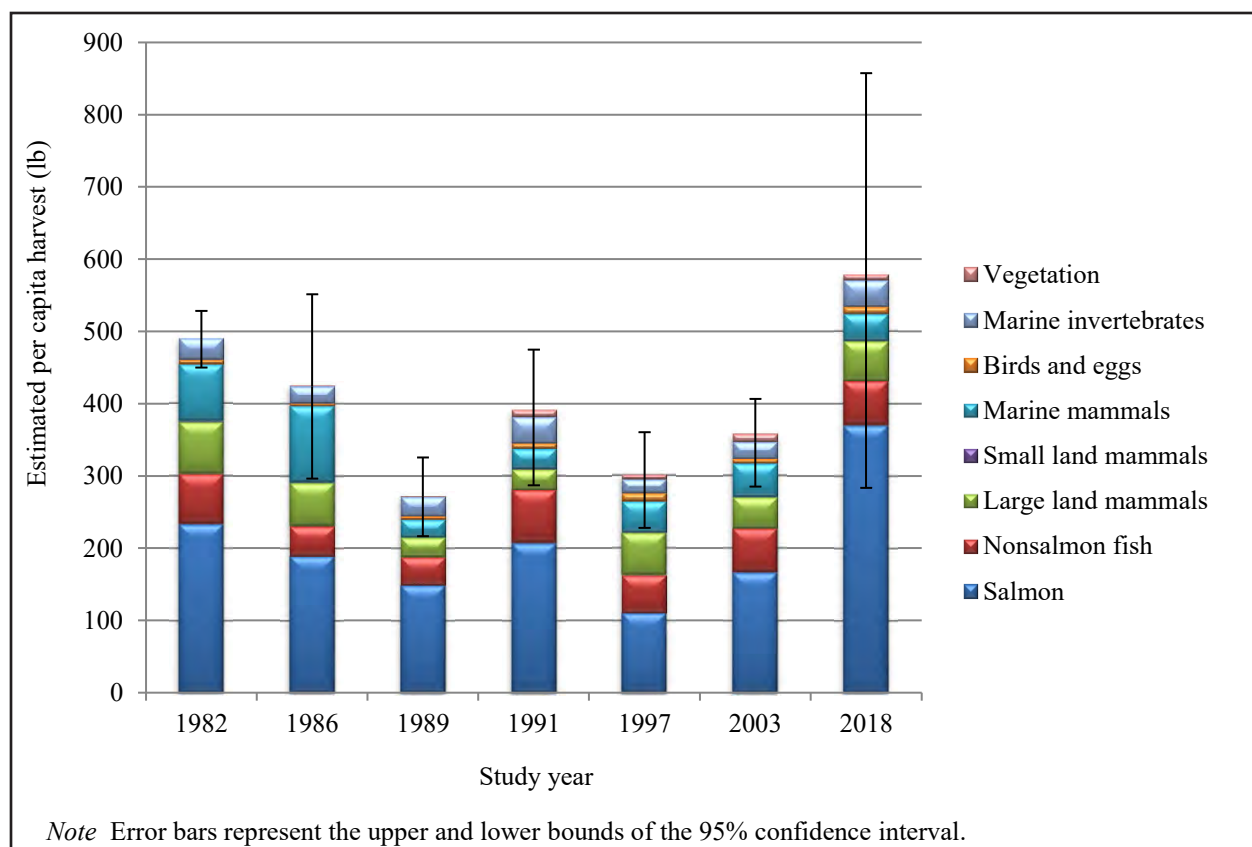


Figure 3-37.—Composition of harvest in pounds per capita, by resource category, Old Harbor, 1982, 1986, 1989, 1991, 1997, 2003, and 2018.

Harvest Data

Changes in the harvest of resources by Old Harbor residents can also be discerned through comparisons with findings from other study years. Table 1-3 summarizes previous studies and identifies which resource categories were surveyed in the past. Baseline comprehensive subsistence harvest surveys were conducted in Old Harbor for study years 1982, 1986, 1989, 1991, 1997, and 2003 (Fall 1991; 2006; Fall and Utermohle 1995b; 1999; Fall and Walker 1993; Schroeder et al. 1987). Species-specific studies were conducted for salmon and nonsalmon fish for the 2004 and 2005 study years (Williams et al. 2010), for salmon for 2012 (Marchioni et al. 2016), and for harbor seals and sea lions from 1992–1998 and 2000–2008 and 2011 (Wolfe et al. 2012:36–37).

The total per capita harvest dropped significantly between 1982 and 1989, the year of the *Exxon Valdez* oil spill (Figure 3-37; Table 3-29). Since that year, total per capita harvests have generally increased. The 2018 study year estimated the highest per capita harvest of all study years, but the wide confidence interval, which overlaps those from earlier study years, means it may not be significantly higher than past years. Until 2018, the increasing per capita harvests since 1989 did not reach the pre-spill levels of 489 lb in 1982 or 425 lb in 1986.

For most resource categories—small land mammals, birds and eggs, marine invertebrates, and vegetation—the percentage of the overall harvest composition in 2018 was consistent with the general harvest composition across study years (Figure 3-38). Salmon harvests composed a greater percentage in 2018 than average and harvests of nonsalmon fish, large land mammals, and marine mammals all composed a smaller percentage in 2018 than average. The harvest of each of these resource categories was dominated by one or two species

Table 3-29.—Comparison of estimated total and per capita harvests in pounds usable weight, by resource category, Old Harbor, 1982, 1986, 1989, 1991, 1997, 2003, and 2018.

Resource category	Estimated harvest in pounds usable weight											
	1982			1986			1989			1991		
	Total	Per capita	CI (%)	Total	Per capita	CI (%)	Total	Per capita	CI (%)	Total	Per capita	CI (%)
All resources	172,672.0	489.4	8.0%	161,083.0	425.4	30.0%	75,982.0	272.3	20.0%	84,781.0	391.0	24.0%
Salmon	82,209.0	233.0	8.0%	71,600.0	189.1	45.0%	41,546.0	148.9	26.0%	44,868.0	206.9	22.0%
Nonsalmon fish	24,363.0	69.1	22.0%	15,677.0	41.4	64.0%	10,936.0	39.2	25.0%	15,925.0	73.4	45.0%
Large land mammals	25,353.0	71.9	12.0%	22,732.0	60.0	21.0%	7,478.0	26.8	24.0%	6,170.0	28.5	28.0%
Small land mammals	305.0	0.9	26.0%	119.0	0.3	74.0%	31.0	0.1	104.0%	128.0	0.6	69.0%
Marine mammals	27,795.0	78.8	15.0%	40,257.0	106.3	37.0%	6,952.0	24.9	48.0%	6,009.0	27.7	69.0%
Birds and eggs	2,242.0	6.4	8.0%	1,329.0	3.5	34.0%	1,146.0	4.1	26.0%	1,652.0	7.6	32.0%
Marine invertebrates	10,404.0	29.5	8.0%	8,821.0	23.3	34.0%	7,537.0	27.0	20.0%	7,885.0	36.4	25.0%
Vegetation				548.0	1.5	66.0%	356.0	1.3	40.0%	2,143.0	9.9	36.0%

-continued-

Table 3-29.—Continued.

Resource category	Estimated harvest in pounds usable weight									Average total harvest (lb) ^a
	1997			2003			2018			
	Total	Per capita	CI (%)	Total	Per capita	CI (%)	Total	Per capita	CI (%)	
All resources	88,851.0	300.4	22.0%	72,034.9	357.2	17.0%	117,561.8	578.5	49.6%	116,163.9
Salmon	32,686.0	110.5	22.0%	33,514.0	166.2	17.8%	75,232.4	370.2	61.8%	56,684.9
Nonsalmon fish	15,260.0	51.6	23.0%	12,256.5	60.8	22.2%	12,448.4	61.3	52.5%	15,988.3
Large land mammals	17,402.0	58.8	32.0%	8,656.5	42.9	24.6%	11,195.3	55.1	44.1%	15,251.5
Small land mammals	26.0	0.1	72.0%	67.2	0.3	59.6%	80.4	0.4	95.3%	120.9
Marine mammals	12,755.0	43.1	48.0%	9,318.8	46.2	41.1%	7,557.6	37.2	44.5%	17,282.1
Birds and eggs	3,279.0	11.1	31.0%	1,289.1	6.4	37.8%	1,993.3	9.8	52.1%	1,964.1
Marine invertebrates	5,677.0	19.2	32.0%	4,699.4	23.3	20.0%	7,430.9	36.6	67.7%	7,486.2
Vegetation	1,766.0	6.0	18.0%	2,233.2	11.1	14.3%	1,623.6	8.0	37.5%	1,662.8

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

Note Blank cells indicate harvest amounts were not collected during the survey for the resource category.

a. The average excludes the estimated harvests from 1989, the year of the *Exxon Valdez* oil spill.

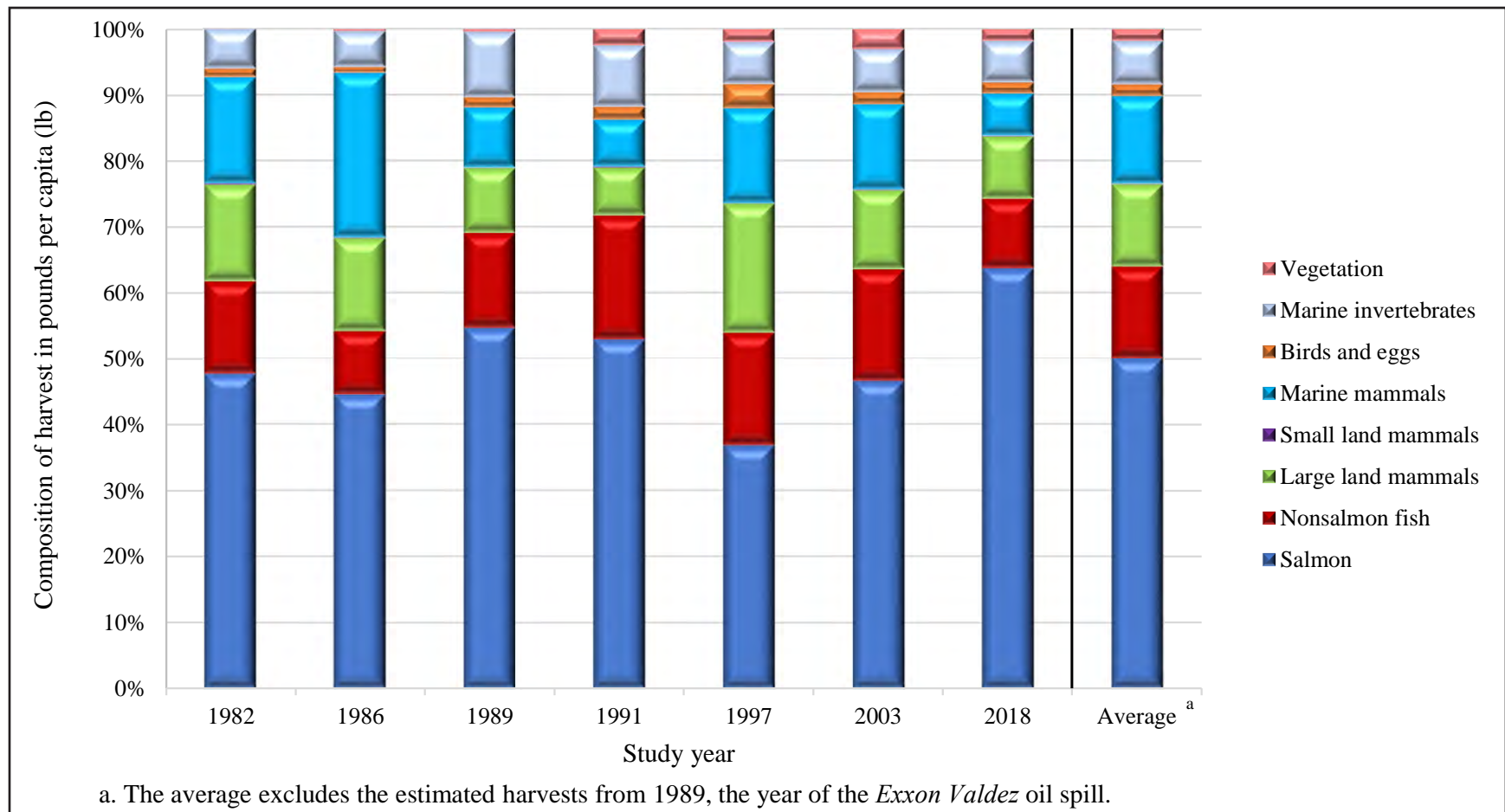


Figure 3-38.—Comparison of harvest composition in pounds per capita, by resource category, Old Harbor, 1982, 1986, 1989, 1991, 1997, 2003, and 2018.

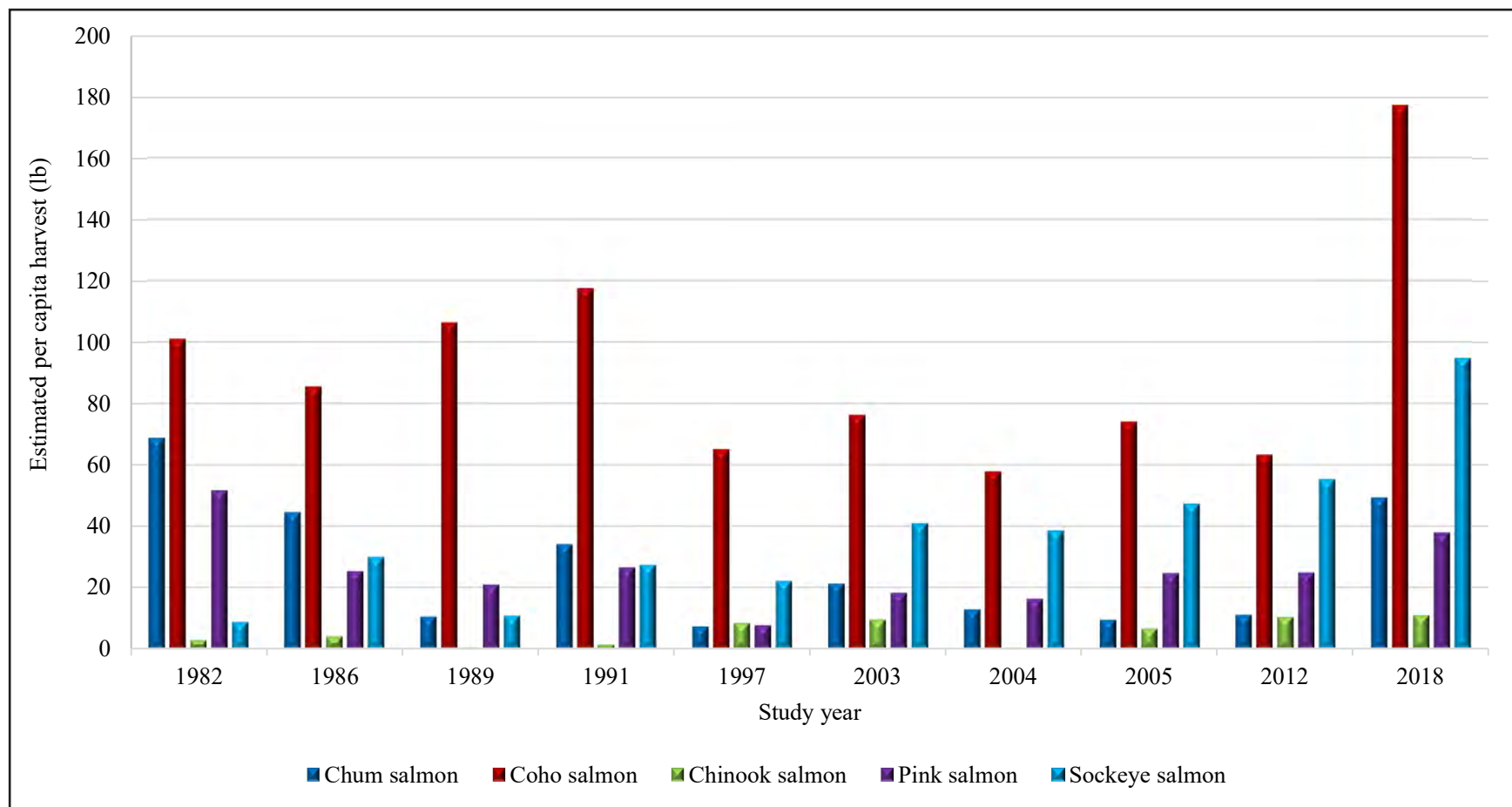


Figure 3-39.—Composition of salmon harvest in pounds per capita, Old Harbor, 1982, 1986, 1989, 1991, 1997, 2003–2005, 2012, and 2018.

Table 3-30.—Estimated per capita harvests of salmon in pounds usable weight and by percent of salmon harvest, Old Harbor, 1982, 1986, 1989, 1991, 1997, 2003–2005, 2012, and 2018.

Study year	Chum salmon		Coho salmon		Chinook salmon		Pink salmon		Sockeye salmon	
	Per capita (lb)	Percentage	Per capita (lb)	Percentage	Per capita (lb)	Percentage	Per capita (lb)	Percentage	Per capita (lb)	Percentage
1982	68.7	29.5%	101.1	43.4%	2.8	1.2%	51.7	22.2%	8.7	3.7%
1986	44.5	23.5%	85.5	45.2%	4.0	2.1%	25.3	13.4%	29.9	15.8%
1989	10.5	7.0%	106.4	71.4%	0.4	0.3%	20.9	14.0%	10.7	7.2%
1991	34.0	16.4%	117.7	56.9%	1.4	0.7%	26.5	12.8%	27.4	13.2%
1997	7.3	6.6%	65.1	58.9%	8.4	7.6%	7.7	6.9%	22.0	19.9%
2003	21.2	12.8%	76.3	45.9%	9.5	5.7%	18.2	11.0%	40.8	24.6%
2004	33.9	10.1%	153.5	46.0%	0.9	0.3%	43.3	13.0%	102.5	30.7%
2005	9.4	5.8%	74.1	45.7%	6.6	4.1%	24.6	15.2%	47.2	29.1%
2012	11.0	6.7%	63.3	38.4%	10.4	6.3%	24.8	15.0%	55.3	33.6%
2018	49.3	13.3%	177.2	47.9%	10.9	2.9%	37.9	10.2%	94.8	25.6%

Sources For 2018, ADF&G Division of Subsistence household surveys, 2019; for 2012, Marchioni et al. (2016:101); for other previous study years, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2020.

Table 3-31.—Estimated proportion of nonsalmon fish harvest composed of Pacific halibut, Old Harbor, 1982, 1986, 1989, 1991, 1997, 2003, and 2018.

Study year	Per capita harvest (lb)		Percentage of nonsalmon fish harvest
	Nonsalmon fish (all)	Pacific halibut	
1982	69.1	56.5	81.8%
1986	41.4	31.8	76.9%
1989	39.2	29.4	75.1%
1991	73.4	61.7	84.0%
1997	51.6	36.2	70.1%
2003	60.8	50.2	82.6%
2018	61.3	23.1	37.7%

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

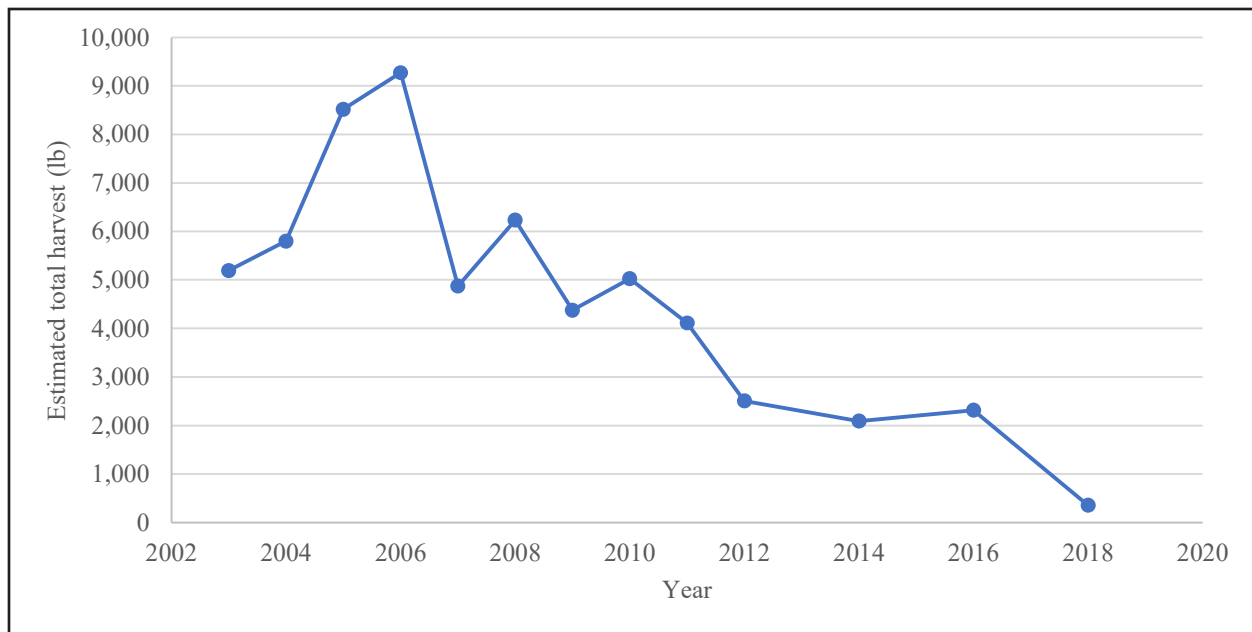


Figure 3-40.—Estimated harvests of Pacific halibut in total pounds, based on SHARC holders, Old Harbor, 2003–2018.

that drive overall harvest trends: coho salmon, and sockeye salmon to a smaller degree, Pacific halibut, deer, and harbor seals and Steller sea lions, to a lesser extent.

On average, salmon composed approximately 50% of subsistence harvests, ranging from a low of 37% in 1997 to a high in 2018 of 64% (Figure 3-38). The per capita harvest of salmon in 2018 (370 lb) was much higher than the next highest harvest of 233 lb per capita in 1982 (Table 3-29). At the same time, almost one-half of sampled households said they used less salmon in 2018 than in the recent past and the most common reason given was because the resource was less abundant (Table 3-23; Table 3-24). In each study year, coho salmon composed the greatest proportion of the salmon harvest (Figure 3-39; Table 3-30). Coho salmon are available to residents with or without boats and near to town: it is possible to fish for coho salmon out of Big Creek, which is accessible by foot as well as boat. In addition, coho salmon are relatively large and are preferred for putting up for the winter. In the earlier study years, pink and chum salmon were harvested more heavily than they have been in recent years. The harvest of sockeye salmon has increased, both as a percentage of total salmon harvests as well as in terms of the per capita harvest.

Nonsalmon fish composed 11% of the 2018 harvest, which is on the low end of a range of values from 10% in 1986 to 19% in 1991 (Figure 3-38). The average over this time period was 15%. Over the study years, Pacific halibut have been harvested in amounts an order of magnitude larger than other nonsalmon species and drive overall nonsalmon harvest trends (Table 3-31). Per capita harvests of halibut decreased in the late 1980s but had rebounded to above pre-spill levels by 1991. Harvests decreased between 1991 and 1997, increased slightly in 2003 by comparison, before decreasing to the lowest level recorded in any study year in 2018. In 2003, federal regulations allowing the subsistence harvest of Pacific halibut were enacted, perhaps explaining the increase in harvests in that year. Annual harvest surveys conducted only with individuals living in Old Harbor who fished for Pacific halibut under the federal regulations show substantial decreases over time as well (Figure 3-40). The low harvest level in 2018 is supported by information from key respondents who related that Pacific halibut have moved farther offshore and are more difficult to catch:

I do see a, a big change now for halibut. This place, you used to be able to go out in front of the village and, you know, be able to sit, you know, right almost off the

docks, sometimes, and be able to catch halibut. You don't see it anymore. They are few and far in between. And we used to be able to do that. (OH3)

Large land mammals also composed a slightly smaller proportion of the 2018 harvest: the 10% of the harvest in 2018 was similar to the 10% in 1989 and more than the 7% in 1991, but was a smaller percentage than the average of 13% (Table 3-29; Figure 3-38). Harvests of large land mammals have fluctuated over the study years, demonstrating a large decrease between 1982 and 1989 (Table 3-29). The per capita harvest in 1991 was similar to the 1989 harvest and then increased in the 1997 study year, but that per capita harvest was still below the high harvest of 1982. The per capita harvest in 2003 dropped by comparison to the previous study year before increasing in 2018 to 55 lb per capita, which was still lower than the 1997 estimate. Old Harbor residents harvest several types of large land mammals, but deer is the only resource harvested in each study year and consistently composes the majority of large land mammal harvests (CSIS). Increasing competition from non-local sport hunters using the southern end of the island to pursue deer was one factor attributed to the declining harvests in 2003 (Fall 2006). Weather is a major driver of deer populations and a bad winter in 1998–1999 increased winter mortality and the deer population on the island did not start recovering until the mid-2000s (Svoboda and Crye 2020). The years previous to the 2018 study year had been mild, which would have been conducive to stronger deer populations.

The harvest of marine mammals in 2018 was substantially smaller compared to most previous study years (Table 3-29). In 2018, marine mammals composed only 6% of the total harvest compared to an average of 14%, with a range of 7% in 1991 to 25% in 1986 (Figure 3-38). The per capita harvest of marine mammals in 1989 dropped significantly from earlier estimates and never fully recovered. The per capita harvest in the 1980s prior to the spill averaged 93 lb, after the spill, and excluding 1989, the average per capita harvest was 39 lb. Marine mammal harvest surveys were conducted in Old Harbor from 1992 through 2008 (not 1999) and in 2011 and show the same generally decreasing trend. The number of harbor seals harvested in 2018 (87 harbor seals) was actually higher than any estimate after 1997 according to results published in Wolfe et al. (2009a:51), although the per capita harvest in 2018 was still lower than the 2003 estimate (Table 3-13; Table 3-29). Sharp declines in harbor seals were observed off the southern end of Kodiak Island between 1976 and 1998; the population of seals on Tugidak Island in 2000 was 80% of the population in the 1970s (Muto et al. 2020:45–49). The South Kodiak stock of harbor seals has shown an increasing trend since the mid-1990s. Wolfe et al. (2012:20) noted that there had been a substantial decline in the number of Kodiak Island households hunting harbor seals and Steller sea lions from 1992 to 2003, but from 2003 to 2011 number of hunters had increased. No clear trends in the harvest of harbor seals over time were evident based on these near-annual surveys. Unfortunately, there have been no marine mammal harvest surveys on Kodiak since 2011. Without more research, it is difficult to attribute the changes in marine mammal harvests based on this survey to changes in resource availability or to social factors such as the number of hunters and demand for seal meat.

One previous comprehensive study included a mapping component for all resources and one salmon-focused study also collected information about salmon harvesting locations. The research for the 1982 study year (Schroeder et al. 1987) mapped locations known to be used at the time the research was conducted. The salmon-only survey conducted in 2013 (Marchioni et al. 2016) asked respondents to provide the name(s) of the location(s) where they harvested each species of fish. Comparing information collected about all resource harvest areas in 1982 to those documented in 2018, differences in the extent of areas used can be seen, especially at the southern end of the harvest areas. During the 1982 study year, residents reported using the coastal and adjacent inland areas from Narrow Cape in the northeast to Geese Channel in the southwest (Figure 3-41). Schroeder et al. (1987) specifically mention the following water bodies and islands in their report: the coastline and waters of Ugak Bay, Kiliuda Bay, Sitkalidak Strait, Kaiugnak and Kaguyak bays, and Sitkalidak Island, Two-Headed Island, and Geese Islands. Like 2018, this earlier study likely documented a minimum use area, rather than an exhaustive one. However, in 2018, a smaller minimum use area was documented (Figure 3-15). Northeast from Old Harbor, the study documented residents going only as far as Kiliuda Bay and not using Ugak Bay at all. In the southwestern direction, some use of lands and waters around Akhiok were documented, but not along the outside coast of the Aliuulik Peninsula to

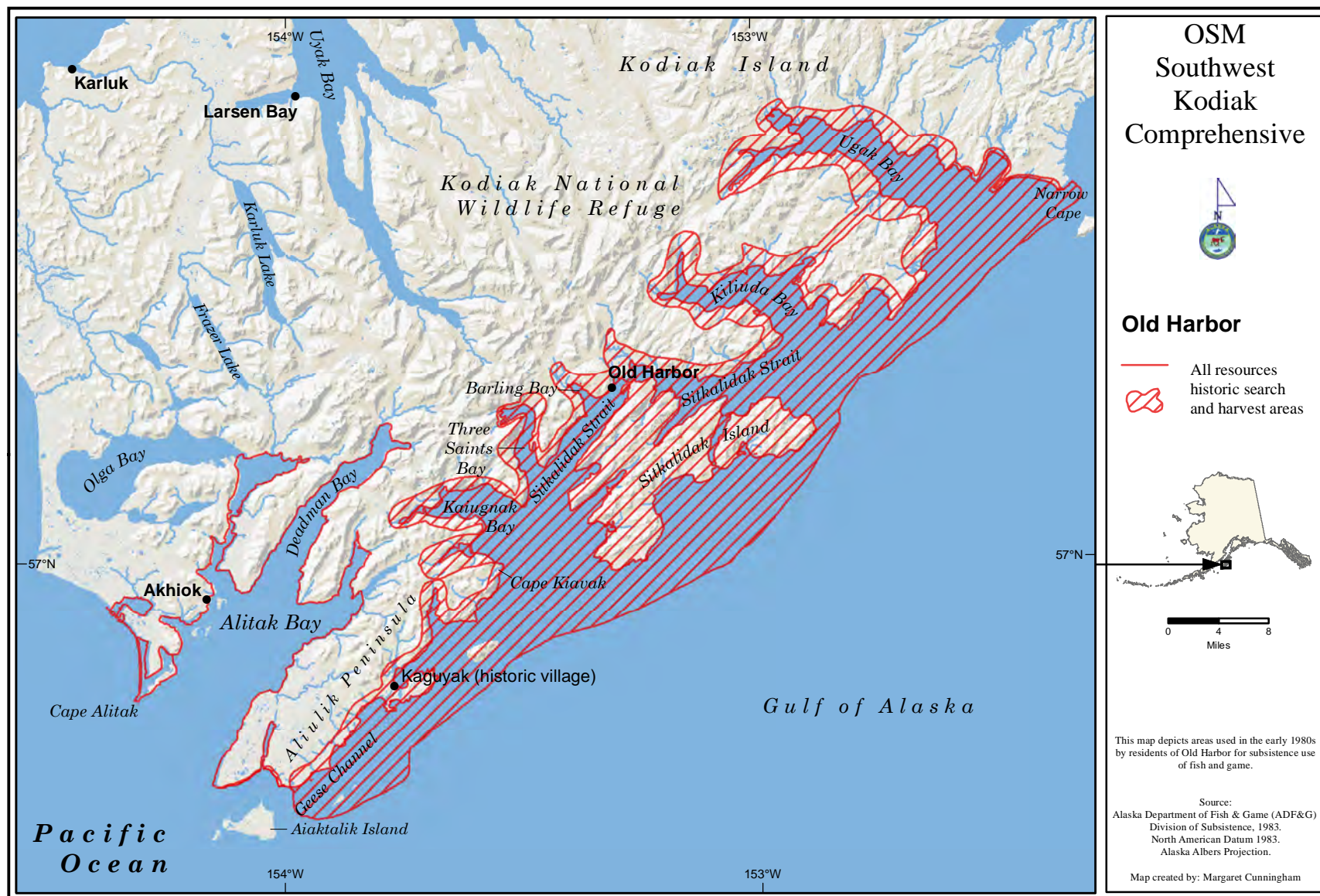


Figure 3-41.—Wild resources search and harvest areas, Old Harbor, 1982.

Geese Channel or Geese Islands. Search and harvest areas were concentrated closer to the community along Sitkalidak strait and island as well as some use of Kaiugnak Bay and Two-Headed Island.

Marchioni et al. (2016) used different mapping methods that make a direct comparison difficult. That study recorded the location of harvested fish by name whereas the study that is the subject of this report mapped out harvest areas but also search areas. As would be expected, by using a map to let respondents document their harvest areas as well as their search areas, this study documented a broader use area for salmon than did the 2012 study.

LOCAL COMMENTS AND CONCERNS

Following is a summary of local observations of wild resource populations and trends that were recorded during the surveys in Old Harbor. Some households did not offer any additional information during the survey interviews, so not all households are represented in the summary.

Fish

The majority of the additional comments offered by Old Harbor respondents concerned fish, in particular Pacific halibut. In general, respondents noted that there were a lot fewer Pacific halibut locally now than in the past. One respondent recalled seeing halibut come up on the beach to eat fish guts thrown in the water. Several respondents attributed this decline to commercial fishing activities happening too close to town—both longliners targeting halibut and the trawlers targeting other fish. Several respondents wished there was a way to keep the commercial activity farther from the local waters of Old Harbor. One respondent noted that it was still possible to get halibut if you could travel farther from town, but that is not a safe option for all the people who own skiffs. Respondents noted that the halibut that are being pulled up are smaller and smaller in size. Because of the lack of halibut, one survey respondent believed people were switching their focus to rockfish and negatively affecting rockfish populations. Another respondent also commented that Pacific (gray) cod and lingcod are both harder to come by now and that he used to be able to catch flounder right off the docks in the 1980s. In contrast, people are catching more skates and sharks, which are less desirable species. As for salmon, one respondent worries that the increasing bear population could potentially damage the salmon population and inhibit access to subsistence harvesting locations. Another respondent thought that salmon fluctuated biannually and that 2018 was a good year for salmon.

Large Land Mammals

Regarding large land mammals, two concerns were voiced. One respondent was concerned with non-local sport hunters who come to the area to hunt, either guided or non-guided, and only salvage antlers. This respondent felt the situation was made worse when these hunters also do not donate the meat to the community. Another respondent wished that guides would be more conscientious about where game is taken so that it is farther from traditional subsistence hunting locations. The other concern was that there were too many bears locally. According to this respondent, the local bear population has grown significantly and the official population estimate for the whole island is much too low. The respondent recalled seeing up to 19 bears in one day in the lagoon and recounted damage bears had done in the community. Another respondent was concerned about the negative effect bears are having on people's access to subsistence harvest locations, especially for fish.

Marine Invertebrates

Only one comment was offered about marine invertebrates which was that the respondent observed that Tanner crab were coming back from low population years.

4. LARSEN BAY

COMMUNITY BACKGROUND

The community of Larsen Bay is situated on the shores of its eponymous water body, which is a small inlet near the mouth of the larger Uyak Bay (Figure 4-1). Like much of the rest of Kodiak Island, the local geography bears the marks of past glacial activity. Larsen Bay itself is a fjord once filled with the glacial ice that covered all of Uyak Bay. The community is located along a beach, with surrounding hills and mountains reaching 3,000 feet. Area vegetation is dominated by deciduous forests and alder and willow brush, with some Sitka spruce trees. The climate of Larsen Bay is mild with cool summers and relatively warm winters. While it can be often overcast and rainy, Larsen Bay, being on the western side of Kodiak Island, generally receives significantly less precipitation than the eastern side of the island. Similar to the other study communities, wintertime is when the worst of the storms usually occur.

Based on archeological evidence found near the present-day community, the area has likely been occupied for longer than 2,000 years (Clark 1996; Heizer 1956).¹ More recently, Russian fur traders began visiting the area as early as the mid-1700s, but the modern community did not begin to develop until the late 1800s. The Arctic Packing Company built a cannery in 1888 across Larsen Bay from the contemporary town and created a seasonal community of workers who processed salmon. Because there were only commercially viable populations of pink salmon in the streams of Uyak Bay, most of the cannery-processed sockeye salmon came mainly from Karluk (Bean 1890). In 1911, the Alaska Packers Association moved the cannery across the bay next to the future location of the Larsen Bay community. By the 1930s, families living in the Uyak Bay region began to settle beside the cannery and gradually residents from Karluk and Uganik joined them.² The community's name originates with Peter Larsen, a Dane who lived on Unga Island and was a bear hunter and guide on mainland Alaska and Kodiak, among other careers (Norgaard Consultants 1984).³ The Larsen Bay cannery still operates: Icicle Seafoods was operating it in 2018, having purchased it in 2006 after several other ownership changes through the years (Plate 4-1). Along with employment in the cannery and commercial fisheries, several lodges and associated guiding services provide seasonal employment in the community.

The city of Larsen Bay incorporated in 1974 as a second-class city within the Kodiak Island Borough. It is governed by an elected city council and mayor. The Native Village of Larsen Bay is the federally recognized tribe located in the community. There is a school building in town, but it closed during the 2018/2019 school year due to insufficient enrollment. In 2019, the building was being used for general community needs. No year-round grocery store exists in Larsen Bay, but during the summer a store operates out of the cannery property. For the remainder of the year, residents rely on the city of Kodiak for fulfilling their shopping needs. Fuel is sold locally year-round. The Kodiak Area Native Association provides healthcare and social services to community residents at the local clinic, staffed by community health aides and itinerant medical professionals. The clinic also provides lodging for visitors because there is no hotel or other facility to use for lodging. During the summer months, several lodges bring in guests. The local, city-owned utility company provides electricity through a hydroelectric facility just south of town and also by using diesel-powered generators. Icicle Seafoods maintains its own generating facility for the cannery, but also purchases electricity from the city. Water is supplied to the community through a gravity feed from the hydroelectric plant and wastewater is treated with septic tanks; the majority of homes within the

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1. Bray and Killion (1994) provide insight and discussion into the pre-history of Larsen Bay and the connections with modern-day residents through an investigation into the effort by Larsen Bay residents to recover remains collected during early archeological digs and kept by the Smithsonian Institute.
 2. Alutiiq Museum. 2020. "Larsen Bay." https://alutiiqmuseum.org/word-of-the-week-archive/446-larsen_bay (accessed April 13, 2021).
 3. Find a Grave. 2021. "Peter Adolf Larsen." <https://www.findagrave.com/memorial/141096345/peter-adolf-larsen> (accessed April 13, 2021).



Figure 4-1.—Community study area, Larsen Bay.



Photo by Jacqueline M. Keating, ADF&G

Plate 4-1.—Larsen Bay Cannery building.

city receive water and wastewater services. The city contracts with a private entity for weekly household garbage collection; refuse is transported to the landfill west of town.

There are no roads connecting Larsen Bay to the rest of Kodiak Island; access is by air or water. Karluk is the closest extant community and there are many cultural and family ties between the two communities. The state operates a gravel airstrip and a seaplane base. Daily flights operate between Larsen Bay and Kodiak, with flights between Larsen Bay and Karluk available three times per week. Commercial airline operations serve Kodiak with connections to the rest of the state and country. Dock facilities are maintained by the cannery for its use, and there is a small boat harbor for the local fleet as well as a barge landing for goods and supplies.

POPULATION ESTIMATES AND DEMOGRAPHIC INFORMATION

This study estimated the population of Larsen Bay in 2018 to be 67 residents living in 30 households (Table 4-1). Approximately 72% of the community's residents were Alaska Native. Other sources estimated varying populations in Larsen Bay: the 2010 federal census identified 34 households in Larsen Bay with 87 residents, and the ACS estimated average population from 2014–2018 was 25 households containing a total of 52 people. Estimates of total number of Alaska Natives in the community also differ: the percentage of the community estimated as being Alaska Native in this study is less than that estimated by the U.S. Census Bureau (76%) and higher than the ACS estimate of 64%. Estimates based on this study and the ACS-produced estimates are not significantly different from each other (Figure 4-2). The U.S. Census Bureau

Table 4-1.—Population estimates, Larsen Bay, 2010 and 2018.

	Census (2010)	5-year American Community Survey (2014–2018)				This study (2018)	
		Estimate	Range ^a	Estimate	Range ^b		
Total population							
Households	34	25.0	13 – 37	30.0			
Population	87	52.0	26 – 78	67.1	56 – 78		
Alaska Native							
Population	66	33.0	11 – 55	48.6	40 – 57		
Percentage	75.9%	63.5%	21.2% – 100.0%	72.3%	60.2% – 100.0%		

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

Note Division of Subsistence household survey eligibility 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.

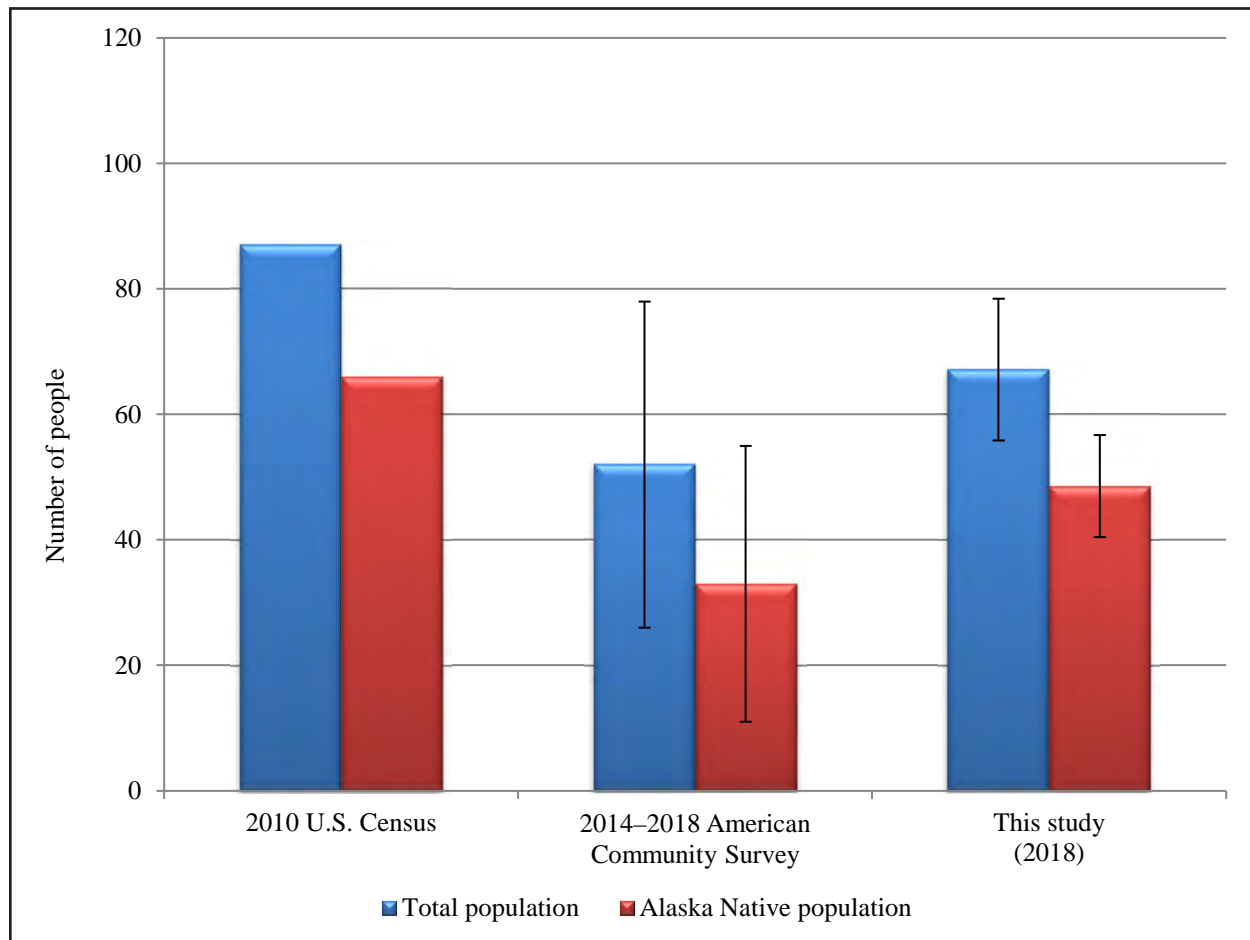


Figure 4-2.—Alaska Native and overall population estimates, Larsen Bay, 2010 and 2018.

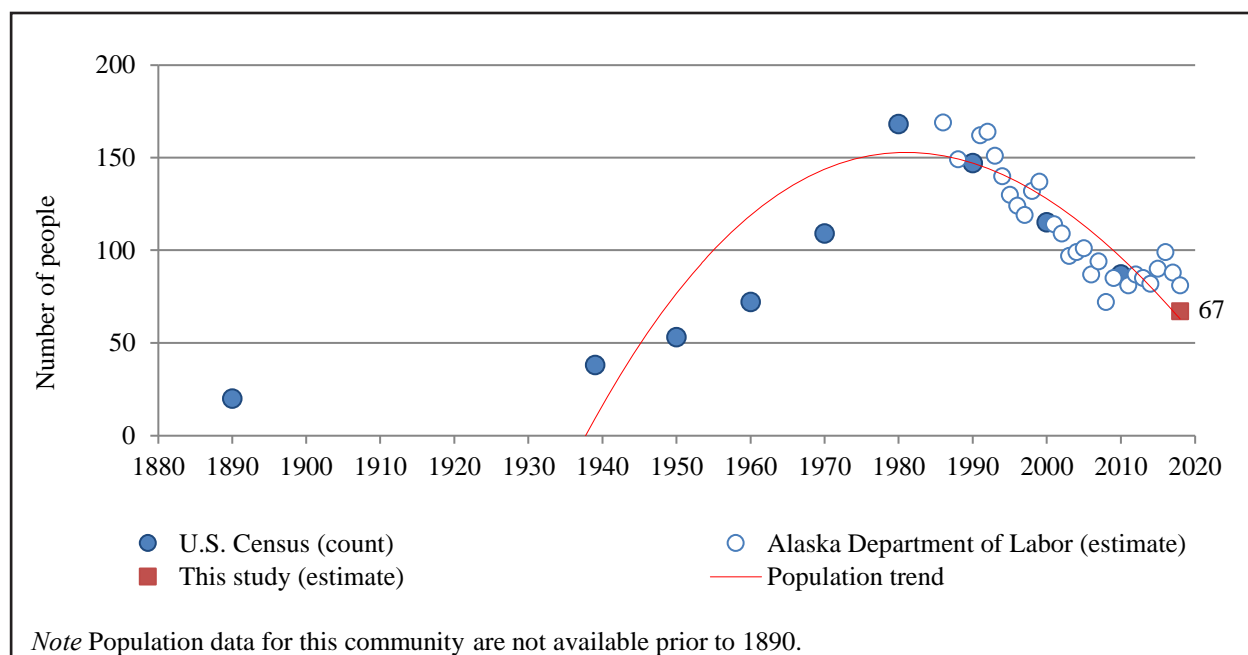


Figure 4-3.—Historical population estimates, Larsen Bay, 1880–2018.

results may be higher than this study's in part because the population of Larsen Bay has been experiencing a general population decline since the 1980s (Figure 4-3). Population growth in Larsen Bay started in the late 1800s with the arrival of fish packing companies expanding from the Karluk area (Roppel 1994). Weakening of commercial fisheries, out-migration to larger towns for employment and health services, and the closure of the Larsen Bay school have likely contributed to the declining population since the 1980s.

Approximately 70% of the population lived in one of the 21 sampled households during this study (Table 4-2). From this sampled population, it was estimated that the average household contained two residents with a minimum household size of one and a maximum of seven. The average resident of Larsen Bay in 2018 was 41 years old and the median age was slightly older at 45 years. The eldest resident sampled was 78 years old. Of the total population, the average resident had lived in Larsen Bay for 23 years and the longest-residing resident had been there for 64 years. Among just heads of households, the average length of residency was longer at 28 years and the minimum length of residency was four years. Looking at the general population, 45% of residents were born in Larsen Bay (Table 4-3). The next most common birthplace was another U.S. state (32%), followed by Kodiak City (11%). Between 2% and 9% of residents were born in Karluk, Craig, or Sitka. Focusing only on household heads, approximately 39% of household heads were born in Larsen Bay, 39% in another U.S. state, and 10% in Karluk (Table 4-4). The age of Larsen Bay residents in 2018 was relatively old, with 47% of its residents being 44 years of age or younger (Table 4-5). There were slightly more males than females living in the community overall. There were no females aged 30–44, but there were more girls aged 10–19 compared to males (Figure 4-4). Other age cohorts were generally balanced between genders, with only three or fewer people in most age cohorts.

Table 4-2.—Sample and demographic characteristics, Larsen Bay, 2018.

Characteristics	Community Larsen Bay
Sampled households	21
Eligible households	30
Percentage sampled	70.0%
Sampled population	47
Estimated community population	67.1
Household size	
Mean	2.2
Minimum	1.0
Maximum	7.0
Age	
Mean	40.8
Minimum ^a	1.0
Maximum	78.0
Median	45
Length of residency	
Total population	
Mean	22.9
Minimum ^a	1.0
Maximum	64.0
Heads of household	
Mean	28.2
Minimum ^a	4.0
Maximum	64.0
Alaska Native	
Estimated households ^b	
Number	22.9
Percentage	76.2%
Estimated population	
Number	48.6
Percentage	72.3%

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

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 4-3.—Birthplaces of population, Larsen Bay, 2018.

Birthplace	Percentage
Craig	2.1%
Karluk	8.5%
Kodiak City	10.6%
Larsen Bay	44.7%
Sitka	2.1%
Other U.S.	31.9%

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

Note "Birthplace" means the place
of residence of the parents of the
individual when the individual was
born.

Table 4-4.—Birthplaces of household heads, Larsen Bay, 2018.

Birthplace	Percentage
Craig	3.2%
Karluk	9.7%
Kodiak City	6.5%
Larsen Bay	38.7%
Sitka	3.2%
Other U.S.	38.7%

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

Note "Birthplace" means the place of
residence of the parents of the
individual when the individual was
born.

Table 4-5.—Population profile, Larsen Bay, 2018.

Age	Male			Female			Total		
	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	1.4	3.8%	3.8%	0.0	0.0%	0.0%	1.4	2.1%	2.1%
5–9	2.9	7.7%	11.5%	1.4	4.8%	4.8%	4.3	6.4%	8.5%
10–14	1.4	3.8%	15.4%	2.9	9.5%	14.3%	4.3	6.4%	14.9%
15–19	1.4	3.8%	19.2%	4.3	14.3%	28.6%	5.7	8.5%	23.4%
20–24	1.4	3.8%	23.1%	1.4	4.8%	33.3%	2.9	4.3%	27.7%
25–29	2.9	7.7%	30.8%	2.9	9.5%	42.9%	5.7	8.5%	36.2%
30–34	4.3	11.5%	42.3%	0.0	0.0%	42.9%	4.3	6.4%	42.6%
35–39	1.4	3.8%	46.2%	0.0	0.0%	42.9%	1.4	2.1%	44.7%
40–44	1.4	3.8%	50.0%	0.0	0.0%	42.9%	1.4	2.1%	46.8%
45–49	2.9	7.7%	57.7%	5.7	19.0%	61.9%	8.6	12.8%	59.6%
50–54	1.4	3.8%	61.5%	0.0	0.0%	61.9%	1.4	2.1%	61.7%
55–59	5.7	15.4%	76.9%	2.9	9.5%	71.4%	8.6	12.8%	74.5%
60–64	4.3	11.5%	88.5%	4.3	14.3%	85.7%	8.6	12.8%	87.2%
65–69	1.4	3.8%	92.3%	2.9	9.5%	95.2%	4.3	6.4%	93.6%
70–74	0.0	0.0%	92.3%	1.4	4.8%	100.0%	1.4	2.1%	95.7%
75–79	2.9	7.7%	100.0%	0.0	0.0%	100.0%	2.9	4.3%	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	37.1	100.0%	100.0%	30.0	100.0%	100.0%	67.1	100.0%	100.0%

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

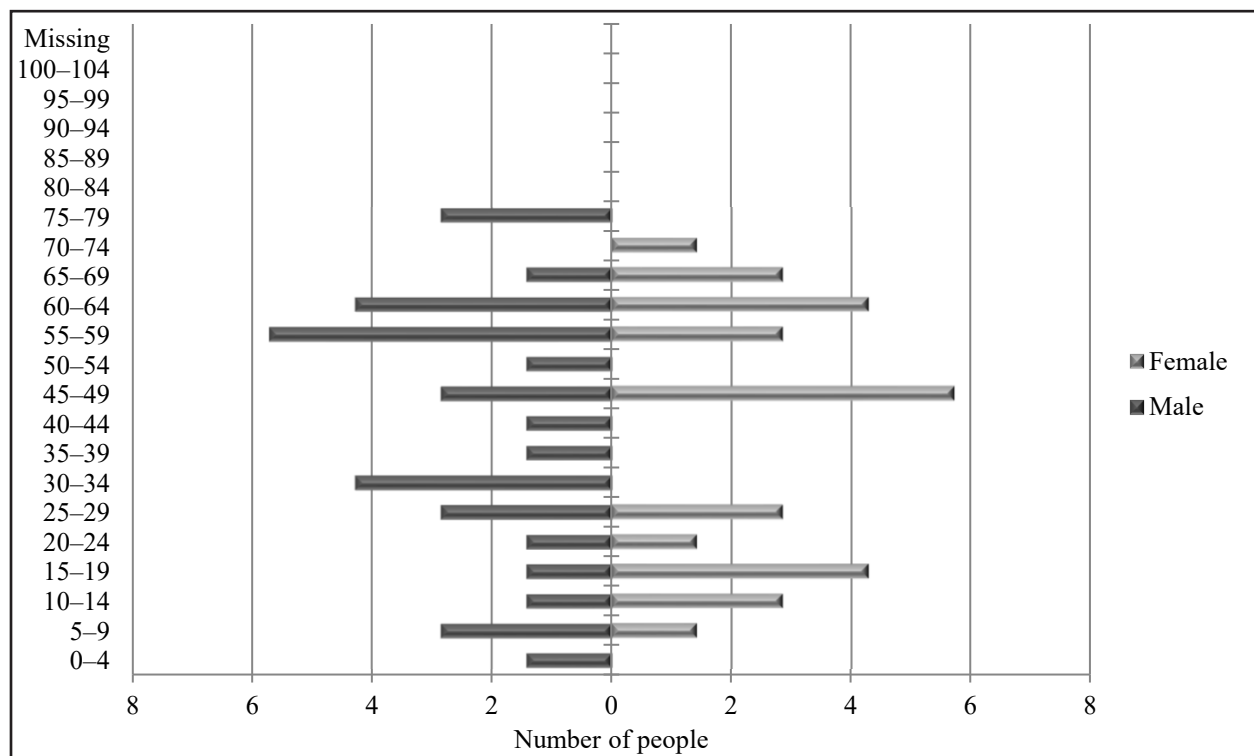


Figure 4-4.—Population profile, Larsen Bay, 2018.

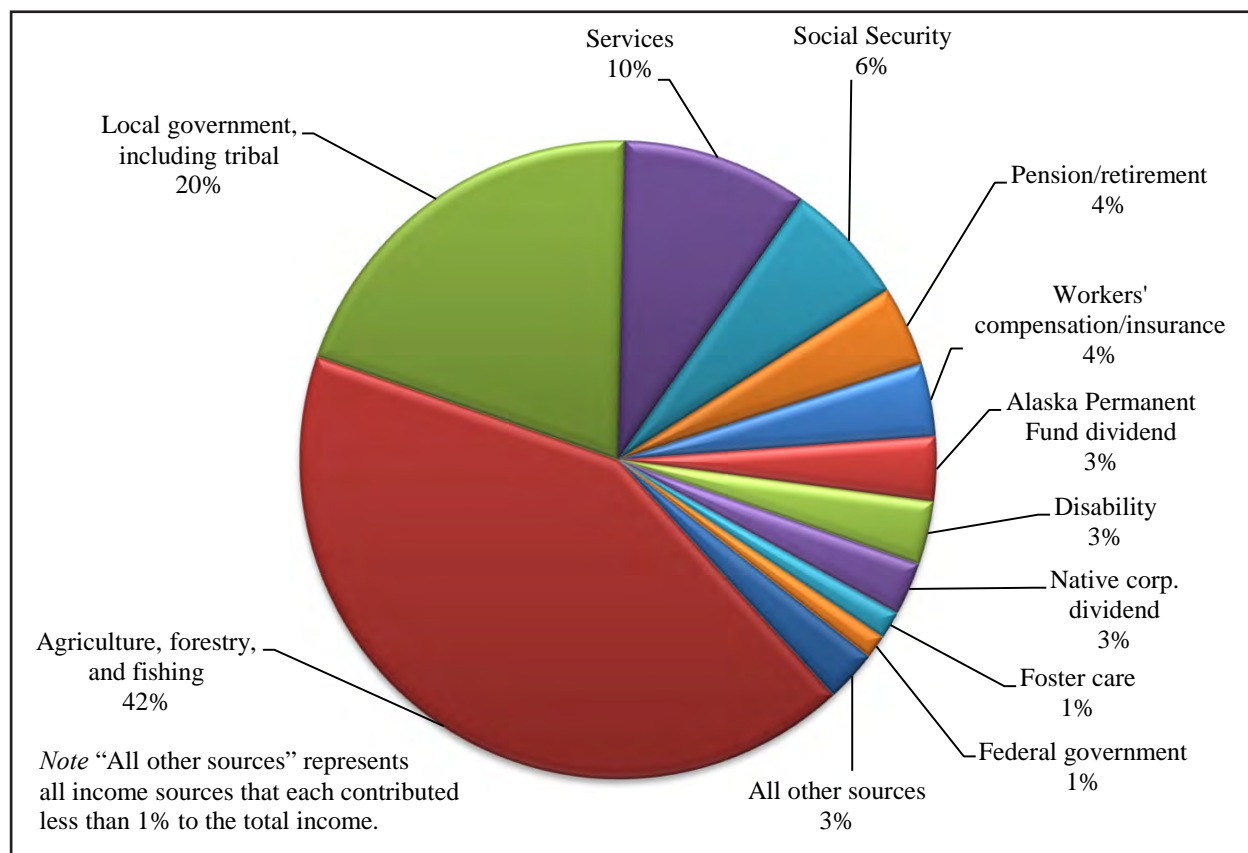


Figure 4-5.—Top income sources, Larsen Bay, 2018.

INCOME AND CASH EMPLOYMENT

Nearly three-quarters (72%) of the total income of Larsen Bay residents in 2018 came from three sources: employment in the agriculture, forestry and fishing sector; employment with local government organizations including tribal; and employment in services (Figure 4-5). Social Security contributed 6% of the total community income, and all other income sources each contributed less than 5%. Of the \$2.2 million in total community income, approximately 74% originated in employment while 26% was other income (Table 4-6); this ratio is similar to the other study communities (Table 2-6; Table 3-6). Top sources of other income were Social Security (\$4,662 per household), pension or retirement (\$3,029 per household), and workers' compensation or insurance (\$2,743 per household). The median household income in 2018 was \$43,000 based on household surveys, which was slightly higher than the ACS 2013–2017 average estimate for Larsen Bay (\$36,250), but approximately one-half (56%) of the ACS estimate for all of Alaska (Figure 4-6). At \$73,437, the average household income was substantially higher than the median household income (Table 4-6; Figure 4-6). Per capita income in 2018 was \$32,812, the highest of the study communities (Table 1-8).

Table 4-6.—Estimated earned and other income, Larsen Bay, 2018.

Income source	Number of employed adults	Number of households	Total for community	-/+ 95% CI	Mean per household	Percentage of total community income
Earned income						
Agriculture, forestry, and fishing	12.4	10.0	\$938,552	\$258,936 – \$1,847,350	\$31,285	42.6%
Local government, including tribal	20.1	14.3	\$447,919	\$192,152 – \$805,990	\$14,931	20.3%
Services	7.7	5.7	\$210,388	\$5,046 – \$608,607	\$7,013	9.5%
Federal government	1.5	1.4	\$26,599	\$4,992 – \$73,624	\$887	1.2%
Earned income subtotal	34.0	24.3	\$1,623,457	\$980,224 – \$2,638,636	\$54,115	73.7%
Other income						
Social Security		8.6	\$139,857	\$46,286 – \$251,857	\$4,662	6.3%
Pension/retirement		2.9	\$90,857	\$63,600 – \$258,857	\$3,029	4.1%
Workers' compensation/insurance		1.4	\$82,286	\$57,600 – \$164,571	\$2,743	3.7%
Alaska Permanent Fund dividend		24.3	\$73,143	\$50,286 – \$93,714	\$2,438	3.3%
Disability		7.1	\$71,314	\$19,886 – \$129,600	\$2,377	3.2%
Native corp. dividend		17.1	\$59,756	\$30,966 – \$101,625	\$1,992	2.7%
Foster care		1.4	\$30,857	\$21,600 – \$61,714	\$1,029	1.4%
Child support		1.4	\$11,429	\$8,000 – \$22,857	\$381	0.5%
Food stamps		2.9	\$6,960	\$4,872 – \$17,246	\$232	0.3%
Longevity bonus		2.9	\$3,320	\$2,324 – \$9,246	\$111	0.2%
Sales (property/garage sales, etc.)		1.4	\$2,857	\$2,000 – \$5,714	\$95	0.1%
Other		1.4	\$2,583	\$1,808 – \$5,166	\$86	0.1%
Meeting honoraria		2.9	\$2,143	\$1,500 – \$6,000	\$71	0.1%
Veterans assistance		1.4	\$1,714	\$1,200 – \$3,429	\$57	0.1%
Heating assistance		1.4	\$571	\$400 – \$1,143	\$19	0.0%
TANF (Temporary Cash Assistance for Needy Families)		0.0	\$0	\$0 – \$0	\$0	0.0%
Adult public assistance (OAA, APD)		0.0	\$0	\$0 – \$0	\$0	0.0%
Supplemental Security income		0.0	\$0	\$0 – \$0	\$0	0.0%
Unemployment		0.0	\$0	\$0 – \$0	\$0	0.0%
CITGO fuel voucher		0.0	\$0	\$0 – \$0	\$0	0.0%
Other income subtotal		28.6	\$579,647	\$259,250 – \$1,047,783	\$19,322	26.3%
Community income total			\$2,203,103	\$1,505,815 – \$3,419,815	\$73,437	100.0%

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

Note In cases where the lower bound of the CI would be less than the reported value, the reported value was used.

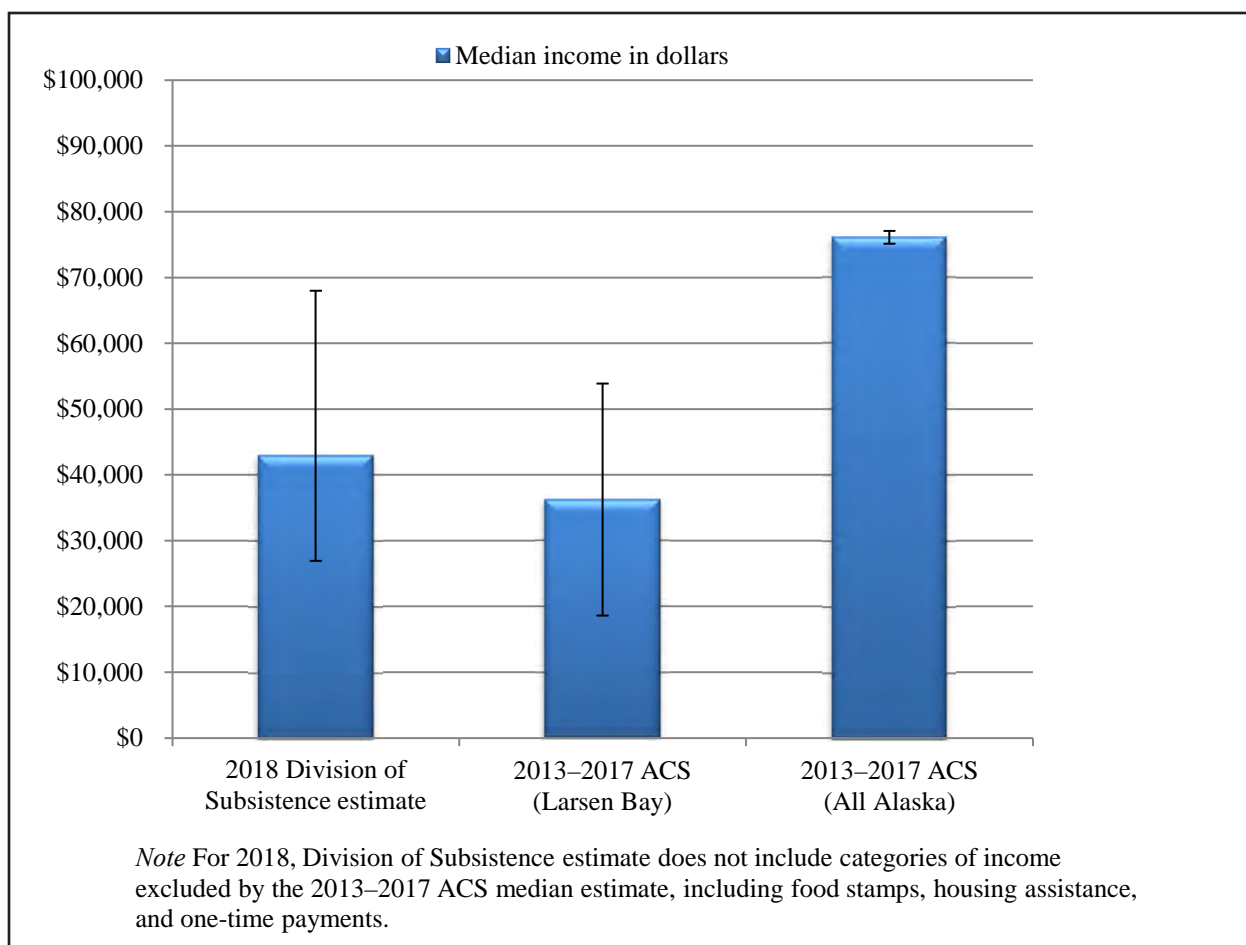


Figure 4-6.—Comparison of household median income estimates, Larsen Bay, 2018.

Employment in the agriculture, forestry, and fishing sector (primarily commercial fishing) contributed 58% of the wage earnings in Larsen Bay but contributed 22% of total jobs in the community (Table 4-7). The local government provided the greatest proportion of jobs (61%) and the second largest proportion of wage earnings (28%). Jobs with the federal government accounted for the smallest percentage of wage earnings (2%) and the smallest percentage of jobs in the community (3%). Jobs in the community were divided among full-time (39% of jobs), part-time (31%), shift (6%) and on-call (22%) schedules (Table 4-8). Most employed persons reported full-time or part-time schedules, with 60% working full time, 36% working part time, 9% working shift jobs, and 27% working on-call jobs (some respondents held more than one job during the 2018 study year and therefore may have reported multiple schedules). An estimated 63% of adults in the community were employed in 2018 and the average length of employment was 10 months in the year (Table 4-9). An employed adult held an average of 1.6 jobs during the year, with a maximum of four jobs. In Larsen Bay, 81% of households were employed and because employed adults worked on average more than one job, each household held an average of 2.3 jobs.

Table 4-7.—Employment by industry, Larsen Bay, 2018.

Industry	Jobs	Employed households	Employed individuals	Percentage of wage earnings
Estimated total number	55.7	24.3	34.0	
Federal government	2.8%	5.9%	4.5%	1.6%
Administrative support occupations, including clerical	2.8%	5.9%	4.5%	1.6%
Local government, including tribal	61.1%	58.8%	59.1%	27.6%
Executive, administrative, and managerial	8.3%	17.6%	13.6%	4.3%
Teachers, librarians, and counselors	5.6%	5.9%	4.5%	2.8%
Technologists and technicians, except health	5.6%	11.8%	9.1%	1.6%
Administrative support occupations, including clerical	13.9%	29.4%	22.7%	5.8%
Service occupations	13.9%	29.4%	22.7%	1.6%
Precision production occupations	5.6%	11.8%	9.1%	9.4%
Transportation and material moving occupations	2.8%	5.9%	4.5%	1.6%
Handlers, equipment cleaners, helpers, and laborers	5.6%	11.8%	9.1%	0.6%
Agriculture, forestry, and fishing	22.2%	41.2%	36.4%	57.8%
Service occupations	2.8%	5.9%	4.5%	4.7%
Agricultural, forestry, and fishing occupations	19.4%	35.3%	31.8%	53.1%
Services	13.9%	23.5%	22.7%	13.0%
Social scientists, social workers, religious workers, and lawyers	2.8%	5.9%	4.5%	2.4%
Health technologists and technicians	2.8%	5.9%	4.5%	3.1%
Service occupations	2.8%	5.9%	4.5%	5.1%
Agricultural, forestry, and fishing occupations	2.8%	5.9%	4.5%	0.2%
Handlers, equipment cleaners, helpers, and laborers	2.8%	5.9%	4.5%	2.2%

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

Table 4-8.—Reported job schedules, Larsen Bay, 2018.

Schedule	Jobs		Employed persons		Employed households	
	Number	Percentage	Number	Percentage	Number	Percentage
Full time	21.7	38.9%	20.1	59.1%	14.3	58.8%
Part time	17.0	30.6%	12.4	36.4%	11.4	47.1%
Shift	3.1	5.6%	3.1	9.1%	2.9	11.8%
On-call (occasional)	12.4	22.2%	9.3	27.3%	8.6	35.3%
Schedule not reported	1.5	2.8%	1.5	4.5%	1.4	5.9%

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

Note Respondents who had more than one job in the study year could provide multiple responses, so the percentages may sum to more than 100%.

Table 4-9.—Employment characteristics, Larsen Bay, 2018.

Characteristic	Community
	Larsen Bay
All adults	
Number	54.3
Mean weeks employed	26.8
Employed adults	
Number	34.0
Percentage	62.7%
Jobs	
Number	55.7
Mean	1.6
Minimum	1
Maximum	4
Months employed	
Mean	9.9
Minimum	2
Maximum	12
Percentage employed year-round	68.2%
Mean weeks employed	42.7
Households	
Number	30.0
Employed	
Number	24.3
Percentage	81.0%
Jobs per employed household	
Mean	2.3
Minimum	1
Maximum	4
Employed adults	
Mean	
Employed households	1.4
Total households	1.1
Minimum	1
Maximum	2
Mean person-weeks of employment	48.5

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

Table 4-10.—Households’ assessments of food security conditions, Larsen Bay, 2018.

Statement	Percentage of sampled households
Had enough of the kinds of food desired	57.1%
Had enough food, but not the desired kind	33.3%
Sometimes, or often, did not have enough food	0.0%

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

FOOD SECURITY

Survey respondents were asked a set of questions intended to assess their household’s food security, defined as, “access by all people at all times to enough food for an active, healthy life” (Coleman-Jensen et al. 2012). The food security questions were modeled after those developed by the U.S. Department of Agriculture (USDA) but modified by ADF&G to account for differences in access to subsistence and store-bought foods. Based on their responses to these questions, households were broadly categorized as being food secure or food insecure following a USDA protocol (Bickel et al. 2000). Food secure households were broken down further into two subcategories—high or marginal food security. Food insecure households were also divided into two subcategories—low food security or very low food security.

Households with high food security did not report any food access problems or limitations. Households with marginal food security reported one or two instances of food access problems or limitations—typically anxiety over food sufficiency or a shortage of particular foods in the house—but gave little or no indication of changes in diets or food intake. Households with low food security reported reduced quality, variety, or desirability of their diet, but they, too, gave little indication of reduced food intake. Households classified as having very low food security were those that reported multiple instances of disrupted eating patterns and reduced food intake (Coleman-Jensen et al. 2012).

Overall, 57% of sampled households in Larsen Bay assessed that they had enough of the kinds of food they wanted eat; 33% said they had enough food, but not necessarily of the kinds they wanted to eat; and no households said they did not have enough food to eat (Table 4-10). Estimates summarized in Figure 4-7 are derived from core questions and responses from Larsen Bay households that did not have enough food or desired kinds of food. For this study, additional questions asked were designed to determine whether food insecurities, if any, were related to subsistence foods or store-bought foods. Responses to the last five conditions depicted on Figure 4-7 were used to assess the severity of food insecure conditions experienced by any household characterized as having low food security. More households (19%) responded that they ran out of subsistence foods at some point during 2018 than answered affirmatively to any other condition. Conversely, only 5% of households responded that their store-bought food did not last through 2018 and 5% of households reported that the household’s food overall did not last. The next question with the highest positive response rate asked whether a household lacked the resources to get food, with 10% of households indicating this was a problem during 2018. Lacking resources means that the household did not have what was needed to hunt, fish, or gather food, or enough money to purchase food. Five percent of households worried that they would run out of food during 2018, and 5% indicated that they ate less than they felt they should. No households experienced the most severe types of food insecurity conditions.

Food security results for surveys for Larsen Bay, the state of Alaska, and the United States are summarized in Figure 4-8. More households were considered food secure in Larsen Bay (95%) than in Alaska overall (85%) or the nation as a whole (89%). Fewer households in Larsen Bay experienced low (5%) or very low (0%) food security in 2018 than households in Alaska or the nation overall. Food security results for the year may obscure the seasonal differences many households experience in food security, based on factors like resource availability, time to harvest, weather, or cash flow fluctuations; however, there was no seasonal variability for this study community.

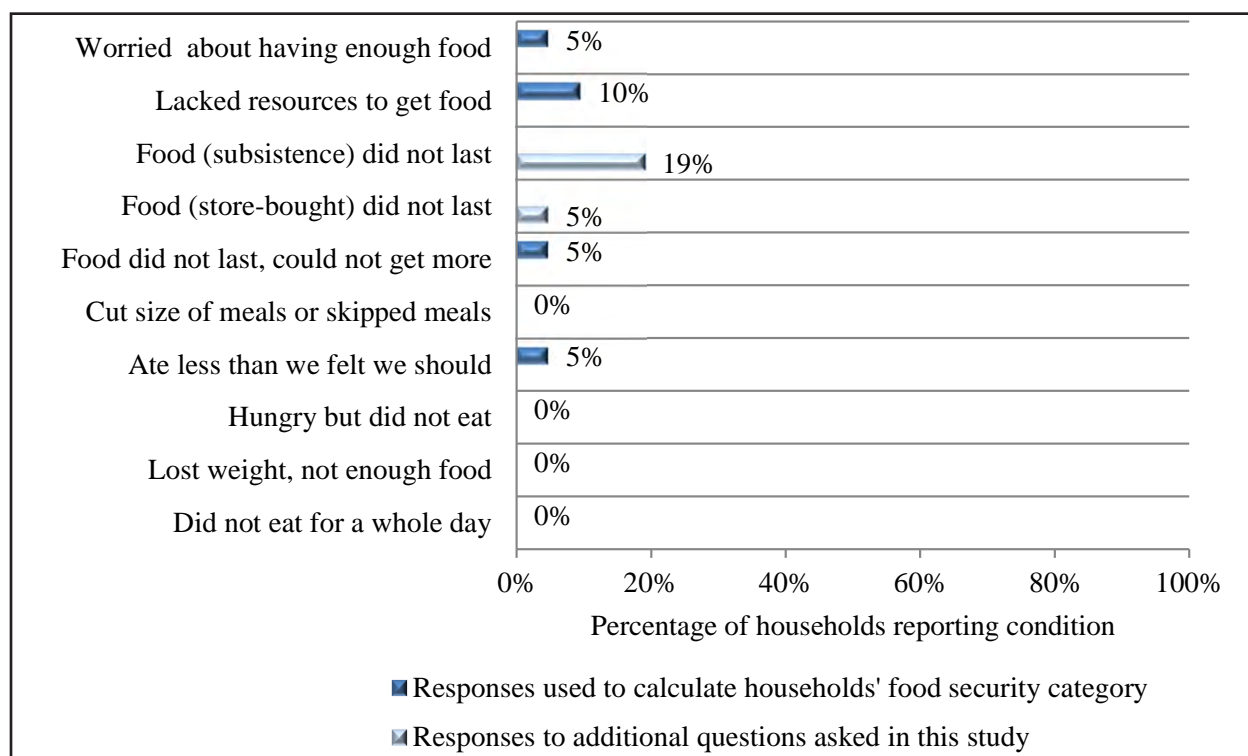


Figure 4-7.—Responses to questions about food insecure conditions, Larsen Bay, 2018.

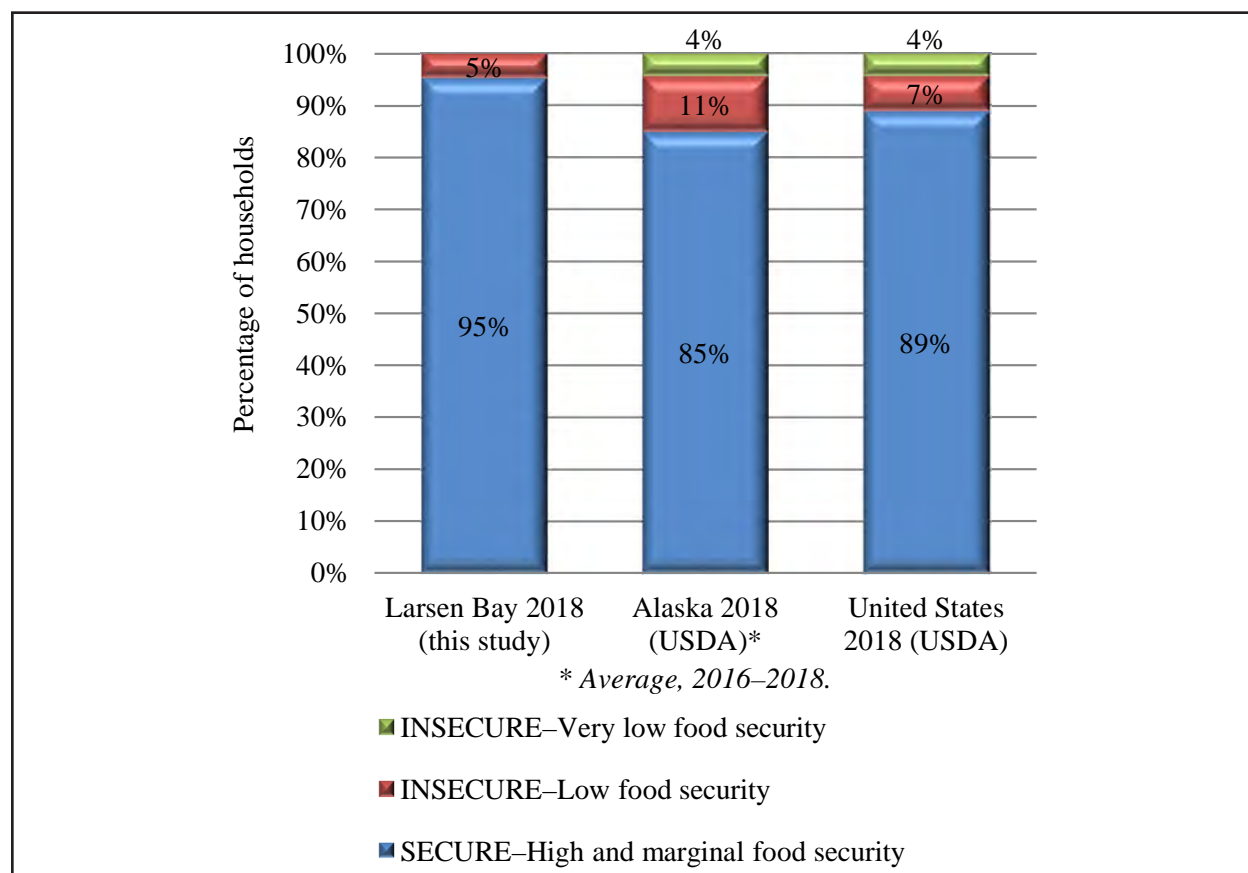


Figure 4-8.—Comparison of food security categories, Larsen Bay, Alaska, and United States, 2018.

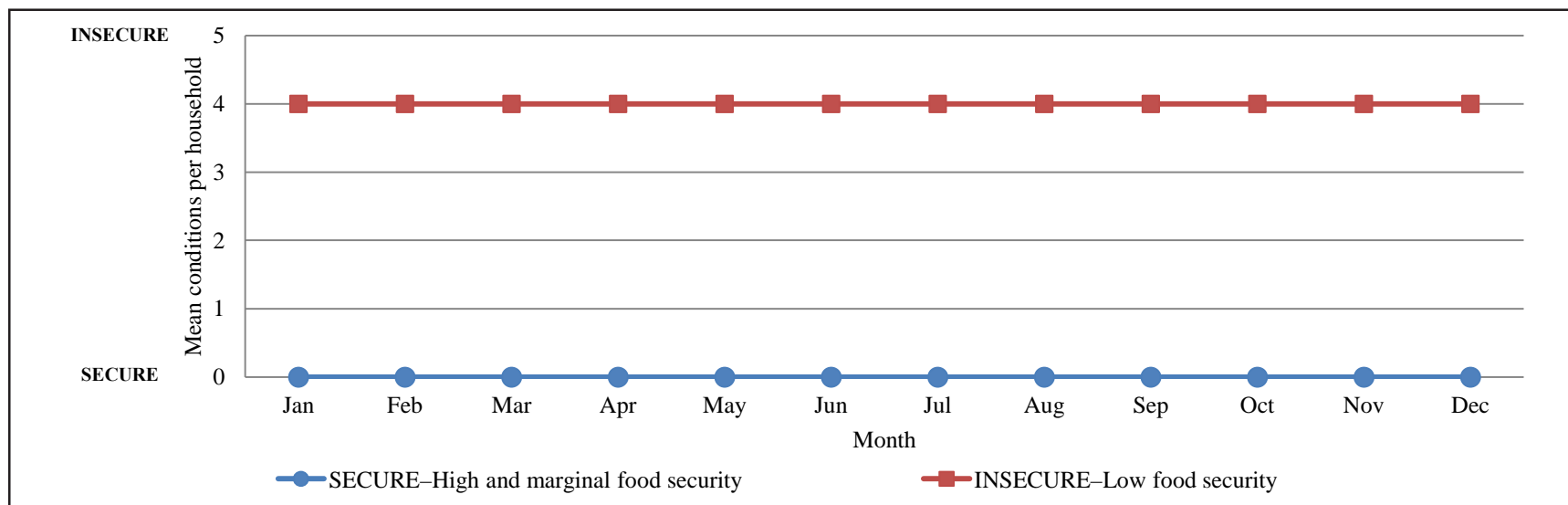


Figure 4-9.—Mean number of food insecure conditions by month and by household food security category, Larsen Bay, 2018.

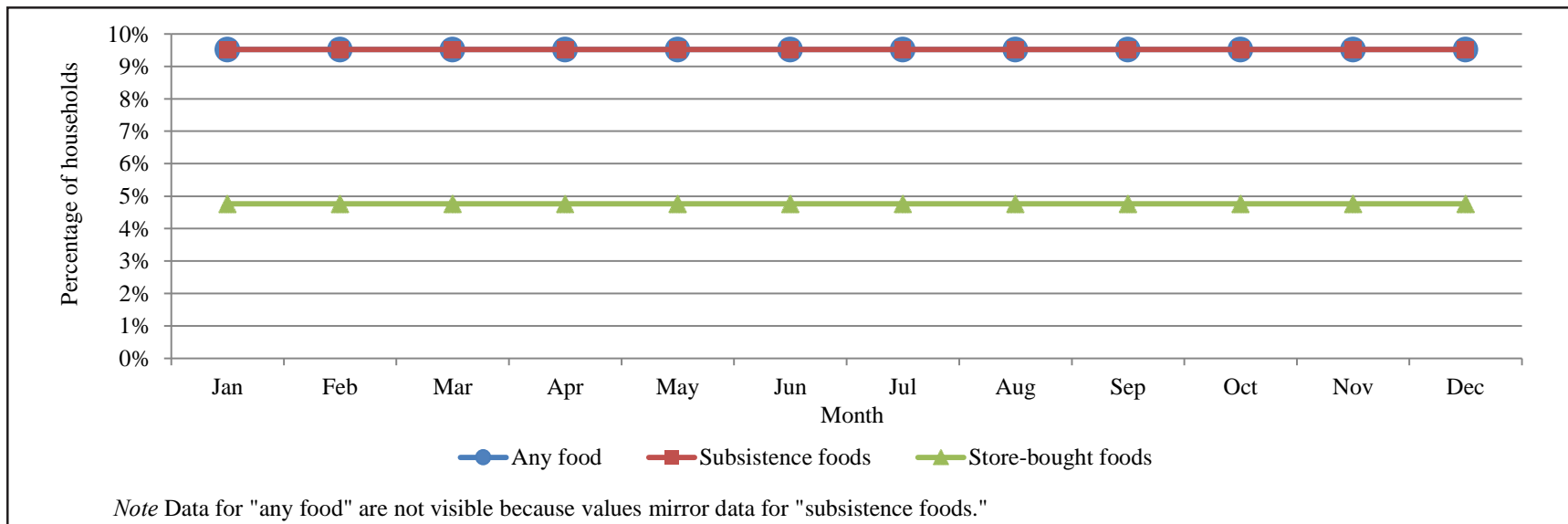


Figure 4-10.—Comparison of months when food did not last, Larsen Bay, 2018.

Figure 4-9 portrays the mean number of food insecure conditions per household by food security category by month. Figure 4-10 shows which months households reported foods not lasting. As can be seen, low food security households reported consistent levels of insecure conditions occurring throughout 2018 (Figure 4-9). In looking at months when food did not last for a household, this happened consistently over the year with 5% of households reporting occurrences of running out of store-bought foods in January through December, and 10% reporting occurrences of running out of subsistence foods for the duration of the study year (Figure 4-10). It is interesting to observe the lack of seasonal variability in availability of subsistence foods, but this could be attributed to the small number of households in Larsen Bay reporting food insecurity.

SUMMARY OF HARVEST AND USE PATTERNS

Individual Participation in the Harvesting and Processing of Wild Resources

Table 4-11 and Figure 4-11 report the expanded levels of individual participation in the harvesting and processing of wild resources by all Larsen Bay residents in 2018. Most Larsen Bay residents participated in harvesting and processing activities. Looking at any resource, 85% of the community participated in harvesting activities, and 89% participated in processing activities. More individuals participated in processing activities than in harvesting activities for all resource categories except for vegetation and marine mammals (the same proportion of the population harvested and processed these resources). Of all the resource categories, most people picked berries or gathered other types of vegetation (77%), collected marine invertebrates (64%), or fished (51%). Fewer than one-half of residents participated in harvesting activities for the remaining resource categories, but the fewest people hunted marine mammals (13%) or hunted birds and collected eggs (13%). Participation in processing activities followed the same pattern: the most individuals processed vegetation (77%), marine invertebrates (66%) and fish (68%), while the fewest people processed marine mammals (13%) and birds and eggs (17%). Substantially more people processed large land mammals (62%) than harvested them (34%). It is relatively common for a smaller number of people to invest the time and resources needed to hunt large land mammals and have a larger number of people helping to butcher the animals. Sharing can occur in the form of packaged meat, or just as likely an entire section of an animal, which would then need to be processed.

Table 4-11.—Individual participation in subsistence harvesting and processing activities, Larsen Bay, 2018.

Total number of people	67.1
Fish	
Fish	
Number	34.3
Percentage	51.1%
Process	
Number	45.7
Percentage	68.1%
Large land mammals	
Hunt	
Number	22.9
Percentage	34.0%
Process	
Number	41.4
Percentage	61.7%
Small land mammals	
Hunt or trap	
Number	12.9
Percentage	19.1%
Process	
Number	18.6
Percentage	27.7%
Marine mammals	
Hunt	
Number	8.6
Percentage	12.8%
Process	
Number	8.6
Percentage	12.8%
Marine invertebrates	
Hunt	
Number	42.9
Percentage	63.8%
Process	
Number	44.3
Percentage	66.0%
Birds and eggs	
Hunt/gather	
Number	8.6
Percentage	12.8%
Process	
Number	11.4
Percentage	17.0%
Vegetation	
Gather	
Number	51.4
Percentage	76.6%
Process	
Number	51.4
Percentage	76.6%
Any resource	
Attempt harvest	
Number	57.1
Percentage	85.1%
Process	
Number	60.0
Percentage	89.4%

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

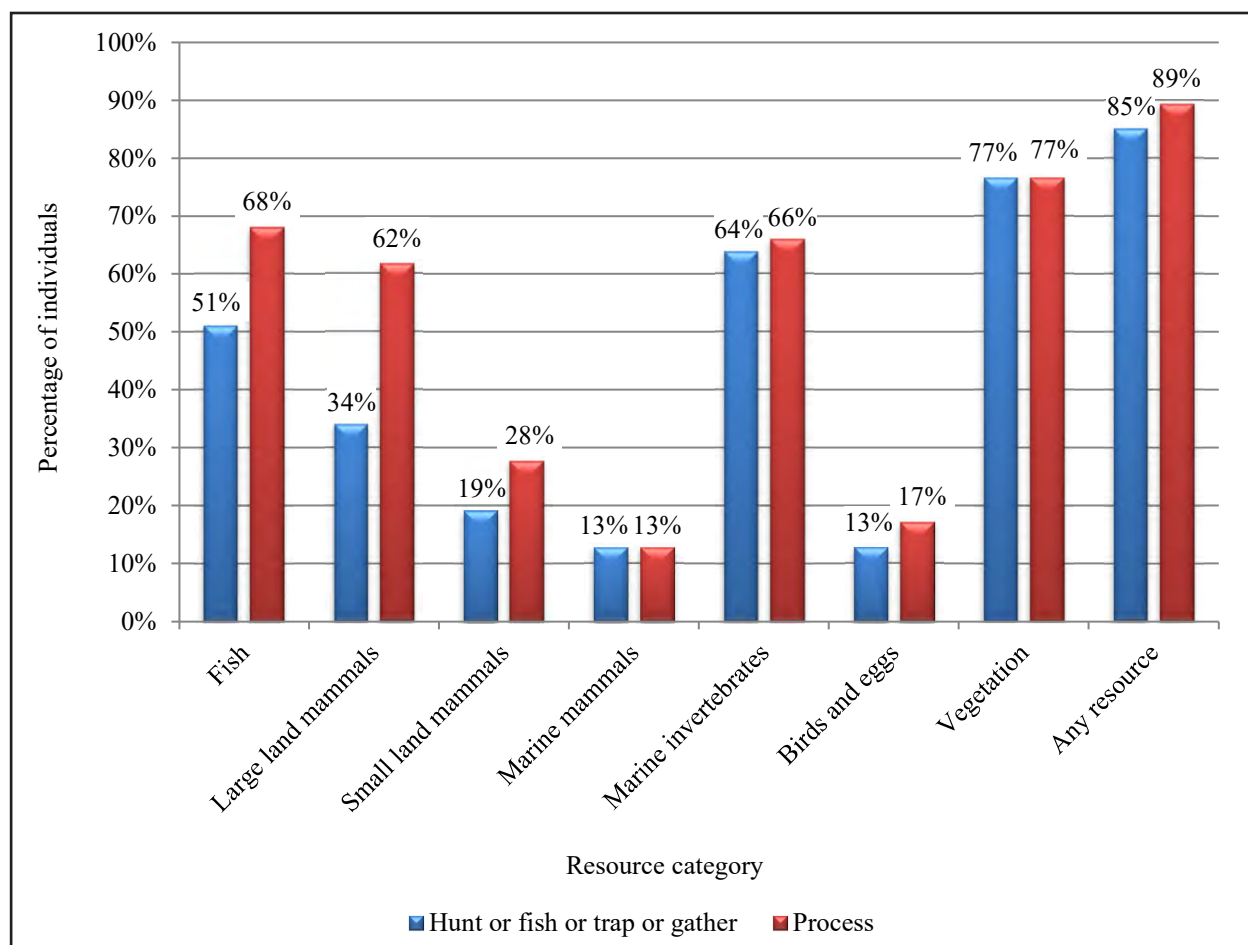


Figure 4-11.—Individual participation in subsistence harvesting and processing activities, Larsen Bay, 2018.

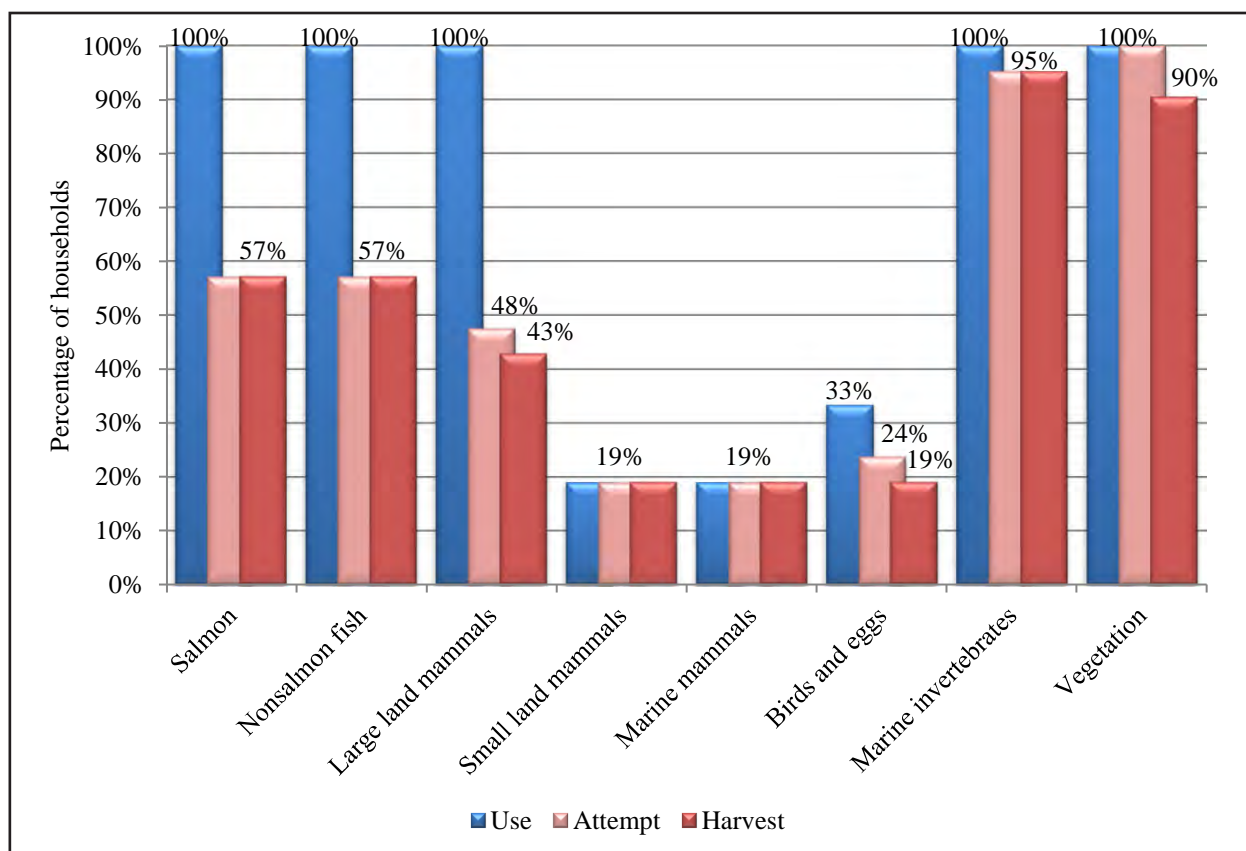


Figure 4-12.—Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Larsen Bay, 2018.

Harvest and Use of Wild Resources at the Household Level

Figure 4-12 shows by resource category the percentages of households that used, attempted to harvest, and harvested wild foods. High levels of use were documented for most resource categories, where all households used salmon, nonsalmon fish, large land mammals, marine invertebrates, and vegetation. One-third or fewer households used the remaining three resource categories: 19% used small land mammals, 19% used marine mammals, and 33% used birds and eggs. Around one-half, or more, households in the community harvested resources from most categories, except for small land mammals, marine mammals, and birds and eggs. For most resource categories, most households that attempted harvests were successful. Not all households were successful in harvesting vegetation, large land mammals, and birds and eggs.

For most resource categories, more households used resources than harvested them. This illustrates how harvested resources are shared within a community. The most notable differences between the percent of households harvesting a resource and percent using are for salmon, nonsalmon fish, and large land mammals.

Table 4-12 summarizes resource harvest and use characteristics for Larsen Bay in 2018 at the household level. The average harvest was 536 lb usable weight per household, or 239 lb per capita. During the study year, community households harvested an average of 12 kinds of resources but used an average of 16 kinds of resources, which is indicative of a high level of sharing in this community. The maximum number of resources used by any household was 32. In addition, households gave away and received an average of six kinds of resources.

Table 4-12.—Resource harvest and use characteristics, Larsen Bay, 2018.

Characteristic	
Mean number of resources used per household	15.7
Minimum	7
Maximum	32
95% confidence limit (\pm)	10.9%
Median	14
Mean number of resources attempted to harvest per household	11.8
Minimum	3
Maximum	33
95% confidence limit (\pm)	17.5%
Median	9
Mean number of resources harvested per household	11.5
Minimum	3
Maximum	32
95% confidence limit (\pm)	17.7%
Median	9
Mean number of resources received per household	6.3
Minimum	0
Maximum	15
95% confidence limit (\pm)	15.0%
Median	6
Mean number of resources given away per household	6.0
Minimum	0
Maximum	14
95% confidence limit (\pm)	17.3%
Median	5
Household harvest (pounds)	
Minimum	6
Maximum	2,601
Mean	535.5
Median	366
Total harvest weight (lb)	16,064.8
Community per capita harvest (lb)	239.3
Percentage using any resource	100.0%
Percentage attempting to harvest any resource	100.0%
Percentage harvesting any resource	100.0%
Percentage receiving any resource	95.2%
Percentage giving away any resource	90.5%
Number of households in sample	21
Number of resources asked about and identified voluntarily by respondents	144

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

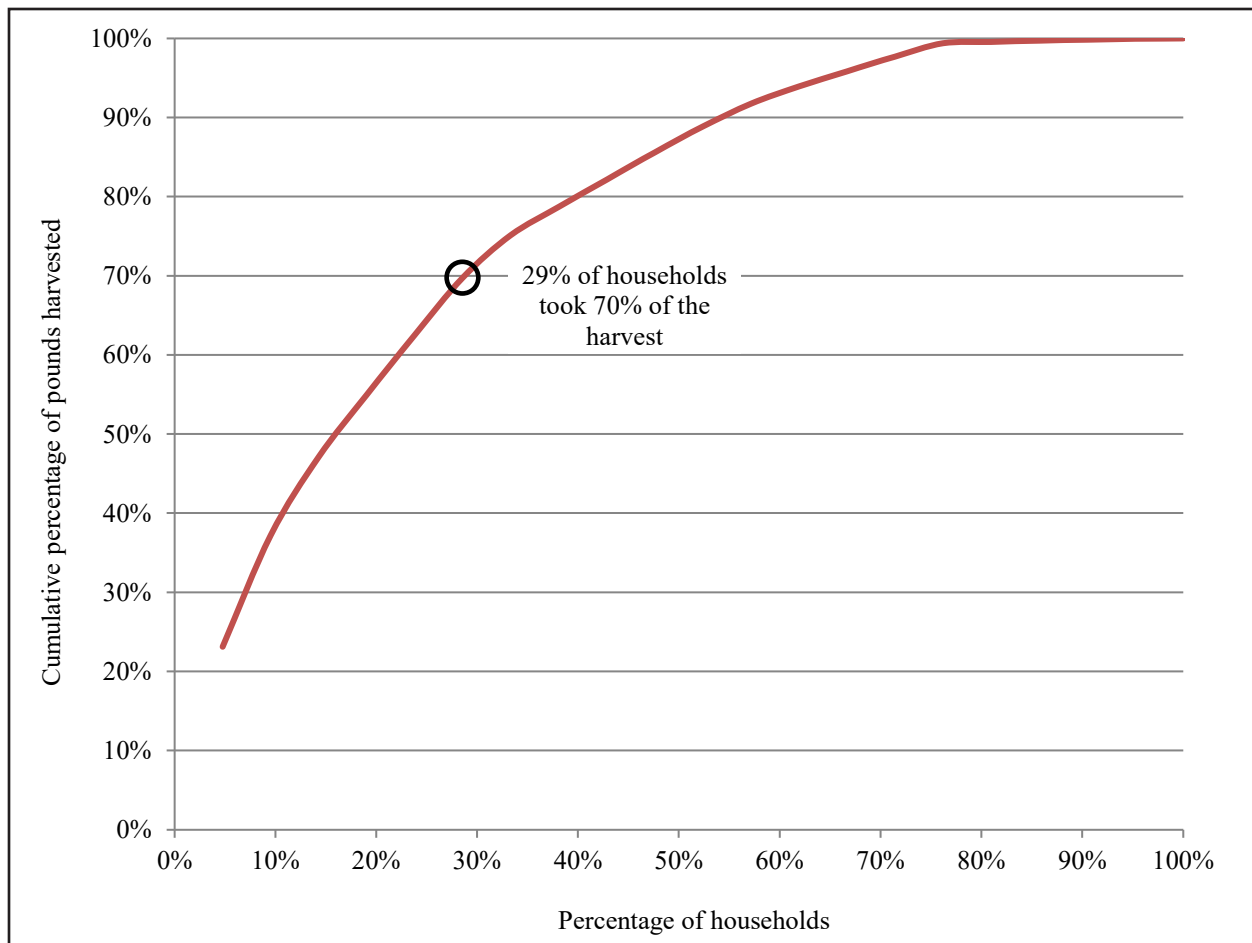


Figure 4-13.—Household specialization, Larsen Bay, 2018.

Household Specialization in Resource Harvesting

Previous studies (Wolfe 1987; Wolfe et al. 2010) have shown that in most rural Alaska communities, a relatively small portion of households produces most of the community's fish and wildlife harvests, which they share with other households. A study of 3,265 households in 66 rural Alaska communities found that about 33% of the households accounted for 76% of subsistence harvests (Wolfe et al. 2010). Although overall the set of very productive households was diverse, factors that were associated with higher levels of subsistence harvests included larger households with a pool of adult male labor, higher wage income, involvement in commercial fishing, and community location.

As shown in Figure 4-13, in the 2018 study year in Larsen Bay, about 70% of the harvests of wild resources as estimated in pounds usable weight were harvested by 29% of the community's households. Further analysis of the study findings, beyond the scope of this report, might identify characteristics of the highly productive households in Larsen Bay and the other study communities.

Harvest Quantities and Composition

Table 4-13 reports estimated wild resource harvests and uses by Larsen Bay residents in 2018 and is organized first by general category and then by species. All edible resources are reported in pounds usable weight (see Appendix D for conversion factors⁴). The harvest category includes resources harvested by any member of the surveyed household during the study year. The use category includes all resources taken, given away, or used by a household, and resources acquired from other harvesters, either as gifts, by barter or customary trade, through hunting partnerships, or as meat given by hunting guides and non-local hunters. Purchased foods are not included, but resources such as firewood are included because they are an important part of the subsistence way of life. Differences between harvest and use percentages reflect sharing among households, which results in a wider distribution of wild foods.

More than 16,000 lb of wild resources were harvested by Larsen Bay households in 2018 (Table 4-13). This equates to an annual per capita harvest of 239 lb. Fish harvests dominated the community's harvest by weight, with salmon accounting for 44% and nonsalmon fish contributing 16% of the total subsistence harvest weight (Figure 4-14). Following the nonsalmon fish harvest weight, the large mammal harvest was a close third, accounting for 14% of the total, followed by marine invertebrates and vegetation, which each composed 12%. A total of 7,503 lb of salmon were harvested (112 lb per capita) as well as 2,738 lb of nonsalmon fish (41 lb per capita) (Table 4-13). Larsen Bay households harvested 2,322 lb of large land mammals (35 lb per capita), 1,953 lb of marine invertebrates (29 lb per capita), and 1,122 lb of plants and berries (17 lb per capita). Marine mammals and birds and eggs each made up less than 1% of the total harvest with per capita harvest weights of fewer than 3 lb (Figure 4-14; Table 4-13).

Seasonal Round

Larsen Bay residents harvest wild resources throughout the calendar year due to the availability of marine resources during the winter months (Schroeder et al. 1987:476). Halibut, harbor seals, sea lions, butter clams, octopus, and multiple species of crab are available to harvest in all months of the year. Some ducks are harvested into January, and ptarmigan are harvested from the fall through the spring. As early as May, residents turn to harvesting salmon, starting with Chinook salmon. Pink, chum, and sockeye salmon harvests start in June, followed by coho salmon harvests beginning in July. Berries and greens ripen and can be gathered in the spring through the fall. Deer hunting starts in August and continues through the beginning of winter. During the fall season ducks, geese, and hares are harvested from September through December.

Although each surveyed household was asked to provide spatial data, not every household participated in that portion of the survey effort and Figure 4-15 is a partial representation of the areas used in 2018 for fishing, hunting, and gathering. Subsequent maps in this chapter identify in the legend the specific sample size for the mapping component for each resource category.

4. Resources that are not eaten, such as firewood and some furbearers, are included in the table but are given a conversion factor of zero.

Table 4-13.—Estimated uses and harvests of fish, game, and vegetation resources, Larsen Bay, 2018.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount		95% confidence limit (±) harvest
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Mean per Unit household	
All resources	100.0	100.0	100.0	95.2	90.5	16,064.8	535.5	239.3	16,064.8 lb	535.5	29.1
Salmon	100.0	57.1	57.1	71.4	57.1	7,503.3	250.1	111.8	7,503.3 lb	250.1	40.9
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	71.4	47.6	47.6	33.3	38.1	1,774.5	59.1	26.4	290.0 ind	9.7	36.7
Chinook salmon	42.9	23.8	23.8	28.6	9.5	140.4	4.7	2.1	28.6 ind	1.0	51.4
Pink salmon	19.0	19.0	19.0	0.0	0.0	76.0	2.5	1.1	27.1 ind	0.9	67.1
Sockeye salmon	95.2	52.4	52.4	57.1	52.4	5,512.5	183.7	82.1	1,468.6 ind	49.0	47.6
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Nonsalmon fish	100.0	57.1	57.1	71.4	47.6	2,737.7	91.3	40.8	2,737.7 lb	91.3	45.9
Pacific herring	9.5	9.5	9.5	0.0	4.8	542.9	18.1	8.1	90.5 gal	3.0	92.2
Pacific herring roe on hemlock branches	4.8	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0 gal	0.0	0.0
Pacific (gray) cod	42.9	23.8	23.8	23.8	9.5	297.1	9.9	4.4	92.9 ind	3.1	66.5
Unknown cod	4.8	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown flounder	4.8	4.8	4.8	0.0	0.0	4.3	0.1	0.1	1.4 ind	0.0	114.3
Kelp greenling	4.8	4.8	4.8	0.0	0.0	57.1	1.9	0.9	57.1 ind	1.9	114.3
Lingcod	9.5	9.5	9.5	0.0	0.0	57.1	1.9	0.9	14.3 ind	0.5	93.1
Pacific halibut	95.2	52.4	52.4	66.7	38.1	1,527.4	50.9	22.7	1,527.4 lb	50.9	35.6
Black rockfish	28.6	19.0	19.0	14.3	9.5	109.3	3.6	1.6	72.9 ind	2.4	64.9
Yelloweye rockfish	4.8	4.8	4.8	0.0	0.0	22.9	0.8	0.3	5.7 ind	0.2	114.3
Quillback rockfish	4.8	4.8	4.8	0.0	0.0	22.9	0.8	0.3	5.7 ind	0.2	114.3
Unknown rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Sablefish (black cod)	9.5	4.8	4.8	4.8	0.0	26.6	0.9	0.4	8.6 ind	0.3	114.3
Bullhead sculpin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown sculpin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown shark	4.8	4.8	4.8	0.0	0.0	12.9	0.4	0.2	1.4 ind	0.0	114.3
Skates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Dolly Varden	9.5	9.5	9.5	0.0	0.0	24.0	0.8	0.4	17.1 ind	0.6	96.2
Lake trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Arctic grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Rainbow trout	4.8	4.8	4.8	0.0	0.0	3.0	0.1	0.0	4.3 ind	0.1	114.3
Steelhead	19.0	9.5	9.5	9.5	14.3	25.3	0.8	0.4	36.1 ind	1.2	94.8
Unknown trout	4.8	4.8	4.8	0.0	0.0	5.0	0.2	0.1	7.1 ind	0.2	114.3

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Table 4-13.--Page 2 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount		95% confidence limit (±) harvest
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	
Large land mammals	100.0	47.6	42.9	81.0	52.4	2,321.7	77.4	34.6	2,321.7 lb	77.4	51.1
Brown bear	9.5	9.5	4.8	4.8	4.8	201.4	6.7	3.0	1.4 ind	0.0	114.3
Caribou	4.8	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Deer	100.0	42.9	38.1	81.0	52.4	1,913.1	63.8	28.5	44.3 ind	1.5	59.6
Elk	4.8	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Mountain goat	28.6	4.8	4.8	23.8	14.3	207.1	6.9	3.1	2.9 ind	0.1	114.3
Moose	4.8	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Small land mammals	19.0	19.0	19.0	0.0	0.0	222.9	7.4	3.3	222.9 lb	7.4	79.5
Beaver	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Red fox	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	4.3 ind	0.1	114.3
Snowshoe hare	14.3	14.3	14.3	0.0	0.0	222.9	7.4	3.3	112.9 ind	3.8	79.5
River (land) otter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Gray wolf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Marine mammals	19.0	19.0	19.0	0.0	4.8	160.0	5.3	2.4	160.0 lb	5.3	57.1
Harbor seal	9.5	9.5	9.5	0.0	4.8	160.0	5.3	2.4	2.9 ind	0.1	57.1
Sea otter	9.5	9.5	9.5	0.0	0.0	0.0	0.0	0.0	92.9 ind	3.1	90.5
Steller sea lion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown whale	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Birds and eggs	33.3	23.8	19.0	14.3	9.5	45.0	1.5	0.7	45.0 lb	1.5	73.3
Bufflehead	9.5	4.8	4.8	4.8	0.0	1.6	0.1	0.0	2.9 ind	0.1	114.3
Common eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
King eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Steller's eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown goldeneye	4.8	4.8	0.0	4.8	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Harlequin duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Mallard	14.3	9.5	4.8	9.5	0.0	11.5	0.4	0.2	7.1 ind	0.2	114.3
Merganser	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Northern pintail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Unknown scaup	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Black scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Surf scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
White-winged scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0
Northern shoveler	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0	0.0

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Table 4-13.-Page 3 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Birds and eggs, continued												
Unknown teal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
American wigeon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Brant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Cackling goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Emperor goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
White-fronted goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown swans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Sandhill crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Black oystercatcher	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown auklet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown cormorant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Glaucous-winged gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Herring gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Mew gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Sabine's gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Black-legged kittiwake	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown murre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown tern	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown ptarmigan	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Mallard eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Black oystercatcher eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Glaucous-winged gull eggs	19.0	19.0	19.0	0.0	9.5	31.9	1.1	0.5	157.1 ind		5.2	66.4
Herring gull eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Mew gull eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Black-legged kittiwake eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown murre eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Unknown tern eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind		0.0	0.0
Marine invertebrates	100.0	95.2	95.2	61.9	71.4	1,952.5	65.1	29.1	1,952.5 lb		65.1	25.5
Red (large) chitons	14.3	9.5	9.5	4.8	0.0	5.4	0.2	0.1	1.8 gal		0.1	93.1
Black (small) chitons	23.8	23.8	23.8	9.5	14.3	84.0	2.8	1.3	21.0 gal		0.7	85.3
Butter clams	66.7	47.6	47.6	28.6	42.9	535.7	17.9	8.0	178.6 gal		6.0	34.4

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Table 4-13.--Page 4 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95%
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	confidence limit (±) harvest
Marine invertebrates, continued												
Horse clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Pacific littleneck clams (steamers)	19.0	9.5	9.5	9.5	9.5	47.1	1.6	0.7	15.7 gal	0.5		103.9
Razor clams	9.5	9.5	9.5	4.8	0.0	94.3	3.1	1.4	31.4 gal	1.0		103.9
Unknown clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Unknown cockles	9.5	9.5	9.5	0.0	4.8	23.2	0.8	0.3	7.7 gal	0.3		105.3
Dungeness crab	28.6	19.0	19.0	14.3	4.8	215.0	7.2	3.2	307.1 ind	10.2		81.2
Brown king crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0		0.0
Red king crab	52.4	38.1	38.1	19.0	19.0	65.7	2.2	1.0	28.6 ind	1.0		35.6
Tanner crab, bairdi	52.4	38.1	38.1	33.3	19.0	113.7	3.8	1.7	284.3 ind	9.5		43.8
Unknown Tanner crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0		0.0
Unknown crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Limpets	4.8	4.8	4.8	0.0	0.0	2.1	0.1	0.0	0.7 gal	0.0		114.3
Blue mussels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ind	0.0		0.0
Octopus	71.4	61.9	57.1	38.1	42.9	560.0	18.7	8.3	140.0 gal	4.7		28.6
Weathervane scallops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Unknown scallops	4.8	4.8	4.8	0.0	0.0	117.1	3.9	1.7	71.4 gal	2.4		114.3
Sea cucumber	19.0	19.0	19.0	0.0	0.0	16.6	0.6	0.2	8.3 gal	0.3		98.3
Red sea cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Sea urchin	23.8	23.8	23.8	4.8	9.5	2.4	0.1	0.0	4.9 gal	0.2		54.7
Shrimp	23.8	19.0	19.0	4.8	4.8	70.0	2.3	1.0	66.4 gal	2.2		64.4
Snails	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Vegetation	100.0	100.0	100.0	42.9	81.0	1,121.7	37.4	16.7	1,121.7 lb	37.4		29.0
Blueberry	4.8	4.8	4.8	0.0	0.0	0.4	0.0	0.0	0.1 gal	0.0		114.3
Lowbush cranberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Highbush cranberry	38.1	38.1	33.3	4.8	23.8	98.6	3.3	1.5	24.6 gal	0.8		57.9
Crowberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Elderberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Cloudberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal	0.0		0.0
Raspberry	61.9	61.9	61.9	9.5	47.6	459.8	15.3	6.8	114.9 gal	3.8		40.6
Salmonberry	57.1	57.1	57.1	9.5	14.3	178.9	6.0	2.7	44.7 gal	1.5		32.2
Twisted stalk berry (watermelon berry)	9.5	9.5	9.5	0.0	0.0	3.6	0.1	0.1	0.9 gal	0.0		93.1

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Table 4-13.–Page 5 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Vegetation, continued												
Other wild berry	4.8	4.8	4.8	0.0	0.0	2.9	0.1	0.0	0.7 gal		0.0	114.3
Beach asparagus	4.8	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Goose tongue	4.8	4.8	4.8	0.0	0.0	0.1	0.0	0.0	0.1 gal		0.0	114.3
Wild rhubarb	9.5	9.5	9.5	4.8	4.8	7.1	0.2	0.1	7.1 gal		0.2	93.1
Fiddlehead ferns	33.3	33.3	33.3	4.8	19.0	294.6	9.8	4.4	294.6 gal		9.8	88.6
Nettle	19.0	19.0	19.0	0.0	0.0	13.2	0.4	0.2	13.2 gal		0.4	70.5
Sourdock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Wild celery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Wild parsley	14.3	14.3	14.3	0.0	4.8	3.0	0.1	0.0	3.0 gal		0.1	75.0
Wild rose hips	4.8	4.8	4.8	0.0	0.0	5.7	0.2	0.1	1.4 gal		0.0	114.3
Other wild greens	4.8	4.8	4.8	0.0	0.0	1.4	0.0	0.0	1.4 gal		0.0	114.3
Unknown mushrooms	14.3	14.3	14.3	4.8	4.8	23.6	0.8	0.4	23.6 gal		0.8	69.2
Fireweed	9.5	4.8	4.8	4.8	4.8	14.3	0.5	0.2	14.3 gal		0.5	114.3
Sea lovage	4.8	4.8	4.8	0.0	0.0	2.9	0.1	0.0	2.9 gal		0.1	114.3
Beach greens	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 gal		0.0	0.0
Bull kelp	4.8	4.8	4.8	0.0	0.0	1.1	0.0	0.0	1.1 gal		0.0	114.3
Bladder wrack	4.8	4.8	4.8	0.0	0.0	0.4	0.0	0.0	0.4 gal		0.0	114.3
Seaweed/kelp used for fertilizer	14.3	14.3	14.3	0.0	4.8	0.0	0.0	0.0	842.9 gal		28.1	76.5
Unknown seaweed	19.0	14.3	14.3	4.8	0.0	10.4	0.3	0.2	10.4 gal		0.3	83.2
Wood	66.7	61.9	61.9	14.3	42.9	0.0	0.0	0.0	0.0 cord		0.0	0.0

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

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

Note Resources harvested for purposes other than food consumption show a non-zero harvest amount with a zero harvest weight.

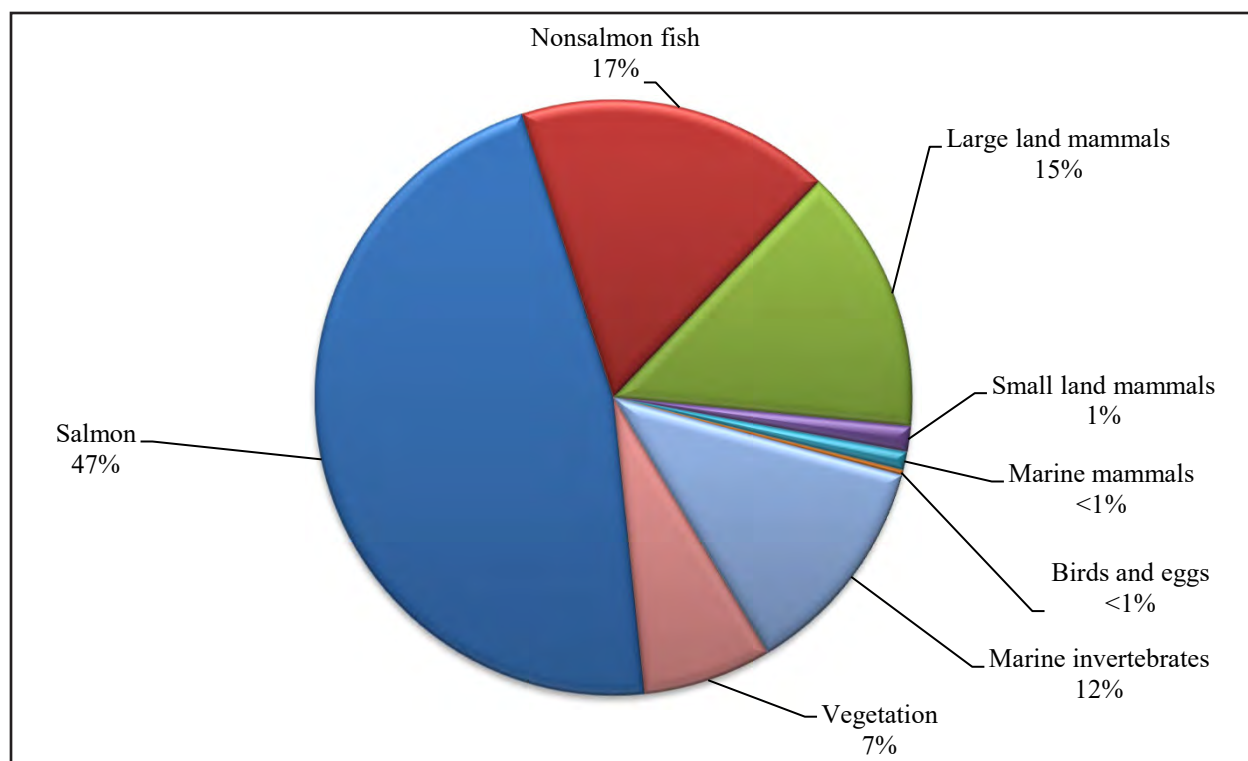


Figure 4-14.—Composition of harvest in pounds usable weight, by resource category, Larsen Bay, 2018.

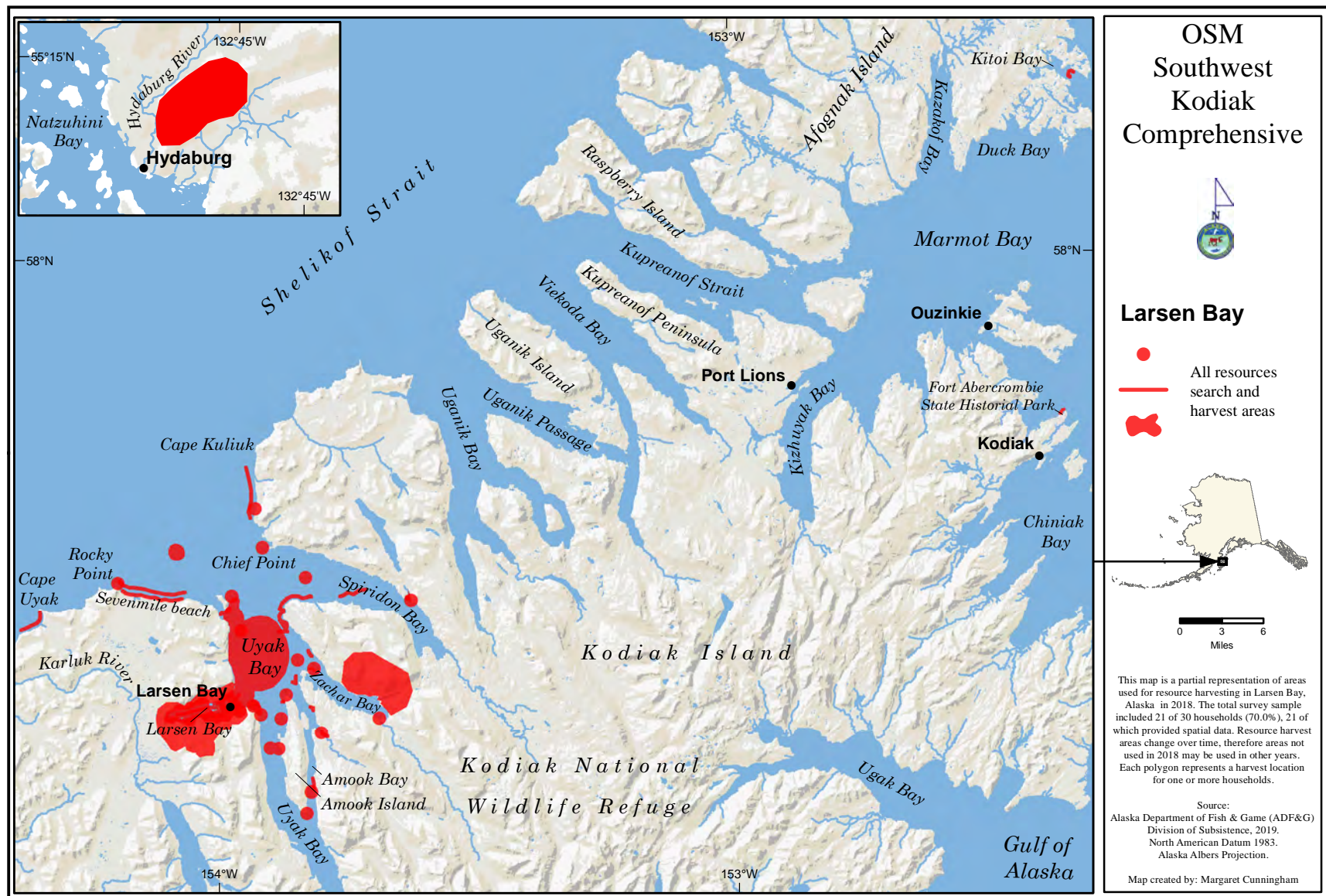


Figure 4-15.—Wild resources search and harvest areas, Larsen Bay, 2018.

Table 4-14.—Top ranked resources used by households, Larsen Bay, 2018.

Rank ^a	Resource	Percentage of households using
1.	Deer	100.0%
2.	Sockeye salmon	95.2%
2.	Pacific halibut	95.2%
4.	Coho salmon	71.4%
4.	Octopus	71.4%
6.	Butter clams	66.7%
7.	Raspberry	61.9%
8.	Salmonberry	57.1%
9.	Red king crab	52.4%
9.	Tanner crab, <i>bairdi</i>	52.4%

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

a. Resources used by the same percentage of households share the highest rank value instead of having sequential rank values.

Use and Harvest Characteristics by Resource Category

As noted above, generally more households use resources than harvest them. For some resources, households may lack the time, knowledge, or equipment necessary to successfully harvest, and other resources may not be locally available and are only obtained through sharing. In 2018, 91% of Larsen Bay households shared resources and 95% of households received resources (Table 4-13). Not all sharing necessarily occurred within the community; Larsen Bay residents also send resources to households in other communities. At the resource category level, the highest percentage of households shared vegetation (81%) followed by marine invertebrates (71%), salmon (57%), large land mammals (52%), and nonsalmon fish (48%). The resource categories that were shared the most did not necessarily translate to the categories that were received the most. More households received large land mammals (81%) than any other resource category. Salmon and nonsalmon fish followed with 71% of households receiving both types of resources, then marine invertebrates (62%) and vegetation (43%). There was less sharing of the remaining resource categories. Ten percent of households shared birds and eggs while 14% received them, 5% of households gave away marine mammals, and no households reported sharing or receiving small land mammals.

Table 4-14 lists the top ranked resources used by households and Figure 4-16 shows the species with the highest harvests during the 2018 study year. The majority of the top resources used by Larsen Bay households came from the sea. These use estimates reflect both the general marine orientation of this community and the overall importance of deer, which all households used (Table 4-14). Sockeye salmon and Pacific halibut were close seconds (each used by 95% of households) followed by coho salmon (71%) and octopus (71%). Butter clams, raspberries, salmonberries, red king crab, and Tanner crab made up the remaining top used resources, and all were used by more than 50% of households. There are some similarities between the most used species and the highest harvested species. Again, the majority of the most harvested species were marine resources, with sockeye salmon making up the largest proportion at 34% of the total harvest by weight (Figure 4-16). Deer was the only resource used by 100% of households, although this resource only represented 12% of the total harvest. Similarly, red king crab and Tanner crab were among the most used species, but they were not harvested in sufficient weights to make the most harvested list. Aside from deer, the only other terrestrial resources that were highly used or harvested were a type of vegetation.

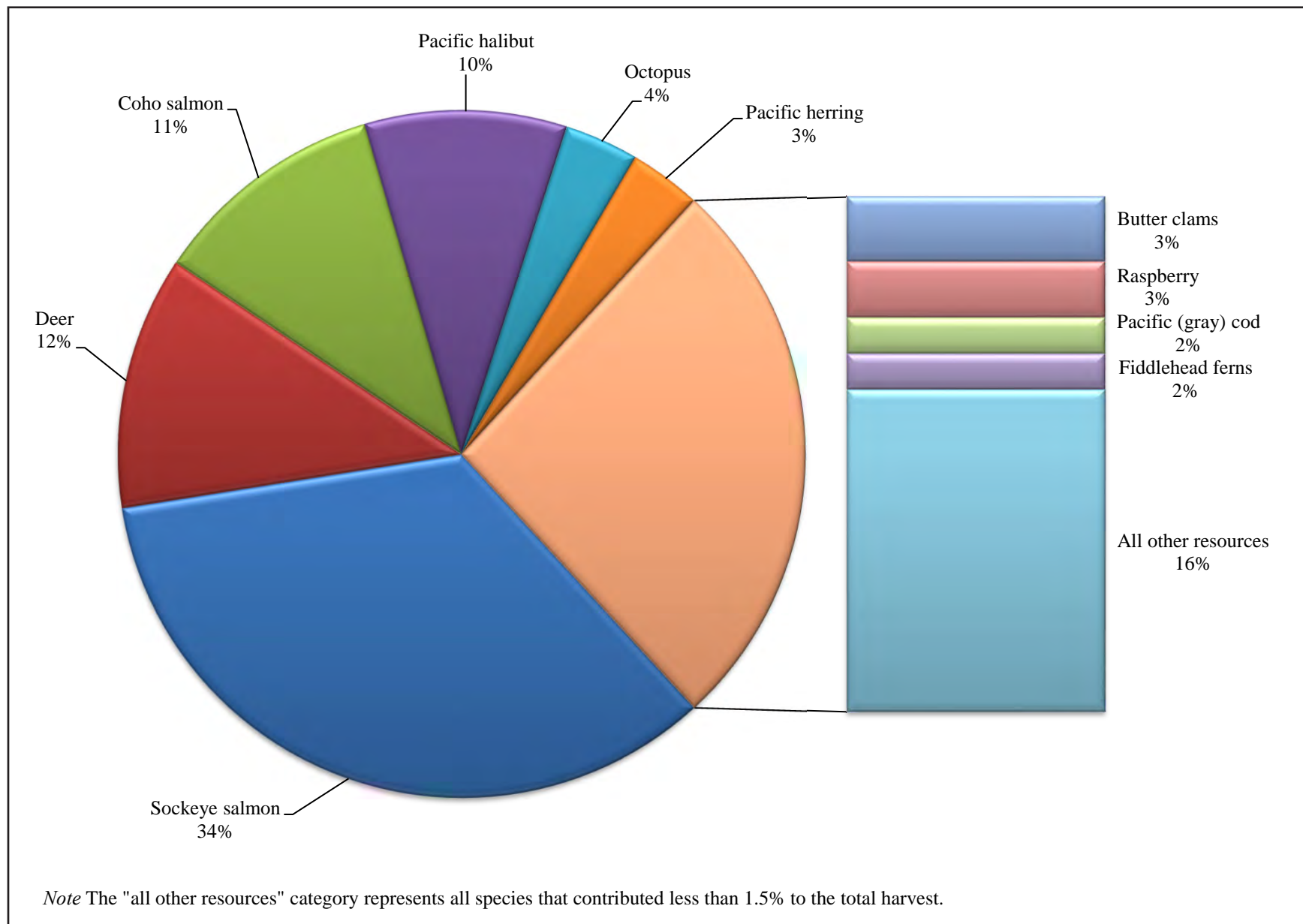


Figure 4-16.—Top resources harvested by percentage of total harvest in pounds usable weight, Larsen Bay, 2018.

Salmon

The total salmon harvest weight, as depicted in Figure 4-17, is primarily composed of sockeye salmon (73%), followed by coho salmon (24%). Chinook and pink salmon composed the remaining 3%. Larsen Bay households harvested a total of 7,503 lb of salmon in 2018 (Table 4-13). The majority of the harvest weight comprised 5,513 lb (82 lb per capita) of sockeye salmon and 1,775 lb (26 lb per capita) of coho salmon. All households used salmon in general, and use of individual species ranged from 19% (pink salmon) to 95% (sockeye salmon); no households reported using or fishing for chum salmon. Interestingly, while Chinook salmon only composed 2% of the total salmon harvest, 43% of households used it. Sharing likely contributed to the high proportion of households that used Chinook salmon and some households might have received this resource from households outside Larsen Bay: 10% of households gave away Chinook salmon but more households (29%) received it. Aside from chum salmon, between 19% (pink salmon) and 52% (sockeye salmon) of households fished for specific salmon species. All households that fished for salmon were successful. Most households (52%) gave away sockeye salmon; 57% of households also received it. Approximately one-third of households were involved in sharing coho salmon, which 33% of households received and 38% gave away. No household reported sharing pink salmon.

Figure 4-18 depicts the salmon harvest (in pounds) by species and gear type. All species of salmon harvested by Larsen Bay households were harvested with multiple gear types (Table 4-15). Approximately one-third of the total pounds of salmon harvested were obtained through commercial removals, with one-half taken with subsistence gear, and the remaining 15% harvested with rod and reel gear (Table 4-16). When looking specifically at sockeye salmon, seines were used to harvest more than one-half of the total pounds harvested while removals from commercial catches accounted for about one-third of the harvest weight and the remainder was harvested with set gillnets. This differs from coho salmon, where more than one-half of the fish were harvested with rod and reel, accounting for 91% of the total rod and reel harvest weight. The majority (60%) of Chinook salmon were harvested by rod and reel, and only pink salmon were harvested by a subsistence method such as hand or spear.

Larsen Bay residents fished for salmon around the community and in multiple locations throughout Uyak Bay, including Amook Bay and Zachar Bay (Figure 4-19). Salmon fishing also took place along Sevenmile Beach, the mouth of Uyak Bay, and on the eastern side of Spiridon Bay.

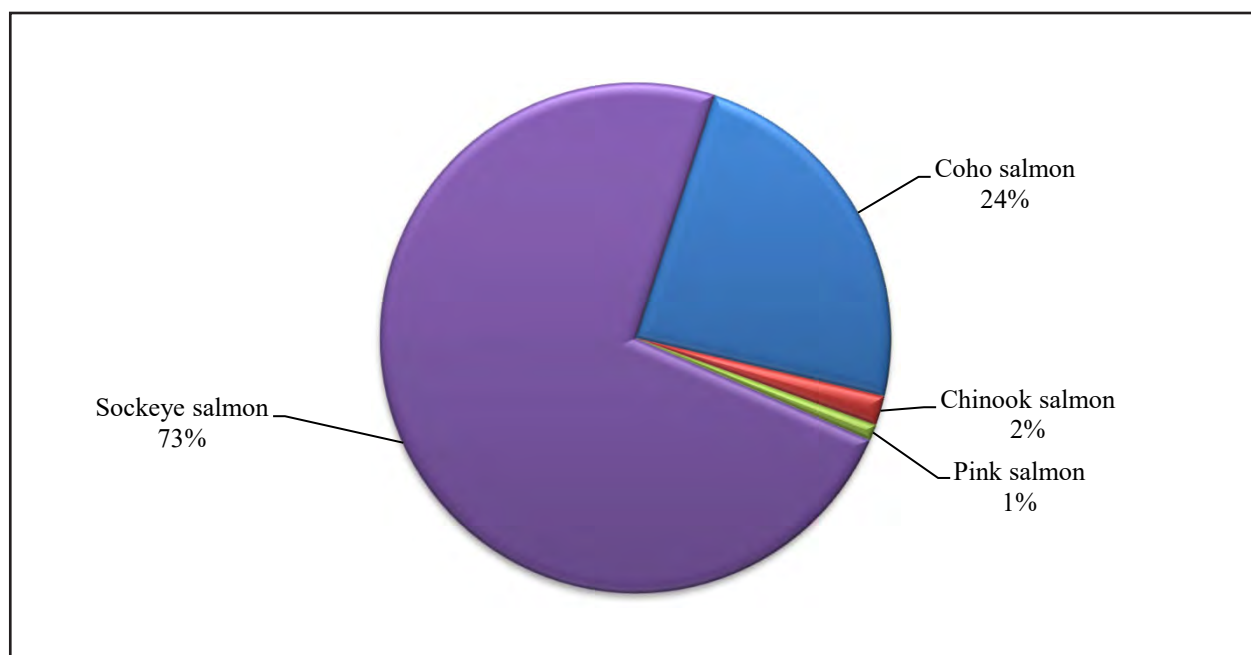


Figure 4-17.—Composition of salmon harvest in pounds usable weight, Larsen Bay, 2018.

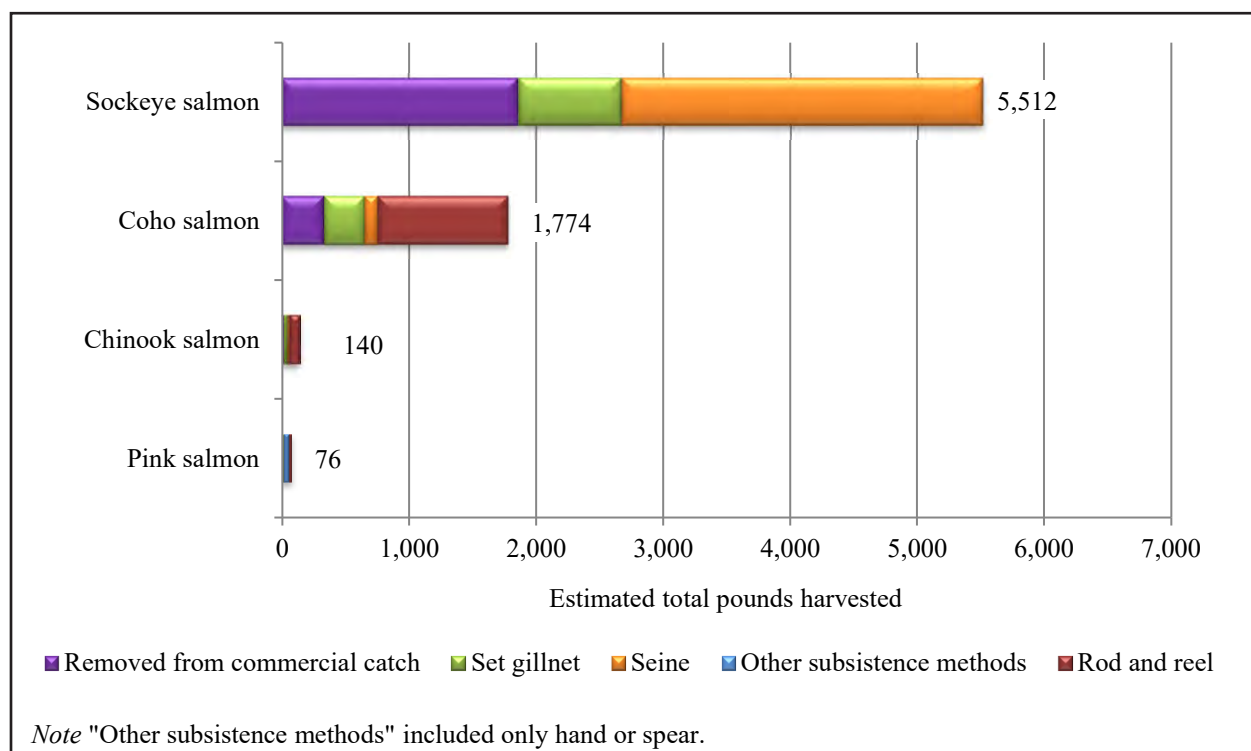


Figure 4-18.—Estimated harvests of salmon in pounds usable weight by gear type and resource, Larsen Bay, 2018.

Table 4-15.—Estimated harvests of salmon by gear type and resource, Larsen Bay, 2018.

Resource	Subsistence methods															
	Removed from commercial catch		Drift gillnet		Set gillnet		Seine		Other method ^a		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
Salmon	554.3	2,210.9	0.0	0.0	277.1	1,164.5	777.1	2,961.0	14.3	40.0	1,068.6	4,165.4	191.4	1,127.0	1,814.3	7,503.3
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
Coho salmon	54.3	332.2	0.0	0.0	51.4	314.7	17.1	104.9	0.0	0.0	68.6	419.6	167.1	1,022.7	290.0	1,774.5
Chinook salmon	2.9	14.0	0.0	0.0	5.7	28.1	2.9	14.0	0.0	0.0	8.6	42.1	17.1	84.2	28.6	140.4
Pink salmon	1.4	4.0	0.0	0.0	4.3	12.0	0.0	0.0	14.3	40.0	18.6	52.0	7.1	20.0	27.1	76.0
Sockeye salmon	495.7	1,860.7	0.0	0.0	215.7	809.7	757.1	2,842.0	0.0	0.0	972.9	3,651.7	0.0	0.0	1,468.6	5,512.5
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

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

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

a. Methods included only hand or spear.

Table 4-16.—Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Larsen Bay, 2018.

Resource	Percentage base	Subsistence methods															
		Removed from commercial catch		Drift gillnet		Set gillnet		Seine		Other method ^a		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
Salmon	Gear type	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Resource	30.6%	29.5%	0.0%	0.0%	15.3%	15.5%	42.8%	39.5%	0.8%	0.5%	58.9%	55.5%	10.6%	15.0%	100.0%	100.0%
	Total	30.6%	29.5%	0.0%	0.0%	15.3%	15.5%	42.8%	39.5%	0.8%	0.5%	58.9%	55.5%	10.6%	15.0%	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%
	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%
	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%
Coho salmon	Gear type	9.8%	15.0%	0.0%	0.0%	18.6%	27.0%	2.2%	3.5%	0.0%	0.0%	6.4%	10.1%	87.3%	90.8%	16.0%	23.6%
	Resource	18.7%	18.7%	0.0%	0.0%	17.7%	17.7%	5.9%	5.9%	0.0%	0.0%	23.6%	23.6%	57.6%	57.6%	100.0%	100.0%
	Total	3.0%	4.4%	0.0%	0.0%	2.8%	4.2%	0.9%	1.4%	0.0%	0.0%	3.8%	5.6%	9.2%	13.6%	16.0%	23.6%
Chinook salmon	Gear type	0.5%	0.6%	0.0%	0.0%	2.1%	2.4%	0.4%	0.5%	0.0%	0.0%	0.8%	1.0%	9.0%	7.5%	1.6%	1.9%
	Resource	10.0%	10.0%	0.0%	0.0%	20.0%	20.0%	10.0%	10.0%	0.0%	0.0%	30.0%	30.0%	60.0%	60.0%	100.0%	100.0%
	Total	0.2%	0.2%	0.0%	0.0%	0.3%	0.4%	0.2%	0.2%	0.0%	0.0%	0.5%	0.6%	0.9%	1.1%	1.6%	1.9%
Pink salmon	Gear type	0.3%	0.2%	0.0%	0.0%	1.5%	1.0%	0.0%	0.0%	100.0%	100.0%	1.7%	1.2%	3.7%	1.8%	1.5%	1.0%
	Resource	5.3%	5.3%	0.0%	0.0%	15.8%	15.8%	0.0%	0.0%	52.6%	52.6%	68.4%	68.4%	26.3%	26.3%	100.0%	100.0%
	Total	0.1%	0.1%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.8%	0.5%	1.0%	0.7%	0.4%	0.3%	1.5%	1.0%
Sockeye salmon	Gear type	89.4%	84.2%	0.0%	0.0%	77.8%	69.5%	97.4%	96.0%	0.0%	0.0%	91.0%	87.7%	0.0%	0.0%	80.9%	73.5%
	Resource	33.8%	33.8%	0.0%	0.0%	14.7%	14.7%	51.6%	51.6%	0.0%	0.0%	66.2%	66.2%	0.0%	0.0%	100.0%	100.0%
	Total	27.3%	24.8%	0.0%	0.0%	11.9%	10.8%	41.7%	37.9%	0.0%	0.0%	53.6%	48.7%	0.0%	0.0%	80.9%	73.5%
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%
	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%
	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%

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

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

a. Methods included only hand or spear.



Figure 4-19.—Fishing and harvest locations of all salmon, Larsen Bay, 2018.

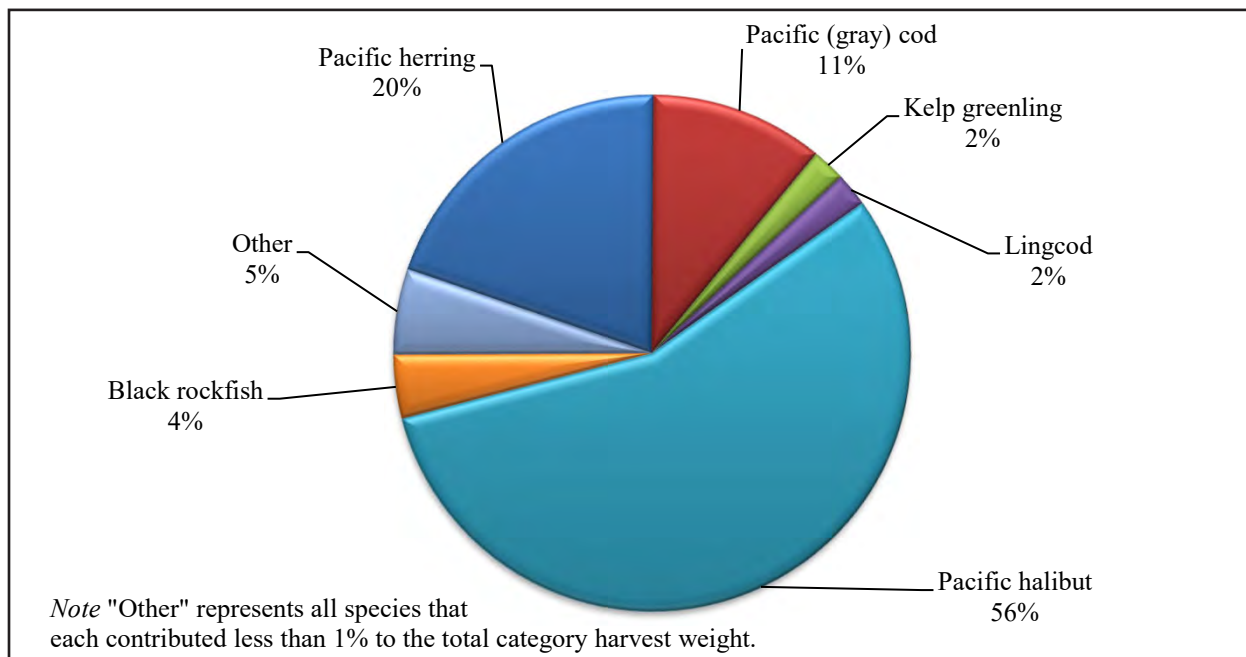


Figure 4-20.—Composition of nonsalmon fish harvest in pounds usable weight, Larsen Bay, 2018.

Nonsalmon Fish

Many different types of nonsalmon fish composed the 2018 harvest by Larsen Bay households (Figure 4-20). Pacific halibut made up more than one-half (56%) of the nonsalmon fish harvest weight, followed by Pacific herring (20%) and Pacific cod (11%). Black rockfish (4%), kelp greenling (2%), lingcod (2%), and other species (5%) that included a few freshwater fish made up the remainder. Compared to salmon, nonsalmon fish were harvested in much smaller amounts with a total of 2,738 lb (41 lb per capita) harvested in 2018 (Table 4-13). Larsen Bay residents harvested 1,527 lb of Pacific halibut, or 23 lb per capita, and 91 gallons of Pacific herring (543 lb; 8 lb per capita). No other nonsalmon fish species was harvested in an amount that converted to greater than 5 lb per capita. The percentage of households using specific nonsalmon fish varied greatly; however, overall, all households used this resource category. The most households used Pacific halibut (95%). Pacific cod was second at 43%, followed by black rockfish (29%) and steelhead (19%). All other nonsalmon fish resources were used by fewer than 10% of households. All households that attempted to harvest individual species of nonsalmon fish were successful; overall, 57% of households fished for and harvested nonsalmon fish.

Sharing some nonsalmon fish was prevalent among Larsen Bay households, as evidenced by the disparity between the percentage of households using and harvesting species. For the most used resources, the percentage of households using the resource was approximately twice the percentage of households harvesting: 95% of household harvested Pacific halibut and 52% harvested, 43% used Pacific cod and 24% harvested, and 29% used black rockfish while 19% harvested. Apart from these species, however, most nonsalmon fish were not given away or received by any households in Larsen Bay. Pacific halibut was received by the most (67%), then Pacific cod (24%), black rockfish (15%), and steelhead (10%). The only other species received by Larsen Bay households were sablefish (5%), unknown cod (5%), and Pacific herring roe (5%) that likely came from households located outside Larsen Bay (Table 4-13).

Figure 4-21 depicts the nonsalmon fish harvest (in pounds) by species and gear type. As can be seen from the figure, rod and reel was the primary gear type for harvesting nonsalmon fish used by Larsen Bay households. Multiple gear types were used to harvest only three species of fish: Pacific halibut were taken with rod and reel, longline/skate, and handline; Pacific herring were taken with rod and reel or set gillnet; and black rockfish were taken with rod and reel or removed from commercial catches (Table 4-17). Many other species were only caught on rod and reel, including Pacific cod, kelp greenling, lingcod, sablefish, rockfishes, sharks, Dolly Varden, and freshwater trout. All steelhead were removed from commercial catches. The majority of the harvest weight of Pacific halibut was harvested using rod and reel (76%), with an additional 20% taken on a longline and 4% with handline (Table 4-18).

Nonsalmon fishing took place in the northwest portion of Uyak Bay, starting from the mouth of Larsen Bay at the south and up to Harvester Island at the north. Fishing also took place along the coast of Northeast Harbor, Sevenmile Beach, along the coast north of Chief Point, and at specific locations in Larsen Bay and Zachar Bay (Figure 4-22).

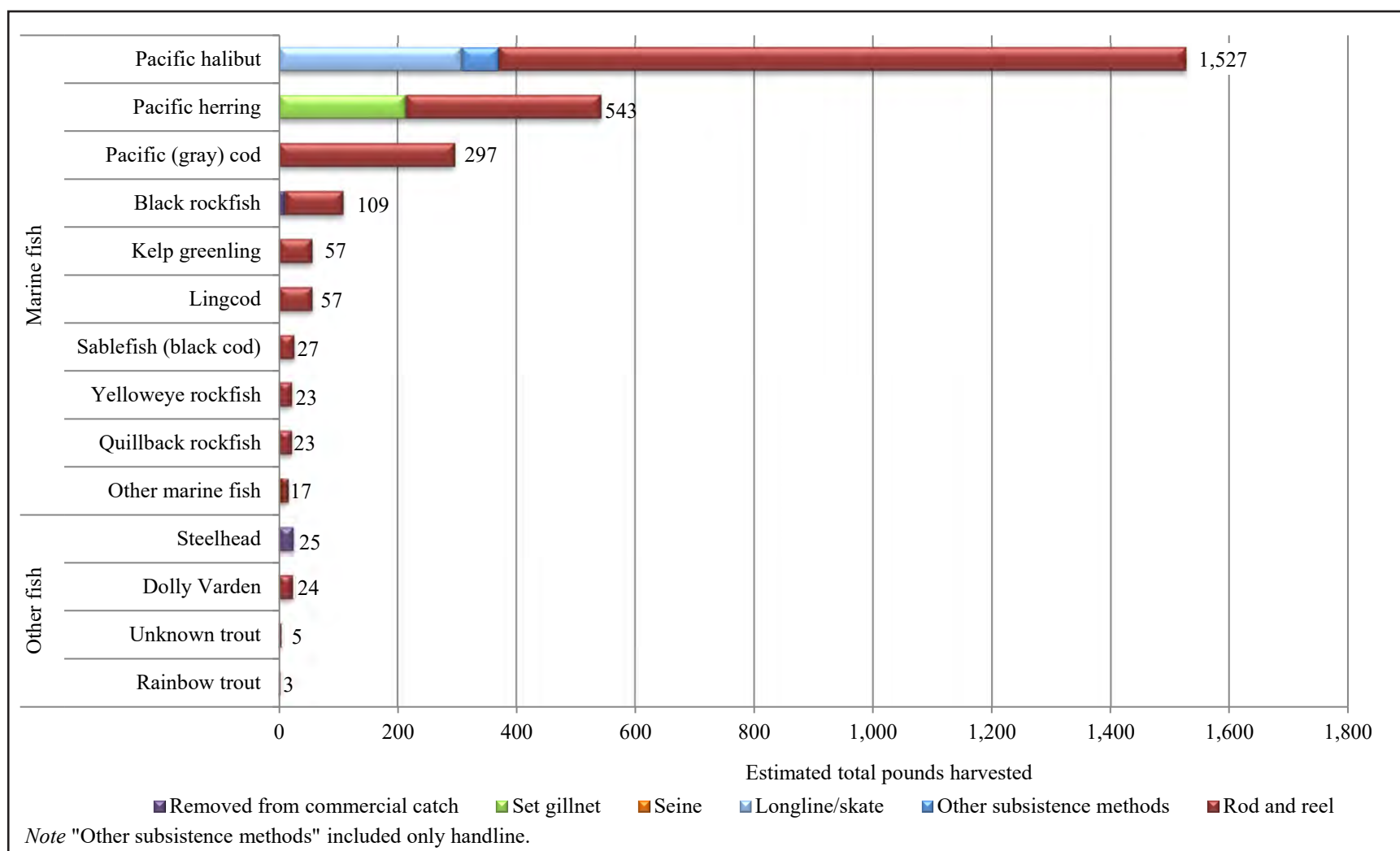


Figure 4-21.—Estimated harvest of nonsalmon fish in pounds usable weight by gear type and resource, Larsen Bay, 2018.

Table 4-17.—Estimated harvests of nonsalmon fish by gear type and resource, Larsen Bay, 2018.

Resource	Unit ^a	Subsistence methods																	
		Removed from commercial catch		Subsistence gear, any										Rod and reel		Any method			
				Drift gillnet		Set gillnet		Seine		Longline/skate		Other method ^b						method	
		Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds	Number ^a	Pounds
Nonsalmon fish			36.0		0.0		214.3		4.3		308.6		61.7		588.9		2,112.9		2,737.7
Pacific herring	gal	0.0	0.0	0.0	0.0	35.7	214.3	0.0	0.0	0.0	0.0	0.0	0.0	35.7	214.3	54.8	328.6	90.5	542.9
Pacific herring roe on hemlock branches	gal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific (gray) cod	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.9	297.1	92.9	297.1
Unknown cod	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown flounder	ind	0.0	0.0	0.0	0.0	0.0	0.0	1.4	4.3	0.0	0.0	0.0	0.0	1.4	4.3	0.0	0.0	1.4	4.3
Kelp greenling	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.1	57.1	57.1	57.1
Lingcod	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	57.1	14.3	57.1
Pacific halibut	lb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	308.6	308.6	61.7	61.7	370.3	370.3	1,157.1	1,157.1	1,527.4	1,527.4
Black rockfish	ind	7.1	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.7	98.6	72.9	109.3
Yelloweye rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	22.9	5.7	22.9
Quillback rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	22.9	5.7	22.9
Unknown rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sablefish (black cod)	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	26.6	8.6	26.6
Bullhead sculpin	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown sculpin	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown shark	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	12.9	1.4	12.9
Skates	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dolly Varden	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.1	24.0	17.1	24.0
Lake trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arctic grayling	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rainbow trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	3.0	4.3	3.0
Steelhead	ind	36.1	25.3	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	36.1	25.3
Unknown trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	5.0	7.1	5.0

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

Note The summary row that includes incompatible units of measure has been left blank.

a. The harvested number of each resource is measured by the unit in which the resource harvest information was collected; the unit of measurement is provided for each resource.

b. Method included only handline.

Table 4-18.—Estimated percentages of nonsalmon fish harvested in pounds usable weight by gear type, resource, and total nonsalmon fish harvest, Larsen Bay, 2018.

Resource	Percentage base	Removed from commercial catch	Subsistence methods					Subsistence gear, any method	Rod and reel	Any method
			Drift gillnet	Set gillnet	Seine	Longline/skate	Other method ^a			
Nonsalmon fish	Gear type	100.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Resource	1.3%	0.0%	7.8%	0.2%	11.3%	2.3%	21.5%	77.2%	100.0%
	Total	1.3%	0.0%	7.8%	0.2%	11.3%	2.3%	21.5%	77.2%	100.0%
Pacific herring	Gear type	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	36.4%	15.6%	19.8%
	Resource	0.0%	0.0%	39.5%	0.0%	0.0%	0.0%	39.5%	60.5%	100.0%
	Total	0.0%	0.0%	7.8%	0.0%	0.0%	0.0%	7.8%	12.0%	19.8%
Pacific herring roe on hemlock branches	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pacific (gray) cod	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.1%	10.9%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.9%	10.9%
Unknown cod	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unknown flounder	Gear type	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.7%	0.0%	0.2%
	Resource	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	0.2%
Kelp greenling	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	2.1%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	2.1%
Lingcod	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	2.1%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	2.1%
Pacific halibut	Gear type	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	62.9%	54.8%	55.8%
	Resource	0.0%	0.0%	0.0%	0.0%	20.2%	4.0%	24.2%	75.8%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	11.3%	2.3%	13.5%	42.3%	55.8%

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Table 4-18.—Page 2 of 3.

Resource	Percentage base	Removed from commercial catch	Subsistence methods							Rod and reel	Any method
			Drift gillnet	Set gillnet	Seine	Longline/skate	Other method ^a	Subsistence gear, any method			
Black rockfish	Gear type	29.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.7%	4.0%
	Resource	9.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.2%	100.0%
	Total	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.6%	4.0%
Yelloweye rockfish	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.8%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	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%	0.8%	0.8%
Quillback rockfish	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.8%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	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%	0.8%	0.8%
Unknown rockfish	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sablefish (black cod)	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	1.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	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%	1.0%	1.0%
Bullhead sculpin	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unknown sculpin	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unknown shark	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.5%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	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%	0.5%	0.5%
Skates	Gear type	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%
	Total	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 4-18.—Page 3 of 3.

Resource	Percentage base	Removed from commercial catch	Subsistence methods						Rod and reel	Any method
			Drift gillnet	Set gillnet	Seine	Longline/skate	Other method ^a	Subsistence gear, any method		
Dolly Varden	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.9%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.9%
Lake trout	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Arctic grayling	Gear type	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%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Rainbow trout	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Steelhead	Gear type	70.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%
	Resource	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%
Unknown trout	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%

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

a. Method included only handline.



Figure 4-22.—Fishing and harvest locations of all nonsalmon fish, Larsen Bay, 2018.

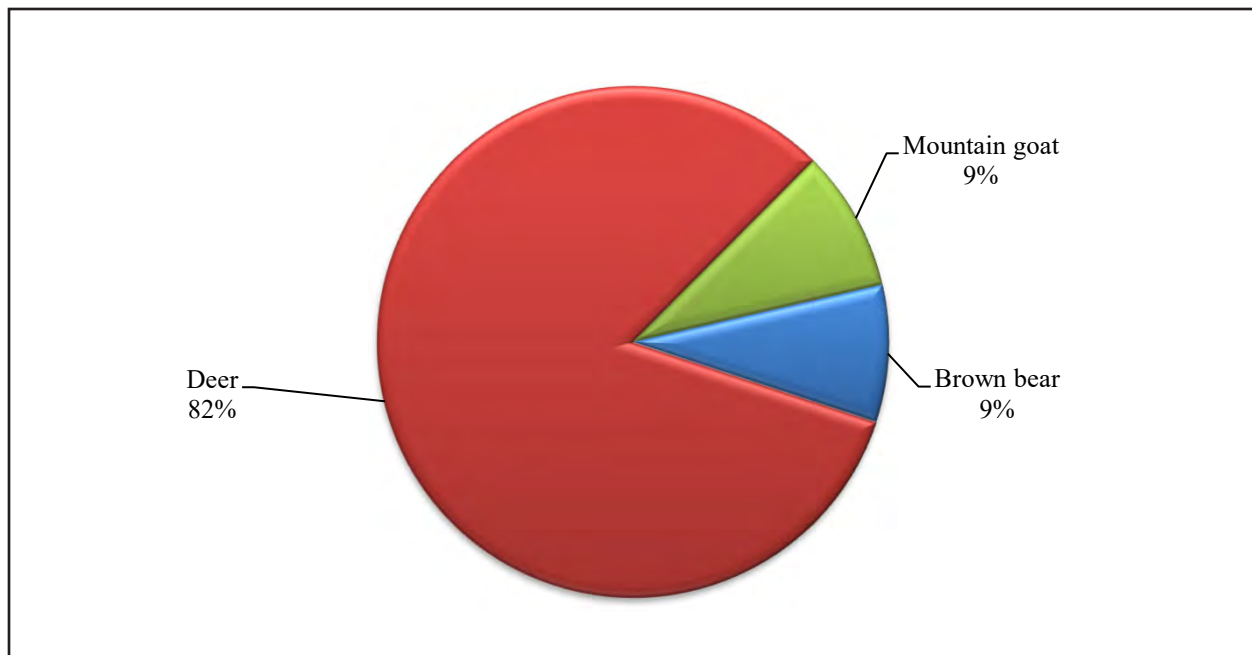


Figure 4-23.—Composition of large land mammal harvest in pounds usable weight, Larsen Bay, 2018.

Large Land Mammals

In 2018, 43% of Larsen Bay residents harvested three species of large land mammals: deer (representing 82% of the harvest weight), brown bear (9%), and mountain goat (9%) (Table 4-13; Figure 4-23). In total, 2,322 lb of game meat were harvested (Table 4-13). An estimated 29 lb per capita of deer meat was harvested from 44 animals; most of the harvested animals were bucks (36), and most were harvested in October and November (Table 4-19). No other large land mammal was harvested in an amount greater than 5 lb per capita (Table 4-13). In April, one brown bear was harvested, equaling a per capita harvest of 3 lb (Table 4-13; Table 4-19). Three mountain goats (3 lb per capita) were taken in December.

Most households that hunted large land mammals were successful, where 48% hunted and 43% harvested (Table 4-13). Although only three species of large land mammals were hunted, six species were used; 100% of Larsen Bay households used large land mammals in 2018. Deer were used by substantially more households than other species: 100% of households used deer, while only 29% of households used mountain goats, 10% used brown bears, and 5% used caribou, elk, and moose. A difference is also noted when looking at the number of households hunting for the three harvested species. While 43% of households hunted deer, only 10% hunted brown bears and 5% hunted mountain goats. Hunting households were all successful at harvesting mountain goats, whereas not all households that hunted brown bears and deer were successful. Deer was also the main resource from this category shared in 2018: approximately 52% of households gave deer away and 81% of households received deer meat. Mountain goats were shared by 14% of households and 24% received goats, while 5% of households gave away brown bear resources and 5% received bear meat or fat.

The local waterways and land surrounding all of Larsen Bay as well as the northeast side of Zachar Bay were used by Larsen Bay households to hunt large land mammals (Figure 4-24). One household also reported traveling to Prince of Wales Island in Southeast Alaska to hunt large land mammals north of Hydaburg.

Table 4-19.—Estimated large land mammal harvests by month and sex, Larsen Bay, 2018.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
All large land mammals	0.0	0.0	0.0	1.4	0.0	0.0	0.0	4.3	1.4	14.3	17.1	10.0	0.0	48.6
Brown bear	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0
Caribou, male	0.0	0.0	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, 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
Deer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	1.4	14.3	17.1	7.1	0.0	44.3
Deer, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	1.4	14.3	15.7	0.0	0.0	35.7
Deer, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	7.1	0.0	8.6
Deer, 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
Elk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elk, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elk, 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
Elk, 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
Mountain goat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	2.9
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, 2019.

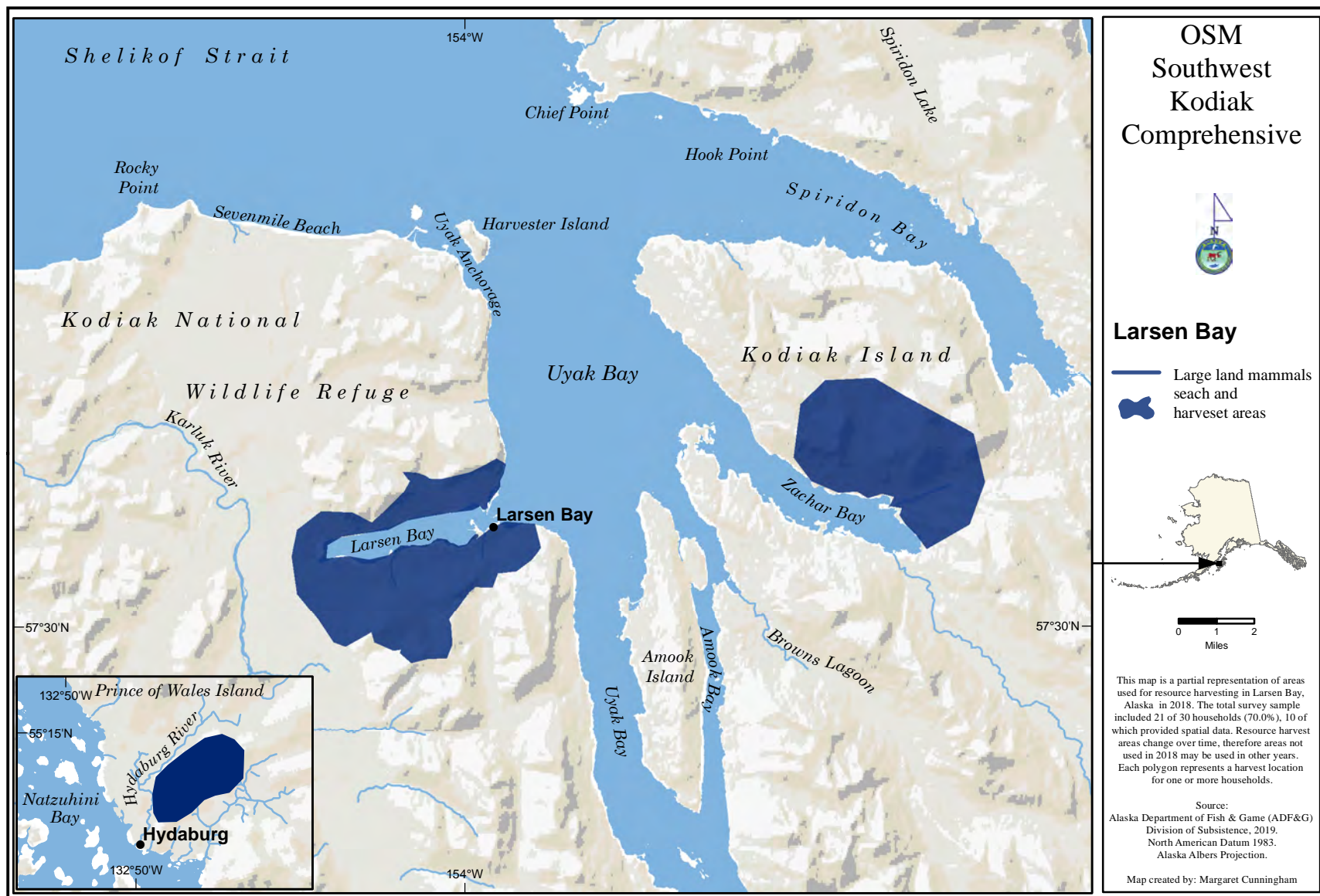


Figure 4-24.—Hunting locations of all large land mammals, Larsen Bay, 2018.

Small Land Mammals/Furbearers

Figure 4-25 shows the composition, by individual animals, of the small land mammal harvest. There were 113 snowshoe hares harvested (223 lb; 3 lb per capita), which accounted for 96% of the total harvest (Table 4-13; Figure 4-25). Four red foxes composed the remainder of small mammal harvest. Because red foxes were not eaten, they were not assigned a harvest weight in the table. Most snowshoe hares were harvested in January (59) and February (19), and the rest were harvested in unknown months (Table 4-20). Red foxes were harvested in November and December. Small land mammals were not widely used by Larsen Bay households in 2018 (Table 4-13). Overall, 19% of households used and hunted small land mammals, and all households that hunted were successful. By individual species, 14% of households used, hunted, and harvested snowshoe hares, and 5% used, hunted, and harvested red foxes.

Most small land mammals were hunted on land south of the Larsen Bay airport runway (Figure 4-26). Hunting was also documented along the southern shore of Larsen Bay toward the west, and at the end of the spit near the cannery.

Marine Mammals

Larsen Bay residents harvested two types of marine mammals in 2018—sea otters and harbor seals (Figure 4-27). Many more sea otters were harvested than harbor seals, but because sea otters were not eaten, they were not assigned a harvest weight in Table 4-13. Sea otters were harvested in January (11), February (10), and unknown months (71) (Table 4-21). Three harbor seals were harvested for a total harvest weight of 160 lb, which was 2 lb per capita (Table 4-13). At least one female seal was harvested, and the rest were of unknown sex or the respondent could not recall (Table 4-21). All seals were harvested in April.

Only 19% of Larsen Bay households used marine mammals in 2018, and the same percentage (19%) hunted them (Table 4-13). All households that hunted were successful in harvesting. An equal percentage (10%) of households used seals and sea otters, and for both resources the same percentage hunted and harvested these animals. Only harbor seals were shared, with 5% of households giving harbor seals away. No households reported receiving any marine mammal resources. Marine mammals were hunted slightly east of the community of Larsen Bay, in two locations close to shore at the southern mouth of the bay (Figure 4-28).

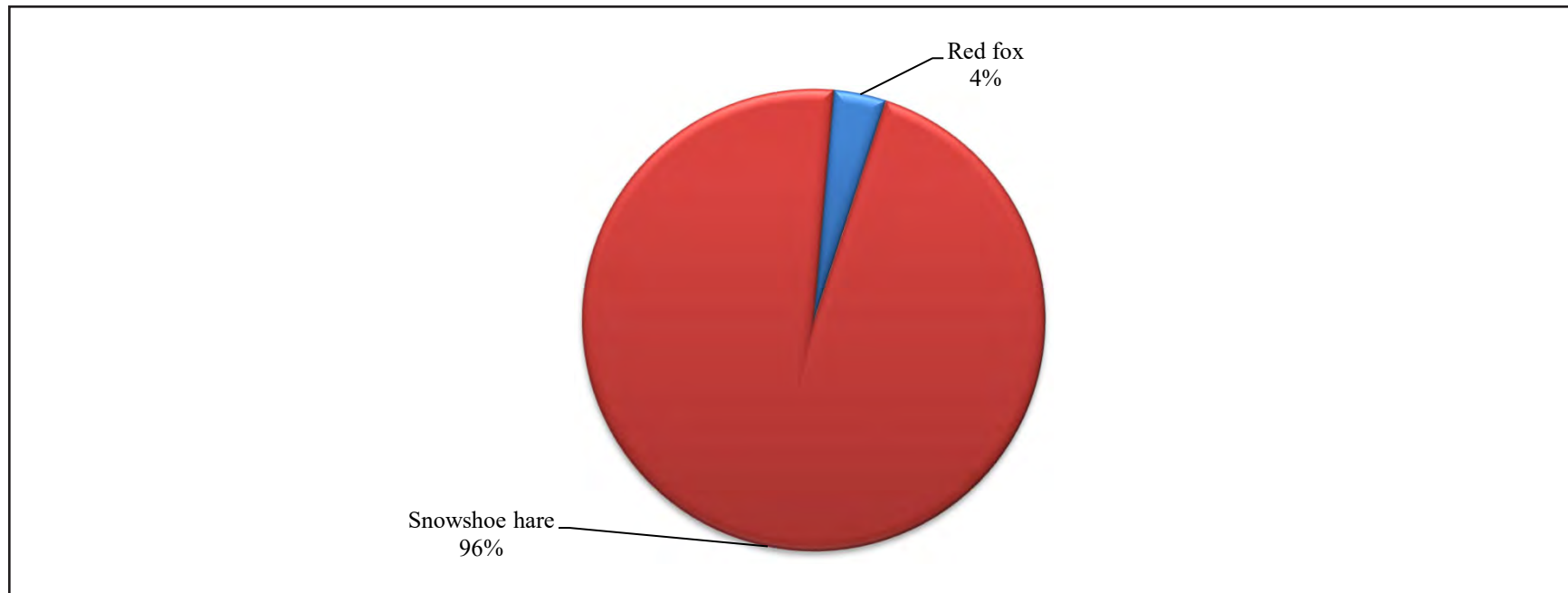


Figure 4-25.—Composition of small land mammal/furbearer harvest by individual animals harvested, Larsen Bay, 2018.

Table 4-20.—Estimated small land mammal/furbearer harvests by month, Larsen Bay, 2018.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
All small land mammals	58.6	18.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.9	35.7	117.1
Beaver	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red fox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.9	0.0	4.3
Snowshoe hare	58.6	18.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.7	112.9
River (land) otter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gray wolf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

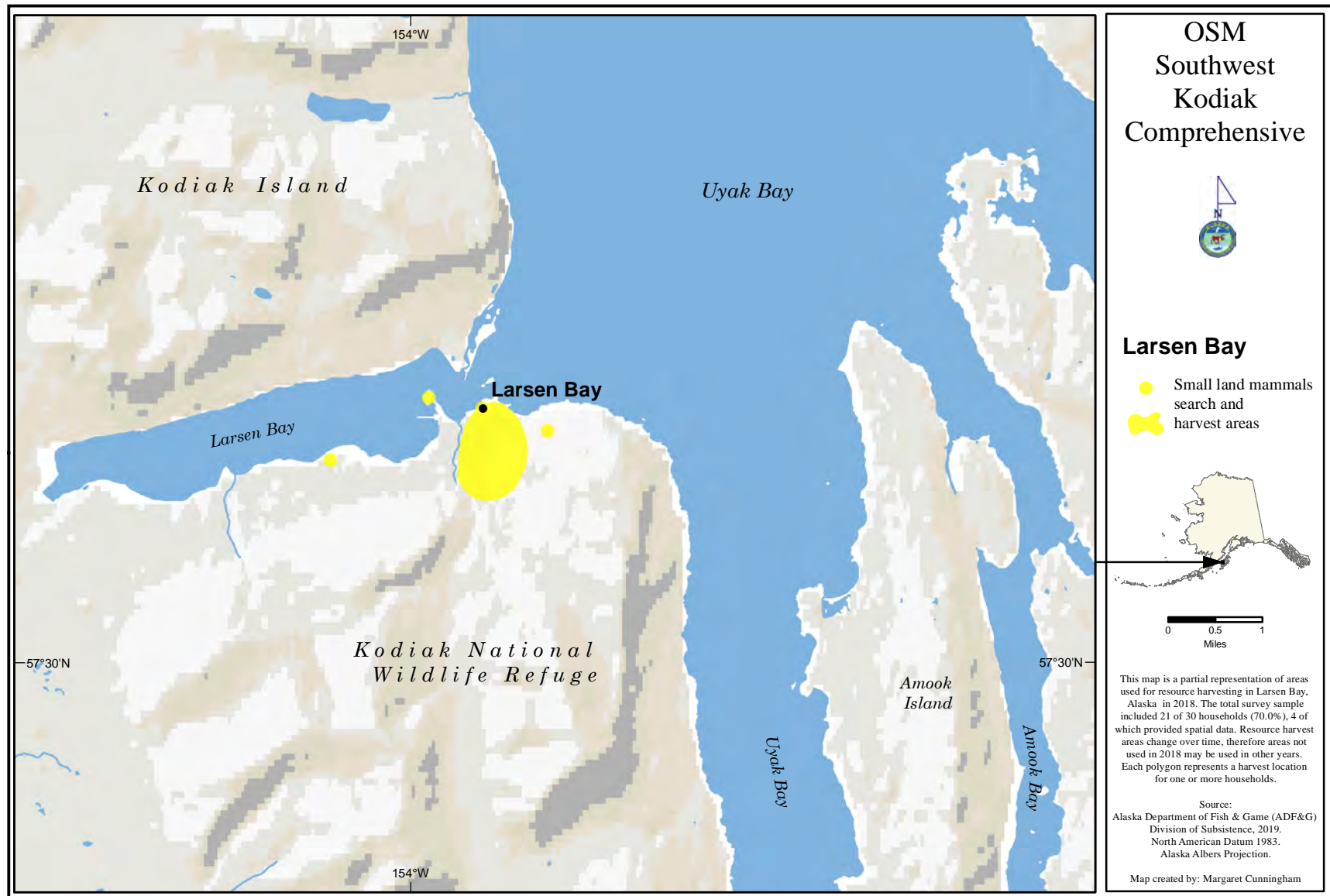


Figure 4-26.—Hunting and trapping locations of all small land mammals/furbearers, Larsen Bay, 2018.

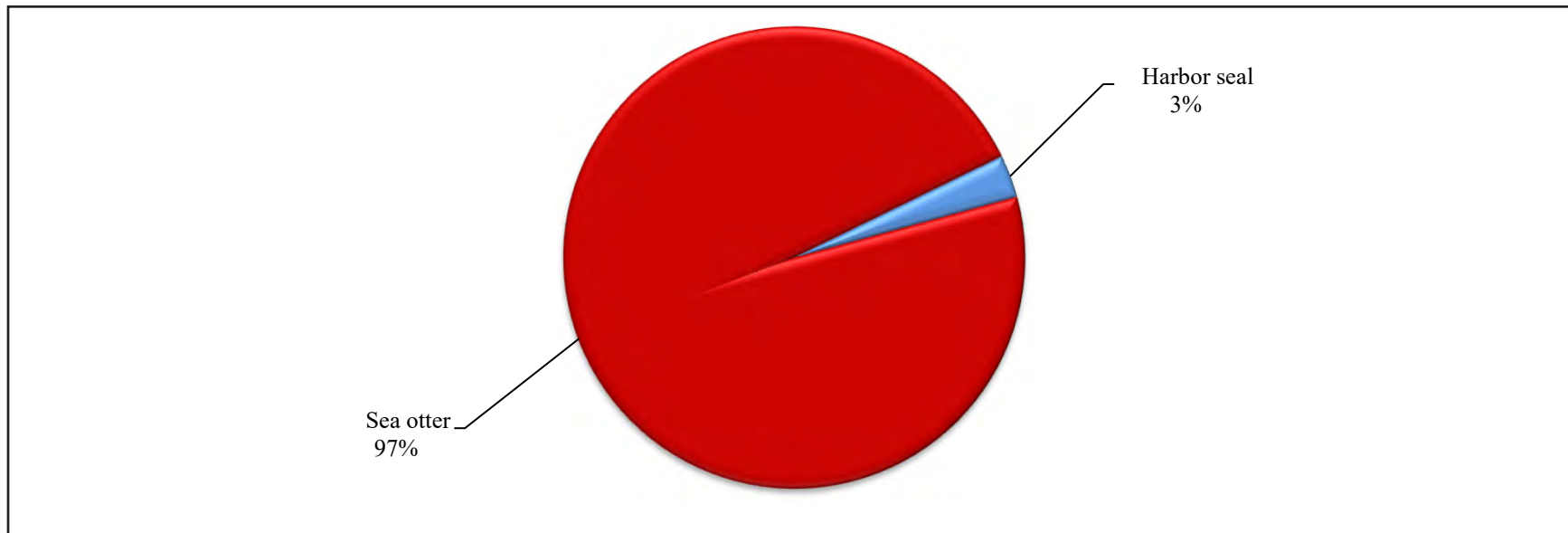


Figure 4-27.—Composition of marine mammal harvest by individual animals harvested, Larsen Bay, 2018.

Table 4-21.—Estimated marine mammal harvests by month and sex, Larsen Bay, 2018.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
All marine mammals	11.4	10.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.4	95.7
Harbor seal	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9
Harbor seal, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Harbor seal, female	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
Harbor seal, unknown sex	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
Sea otter	11.4	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.4	92.9
Steller sea lion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steller sea lion, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steller sea lion, 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
Steller sea lion, 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
Unknown whale	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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



Figure 4-28.—Hunting locations of all marine mammals, Larsen Bay, 2018.

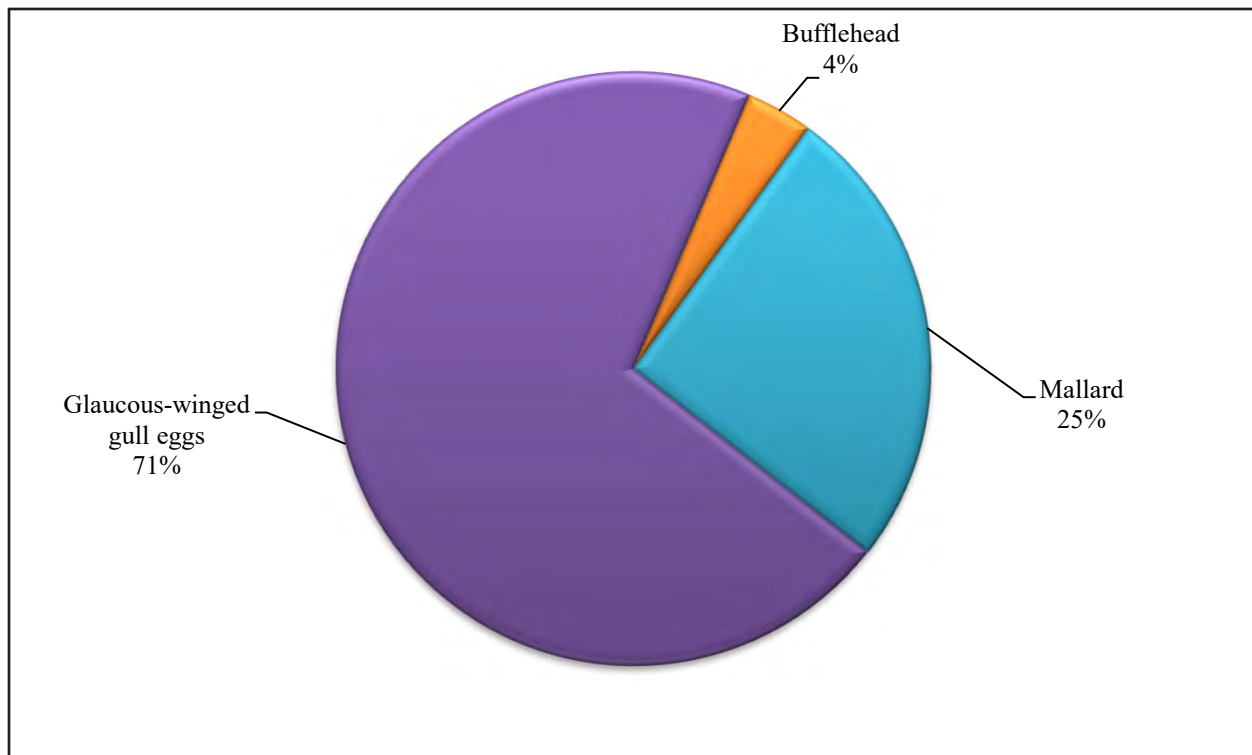


Figure 4-29.—Composition of bird and bird egg harvest in pounds usable weight, Larsen Bay, 2018.

Birds and Eggs

Glaucous-winged gull eggs made up the majority (71%) of birds and eggs harvest by Larsen Bay households; mallards contributed 25% to the harvest weight and buffleheads accounted for the final 4% (Figure 4-29). A total of 45 lb of birds and eggs were harvested, consisting of 157 glaucous-winged gull eggs (32 lb), 7 mallards (12 lb), and 3 buffleheads (2 lb); these harvests amounted to less than 1 lb per capita for each resource. In addition to the harvested species, 5% of households unsuccessfully hunted for goldeneyes in general and ptarmigan. (Table 4-13). Buffleheads and mallards were harvested during winter months (Table 4-22).

Birds and eggs were used by 33% of households, hunted by 24%, and harvested by 19% of community households (Table 4-13). More households used glaucous-winged gull eggs (19%) than any other resource; 14% of households used mallards and 10% used buffleheads. A similar pattern is evident in households that attempted to harvest these resources: 19% of households searched for glaucous-winged gull eggs, 10% hunted mallard, and 5% hunted bufflehead. Most of these households were successful, but one-half the households hunting for mallard were unsuccessful. Birds and eggs were not widely shared: only glaucous-winged gull eggs were shared (by 10% of households) and 10% of households received mallard while 5% received buffleheads and goldeneyes. Birds and eggs were hunted and collected on land surrounding all sides of Larsen Bay, as well as north on Chief Point, and on the northern and southern ends of Amook Island (Figure 4-30).

Table 4-22.—Estimated bird harvests by season, Larsen Bay, 2018.

Resource	Estimated harvest by season					Total
	Spring	Summer	Fall	Winter	Season unknown	
All birds	0.0	0.0	0.0	10.0	0.0	10.0
Bufflehead	0.0	0.0	0.0	2.9	0.0	2.9
Common eider	0.0	0.0	0.0	0.0	0.0	0.0
King eider	0.0	0.0	0.0	0.0	0.0	0.0
Steller's eider	0.0	0.0	0.0	0.0	0.0	0.0
Unknown goldeneye	0.0	0.0	0.0	0.0	0.0	0.0
Harlequin duck	0.0	0.0	0.0	0.0	0.0	0.0
Mallard	0.0	0.0	0.0	7.1	0.0	7.1
Merganser	0.0	0.0	0.0	0.0	0.0	0.0
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0
Northern pintail	0.0	0.0	0.0	0.0	0.0	0.0
Unknown scaup	0.0	0.0	0.0	0.0	0.0	0.0
Black scoter	0.0	0.0	0.0	0.0	0.0	0.0
Surf scoter	0.0	0.0	0.0	0.0	0.0	0.0
White-winged scoter	0.0	0.0	0.0	0.0	0.0	0.0
Northern shoveler	0.0	0.0	0.0	0.0	0.0	0.0
Unknown teal	0.0	0.0	0.0	0.0	0.0	0.0
American wigeon	0.0	0.0	0.0	0.0	0.0	0.0
Brant	0.0	0.0	0.0	0.0	0.0	0.0
Cackling goose	0.0	0.0	0.0	0.0	0.0	0.0
Emperor goose	0.0	0.0	0.0	0.0	0.0	0.0
White-fronted goose	0.0	0.0	0.0	0.0	0.0	0.0
Unknown swans	0.0	0.0	0.0	0.0	0.0	0.0
Sandhill crane	0.0	0.0	0.0	0.0	0.0	0.0
Black oystercatcher	0.0	0.0	0.0	0.0	0.0	0.0
Unknown auklet	0.0	0.0	0.0	0.0	0.0	0.0
Unknown cormorant	0.0	0.0	0.0	0.0	0.0	0.0
Glaucous-winged gull	0.0	0.0	0.0	0.0	0.0	0.0
Herring gull	0.0	0.0	0.0	0.0	0.0	0.0
Mew gull	0.0	0.0	0.0	0.0	0.0	0.0
Sabine's gull	0.0	0.0	0.0	0.0	0.0	0.0
Black-legged kittiwake	0.0	0.0	0.0	0.0	0.0	0.0
Unknown murre	0.0	0.0	0.0	0.0	0.0	0.0
Unknown tern	0.0	0.0	0.0	0.0	0.0	0.0
Unknown ptarmigan	0.0	0.0	0.0	0.0	0.0	0.0

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

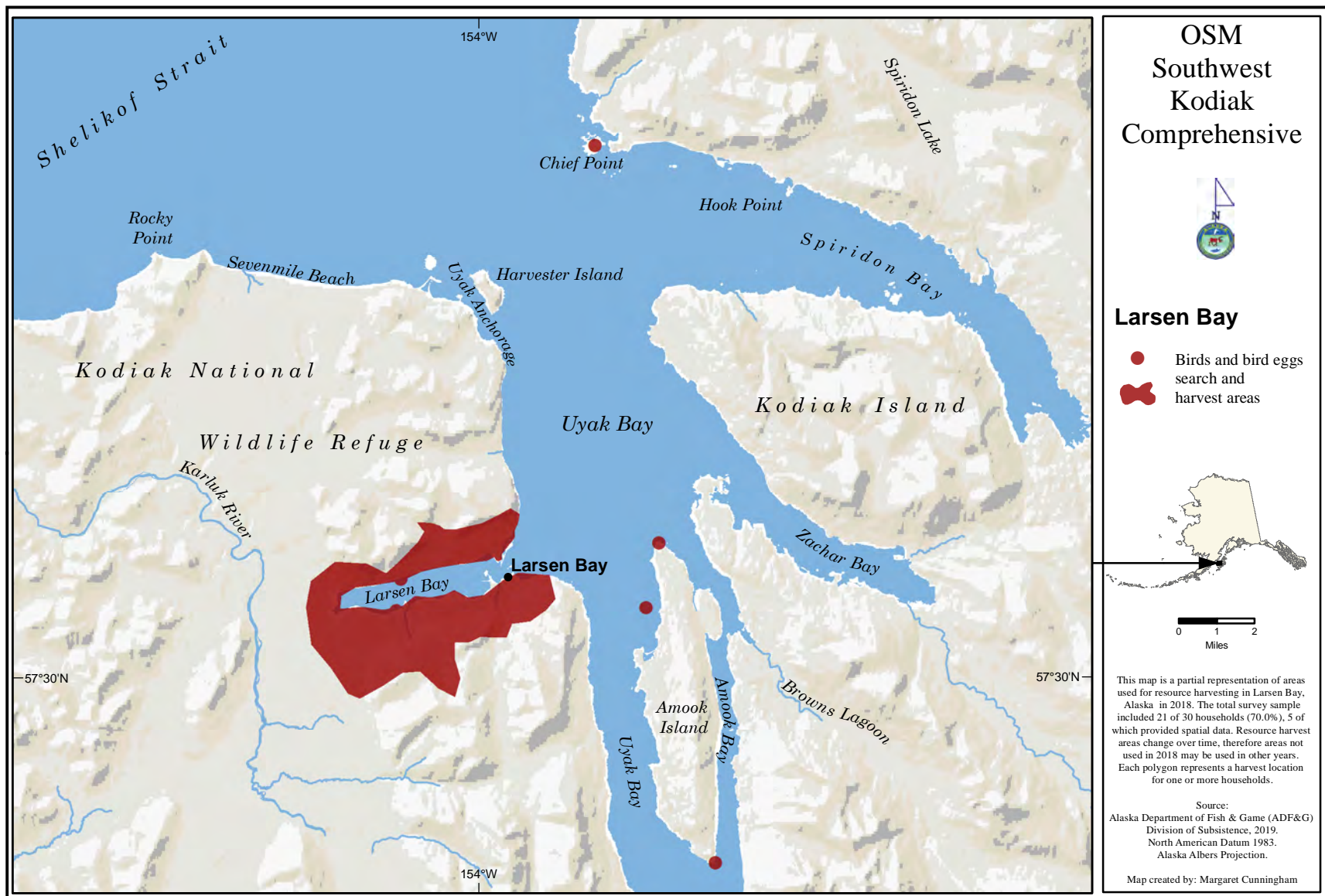


Figure 4-30.—Hunting and gathering locations of all birds and bird eggs, Larsen Bay, 2018.

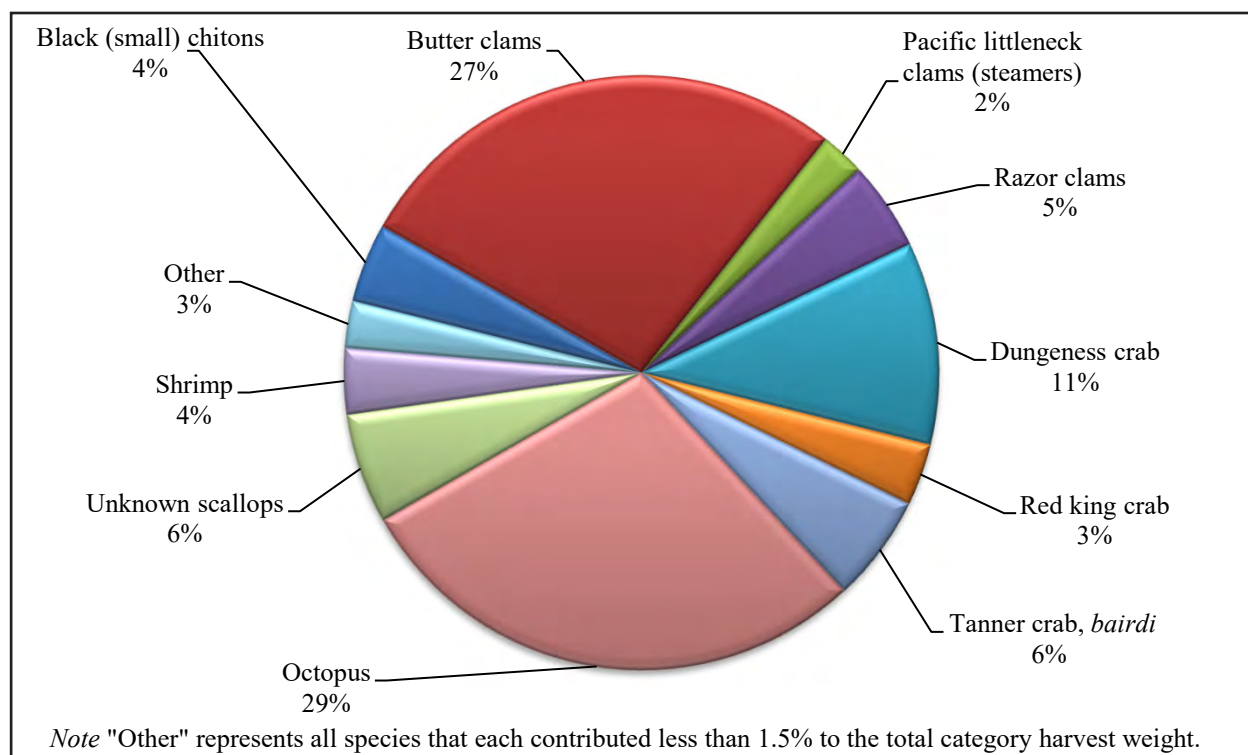


Figure 4-31.—Composition of marine invertebrate harvest in pounds usable weight, Larsen Bay, 2018.

Marine Invertebrates

Octopus, butter clams, and Dungeness crab were harvested in the greatest amounts by Larsen Bay households in 2018 (Figure 4-31). Together, these three species contributed 67% to the total marine invertebrate harvest weight (29%, 27%, and 11%, respectively). A total of 1,953 lb of marine invertebrates were harvested, equaling 29 lb per capita (Table 4-13). Looking at individual species, 140 gallons of octopus were harvested (560 lb; 8 lb per capita), as well as 179 gallons of butter clams (536 lb; 8 lb per capita) and 215 lb of Dungeness crab (3 lb per capita). Species harvested in lesser amounts included scallops (117 lb; 2 lb per capita), Tanner crab (114 lb; 2 lb per capita), razor clams (94 lb; 1 lb per capita), and black chitons (84 lb; 1 lb per capita). No other species was harvested in an amount that contributed more than 1 lb per capita. Marine invertebrates were used by 100% of households and were harvested by 95% of households (Figure 4-12). All households that attempted to harvest marine invertebrates were successful, with the exception of some of those that attempted to harvest octopus.

At the species level, octopus was used by the most households (71%), followed by butter clams (67%), red king crab and Tanner crab (52% each), and Dungeness crab (29%). The least used species were scallops and limpets (5% each) and razor clams and cockles (each used by 10% of households). Of all the harvested marine invertebrate resources, only four were sought by more than one-quarter of households: octopus (62%), butter clams (48%), and red king crab and Tanner crab (38% each). Slightly more households (71%) gave marine invertebrates away than received them (62%). The most households gave away butter clams and octopus (43% each), followed by red king crab and Tanner crab (19% each). The most households received octopus (38%), Tanner crab (33%), and butter clams (29%).

Marine invertebrates were harvested along Sevenmile Beach; throughout Larsen Bay; in the middle of Uyak Bay; along the western coast of Amook Island; in Amook, Zachar, and Spiridon bays; and north of Chief Point (Figure 4-32).

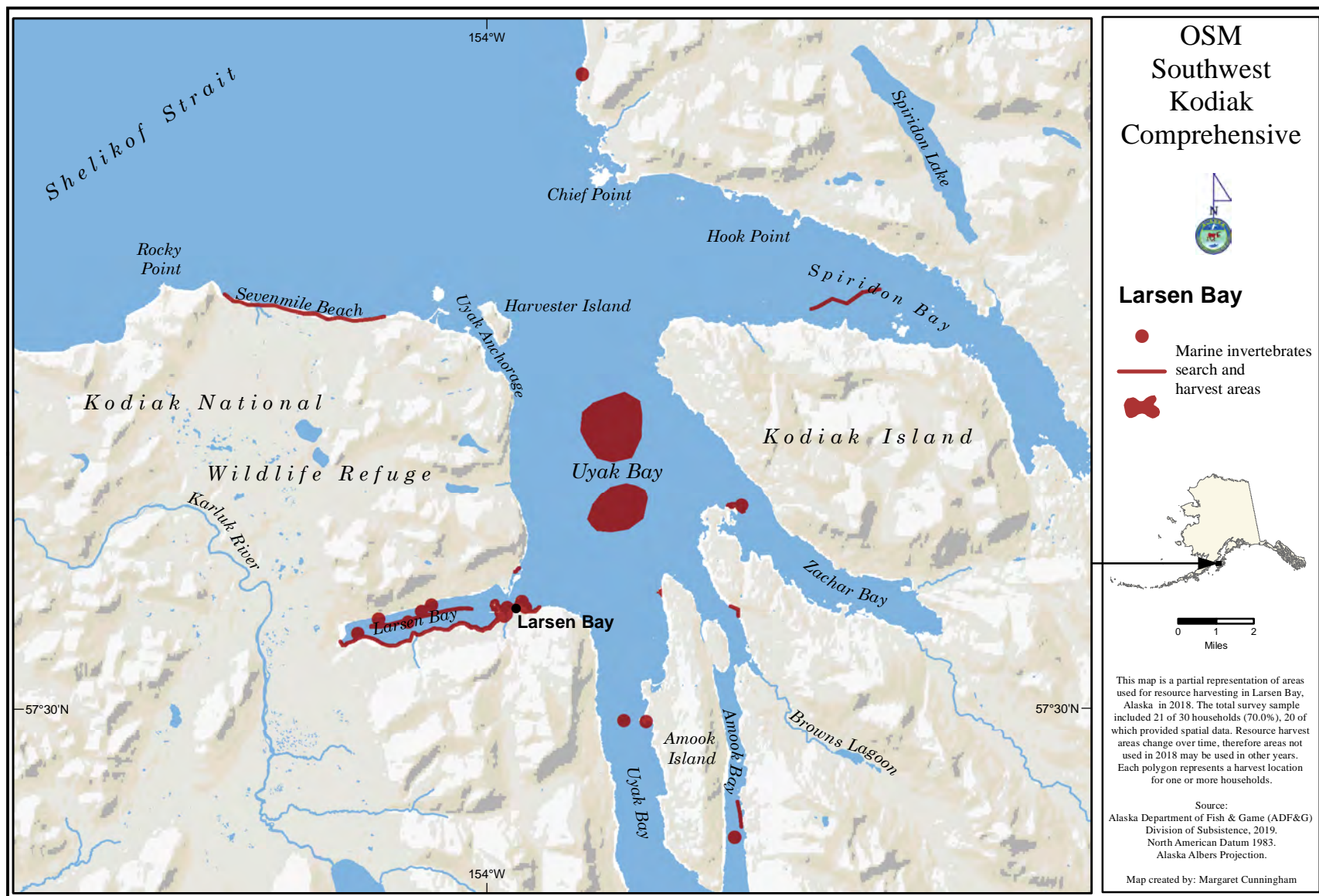


Figure 4-32.—Search and harvest locations of all marine invertebrates, Larsen Bay, 2018.

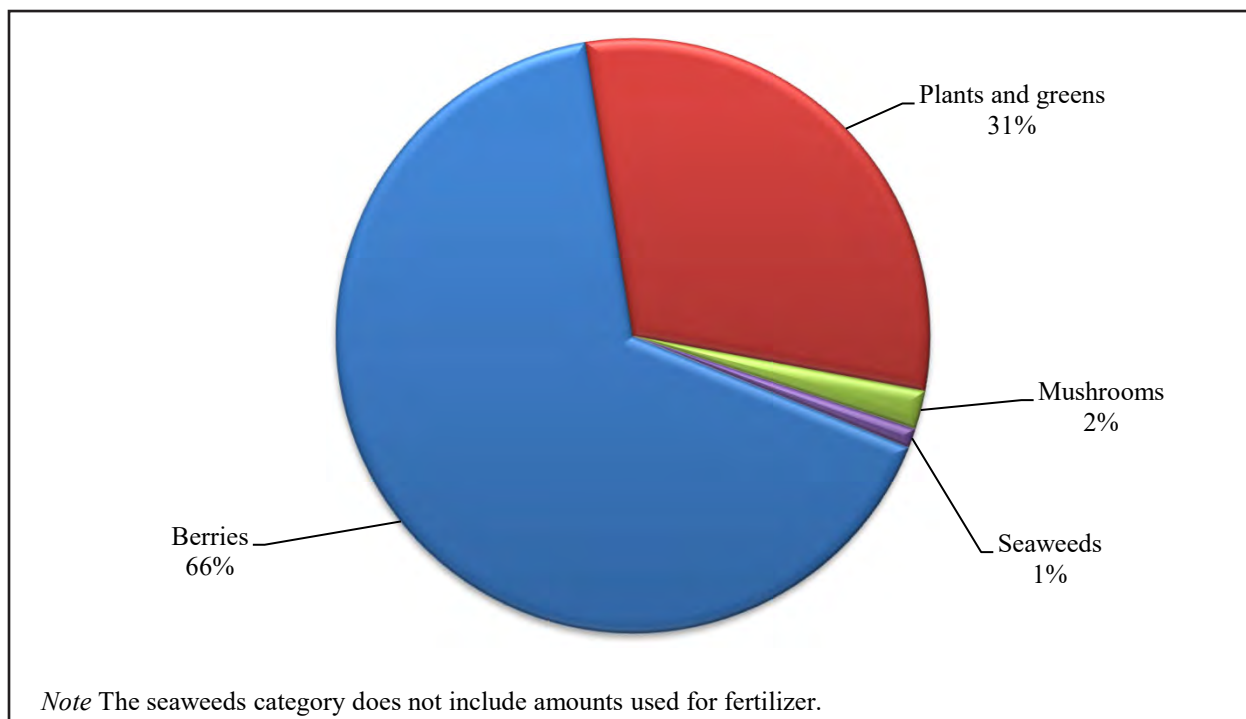


Figure 4-33.—Composition of vegetation harvest by type in pounds usable weight, Larsen Bay, 2018.

Vegetation

Within the vegetation category, Larsen Bay residents harvested berries (66% of harvest as measured by weight), along with plants and greens (31%), mushrooms (2%), and seaweeds (1%) (Figure 4-33). There were 1,122 lb of vegetation harvested in 2018, including five identified types of berries and six identified types of plants and greens (Table 4-13). Mushroom harvests are not collected by type. The raspberry harvest was substantially larger than any other berry harvest: 115 gallons of raspberries (460 lb; 7 lb per capita). The next largest harvest was of salmonberries: 45 gallons, which equated to 179 lb, or 3 lb per capita. Twenty-five gallons of highbush cranberries were also harvested (99 lb; 2 lb per capita). Harvests of blueberries, twisted stalk berries, and other wild berries were each less than 5 lb total, and combined contributed less than 1 lb per capita. Raspberries and salmonberries were used and harvested by the most households (62% and 57%, respectively), followed by highbush cranberries (38% used and 31% harvested). With the exception of raspberries, berries were not widely shared or received: 48% of households gave raspberries away, but no more than 10% of households received any species of berries.

Turning to plants and greens and mushrooms, fiddlehead ferns were harvested in the greatest amount (295 gallons; 4 lb per capita), followed by mushrooms (24 gallons), fireweed (14 gallons), and nettles (13 gallons). Other than fiddlehead ferns, all harvests of plants and greens and mushrooms were less than 1 lb per capita. Fiddlehead ferns were used by the most households (33%), followed by nettles (19%), wild parsley (14%), and mushrooms (14%); the same percentages of households used, attempted to harvest, and harvested each of the top used resources from this group of vegetation. Most remaining plants and greens were only used by 5% of households. The most households (19%) gave away fiddlehead ferns, and 5% of households gave away wild rhubarb, wild parsley, mushrooms, and fireweed. Five percent of households received fiddlehead ferns, fireweed, mushrooms, wild rhubarb, and beach asparagus. Seaweed was harvested and used by 14% of households for use as fertilizer, which was not assigned a harvest weight. An additional 19% of households used seaweed for food (10 gallons harvested). Wood was collected and used by 62% and 67% of households, respectively, for use as heating fuel, for smoking sheds, or for banyas (a traditional Russian steam bath). Wood was given by 43% of households and received by 14%.

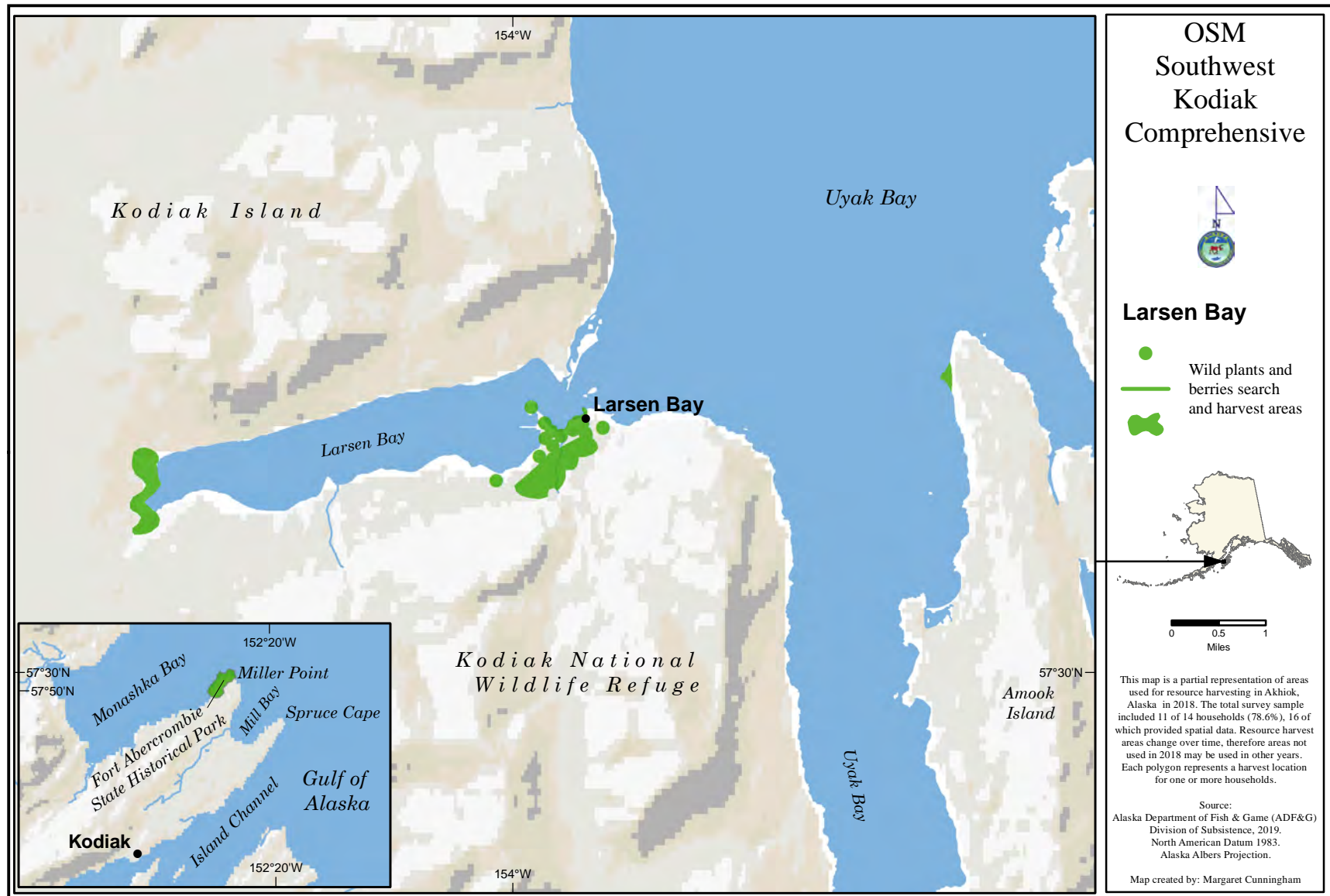


Figure 4-34.—Search and harvest locations of wild plants and berries, Larsen Bay, 2018.

Most plants, berries, and other vegetation were harvested in areas immediately adjacent to the community of Larsen Bay, including land south of the airstrip (Figure 4-34). Harvests also took place along the shore at the head of Larsen Bay, and on the northwestern end of Amook Island.

COMPARING USES AND HARVESTS IN 2018 WITH PREVIOUS YEARS

Use Assessments

Researchers asked respondents to assess their own harvests in two ways: whether they used more, less, or about the same amount of nine resource categories and all wild resources overall in 2018 compared to the past five years, and whether they got “enough” of each of the nine resource categories and all wild resources overall. Households also were asked to provide reasons if their use was different or if they were unable to get enough of a resource. If they did not get enough of a resource, they were asked to evaluate the severity of the impact to their household as a result of not getting enough. They were further asked whether they did anything differently (such as supplement with store-bought food or switch to a different subsistence resource) because they did not get enough. Because not everyone uses all resource categories, some households did not respond to the assessment questions. Additionally, some households that do typically use a resource category simply did not answer questions. This section discusses responses to those questions.

In general, more households reported using the same amount of resources for each category than reported using less or using more (Figure 4-35; Table 4-23). Marine mammals was the only resource category for which slightly more households used more resources than used the same amount. Additionally, slightly more households used less small land mammals, birds and eggs, and vegetation than households that used the same amount. Excluding the resource categories that were used the least (those with more than 10% of responding households reporting they do not normally use), 38%–67% of responding households used the same amount of these resource categories, 24%–43% reported less use of resources, and 5%–19% reported using more. Continuing to exclude the categories used the least, vegetation garnered the highest percentage (43%) of households reporting less use while the fewest households (24%) said the same about salmon. Conversely, 19% of households said they used more vegetation and salmon, while just 5% reported that they used more large land mammals and marine invertebrates. The most households (67%) used the same amount of large land mammals compared to recent previous years while the fewest (38%) used the same amount of vegetation. Of the resources less widely used (small land mammals, marine mammals, birds, and bird eggs), the fewest households (5%) reported less use of marine mammals and the most households (14%) reported less use of small land mammals. Slightly more households (10%) reported using more marine mammals and birds, while 5% reported using more small land mammals and bird eggs.

Larsen Bay residents provided many reasons for why they used less of any resource category (Table 4-24). The least common reasons given were unsuccessful (listed once for bird eggs), equipment/fuel expenses (listed once for marine mammals and large land mammals), and other reasons that were not categorized (listed once for small land mammals). More than any other reason, lack of resource availability was attributed as a cause for less use of any resource: this reason was cited by seven households for reduced use of four resource categories.

The most often cited reason for more household use of resources was increased effort, which two households listed as a reason for increased use of marine mammals, and three households listed for increased vegetation use (Table 4-25). Increased harvest effort was also given as a reason for more use of salmon, birds, birds eggs, and marine invertebrates. Larsen Bay households listed a wide range of other reasons for using more of individual resource categories, including family or personal reasons (one household listed for salmon), increased availability (one household for small land mammals), received more (one household each for nonsalmon fish and birds), needed more (one household for large land mammals), more success (one household for salmon), and acquired or fixed equipment (one household for nonsalmon fish).

More sampled households reported that they got enough of each resource category than that they did not get enough (Figure 4-36). The resource categories that garnered the most responses of “not enough” were nonsalmon fish (24%), marine invertebrates and vegetation (14% each), large land mammals (10%), and birds (10%); no households indicated that they did not receive enough small land mammals or marine mammals. Households that did not get enough of a resource were further asked what the impact to their household was from not getting enough.

For salmon, birds, bird eggs, and marine invertebrates, the households that did not get enough said the impact was minor (Table 4-26). Most households that did not get enough nonsalmon fish rated the impact of not getting enough as minor (three households, or 60%), but one household said it was major and one said it was not noticeable. For large land mammals, one household reported the impact as minor and one as major. All three households that did not get enough vegetation rated the impact as major. Households that did not get enough of a particular resource category adapted in several ways (Table 4-27). The most common adaptation was for a household to use more commercial foods; this response was given with regard to not getting enough nonsalmon fish, large land mammals, marine invertebrates, and vegetation. The only other response was to buy or barter after not having enough salmon or nonsalmon fish.

Households were also asked to assess their use of subsistence resources broadly in 2018, not just for particular resource categories. In response, 48% of households explained that they used the same amount of resources overall in 2018, 38% shared that they used fewer resources, and 14% said they used more (Table 4-23). When asked why they used fewer overall resources, 25% thought that it was due to family or personal reasons, less resources available, working or no time, or needing less, and 13% felt it was due to lack of effort or small or diseased animals (Table 4-24). For households that used more resources overall during the study year, 33% explained that it was because of family or personal reasons, needing more, or increased effort (Table 4-25). Two households also reported more use was due to “other” reasons. Four households reported that they did not get enough subsistence resources overall in 2018 (Table 4-26). Three of these households said that the impact of not getting enough was minor while one reported that it had a severe impact. For those households that did not get enough, buying or bartering and using more commercial foods were given as methods of compensation (Table 4-27).

Households that did not get enough of a resource during the study year were asked what resources of which they could have used more. No resource was indicated as being needed by more than 20% of sampled households (Table 4-28). The most households (19%) indicated needing Pacific halibut, followed by 14% needing deer and 10% needing goldeneyes and berries. No other resource was needed by more than 5% of households.

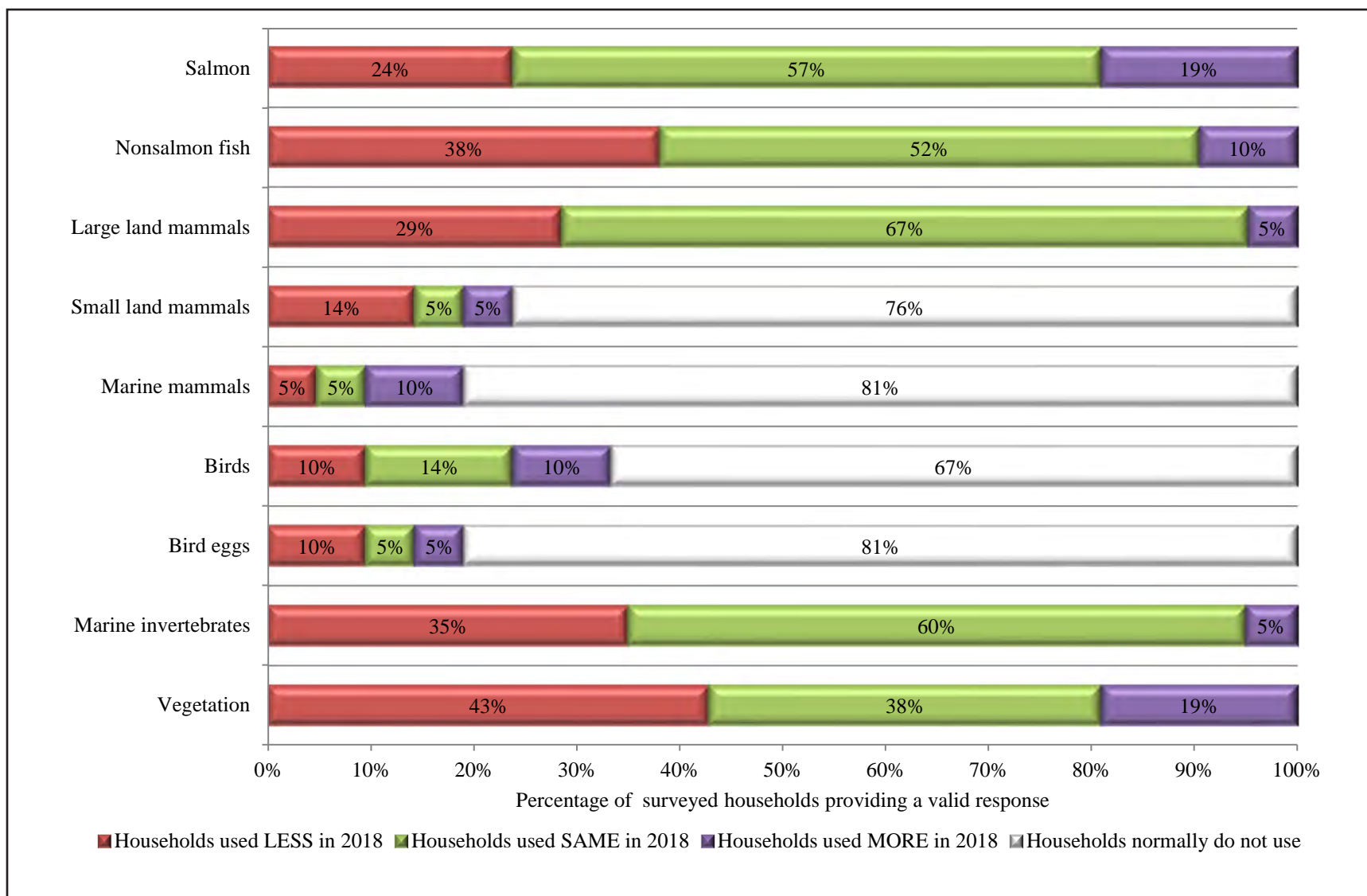


Figure 4-35.—Changes in household uses of resources compared to recent years, Larsen Bay, 2018.

Table 4-23.—Changes in household uses of resources compared to recent years, Larsen Bay, 2018.

Resource category	Sampled households	Valid responses ^a	Households reporting use								Households not using	
			Total households		Less		Same		More			
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	21	21	21	100.0%	16	76.2%	19	90.5%	10	47.6%		
All resources	21	21	21	100.0%	8	38.1%	10	47.6%	3	14.3%	0	0.0%
Salmon	21	21	21	100.0%	5	23.8%	12	57.1%	4	19.0%	0	0.0%
Nonsalmon fish	21	21	21	100.0%	8	38.1%	11	52.4%	2	9.5%	0	0.0%
Large land mammals	21	21	21	100.0%	6	28.6%	14	66.7%	1	4.8%	0	0.0%
Small land mammals	21	21	5	23.8%	3	14.3%	1	4.8%	1	4.8%	16	76.2%
Marine mammals	21	21	4	19.0%	1	4.8%	1	4.8%	2	9.5%	17	81.0%
Birds	21	21	7	33.3%	2	9.5%	3	14.3%	2	9.5%	14	66.7%
Bird eggs	21	21	4	19.0%	2	9.5%	1	4.8%	1	4.8%	17	81.0%
Marine invertebrates	21	20	20	100.0%	7	35.0%	12	60.0%	1	5.0%	0	0.0%
Vegetation	21	21	21	100.0%	9	42.9%	8	38.1%	4	19.0%	0	0.0%

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

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

Table 4-24.—Reasons for less household uses of resources compared to recent years, Larsen Bay, 2018.

Resource category	Valid responses ^a	Households reporting reasons for less use	Family/ personal		Resources less available		Too far to travel		Lack of equipment		Less sharing		Lack of effort		Unsuccessful		Weather/ environment	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	21	16	3	18.8%	7	43.8%	0	0.0%	2	12.5%	5	31.3%	6	37.5%	1	6.3%	0	0.0%
All resources	21	8	2	25.0%	2	25.0%	0	0.0%	0	0.0%	0	0.0%	1	12.5%	0	0.0%	0	0.0%
Salmon	21	5	1	20.0%	0	0.0%	0	0.0%	2	40.0%	1	20.0%	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	21	8	0	0.0%	3	37.5%	0	0.0%	0	0.0%	2	25.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	21	5	1	20.0%	1	20.0%	0	0.0%	0	0.0%	1	20.0%	1	20.0%	0	0.0%	0	0.0%
Small land mammals	21	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	33.3%	0	0.0%	0	0.0%
Marine mammals	21	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	21	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%	1	50.0%	0	0.0%	0	0.0%
Bird eggs	21	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Marine invertebrates	20	7	0	0.0%	5	71.4%	0	0.0%	0	0.0%	1	14.3%	0	0.0%	0	0.0%	0	0.0%
Vegetation	21	9	2	22.2%	2	22.2%	0	0.0%	0	0.0%	0	0.0%	3	33.3%	0	0.0%	0	0.0%

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Table 4-24.—Continued.

Resource category	Valid responses ^a	Households reporting reasons for less use	Other reasons		Working/ no time		Regulations		Small/ diseased animals		Needed less		Equipment/ fuel expense		Used other resources		Competition	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	21	16	1	6.3%	3	18.8%	0	0.0%	1	6.3%	2	12.5%	1	6.3%	0	0.0%	0	0.0%
All resources	21	8	0	0.0%	2	25.0%	0	0.0%	1	12.5%	2	25.0%	0	0.0%	0	0.0%	0	0.0%
Salmon	21	5	0	0.0%	2	40.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	21	8	0	0.0%	2	25.0%	0	0.0%	0	0.0%	1	12.5%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	21	5	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	20.0%	1	20.0%	0	0.0%	0	0.0%
Small land mammals	21	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	21	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Birds	21	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%
Bird eggs	21	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%
Marine invertebrates	20	7	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	14.3%	0	0.0%	0	0.0%	0	0.0%
Vegetation	21	9	0	0.0%	2	22.2%	0	0.0%	0	0.0%	1	11.1%	0	0.0%	0	0.0%	0	0.0%

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

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

Table 4-25.—Reasons for more household uses of resources compared to recent years, Larsen Bay, 2018.

Resource category	Valid responses ^a	Households reporting reasons for more use	Family/personal		Increased availability		Used other resources		Favorable weather		Received more		Needed more		Increased effort		Regulations	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	21	10	1	10.0%	1	10.0%	0	0.0%	0	0.0%	2	20.0%	1	10.0%	5	50.0%	0	0.0%
All resources	21	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	33.3%	1	33.3%	0	0.0%
Salmon	21	4	1	25.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	25.0%	0	0.0%
Nonsalmon fish	21	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	21	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Small land mammals	21	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	21	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%
Birds	21	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	1	50.0%	0	0.0%
Bird eggs	21	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Marine invertebrates	20	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Vegetation	21	4	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3	75.0%	0	0.0%

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Table 4-25.—Continued.

Resource category	Valid responses ^a	Households reporting reasons for more use	Traveled farther		More success		Had more time		Store-bought expense		Got/ fixed equipment		Substitute for unavailable resource(s)		Had more help		Other	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Any resource	21	10	0	0.0%	1	10.0%	0	0.0%	0	0.0%	1	10.0%	0	0.0%	0	0.0%	1	10.0%
All resources	21	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	66.7%
Salmon	21	4	0	0.0%	1	25.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	25.0%
Nonsalmon fish	21	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	21	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
Small land mammals	21	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
Marine mammals	21	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%
Birds	21	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%
Bird eggs	21	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	20	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	21	4	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	50.0%

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

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

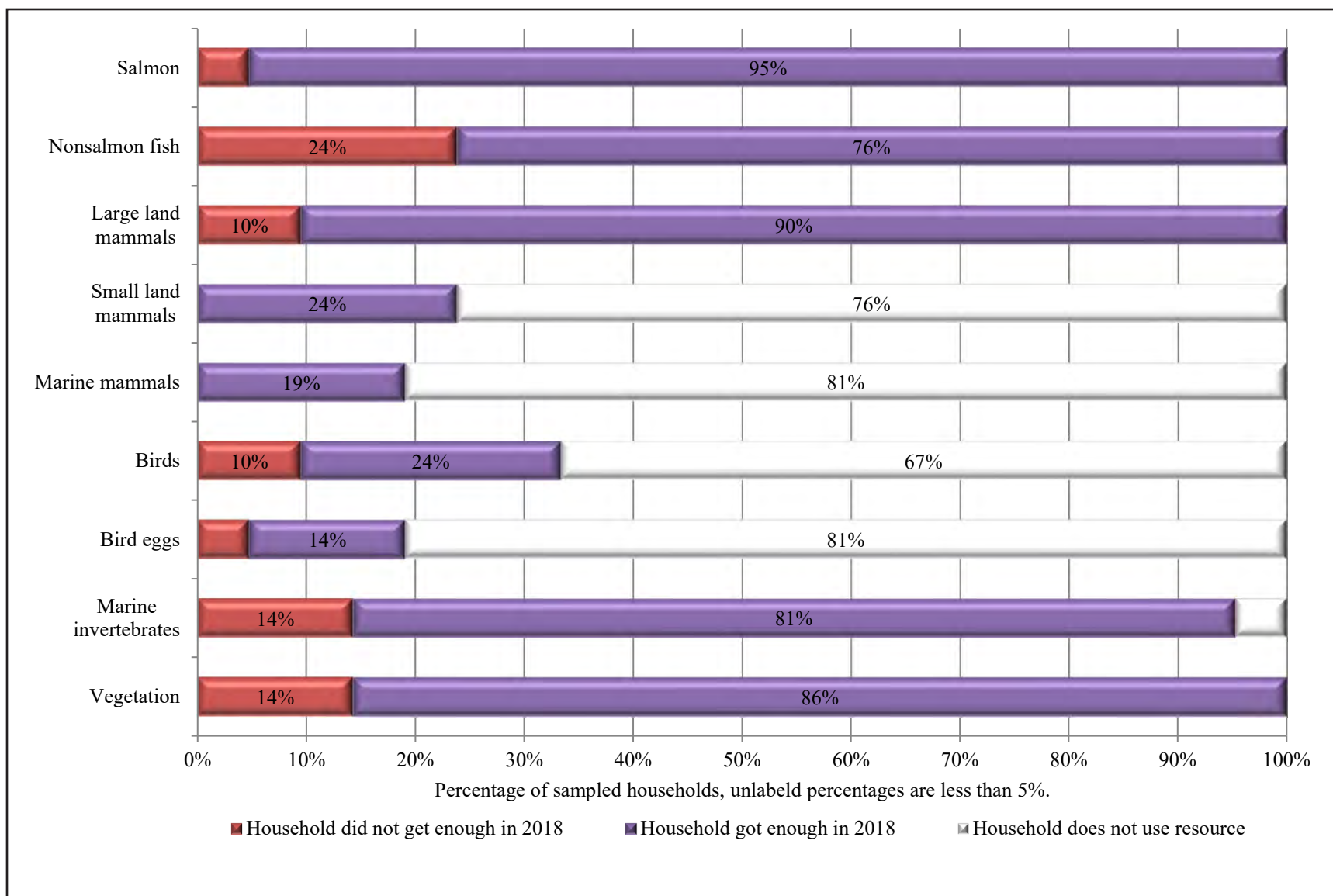


Figure 4-36.—Percentage of sampled households reporting whether they had enough resources, Larsen Bay, 2018.

Table 4-26.—Reported impact to households reporting that they did not get enough of a type of resource, Larsen Bay, 2018.

Resource category	Sampled households	Households not getting enough _____.				Impact to those not getting enough _____.									
		Valid responses ^a		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	21	21	100.0%	4	19.0%	0	0.0%	0	0.0%	3	75.0%	0	0.0%	1	25.0%
Salmon	21	21	100.0%	1	4.8%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Nonsalmon fish	21	21	100.0%	5	23.8%	0	0.0%	1	20.0%	3	60.0%	1	20.0%	0	0.0%
Large land mammals	21	21	100.0%	2	9.5%	0	0.0%	0	0.0%	1	50.0%	1	50.0%	0	0.0%
Small land mammals	21	5	23.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	21	4	19.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	21	7	33.3%	2	28.6%	0	0.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%
Bird eggs	21	4	19.0%	1	25.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Marine invertebrates	21	20	95.2%	3	15.0%	0	0.0%	0	0.0%	3	100.0%	0	0.0%	0	0.0%
Vegetation	21	21	100.0%	3	14.3%	0	0.0%	0	0.0%	0	0.0%	3	100.0%	0	0.0%

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

a. Does not include households failing to respond to the question and those households that did not use the resource.

Table 4-27.—Things households reported doing differently as the result of not getting enough of a type of resource, Larsen Bay, 2018.

Resource category	Valid responses ^a	Bought/bartered		Used more commercial foods		Replaced with other subsistence foods		Asked others for help		Made do without	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	2	1	50.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%
Salmon	1	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	2	1	50.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	2	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%
Small land mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	2	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	3	0	0.0%	2	66.7%	0	0.0%	0	0.0%	2	66.7%

-continued-

Table 4-27.—Continued.

Resource category	Valid responses ^a	Increased effort to harvest		Got a job		Obtained food from other sources		Got public assistance		Did not share as much	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Salmon	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Small land mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bird eggs	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	3	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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

a. Does not include households failing to respond to the question and those households that did not use the resource.

Table 4-28.—Resources that households reported needing, Larsen Bay, 2018.

Resource	Households needing	Percentage of households
Pacific halibut	4	19.0%
Deer	3	14.3%
Goldeneye	2	9.5%
Berries	2	9.5%
Sockeye salmon	1	4.8%
Pacific herring roe	1	4.8%
Cod	1	4.8%
Rockfish	1	4.8%
Mallard	1	4.8%
Glaucous-winged gull eggs	1	4.8%
Marine invertebrates	1	4.8%
Butter clams	1	4.8%
Crabs	1	4.8%
Dungeness crab	1	4.8%
Tanner crab	1	4.8%
Geoducks	1	4.8%
Shrimp	1	4.8%
Salmonberry	1	4.8%
Plants, greens, and mushrooms	1	4.8%
Seaweed/kelp	1	4.8%

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

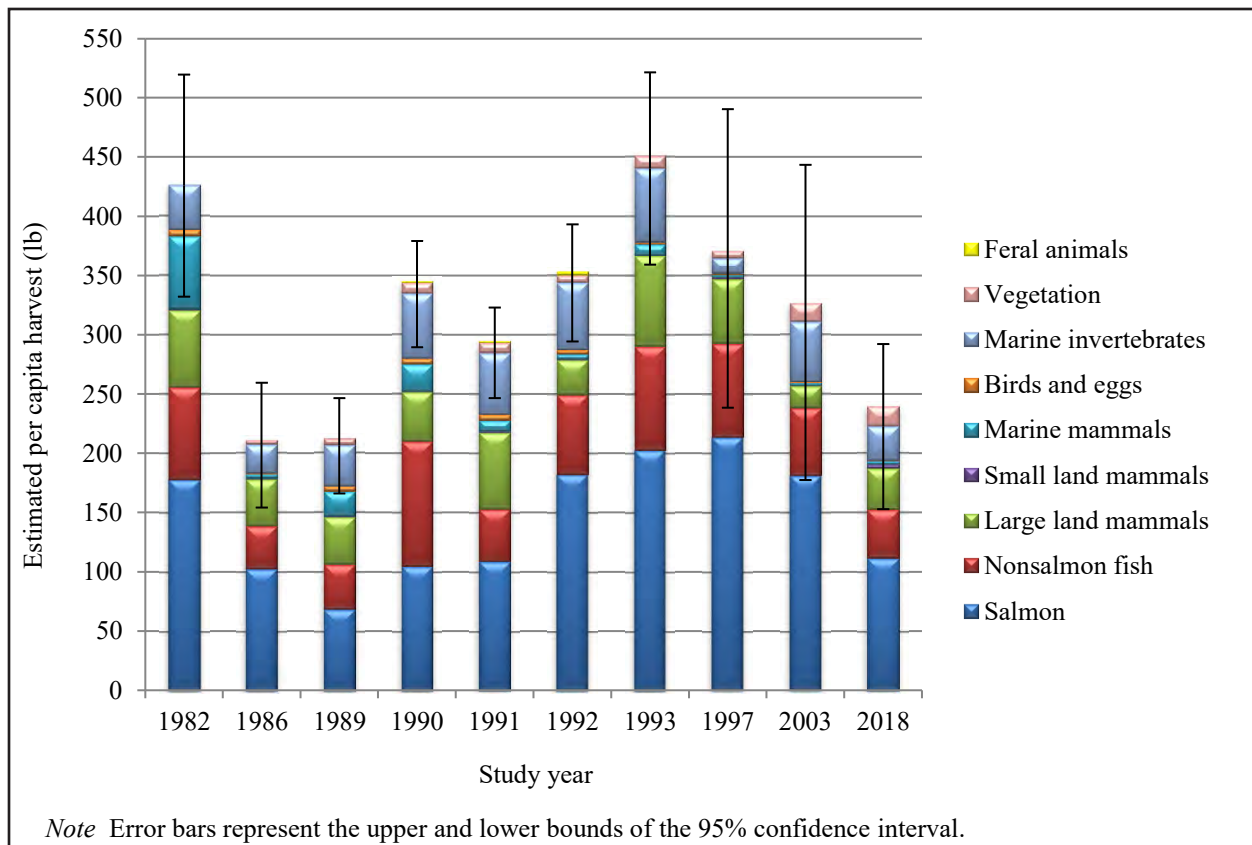


Figure 4-37.—Composition of harvest in pounds per capita, by resource category, Larsen Bay, 1982, 1986, 1989–1993, 1997, 2003, and 2018.

Harvest Data

Changes in the harvest of resources by Larsen Bay residents can also be discerned through comparisons with findings from other study years. Table 1-3 summarizes previous studies and identifies which resource categories were surveyed in the past. Baseline comprehensive subsistence harvest surveys were conducted in Larsen Bay in 1983 for the 1982 study year spanning June 1982 through May 1983 (Schroeder et al. 1987); follow-up comprehensive surveys were conducted in multiple years during the 1980s and 1990s (Fall 1991; 1997; Fall and Utermohle 1995a:XI-2; 1999; 1999; Fall and Walker 1993) and again in 2004 for the 2003 calendar year (Fall 2006). Species-specific studies were conducted for salmon and nonsalmon fish for the 2004 and 2005 study years (Williams et al. 2010), for salmon for 2012 (Marchioni et al. 2016), and for harbor seals and Steeler sea lions from 1992–1998 and 2000–2008 and 2011 (Wolfe et al. 2012).

Total per capita harvests in Larsen Bay generally show a steep decline in the year of the *Exxon Valdez* oil spill (1989) before rebounding to pre-spill levels by 1993, then steadily declining again through 2018 (Figure 4-37; Table 4-29). The total per capita harvest in 2018 (239 lb) was just slightly more than one-half of the total per capita harvest of 426 lb in 1982, and the lowest estimated per capita harvest since the oil spill in 1989. While per capita harvests were also unusually low in 1986, Fall and Walker (1993) cautioned that there was uncertainty of the 1986 data due to irregularities in data collection methods that may have contributed to an underestimation of total harvests. While there has been an apparent decline of per capita harvests since 1993, it is important to note the confidence intervals for the 2003 and 2018 study years do overlap, indicating the harvest estimate of 2018 may not be statistically significantly smaller than that of 2003 (Figure 4-37).

Table 4-29.—Comparison of estimated total and per capita harvests in pounds usable weight, by resource category, Larsen Bay, 1982, 1986, 1989–1993, 1997, 2003, and 2018.

Resource category	Estimated harvest in pounds usable weight											
	1982			1986			1989			1990		
	Total	Per capita	CI (%)	Total	Per capita	CI (%)	Total	Per capita	CI (%)	Total	Per capita	CI (%)
All resources	72,114.0	425.9	22.0%	35,826.0	210.7	25.0%	27,717.0	212.0	19.0%	50,004.0	344.5	13.0%
Salmon	30,112.0	177.9	22.0%	17,430.0	102.5	33.0%	8,941.0	68.4	21.0%	15,223.0	104.9	17.0%
Nonsalmon fish	13,144.0	77.6	35.0%	6,120.0	36.0	44.0%	4,954.0	37.9	30.0%	15,264.0	105.2	18.0%
Large land mammals	10,999.0	65.0	26.0%	6,685.0	39.3	29.0%	5,203.0	39.8	22.0%	6,009.0	41.4	18.0%
Feral animals				0.0	0.0	—				143.0	1.0	100.0%
Small land mammals	153.0	0.9	48.0%	121.0	0.7	51.0%	63.0	0.5	54.0%	30.0	0.2	55.0%
Marine mammals	10,417.0	61.5	37.0%	565.0	3.3	58.0%	2,736.0	20.9	62.0%	3,365.0	23.2	37.0%
Birds and eggs	905.0	5.4	31.0%	157.0	0.9	39.0%	574.0	4.4	39.0%	687.0	4.7	25.0%
Marine invertebrates	6,384.0	37.7	21.0%	4,130.0	24.3	27.0%	4,531.0	34.7	18.0%	7,965.0	54.9	15.0%
Vegetation				618.0	3.6	37.0%	715.0	5.5	24.0%	1,319.0	9.1	14.0%

—continued—

Table 4-29.—Continued.

Resource category	Estimated harvest in pounds usable weight											
	1991			1992			1993			1997		
	Total	Per capita	CI (%)	Total	Per capita	CI (%)	Total	Per capita	CI (%)	Total	Per capita	CI (%)
All resources	46,007.0	294.6	13.0%	48,120.0	353.3	14.0%	58,562.0	451.0	18.0%	46,154.0	370.5	34.0%
Salmon	16,996.0	108.8	15.0%	24,809.0	182.1	17.0%	26,321.0	202.7	23.0%	26,595.0	213.5	41.0%
Nonsalmon fish	6,899.0	44.2	16.0%	9,149.0	67.2	20.0%	11,372.0	87.6	23.0%	9,859.0	79.1	47.0%
Large land mammals	10,070.0	64.5	21.0%	4,021.0	29.5	15.0%	9,921.0	76.4	19.0%	6,747.0	54.2	29.0%
Feral animals	212.0	1.4	66.0%	426.0	3.1	42.0%	0.0	0.0	—	0.0	0.0	—
Small land mammals	145.0	0.9	40.0%	41.0	0.3	35.0%	25.0	0.2	42.0%	164.0	1.3	82.0%
Marine mammals	1,471.0	9.4	43.0%	608.0	4.5	32.0%	1,245.0	9.6	55.0%	265.0	2.1	86.0%
Birds and eggs	747.0	4.8	28.0%	471.0	3.5	31.0%	219.0	1.7	38.0%	177.0	1.4	61.0%
Marine invertebrates	8,152.0	52.2	13.0%	7,737.0	56.8	13.0%	8,084.0	62.3	18.0%	1,590.0	12.8	34.0%
Vegetation	1,315.0	8.4	15.0%	857.0	6.3	21.0%	1,374.0	10.6	20.0%	757.0	6.1	35.0%

—continued—

Table 4-29.—Continued.

Resource category	Estimated harvest in pounds usable weight						Average total harvest (lb) ^a
	2003			2018			
	Total	Per capita	CI (%)	Total	Per capita	CI (%)	
All resources	20,639.2	326.4	40.7%	16,064.8	239.3	29.1%	43,721.2
Salmon	11,443.7	181.0	25.3%	7,503.3	111.8	40.9%	19,603.7
Nonsalmon fish	3,612.5	57.1	41.4%	2,737.7	40.8	45.9%	8,684.1
Large land mammals	1,178.5	18.6	90.8%	2,321.7	34.6	51.1%	6,439.1
Feral animals	0.0	0.0	—	0.0	0.0	—	97.6
Small land mammals	14.9	0.2	90.8%	222.9	3.3	79.5%	101.9
Marine mammals	138.9	2.2	53.2%	160.0	2.4	57.1%	2,026.1
Birds and eggs	50.2	0.8	48.3%	45.0	0.7	73.3%	384.2
Marine invertebrates	3,198.6	50.6	44.7%	1,952.5	29.1	25.5%	5,465.9
Vegetation	1,001.9	15.8	0.0%	1,121.7	16.7	29.0%	1,045.5

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

Note Blank cells indicate harvest amounts were not collected during the survey for the resource category.

Note "—" indicates no confidence interval could be calculated due to no harvest.

a. The average excludes the estimated harvests from 1989, the year of the *Exxon Valdez* oil spill.

At the resource category level, per capita harvests estimated for 2018 were lower than harvests in 1982 with the exception of small land mammals (Table 4-29). The most notable difference was for the per capita harvest of marine mammals, which was 62 lb in 1982, and only 2 lb in 2018. This decline in harvests is supported by other studies specific to marine mammal hunting conducted over the 1990s and early 2000s (Wolfe et al. 2009b; 2012). There has been a statewide decline in seal harvests in this time period, likely associated with declining participation and a complex array of other local factors, including the number of hunters and the demand for seal meat.

Salmon easily made up the highest percentage of per capita harvests across study years, and generally followed the overall patterns of rebounding in the years immediately after the oil spill, and then declining steadily since 1997. The highest per capita salmon harvest was 214 lb in 1997, and the lowest was 68 lb in 1989. The 2018 per capita salmon harvest was slightly below the average of all study years at 112 lb. Nonsalmon fish harvests follow the same pattern of decline with the decline starting in 1993. Larsen Bay residents harvested 88 lb of nonsalmon fish per capita in 2003, and the volume decreased each year through 2018 when residents harvested an estimated 41 lb per capita.

Two resources categories—birds and bird eggs and marine invertebrates—that are generally harvested in smaller amounts compared to the other categories also show an overall decline in both per capita and total harvests since 1993. The difference between the total birds and eggs harvest in 2018 (45 lb) is considerably smaller than the average harvest of 384 lb, and the per capita harvest reduced by 1 lb compared to that of 1993. The per capita harvest of marine invertebrates in 2018 was about one-half the per capita weight harvested in 1993, and the total harvest weight of marine invertebrates reduced by 76% between 1993 and 2018. Despite the total harvest weight of vegetation being similar in 1993 (1,374 lb) and 2018 (1,122 lb), vegetation composed a higher proportion of the per capita harvest in 2018 (7%) than in 1993 (2%). Large land mammal harvests declined steadily for two study years following 1993 (76 lb per capita in 1993, 54 lb per capita in 1997, and 19 lb per capita in 2003), but ultimately increased in 2018 to 35 lb per capita. The 2018 total harvest is considerably lower than the average of all study years (excluding 1989, when the oil spill occurred): the average total harvest is 27,656 lb more than the total harvest in 2018. Many residents reported receiving deer meat from the numerous lodges in Larsen Bay that attract trophy hunters who do not always wish to keep the harvested meat. Vegetation was the only resource category that increased steadily since 1997, reaching 17 lb per capita in 2018.

Current and Historical Harvest Areas

One previous comprehensive study included a mapping component for all resources and one salmon-focused study also collected information about salmon harvesting locations. The research for the 1982 study year (Schroeder et al. 1987:468) mapped locations known to be used at the time the research was conducted. The salmon-only survey conducted in 2013 (Marchioni et al. 2016) asked respondents to provide the name(s) of the location(s) where they harvested each species of fish. In comparing information collected about all resource harvest areas in 1982 (Figure 4-38) to those documented in 2018 (Figure 4-15), overall harvest areas appear mostly similar. In both years, residents documented using all of Larsen Bay and the lands surrounding it on all sides, as well as Zachar and Spiridon bays to the east. One possible difference is less harvest activity throughout all of Uyak Bay and the surrounding lands in 2018, although there was still documented use in the waters closer to the head of the bay. Additionally, both study years show documented use of the waters around Cape Uyak toward the village of Karluk, although it is worth noting that in 1982 it appears that this area was used all the way to the Karluk River and west of the riverbank, while the 2018 search and harvest area fell east of the Karluk River. Marchioni et al.'s (2016) study used different mapping methods that make a direct comparison difficult. That study recorded the location of harvested fish by name whereas the study that is the subject of this report mapped out harvest areas but also search areas. As would be expected, by using a map to let respondents document their harvest areas as well as their search areas, this study documented a broader use area for salmon than did the 2012 study.

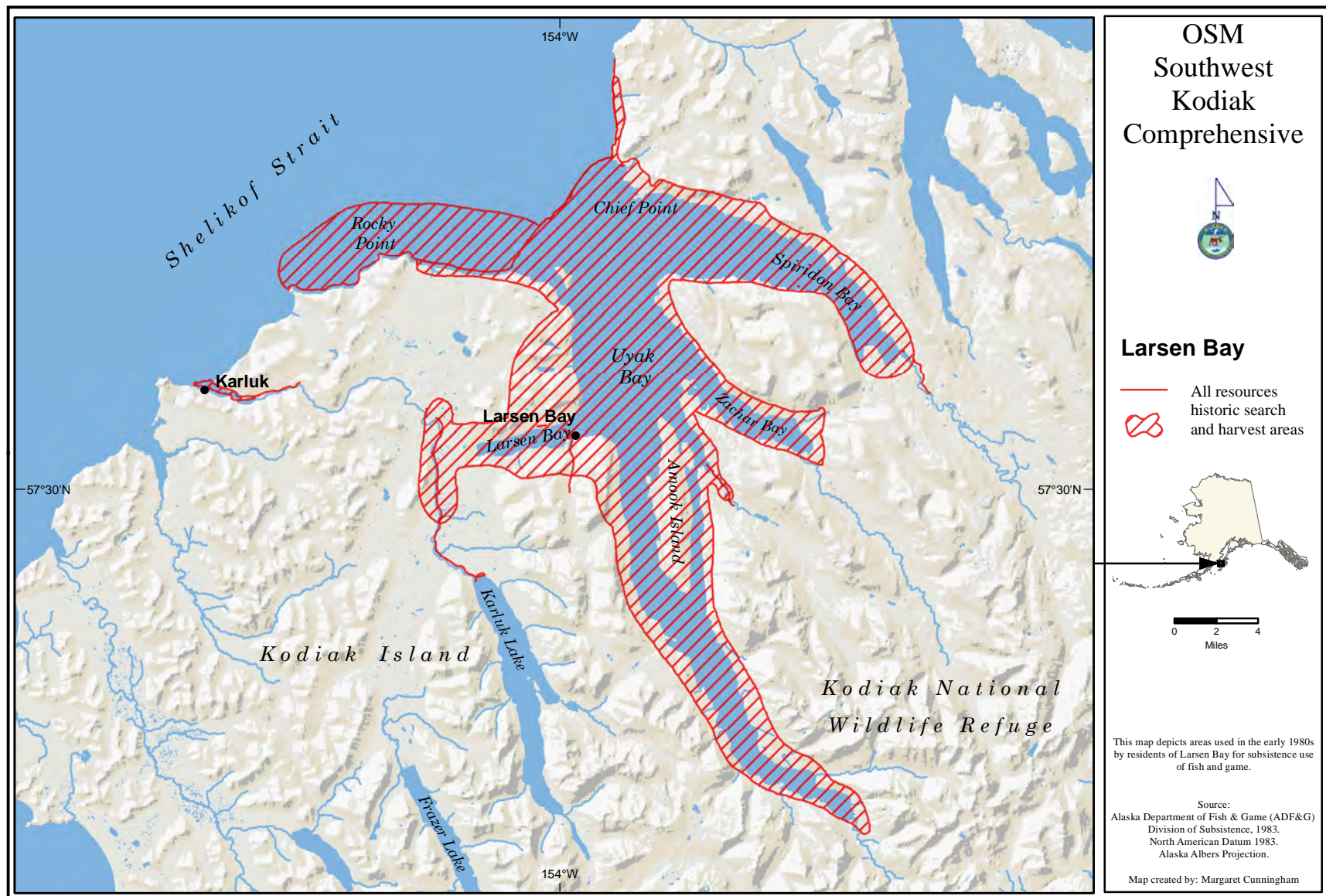


Figure 4-38.—Wild resources search and harvest areas, Larsen Bay, 1982.

LOCAL COMMENTS AND CONCERNS

Following is a summary of local observations of wild resource populations and trends 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.

Fish

Additional comments about fish were minimal, although one household commented that it was more difficult to get Pacific halibut. Another shared some observations about other marine resources: “Spiny starfish have holes and growths on them. Large starfish are gone. No eels anymore.”

Large Land Mammals

Multiple respondents shared thoughts about deer. A local guide shared that he felt the local population was rebounding after a rough winter a few years prior: “Deer population is back, mostly younger, under three years old.” Another felt that sport hunters needed to be managed better while local residents should be able to harvest what they needed: “Sport hunters [are] taking too many too close to town. It is not meat people necessarily want ... let locals keep shooting whatever for meat.” Someone else also spoke about deer meat taken by sport hunters that lodges sometimes distributed to community residents, but also noted that the meat was of poor quality due to adrenaline in the deer. Finally, one respondent shared that the local bear population seemed to decrease about 6–7 years ago.

Small Land Mammals/Furbearers

One respondent shared observations of small land mammals, saying, “Voles were not around five years ago, now there are tons. But foxes are low. Ground squirrels were never seen around here until recently.”

Birds and Eggs

One respondent mentioned that the kinds of birds in the area were changing, and suggested that an abundance of eagles was causing problems for other animals: “Eagles go after ducks and fawns. Lots of hawks. Kinds of bird is changing.”

Marine Invertebrates

Only one comment was offered about marine invertebrates, which was that the respondent observed that Tanner crabs were coming back from low population years.

Marine Mammals

The most comments were made about the overabundance of sea otters near Larsen Bay. As one respondent expressed, “Something needs to be done about sea otters. A population assessment, and figure out what to do. [There are] hundreds of them around Chief Cove.” Most shared similar sentiments. As another stated, “Sea otters: too many. Need to get rid of them. Send ADF&G out to take care of them.” A third respondent expressed his desire to hunt them: “We need to get rid of the sea otters and I would like to get some pelts.” Finally, a fourth respondent put it most succinctly: “Damn sea otter.”

General Comments on Subsistence Participation

The remaining comments were related to general participation in subsistence activities. One respondent noted that he did not want to see the subsistence way of life go away, and thought that there was less local interest:

Lifestyles are changing. We say it's McDonald's. Go to McDonald's instead of the beach. Go to Amazon instead of your backyard. But everything changes. I try to get people to go down to the beach and you are competing with Nintendo and all sorts of good stuff.

Two others noted that more harvesting seemed to be done by people who did not actually live in Larsen Bay. As one described, “More of the harvested here are by non-residents than by people who live here. Nothing

wrong with that, it is part of their subsistence lifestyle.” Another respondent was more bothered by harvest from non-residents, stating, “More boats from out-of-state are coming in, to fish. We wish there was more enforcement out here for people who are not following the rules and abusing the system, creating wanton waste, trophy hunters Lodges and ‘pretend lodges’ [people who are not official and have relatives/friends shift in and out but do not call it a lodge] are using up resources and decreasing resources for locals.” Finally, in a key respondent interview, one local resident shared his perspective on sharing wild foods in Larsen Bay:

Everybody is pretty good about sharing around here. Especially once you get to know people. It’s a pretty good community in that aspect. People come in with a bunch of fish, for example. Commercial fishermen come in and put a subsistence net out with 200–300 reds and they’ll tell everyone in town come get 5–10. Everybody is good. I get lots of deer, and I give people deer meat, all they want. (LB01)

Despite general comments alluding to changes in subsistence participation, statements like the one above suggest that the underlying values of resourcefulness and sharing remain a prominent aspect of life in Larsen Bay.

5. SUBSISTENCE HARVEST PATTERNS AND LOCAL TRADITIONAL KNOWLEDGE

This chapter addresses project objectives 3 and 4. Objective 3, “Document patterns associated with subsistence salmon and nonsalmon harvests, historically and in the recent past,” encompassed researching a wide range of environmental and social factors associated with subsistence harvest patterns in the southwest Kodiak communities of Akhiok, Larsen Bay, and Old Harbor. Factors include changes in salmon and other resource abundance, quality, and access; perceived effects of commercial fishing on subsistence resources; broader environmental changes; and rich social traditions of resourcefulness and resource sharing intertwined with local demographic shifts and technological changes that alter the subsistence way of life. Objective 4, “Collect local traditional knowledge (LTK) of habitat important to salmon lifecycles held by residents of Akhiok and Larsen Bay, with a specific focus on Olga and Akalura lakes,” focused on researching residents’ knowledge of salmon and habitat connected to Olga Bay, as well as observations of changes to habitat and salmon stocks over time.

Eleven people from the three study communities participated in key respondent interviews (KRIs) to provide LTK for this study: four from Akhiok, six from Old Harbor, and one from Larsen Bay. While multiple potential respondents were contacted in Larsen Bay, only one possessed both the knowledge of wild resources and the willingness to participate in an interview. As with any respondent, the opinions expressed by the sole Larsen Bay respondent do not necessarily represent those of the community at large. Some respondents participated in a single interview together, resulting in a total of nine interviews across the three study communities. There was one respondent in the 70–79 age range, three in the 50–59 range, four in the 40–49 range, one in the 30–39 range, and two in the 20–29 range. Seven respondents were male and four were female. Seven respondents had lived in their communities for their entire lives, while the remaining four lived in their communities for the majority of their adult lives. The majority (eight) of respondents were Alaska Native, primarily Alutiiq/Sugpiaq.

A note to the reader regarding participant quotes in this chapter that use local names for salmon species: Chinook salmon were referred to as “king salmon” or “kings,” sockeye salmon were referred to as “red salmon” or “reds,” coho salmon were referred to as “silver salmon” or “silvers,” pink salmon were referred to as “humpies,” chum salmon were referred to as “dog salmon” or “dogs,” and “lake fish” was used to refer to old, blackened sockeye or coho salmon that were harvested from lakes. Additionally, to demonstrate the breadth of individuals addressing key topic issues, quotes are attributed to respondents using a code that combines a community name shorthand¹ with a respondent number.

PATTERNS ASSOCIATED WITH SUBSISTENCE SALMON AND NONSALMON FISH HARVESTS

General Observations

Salmon are extremely important to residents of Akhiok, Larsen Bay, and Old Harbor. To understand local salmon issues, respondents were first invited to share general observations of local salmon stocks, including any notable changes. Responses included comments related to species of salmon appearing in locations where they had not been previously observed, changes in run times and the strength of runs, and changes in the size of fish.

One Akhiok resident noted that some pink and coho salmon have been observed in places where they have not historically been:

There’s a creek that goes down here to our bay and the fish the past few years have been trying to get up this creek to get to that lake. We’ll have silvers and pinks

1. Note: AK = Akhiok; OH = Old Harbor; LB = Larsen Bay.

pooling up right here in our bay trying to get up to the big lake up there but there's never any fish. We don't know whether they got lost but, yeah, we've been noticing that the fish are pooling and going up different creeks than they're supposed to. (AK01)

The same resident mentioned that coho salmon seemed to be continuing to return longer than usual:

Usually by about September 15 we're pretty much done. The salmon are getting colored up. They're not coming anymore. This last year, September 30 we were catching chrome² fish still, and limits of them. ... But it's not that they showed up late, they still showed up when they show up, September 1. (AK01)

Another Akhiok resident mentioned that there were some years when pink salmon in the area were as large as sockeye salmon, noting, "A couple of years ago though, there was people, you know, hauling up 12-pound pink salmon, 12-, 13-pound pink salmon. Just huge ... I mean those pink salmon were big as reds" (AK03).

The only respondent from Larsen Bay noted that sockeye salmon returns seemed healthy enough, and that the pink salmon returns were very strong in odd-numbered years: "There's so many pinks you just don't know what to do with them. They're everywhere." He went on to explain that he still enjoyed eating pink salmon even though it was not the local preference:

So pinks, yeah, everybody up here is spoiled is what I like to say. Nobody wants to eat them because they're not that good. However, if you come from the Lower 48 a fresh pink salmon is better than a farm-raised salmon, any day. (LB01)

Old Harbor respondents spoke about the three species that regularly return to their community: "It's pinks, dogs, and silvers. That's all we get" (OH01). One young fisherman noted that local residents have to travel in order to fish for other species:

If people want kings though, they have to go quite a distance out. We don't have a place where we have kings run up here ... That's the same with the reds, there's no red run here. So they just get what's coming through to the south end of the island. (OH05)

He went on to say that he thought some of the sockeye salmon harvested on the south end of the island were Cook Inlet fish:

What's happening is somebody's catching our fish on a different part of the island. When the weather comes through the Cook Inlet fish will just get blown straight into the bays and they won't make it back out 'cause we catch them all. (OH05)

Of the three locally available species, pink salmon are typically the first to arrive near Old Harbor: "Generally, here, if you don't start seeing pink salmon by, you know, even a handful of them jumping around by the first of July, you know, you're gonna start to get kinda suspicious" (OH03). The same older fisherman noted that the local coho salmon run seemed to be reliable for fulfilling subsistence needs: "As far as our silver run, like I said, our two main subsistence rivers always seem to get their fish. I mean, they, they don't seem to have an issue with that" (OH03). The local coho salmon run usually continues until late in the fall: "The silvers won't come around until the end of August. They'll run through like October–November" (OH05).

Changes in Resource Abundance

To understand patterns in subsistence salmon and nonsalmon fish harvests, respondents were asked about observed changes in the abundance of local resources used for subsistence. While interview questions focused on salmon, respondents spoke about a wide variety of resources important to them, including Pacific halibut and other nonsalmon fish, seals and other marine resources, deer and other land animals, and plants and berries. The strong emphasis placed on observations of other nonsalmon resources highlights

2. "Chrome fish" in this case is referring to coho salmon that had not yet spawned and changed color.

the importance of the interwoven relationship among wild resources that subsistence communities rely on, where use of one resource is often affected by the abundance and availability of other resources.

Salmon

All four Akhiok respondents spoke of a notable decrease in the abundance of local salmon populations. Speaking generally about the Olga Bay area, one Akhiok resident explained, “We used to get 500,000 [sockeye] a year, each count! So we’d have a million fish in the river. Now we don’t even get 500,000 fish for both counts, total” (AK02). Another Akhiok respondent noted the sharp decline in the early run of coho salmon: “Yeah, the early run [of coho] is nonexistent” (AK04). A woman who grew up in Akhiok explained how the decrease in salmon abundance changed her family’s fishing practices:

It used to be any time we could go up there and get our amount of fish we need, now we sit home and listen for the counts, the numbers for the day to decide if it’s even worth going up. (AK01)

Some respondents thought that the decline in returns was due to factors like the *Exxon Valdez* oil spill in 1989 or other pollution: “Maybe the *Exxon* oil spill had a big part. Um, one of that nuclear reactor just, uh, screw up, uh, blow up in Japan [Fukushima, 2011]. Maybe that had a big factor” (AK03); “A lot of changes since the oil spill. Numbers have drastically gone down since the oil spill” (AK04). Others were more likely to blame fisheries managers and overharvesting for the decrease in salmon abundance. One Akhiok fisherman spoke of his perceived effects of the commercial fishery:

I think that’s just been mismanaged. I remember they used to be, 30 years ago, there used to be 250,000 reds and reds alone. You know. Go up in there in a season. Now, you might get 125,000 return probably, probably get 40 or 50 thousand for the first run, and probably 100,000 for the second run. (AK03)

Another resident went on to describe changes he noticed with younger salmon in the local streams, saying, “I used to see a bunch of smelt and fry around here, I mean it used to be thick with the baby fish. Now I don’t even rarely see a school of baby fish anymore” (AK02).

Combined, the Larsen Bay and Old Harbor respondents had more mixed reviews of salmon abundance near their communities, ranging from perceptions of strong salmon populations for all species to observations of a decrease in sockeye and coho salmon populations. The Larsen Bay respondent did not express concern about salmon abundance: “All the salmon seems to be fine. The runs are good. The king salmon in the Karluk River starting to come back” (LB01). One Old Harbor fisherman noted that returns of sockeye salmon were low for southwest Kodiak Island in 2018:

Like last year was pretty, pretty slim here for reds so we didn’t see much, I mean, I got 40 reds from my friend in Olga Bay that her, you know, down in Alitak that brought ‘em, sent ‘em up. But my brother-in-law didn’t get, you know, between him and I, we usually do a couple hundred reds. And I, I think he might’ve had 10, 10 reds last year, so I mean, it was just really slow here. (OH03)

He went on to say that this seemed to be part of a broader decline in local salmon returns: “I just don’t know enough about those salmon. But I mean, that lagoon [in Old Harbor] has changed a lot. We just don’t get the fish in there we used to” (OH03). The younger fisherman in Old Harbor described how he observed an overabundance of pink salmon in 2017: “They were trying to go up water runoffs, like water runoffs that were this big [gestured with hands held apart]. They were just trying to go up everywhere. We were having to keep them out of our water supply even [laughs] ... That was the most I’ve ever seen in my life,” but he noticed an overall decline in coho salmon abundance near Old Harbor: “It seemed like the seiners used to fish until October ... for silvers because it was worth it, you know. It’s not really worth it for them to do it anymore. They can’t even really pay their fuel” (OH05).

Nonsalmon Fish

Concern over a decrease in Pacific halibut abundance was consistent across communities, with the majority of respondents reporting sharp declines. All four respondents from Akhiok noted that the abundance of Pacific halibut in Olga Bay had sharply declined: “We barely get a halibut in Olga Bay, Moser Bay anymore” (AK01); “It used to be rich in Olga Bay with halibut” (AK02); “Um, halibut is, uh, I noticed have gone down” (AK03); and, “Halibut has become more scarce even though statistics say that they’re coming back in certain areas, we don’t see it coming back” (AK04). Similar observations were shared by residents of the other two communities. The respondent in Larsen Bay worked as a fishing guide and described the decline he had witnessed over the time he has lived and worked in Larsen Bay:

The halibut fishing is nothing like it used to be. I’m only talking about 10, 15 years, you know what I mean. It has dropped off so dramatically. I have in my records from fishing, sport fishing as I guide for about 100 days a year on salt water. In, I think in 2008 or 2009, I caught it was like 30, 35 halibut over 100 pounds. There was one or two a week, no matter what, if not one or two a day some days. Like five fish in three days that were over 100 pounds. Just tons of them. Now you go up there and I catch two of them a year. Two of them at 100, it is so much different than it used to be. (LB01)

Similarly, multiple Old Harbor residents described an abrupt decline in Pacific halibut abundance close to their community: “We got hit by the fact that we didn’t catch a halibut for the first time in our lives ... ever. I think the fact is there’s still lots of halibut around. They just didn’t come by where we were” (OH02). One fisherman stressed that Pacific halibut seemed to have abruptly disappeared from the waters adjacent to Old Harbor: “It seems the halibut just almost dropped off the face of the earth, like in the area completely ... I mean I haven’t caught a halibut in 2, 3 years, something’s up here” (OH05). One older fisherman described changes in greater detail:

I do see a big change now for halibut. Um, this place, you used to be able to go out in front of the village and, you know, um, be able to sit, you know, right almost off the docks, sometimes, and be able to catch halibut. You don’t see it anymore. Um, they are few and far in between. And we used to be able to do that. (OH03)

In addition to halibut, some respondents also discussed changes in abundance for other nonsalmon fish. In Larsen Bay, the respondent discussed the abundance of Dolly Varden, and his concerns about the potential effects on local salmon populations:

They are tons and tons and tons and, in my opinion, an extremely overabundance of Dollies everywhere. There’s Dollies every river system I go to. There’s tons of Dollies. I know what the Dollies eat, they eat eggs. They eat the roe. They’ve got to [be] putting a hurting on it ... There are just tons of them. I think we need to keep some of them. You know what I mean? When they’re eating that much roe, they’re eating fertilized eggs as well. So it’s one less salmon that’s going to hatch. One less native rainbow [trout] that’s not going to eat a meal then, ‘cause the Dolly ate it all. (LB01)

One fisherman in Old Harbor shared his observations of an abrupt disappearance of local cod:

We’re used to having codfish bother us to get our bait for halibut, we’re trying to catch halibut. We can’t because there’s so many codfish. All of a sudden in a two-year period the codfish are gone in Barling Bay. I don’t know about anywhere else, but we do know about Barling Bay. (OH02)

Finally, two Old Harbor respondents discussed changes in the abundance of black rockfish:

So, the bottom, the bottom fish stuff is, is uh, black bass is the same way. There used to be more black bass in some places here closer to the village, but you don’t see that anymore. (OH03)

The other elaborated on his perceived effects of charter fishing on local yelloweye rockfish populations:

The yelloweye, that's what I was trying to think of were the yelloweye. They're pretty scarce around here now. We had guys, like outside entities I guess, buy some of the lodges here and it's just certain stuff like that. They don't realize that they don't reproduce until they're 50 ... something like that or whatever. So they're out there pretty much murdering them and they're nowhere to be found. I mean we had spots where there was yelloweye just every time you let your rod down Then they [lodge owners] figured it out [where to find yelloweye rockfish], people showed them, and overfished them completely. (OH05)

Crab

All four Akhiok respondents shared observations of local crab populations in relation to commercial fishing. Only one respondent thought that populations were fairly stable, but acknowledged that commercial fishing still had an effect:

I guess Dungeness have been OK. King crab, I think they're all about the same ... when they finally opened up that, uh, Tanner [crab] fishing around here. You get 16 boats down here with how many pots and they just fish this area for straight, I don't know, however long, and they're just wiping 'em all back out again. (AK03)

The other three Akhiok respondents expressed concern over local crab population declines and explicitly blamed commercial trawling: "We've seen a decline in our crab, all species of our crab, they're getting much more harder to find, ... and we know that those trawlers aren't following the rules of the areas that they can trawl" (AK01). In explaining changes in abundance of local crab populations, two respondents noted how crabs used to be easier to catch: "I used to catch king crab in the gillnets. Now that's very rare" (AK01); "We used to catch king crab on a halibut line" (AK02). Similarly, a lifelong resident described how blue king crab used to be more abundant in shallow waters close to shore and shared how he remembered "going up to Akalura by the old cannery, going swimming there and just plucking them off the pilings. All the adults would be fishing for fish and us kids would be out there swimming for [blue] king crab" (AK04).

Other Marine Resources

Akhiok and Larsen Bay respondents had the most to say about changes in abundance for a wider variety of marine resources. Akhiok respondents noted changes in local populations of multiple marine resources, including clams, sea lions, Pacific herring, seals, jellyfish, and sea urchins:

Our clams are not as abundant as they used to be, there are only certain areas now where we get the clams. We used to be able to go out right below this house right here on this beach and get cockle clams. (AK01)

Sea lions are less and less. Herring is less and less. (AK03)

Those seals numbers have gone down since I was a kid. Here I remember seeing maybe 60 or 70 or so when I was a kid. As a kid I remember the biggest stock. (AK04)

Um, nothing noticeable but jellyfish, way a lot more jellyfish. (AK04)

Respondents in both Akhiok and Larsen Bay noted an increase in the sea otter population: "Urchins are getting less and less I noticed. Otters are becoming more and more" (AK03). This Akhiok resident elaborated on the relationship between sea urchin declines and a spike in the local sea otter population:

The urchin population started dying down about four, five years ago, I think. Otters just started showing up here, as far as numbers, seeing numbers, with otters floating around. They just started showing up here the last three years maybe. And it's like every year they've been doubling in numbers. (AK03)

The Larsen Bay respondent shared a similar observation: “There’s more otters, it seems like that population is growing, holy cow it is definitely on the rise” (LB01). He also noted changes in the number and size of octopus near Larsen Bay: “Probably less octopus than ever, but there are still plenty of them. You just don’t get as many big ones” (LB01).

Land Animals

Some respondents discussed changes in the abundance of land animals. One Akhiok respondent spoke of a significant decrease in local deer populations, and blamed charter boats for excessive harvesting:

When I was a kid growing up, before the whole charter industry started booming. I can literally ride from this point here, drive up into here, and come back out, and literally see almost a thousand deer. In the thousands. Now you can drive from just past this island, from Fox Island, all up to here, you might be lucky if you see one deer standing there So, these charter boats who live and hunt in here for October, November, December, three months, have shot anything that walked, crawled, squatted, anything. They shot and killed it. (AK03)

The Larsen Bay respondent shared several observations from his work as a hunting guide:

- “A lot more goats than there were when I first showed up here,”
- “I call them rabbits, the hare there’re always tons of hares,” and
- “Tons of ermine” (LB01).

He also spoke of changes in abundance for some animals that he perceived to be part of a cycle rather than cause for concern, such as for foxes—“The fox population is down a little bit, you know I think that’s just a cycle”—and brown bears:

When I first showed up, there were a lot of bears, 2006. Then it was like 2010–2013 I’m guessing on those numbers. There were a lot less bears. Just seems like you weren’t seeing them as much when I’m out fishing in the summer. You just didn’t see the quantity of bears. Now it’s back to normal it seems like it, you see them everywhere. You see them spring hunts and all summer long everywhere in the creeks. (LB01)

Finally, he noted the introduction³ of squirrels to the island: “There wasn’t a single squirrel here. My boss who’s from here, lived here his whole life, born and raised. He’s 50-something years old now. He’d never seen a squirrel, until like five or six years ago” (LB01). Old Harbor respondents did not have any comments related to land animals.

Plants and Berries

Gathering berries was a popular activity in all study communities, although respondents in both Akhiok and Old Harbor noted an overall decrease in berry abundance in recent years. One Akhiok resident described a sharp decrease in both blackberries (crowberries)—“We don’t even get blackberries anymore Blackberries are probably 90 percent less than what they used to be”—and salmonberries—“Salmonberries are, uh, 60 to 70 percent than what they used to be. Less. And I’m just speaking for this area you know, Akhiok, I don’t know how it is anywhere else” (AK03). Describing blackberries in more detail, he noted:

I remember growing up, we’d pick [black]berries, well it’d be, well I guess with ... my mom and my grandmother, my aunts. Just our one big family, you know. Um. We’d pick berries probably four, five times a year. Now we’re picking berries once every four, five years, you know. (AK03)

3. Red squirrels (*Tamiasciurus hudsonicus*) were introduced to Kodiak Island between the 1920s–1960s. Source U.S. Fish and Wildlife Service. “Kodiak National Wildlife Refuge: Wildlife & Habitat.” https://www.fws.gov/refuge/Kodiak/wildlife_and_habitat/index.html (accessed May 2021).

He also described changes in salmonberry harvests:

I mean you could get a 5-gallon bucket in about two hours, a couple hours just one person. Now you get three or four people out there for an hour, you might get a Ziploc bag full. (AK03)

Similarly, an Old Harbor resident described that, from his time spent fishing in the Olga Bay area, he observed local plants change:

Our salmonberries down there haven't been nearly as good either of these past couple of years ... We'd get 50 gallons of berries a summer, at least. It's down to probably 10 [gallons]. (OH05)

Another Old Harbor resident described the small number of salmonberries close to the community of Old Harbor in 2017 and 2018: "Couple years we didn't have salmonberries and holy cow. It was terrible; you'd have to crawl and go up the hill to pick berries, but there were hardly any." She also noted a decrease in other types of berries, saying, "Not even those highbush cranberries, the sour ones, we haven't had those in a couple years" (OH01).

Changes in Subsistence Resource Quality

In addition to resource abundance, respondents were also asked about notable changes in the quality of local resources used for subsistence. Again, questions were focused on changes in salmon quality, but respondents also spoke about changes in the size and quality of Pacific halibut and changes in the quality of local populations of seals and clams. Similar to how observations about salmon abundance prompted respondents to discuss changes to a wide variety other subsistence resources, observations of changes in quality for numerous marine resources show how local residents rely on a wide variety of resources to support their subsistence way of life.

Salmon

When asked about changes in the quality of local subsistence resources, only Akhiok respondents expressed concern about salmon, with one noting sores on some local stocks: "When I've seen some of the fish come out of Upper Station up there, they've got a bunch of sores on them" (AK01). Another resident noted that salmon returning to the Dog Salmon River system seemed to be getting smaller: "Um, a lot of the fish are returning undersized or small ... That Dog Salmon [River] run, generally the fish are a little bit smaller in size" (AK03). Finally, a longtime resident of the community spoke about the invasion of farmed fish that have been sometimes caught accidentally: "Franken-fish we call them. If we ever come across a farmed salmon we know right away, we don't even use those for bait." He went on to describe how to identify farmed salmon, noting:

They look more like trout than salmon. You open them up and there's no pink, it's all white. You go to the store you know which ones are farmed fish, too. They call them wild Alaskan salmon and it's not, it's the wrong kind of pink. Because they put the color in those fish, it's like going out to get surimi: mm-hmm that's not a crab, it's a fish! (AK04)

The respondents from Larsen Bay and Old Harbor did not explicitly share any concerns on changes in the quality of local salmon stocks close to their communities.

Pacific Halibut

Respondents from both Akhiok and Old Harbor described decreases in the quality of Pacific halibut, especially related to size. An Akhiok resident described changes in detail:

I noticed that when I was growing up, 30 years ago when I used to halibut fish, I mean, just handline, I mean our average size was 30 to 40 pounds. Yeah, I would have to say 40- to 60-pound was an average. Anything over 100 pounder was a nice big one. But ... somebody would get an over-a-hundred-pounder every, maybe five times a summer. In the village. Just handlining. You'd get you know five, and

then at least once a summer somebody would pull in something over 200 pounds, handlining. Now, it's just they're all below 25 pounds. And very rarely you'll get one, ah, I don't know, over a hundred pounds. And that's with handlining. I mean you can probably get 'em if you're longlining, but it's not the same thing. You have to go straight out into the deep, and you can't handline with 250 feet deep, or 150 to 250 feet. Everybody who used to handline used to handline in 30 feet of water to 70 feet of water. (AK03)

Another Akhiok resident noted the poor quality of some of the Pacific halibut⁴ she was recently catching, which she referred to as "jelly halibuts":

You catch a halibut, it looks perfectly fine, you cut it [in] half and the meat is like Jell-O, you cut it and it literally melts like Jell-O. We don't know what it is. And how many times I was heartbroken, come home boy I got this nice halibut and I go to cut it open and what the heck it's almost like clear and it's jelly, it's just water. You know when a watermelon goes bad and it's like just jelled? Water? The halibut looks perfectly fine when you catch it, you don't know it's almost like you want to test it after you catch it, poke it and take a piece and see if it's a good meat rather than hauling it all the way home and find out it's ... it's just in the past few years we noticed we've been getting those. (AK01)

Finally, one Old Harbor fisherman also described the smaller size of local Pacific halibut: "I see a lot fewer big fish ... I used to go out and, I mean, for us to go out back, you know, 15 years ago, some place, I mean, the size of fish was anything from 50 to 150 pounds. Now, most of what we're catching are 50 and under" (OH03).

Other Marine Resources

Respondents also made note of changes in the quality of other local marine resources. One Akhiok resident described the declining quality of local populations of seals:

There are places where we used to go to hunt seal all the time, and now we found a lot of those places, the seals are getting sores on their skin. Lately we just don't go hunting for those seal anymore. And those are stocks of seal that we know stay in one place. They don't move around like the seal out here in the bay. (AK04)

An Old Harbor respondent described how some residents continued to dig for clams, despite the risks of paralytic shellfish poisoning (PSP).

Everybody says that's a no-no, but they still do. Um, we get razor clams in the summer. The beaches that we get our razor clams off of, I've never seen any red tide there. (OH03)

He went on to say that one resident had died in the past due to PSP:

There's been one lady that I know of here ... that actually passed away from eating, um, mussels off of a rock right over here on the beach down here below the village. In the summer. She had, she, um, got paralytic shellfish poisoning and passed away. (OH03)

Changes in Subsistence Resource Access

Respondents from both Akhiok and Old Harbor spoke of difficulties with the increasing distance required to travel to harvest Pacific halibut and other marine resources as they become less abundant locally. As one longtime Akhiok resident described:

4. Note that "mushy halibut syndrome," a suspected nutritional deficiency problem, has been identified in Pacific halibut in Alaska (Meyers et al. 2019:110–111).

We barely get a halibut in Olga Bay, Moser Bay anymore. There aren't as much that make it all the way up there anymore. So we don't even attempt if we're gonna go out halibut hooking, we go to the grounds where we know we have a good chance at rather than using our gas to go all the way up to Olga Bay on a whim that maybe we'll get one. (AK01)

One Old Harbor fisherman noted issues with having to travel farther to harvest Pacific halibut than in the past:

I mean, even in the winter, pretty close to the village here you used to be able to find a fish once in while, you know. Um, but, not, not, you have to work at it pretty hard now, and you're going a lot further than we used to. (OH03)

Another resident described changes to access in Pacific halibut in Three Saints Bay:

Some of the other fishermen they were catching halibut, too, but they were way out in the deep. On our skiff we don't go way out past Three Saints [Bay]. We go to Three Saints Bay, but not inside. We don't travel very far. We can stay out 10 hours a day in the summertime. (OH01)

Another local Akhiok respondent echoed these thoughts, explaining that most Akhiok residents could not afford to purchase the necessary equipment for fishing in deeper waters that require more specialized gear than a handline:

Here, it's too expensive for everybody to buy a rod and reel. It's almost like, I don't know, a \$150 pair of basketball shoes. If you've got the money you probably buy them to play basketball, other than that they probably sit on the shelf. Same thing with the fishing pole. If you've got a little extra money you want to buy something to fish a little deeper, you'll probably buy it. But if you don't have the money, you ain't even going to worry about it. Just go back to handline. (AK03)

Finally, a young Old Harbor fisherman described the travel involved with harvesting seals and sea lions:

Some of the stuff you have to go quite a distance to get. You don't always find seals close, like sea lion. There's certain spots that you know they're going to be out. But that's ways out, like Table Island. Which is almost on the outside of the island. (OH05)

Perceptions of Management of Alaska's Fish and Game Resources

Respondents spoke on a variety of issues related to the general management of Alaska's fish and game resources. Researchers prompted KRI participants to share how they thought regulations effect their harvest and use of wild resources and experiences with state regulatory boards. Like previous interview topics, and likely due to the holistic view often associated with the subsistence way of life, these prompts resulted in a wide range of responses on numerous species and also various management, enforcement, and regulatory entities. For example, respondents spoke about subsistence brown bear harvest regulations that are managed by the Federal Subsistence Board, emperor goose subsistence harvest regulations that are managed by the U.S. Fish and Wildlife Service (USFWS), and Pacific halibut subsistence fishing regulations that are managed by the North Pacific Fishery Management Council. Comments ranged from dissatisfaction with a perceived management preference for commercial fisheries ahead of subsistence uses, to positive feedback on management strategies and praise for relationships with ADF&G managers. Akhiok respondents had the most to share about the effects of commercial fishing and management decisions on local subsistence salmon stocks due to their proximity to commercial fisheries and trawling.

Local Perceptions of Commercial Fishing and Management Among Akhiok and Larsen Bay Respondents

Among Akhiok respondents, opinions of commercial fishing and management of those fisheries were mostly unfavorable. All four respondents expressed frustration with observed decreases in local salmon stocks

that were generally attributed to management strategies prioritizing the maximum commercial harvest of salmon, rather than returning salmon stocks to historical levels. As one Akhiok resident explained: “Well, since the [*Exxon Valdez*] oil spill, the oil spill was the major cause of the declining in numbers of fish runs. But lately I think it’s the management of salmon” (AK04). He then elaborated on his concerns about management actions:

The way I understand it now is they’re managing the fish stock for the lowest number they can get by with. And they give the rest to the fishing industry. When it should be not what they could scrape by with, with the stocks, but what the lakes can really handle is a lot more [important]. Because before fishing industry these lakes got maybe a thousand times more fish than they do today. (AK04)

It is worth noting that the idea that current management strategies do not allow fish to return to historical population levels was not unique to Akhiok respondents. The Larsen Bay respondent also shared this sentiment:

Everybody will tell you 60 years ago instead of 100,000 red salmon ... there was five million. Why aren’t they trying to make that back to what it was? Why are they keeping it right there? You know what I mean, like what in the world They’ll say, “Well it can’t, the system can’t hold that.” What do you mean it can’t? Before we were here it could. I don’t understand that. (LB01)

All four Akhiok respondents agreed that local systems were seeing much lower returns of salmon than in the past, and most of them cited management decisions that allowed for lower escapements and greater commercial harvests. One longtime resident described how the minimum escapement goals seemed to be getting lower while the number of fish returning continued to be much fewer than in the past:

Well for some reason, their limit, or their minimum limit has been getting lower and lower and lower and lower every year. Therefore, in three, four, five years, the returns have just been getting lower and lower and lower. That’s how I think it’s mismanaged. (AK03)

Another resident thought that the local systems were being overfished:

Yeah, and they still go and open it [commercial fishing] up even though they know there’s no fish down there. What’s the economical thought in that? Western society thought: the East Coast they killed out theirs and now they’re coming over to the West Coast to kill off all our stuff. (AK02)

Another lifelong resident thought that commercial fishermen were allowed to fish closer to Akhiok than ever before, while other fishing seemed restricted: “The commercial fishermen are allowed to go up and fish in the fall time straight up to the mouth of our rivers. And to the mouth of our tributaries when the fish are going up ... they never were able to do that before” (AK01). Due to low Chinook salmon escapement into the Ayakulik River, ADF&G has restricted harvest for Chinook salmon since 2006.⁵ The respondent continued:

I know the escapement for that river is not what it’s supposed to be because they’re stopping the sports fishermen from keeping anything they catch. It used to be that this whole area would be open, but they had a parcel right here where the [commercial fishing] boats couldn’t fish inside the markers. ... And that’s the past couple years we’ve had regulations [to reduce harvest] on our sports fishing and all that stuff because escapement isn’t enough. Well, it’s not our problem, you fix it out there. Let the fish go up! (AK01)

5. Alaska Department of Fish and Game. 2020. “Alaska Board of Fisheries Meeting Information: Kodiak Finfish – January 11–15, 2020, Department Written Reports — RC (Record Copy) 017: ADF&G Ayakulik River King Salmon Action Plan,” <https://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=01-11-2020&meeting=kodiak> (accessed June 2021).

Finally, one resident noted that the decline in local resources due to commercial fishing affected multiple resources beyond just salmon: “There is nothing doing well around these parts with the declining of the fish population. You see it in salmon, you see it in the halibut, and we see it in the crab ... there’s a small population with the commercialization going around” (AK02).

The majority of Akhiok respondents are of the opinion that commercial fishing should be closed for set periods of time to allow local salmon populations to rebound to historical levels.

If they keep managing them like they are, the numbers are just going to keep going down. If they keep fishing ‘em commercially the way they are, the numbers will never come back. I’d like to see commercial fishing go every other year, that would really bring back stocks of all species. (AK04)

The same Akhiok respondent argued, “I think in the long run it would bring the fishing industry more money. Because the stocks will come back and when the stocks are back there are more fish so you can catch more” (AK04). Another resident shared similar sentiments: “Close ‘em for a while. When we completely close them for a while we let the fish go through and repopulate ... shut it down one year and open it up the next year” (AK01). A third respondent offered a less restrictive solution: “If they can’t close down commercial fishing then at least restrict days ... less days of commercial fishing” (AK02).

For some respondents, frustration over the perceived effects of commercial fishing on abundance of salmon stocks used for subsistence led to a broader conversation on the perceived management priority given to commercial fishing over subsistence activities. As one explained:

If they changed their management style, I think it’ll recover. But the way they’re going now, they’re listening more to the commercial fishing industry rather than the rural community lifestyle and noticing the numbers. Like a traditional lifestyle is you only took what you needed, and the way they’re managing the fisheries right now is how much can the fishing industry make with the stocks they have. (AK04)

Others elaborated that subsistence regulations, generally speaking, placed difficulties on their ability to fulfill their subsistence needs. It is important to note that with the exception of the Kodiak road system, there is no annual limit on the Kodiak Area subsistence salmon fishery (5 AAC 01.530(a)(2)).

My concern is about the commercial industry encroaching on our subsistence areas and putting restrictions on what we can [do] and the amounts we can get and the amounts we need, versus what they just come in and take and leave us shorthanded. (AK01)

She went on to explain: “We’ve got to fend for ourselves with all these regulations and rules that we have to follow, that we’re struggling to just fulfill our needs” (AK01). Another noted how subsistence harvests are generally far less impactful on stock abundance than commercial harvests: “The amount of fish I get for my subsistence use is not an impact; 150 fish, what is that?” (AK02).

In addition to the decline in local salmon populations, Akhiok respondents observed that excessive commercial fishing was affecting other subsistence resources, including Pacific halibut, Pacific herring, and crabs:

Our areas like I said, we’d go five, 10 minutes out of the village and get all the halibut we needed, now we’re having to go a half-hour, way out in the ocean, and now we’re spending more time trying to get the amount that was easily gotten before the commercial fishermen were allowed to come encroach closer to where we get ours. (AK01)

Well, I think they really shot themselves in the foot years ago because we used to have, um, a lot of herring and then they just wanted more and more and more. So, they harvested and they’d never get enough time to lay their eggs and uh, get a return on it, you know? (AK03)

I wish they would do something with the crab, because the crab fishermen come in here and the trawlers rake them up. (AK01)

[Subsistence fishers] don't have a limit on Tanners⁶ [crab], only because they don't have a super high dollar amount. But as soon as you put a high dollar amount on king crab, whoa, you can only get three. 'Cause I mean, my family, we might eat 20 Dungeness [crab], 25 Dungeness a year. Tanners, we might eat 10 Tanners a year. King crab, we might eat 20 king crab a year, you know? (AK03)

Multiple Akhiok respondents expressed concern for the commercial trawling. Although nonpelagic trawl gear may not be operated in state of Alaska waters in the Kodiak groundfish registration area (5 AAC 39.164(b)(1)), some residents were either unaware of these regulations, or thought that the regulations were not being enforced. One resident shared his concerns about the negative effects of trawling:

Another thing on those regulations, like I said before. Those draggers should, my personal opinion, is they should, you know, stay out of our bay. I mean any enclosed bay is probably a natural habitat or a ground where fish could come in, they spawn, produce more fish, go back out. And these draggers come in there and they disturb everything, wipe everything out. (AK03)

Another resident thought that trawlers were in violation of established regulations by being so close to the community:

I don't know the distance, but I know that they're not in the area where they're supposed to be so far offshore, between any shore, that there's not enough room there for them to be all in compliance for what they're doing. (AK01)

Local Perceptions of Commercial Fishing and Management Among Old Harbor Respondents

Comments on commercial fishing from Old Harbor residents ranged from concerns about decreasing abundance of local resources related to ADF&G population estimates, to concerns with enforcement affecting traditional subsistence activities. One respondent expressed that local populations of fish continued to decline under current management strategies:

When [ADF&G] go out and they do their, their bottom drags, or however they figure out what's in an area, and then they have a formula to figure out how much they're going to allow you to catch ... somebody comes up with a new way to figure out how much is really out there. But there's definitely less now than there used to be, in the last four years, five years. (OH03)

Similar to Akhiok respondents, there were Old Harbor respondents who worried that regulations prioritized commercial activities while making it more difficult for local residents to meet their subsistence needs. One resident who moved to the community as an adult explained why limits⁷ for subsistence fishing can be problematic: "If the weather is bad and it's bad for a month, well you don't get out. So, the first time you go out, you're gonna get as much as you can ... to sustain yourself for, you know. Who knows? I mean, it

6. Under regulation 5AAC 02.425(3), the daily bag and possession limit for the Kodiak Area Tanner crab subsistence fishery is 12 crab per person and only male crab may be taken. The respondent was likely expressing that the Tanner crab harvest limit is not impeding subsistence practices compared to the king crab subsistence fishery limit, which has an annual limit of three king crab per household (5 AAC 02.420(a)(1)).

7. With the exception of the Kodiak road system, there is no annual limit on the Kodiak Area subsistence salmon fishery (5 AAC 01.530(a)(2)). In 2008, the Alaska Board of Fisheries amended 5 AAC 01.530 to eliminate the subsistence salmon harvest limits on permits and in the portion of the Kodiak Area that is not on the road system. *Source* Alaska Department of Fish and Game. 2008. "Alaska Board of Fisheries Meeting Information: Kodiak Finfish – January 14–18, 2008, Meeting Summary and Meeting Documents — Proposals (see No. 45)." <http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=01-14-2008&meeting=kodiak> (accessed May 2021).

The subsistence Pacific halibut daily limit under federal regulations is 20 fish per day.

might be another month before you get a chance to get out to these areas to do things (OH03).” He went on to explain his thoughts on regulations for Alaska Native people who rely on salmon:

Personally, if somebody told me because I’m non-Native that I can’t live that lifestyle, I have a job, um, I could probably survive within the limits that they give me. But I don’t think people that have been doing it for years ... should be under the same limits. (OH03)

Another longtime resident perceived disparity between legal subsistence fishing gear and traditional harvest practices, and explained in greater detail how enforcement effected the subsistence way of life:

Yeah, for that Fish and Game guys, I don’t think we should be stopping the community people. We’re doing our subsistence. We’re getting our winter supply of food. It’s bad enough that people get charged, how would you say pinched for getting your food. You get charged for that. You have to pay your way into Kodiak [city], pay a fine and come back home. That’s quite a bit of money to go and pay a fine. Why can’t you guys just let them go, we’re trying to get our food. I mean we don’t have all the legal stuff on the skiff, no reason to get a in a pinch. That’s what irks me, man. (OH01)

Finally, another resident discussed the importance of understanding any hypothetical changes in regulations that could affect the local subsistence practices she depended on:

I think that we have to be looking forward to what changes are coming because we rely on subsistence. We rely on deer, we rely on fishing. I think if we don’t keep up with what they’re doing, it can hurt us in the end. ... What the new laws are, with the new regulations I think that we need to [be] very cognizant of all the changes. We need to be up front and know what’s going on so we can help protect what we have going for ourselves. (OH06)

Other Commercial Salmon Management Comments: Counting Jack Salmon

Multiple respondents described the issue of ADF&G including jack salmon⁸ in the weir counts. Jack salmon are sexually mature, but they are smaller than other adult salmon and they have become increasingly abundant in the Frazer River system as they return in higher numbers and compete with full-grown salmon to fertilize eggs.⁹ Respondents had varying understandings of jack salmon, but generally thought that including jacks in weir counts had negative effects on the health of local sockeye salmon populations by influencing the number of full-sized adults that returned.

The reds numbers have dwindled. I remember there was a year they were counting jacks, what they call undersize reds, they were counting them, and those ones won’t spawn. And so what happened was, these guys were counting fish that weren’t going to spawn in the river and so they kept it [commercial fishing] open so any fish that was coming in, you know, all the fishermen were catching and catching and catching (AK03)

Another explained his perception of how weir counting practices changed the local sockeye salmon population:

Source National Oceanic and Atmospheric Administration. “Sustainable Fisheries: Subsistence Halibut Fishing in Alaska.” <https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/subsistence-halibut-fishing-alaska> (accessed May 2021).

8. Small salmon that mature after spending only one winter in the ocean are commonly referred to as “jacks,” and are typically male (Burgner 1991).
9. Alaska Department of Fish and Game. 2017. “Alaska Board of Fisheries Meeting Information: Kodiak Finfish – January 10–13, 2017, Department Reports — RC (Record Copy) 4: Frazer Lake Jack Salmon Review and Plan, 2016,” <http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=01-10-2017&meeting=kodiak> (accessed May 2021).

So when they counted those jacks, so they thought their numbers were up good, and then letting the commercial fish open to catch the rest of the fish, but not realizing that jacks don't stay up in lakes and rivers, they come back out. Or if they stay up there they don't spawn, they just eat up all the eggs. So really their numbers were down those years. That was kind of messed up. They're trying to fix that now, but the numbers of jack just keep going up. (AK04)

Finally, the young Old Harbor fisherman who fished commercially near Akhiok mentioned that counting jacks was the only issue he had with ADF&G management: "We had trouble with Fish and Game down there one year because they were counting jack reds. That's as much as I can think so far, that's what we think may have had some doing in screwing up" (OH05).

Positive Feedback on Resource Management

Despite some frustrations, respondents also had positive feedback on various management practices. One Akhiok resident shared her satisfaction with the increase in bear and Pacific halibut limits, and thought that the Alaska Board of Fisheries was receptive to hearing the community's perspective:

I mean they've been helping us out, they upped our subsistence bear from one to three but we don't use it because nobody here eats bear except my son. ... We're allowed three subsistence bear a year now, they upped our geese amount and our halibut. When we put our concerns forward to the Board of Fisheries they listen and they have been helping us out with our problems when we bring them to them. (AK01)

Multiple Old Harbor respondents also expressed that they thought fishing regulations were working:

As far as a whole I think the program is working. I think it's needed for check and balance for fishing right here, to boats getting busted out in the Aleutian [Islands] chain. (OH02)

Fish and Game had these 2–3 years with the red management is what they called it, down on the south end of the island. We were fishing 10 days out of the whole summer, you know. They were trying to let as much of their fish go past as they can. So they were just like, "Sorry but we have to let the fish get the numbers back," is what it came down to. So, we were just stuck down there, you know, waiting to reopen. It seemed like it [is] somewhat working out at this point, for them. It's coming back a little bit. (OH05)

Observations of Environmental Patterns and Changes

Nine of the 11 total respondents spoke of notable changes in temperature and weather patterns near their communities. Every respondent in Akhiok agreed that winter temperatures had gotten notably warmer in recent years. As one noted: "I remember as a kid, this whole bay would freeze" (AK04). Another spoke of the significant decrease in snow: "When we grew up we'd go sliding off the top of our porch the snow was so high, like 8 feet off the ground we'd have snow drifts, now we don't even see a snowflake" (AK01). Another shared similar observations: "The last three or four years it's been extremely warm here. Um, probably 90 percent less snow" (AK03). One lifelong resident exclaimed how comical it was that the contiguous United States was having a worse winter than she was in Alaska:

Past 10 years, 10, 15 years it's been since we've had a really bad winter. This is our winter here. We used to get 5, 6 feet of snow at a time. Makes me feel bad that down states are having more of a winter than we are and we're in Alaska [laughs]. Do we live in igloos, no, do you? (AK01).

The Larsen Bay respondent who had lived there for 15 years at the time of the interview shared stories he had heard about how parts of the bay used to freeze over when the winters were colder:

One of the elders in the village ... a great, great friend of mine, she's probably, God, I want to guess probably in her 70s. When she was a little girl she was raised up in Uyak Bay up here, on Alf Island. It used to freeze up enough that they could walk to shore. Does not happen at all, hasn't happen since I've been here. It is warmer than it was 50 years ago. (LB01)

Respondents in Old Harbor also noted the significant changes in weather patterns: "Basically, we have had the mildest winter that I've ever seen in Kodiak, in my life" (OH02). Many spoke of changes related to snow and ice: "It's warmer. We have less snow ... It's just the weather has gotten warmer" (OH06); "Even our glacier looks smaller ... You weren't able to see the peaks behind the glacier when we were younger. Now you can see all the way into second half valley behind the glacier" (OH05). Another respondent spoke of more general changes in weather:

Well, what's weird now, is in the last few years I've seen that we get a lot of winds out of the south. Either southwest, southeast, southerlies. There's a lot more southerlies. This, this year specifically, we, I haven't seen a lot of the huge weeklong northeast rains. Like we used to see when I first got here in the '80s. Now the storms seem to be a little shorter, and most of it is coming out of the south. (OH03)

Respondents expressed concern that these environmental changes were having negative effects on fish and wildlife populations: "Used to be, 20 years ago, um, it was 20 degrees out with blowing snow for Halloween. I mean, does it play a factor? It ... has to play a factor on the fish" (AK03). Some specifically noted issues related to water: "I'm sure it has an impact on everything ... With no snow melt every year we're having a water shortage problem. We don't have the snow like we used to, the lakes don't freeze" (AK01); "You can tell there's no snow on these mountains ... The amount of snow doesn't last all summer. And that could be another reason why numbers [of salmon] have gone down" (AK04). One mentioned how bear behavior has changed as a result of warming temperatures:

They don't sleep anymore. We don't have enough snow ... our winters are way milder so, yeah, our bears don't hibernate wintertime ... you go up to those lakes any time in the wintertime, you could count like 15 bears around the edge of the lake. (AK01)

One Akhiok resident noted changes in the tidal current that could be affecting salmon:

The tidal current, here in the last 20 years, I'm noticing, maybe 20, 30 years. We used to have a lot of driftwood on this beach out here. We call it Cape Alitak. In the last 30 years, it [the driftwood] was just dwindling and dwindling down to nothing. So that has, might have to be something to do with the fish return, too. Or the numbers. Or the time that they show up. Maybe they're being pushed out farther and farther, take longer for them to ... come back, who knows. (AK03)

Like Akhiok respondents, residents of Old Harbor worried about the effects of environmental changes on fish and wildlife. One lifelong resident expressed, "We just worry now with global warming, how is that going to affect our salmon? How is it going to affect everything that we rely on for food and subsistence? That's scary because we rely on salmon" (OH06). Similarly, another expressed his deep concern for the unknown effects of a warming climate:

I think that the fish and everything, including ourselves, the fish, bears ... are in a real heavy-duty transitional period that we got no idea. It's got a mass effect and we don't know what the hell is going to happen yet. (OH02)

Harvest Practices and Use Patterns

As part of Objective 3, researchers investigated the patterns associated with subsistence harvesting of salmon and nonsalmon fish in this area. Respondents were asked to provide details about the social organization of fishing and their harvesting and processing techniques over time, as well as about social patterns associated

with changes in harvest practices over time. Respondents spoke about patterns and changes in harvest and processing methods for salmon and other marine resources, patterns in resource sharing, enduring qualities of rural life, cultural changes and access to technology, changes in elder populations, outmigration, past community members returning to harvest wild resources, and increased external competition for local resources.

Salmon Harvest and Processing Methods

Respondents from both Akhiok and Old Harbor shared rich histories of communal harvest methods, changes in harvest practices over time, and complex methods for processing and preserving different salmon species. One older Akhiok respondent described how harvest practices had changed over his lifetime:

Ever since I was probably old enough, probably, you know, 8, 9, 10 years old. Just, you know, going with the family. If you're old enough to carry a fish, you're old enough to go along. So, old-timers would just be, old people would be throwing them out of the gillnet and you was, it was your job to go and pick them up and go throw 'em in the skiff What a lot of people have been doing the last how-many years is they'll wait for a big number of fish count. The, uh you know, Fish and Game will be like, "OK, Dog Salmon [River] had got 6,000 reds as of last night. Upper Station had gotten 4,000." So, we're thinking there's 10,000 fish moving through these bays in the last day. So now let's go set out a gillnet. And that's when you wait. And usually you'd get your fish probably within half-hour to an hour-and-a-half. (AK03)

Old Harbor residents shared similar stories of communal harvest practices. One shared how his grandparents used to travel to the south end of Kodiak Island in the summers to harvest salmon:

She spent 50 years going down there, straight every summer, go fishing. They started out in little shacks and tents, and stuff like that. We still have a couple of our older buildings down there, from when they built them. Kind of cool. (OH05)

Another described how older generations worked together to harvest and process salmon for the whole community:

I remember when they used to just make sets out here and get enough fish for the whole town to put away for the winter. All the older ladies, my grandmas and aunts, and my mom would be on the beach splitting salmon. (OH06)

Akhiok respondents described various processing methods based on the species of salmon:

I would say reds come out as the first thing, silvers mostly we just freeze otherwise, but for smoked salmon and salt fish and freeze fish its mostly reds. Pinks is drying, pinks and dogs for dry. The silvers, we tried salting silvers but they're just too mushy. (AK01)

Another noted only smoking fish if a lot were harvested:

If we get this much fish, we'll throw it in the smoker. If, you know, if we get 150 fish, we'll throw most of them in the smoker and freeze and salt. And if we um, don't get, if we get 40 or 50 fish everybody gets, we split it up with whoever went to go and help, you know. (AK03)

Old Harbor respondents also described a wide variety of salmon processing and preserving methods.

People use different fish for different things. So you can't just go in and say well you're going to be allowed^[10] 25 fish in case, what are you giving up? Is it going to

10. With the exception of the Kodiak road system, there is no annual limit on the Kodiak Area subsistence salmon fishery (5 AAC 01.530(a)(2)). In 2008, the Alaska Board of Fisheries amended 5 AAC 01.530 to eliminate the subsistence salmon harvest limits on permits and in the portion of the Kodiak Area that is not on the road system.

be silvers or is it going to be pinks? Is it going to be dogs? Well, we don't use them all for the same purpose. (OH03)

Many described the lengthy process for smoking salmon: "The smoked salmon could take up to two weeks, it could possibly take longer if it's raining outside" (OH06). The younger fisherman described challenges to smoking salmon in detail:

We'll do smoked salmon and we'll dry them. We actually will do our dry fish November–December, we go get our fish It's drier, no flies. The only thing you really have to worry about are the birds and if it's going to stay, you know, dry enough out like if it's just going to rain then it'll spoil. But most of the times if it's snowing, pretty snowy on the ground and windy it stays for a while. That's just like our deer, we'll let our deer hang for two months in the wintertime sometimes, in the shed. (OH05)

Finally, another Akhiok resident noted the difference in taste between salmon harvested fresh in winter and salmon that is frozen from the summer:

You can notice if somebody makes soup from lake fish in the wintertime, and then somebody else made up frozen fish from the summer, you notice the way the oil tastes in the soup, the fish oil. Even though the lake fish taste muddy, but you notice the fish oil in the soup is fresh. (AK04)

Other favorite ways to preserve and eat salmon included:

- "People also use silvers for dried fish. They make excellent dry fish" (OH03),
- "*Salunak* is salted fish Salt the fish maybe 3–4 months. Whenever you want it you take it out of your salted bucket and run water over it to get most the salt off of it, then you eat it" (OH01), and
- "*Perok*, fish pie. That's what I always do with my fish. Make a lot of perok. One guy says you only make perok for dead people and we have funerals. I'm like baloney, you can make perok anytime you want" (OH01).

Pacific Halibut and Crab Harvest Methods

Both Akhiok and Old Harbor respondents described handlines as the preferred harvest method for pursuing Pacific halibut. As one Akhiok resident explained: "Everybody here, 90 percent of everybody here, is handline. It's electrical cord reel with some tarred twine and a lead weight and a halibut hook, you know?" He elaborated:

Yep, because you can hook 'em and just keep pulling 'em and you, as soon as you get to the surface you gaff 'em, throw 'em right in the deck, pop the hook out, throw your line back over, bleed your halibut and then sit there and go back to work And if you use the, if you catch the same halibut on a fishing pole, takes you five times, maybe it depends on the person, five to 10 times longer (AK03)

Similarly, an Old Harbor resident also spoke of using a handline for catching Pacific halibut but specified the depth where this was appropriate: "We don't fish very deep at all. We fish with hook and line and jigging. That's the only way that fish, hand jigging is maximum 100 feet. Rarely do we do that, it's usually around 75 feet is where we like to go" (OH02). Another longtime resident described how Pacific halibut were caught before other gear became available:

Source Alaska Department of Fish and Game. 2008. "Alaska Board of Fisheries Meeting Information: Kodiak Finfish – January 14–18, 2008, Meeting Summary and Meeting Documents — Proposals (see No. 45) <http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=01-14-2008&meeting=kodiak> (accessed May 2021).

Love a can line. That's how we used to go fishing before. Before we got the fishing poles, can of milk and wrap the line around it, enough line and put a hook at the end of it. Swing it and throw the hook out. Catch a fish or snag them. That was fun. (OH01)

Finally, one young Old Harbor fisherman shared his grandmother's account of how women in the community used to work together to process crabs: "My grandma said that so all the ladies would be in there shucking the crab. They used to be so cold down there in the wintertime. They'd sit with their feet in hot tubs of water" (OH05).

Resource Sharing Patterns

Most respondents spoke of how sharing food within the community is an integral part of the subsistence way of life. As an Akhiok resident put it, "I just love living the subsistence lifestyle down here. I like helping people out, getting their stuff for them" (AK04). Others described the importance of providing food for those who cannot obtain it on their own:

My husband and I go out and do a lot of subsistence for the community for people that don't have boats or ways of getting subsistence food ... we provide the community with the fish, salmon, clams, and octopus. (AK01)

One lifelong resident of Akhiok spoke of harvesting fish for people who worked at the seminary in the city of Kodiak: "I probably only eat 10 percent of those kings ... most of the time I send it out to, I don't know, do you know what a seminary is? Where all these people go, they don't make a lot of money, they don't have jobs, they just serve the church" (AK03). The respondent in Larsen Bay also spoke of sharing a variety of resources:

Everybody is pretty good about sharing around here, especially once you get to know people. It's a pretty good community in that aspect. People come in with a bunch of fish, for example. Commercial fishermen come in and put a subsistence net out with 200–300 reds and they'll tell everyone in town come get 5–10 ... I get lots of deer, and I give people deer meat, all they want. (LB01)

Old Harbor residents expressed a similar appreciation for the subsistence way of life and the role of sharing foods: "I like sharing my Native food. I was telling them the other day, people give us *sikiaq* (salmon) and seal and stuff. So I try to give back" (OH01). A younger fisherman spoke of harvesting sockeye salmon in Olga Bay to bring back to the community:

A lot of the times one of my dad's friends will come down on a boat ... and we'll put 300 reds or something like that and send them back here. Just because a lot of people can't catch reds as easy here. (OH05)

One resident emphasized the importance of sharing even if he did not have enough for himself: "I give ducks away, I give deer meat away ... if somebody comes to me, even if I may or may not have enough for personal use, if I know, um, somebody wants it that bad, then I'll give it to them" (OH03). A woman who spent her whole life in Old Harbor spoke fondly of her father and the lessons he taught about providing for others:

I remember one time when my dad was older, he was really worried about his friend He told my husband, "Tomorrow get your fishing gear and get ready: we're going up the creek." My husband is like, "Why?" "Don't ask questions, just be ready and we're going." They went up and got 50 fish for [his friend] and brought them back and let him split them. Nobody would get them for him. It was blowing and raining, I was like that made me feel good. That made [his friend] feel good, he talked about it for a long time. (OH06)

Similarly, multiple respondents mentioned the importance of providing subsistence foods for elders and suggested that young people had a responsibility to provide for them. As one succinctly put it, “To me, that’s what you have the younger generation for” (OH03).

The Rural Character of Subsistence

Respondents’ descriptions of their roles in their communities overwhelmingly paint a picture of resourceful and resilient people who take care of one another. Most respondents described themselves as having multiple jobs and roles within the community, such as one lifelong resident of Akhiok:

I just work at the office, I help the tribal communities out with enrollment, basic enrollment, and my husband and I go out and do a lot of subsistence for the community for people that don’t have boats or ways of getting subsistence food. (AK01)

Another stressed the importance of passing along traditional knowledge and working on other practical tasks:

I think for the most part my biggest role here is being a keeper of traditional knowledge, traditional arts, history, and trying to keep some of that alive. And then what I do for the village is odd jobs here and there, whenever they need hands for doing stuff I’ll volunteer. (AK04)

Similarly, another resident spoke of resourcefulness in terms of local construction jobs: “Well, my role is kind of like a go-to guy, I guess. I’ve done a lot of building and construction around the village” (AK03).

Old Harbor residents expressed similar values and resourcefulness: “Here in the village it’s just an association, I’m an associate of the community. If I can, I always will and do help anyone and everyone with mechanical, plumbing problems. The lady across the street, I just helped her with her plumbing. I enjoy that.” He later elaborated on the need to be self-sufficient when living remotely.

Furnaces, Toyos [stove], I install satellite dishes, I do plumbing, I do a little bit of, um, carpentry. I do a little bit of automotive repair when it needs to be ... I mean, here, it isn’t like you can just take things to the shop. And even then it’s very expensive. (OH02)

Like Akhiok respondents, Old Harbor residents stressed their desire to care for others in their community. For example, one woman who spent her whole life there stated:

I see my role as a person who likes to take care of others. I’m a leader as a sense I’m on the tribal council. I’m on the advisory school board, since 2008. I like to see myself as a person who helps others and makes sure everyone is taken care of, if need be. As a role in the tribal council I like to do what the people want to see done. I’m not there for myself, I’m there to serve others. (OH06)

As another put it succinctly “Everyone cares for each other. You might have your disagreements; you might have your arguments, but, in the end, everyone cares for each other” (OH06). Overall residents expressed a deep appreciation of their home and their ways of life: “This is fine right here, got everything right here. Got your berries, your fish” (OH01). One fisherman described how he could not put a price on the resources he harvested because they were part of his way of life:

I mean, people don’t, people don’t understand. And I mean, for years, you know, even like before the, the *Exxon* oil spill, you know, um, they kept, they kept asking me when I was filling out these forms, they’re asking you, well what is subsistence worth to you. Well, I kept asking the people, “How do you put a dollar amount on it?” [They replied,] “Well, what we’re looking at is what do you think you lost as far as if you had to go buy that fish?” And I’m like, well you don’t, guys don’t understand. It’s a, it’s a lifestyle. (OH03)

One resident's (OH01) sister-in-law, who came to visit from the contiguous United States, stated, "You don't go to church, at least you're close to God," which is a sentiment that nicely summarized how many residents seemed to regard their home in Old Harbor.

Changes in Subsistence Practices and Culture

Despite widespread appreciation of the subsistence way of life, many respondents expressed that the historical practices of communal subsistence harvest practices were becoming less prevalent than they were in the past. One female resident in Akhiok described the traditional communal nature of putting up fish each year:

The women would come along, we'd drop them off and they'd sit and split the fish as they're caught and the men would be hauling them back to the village The community would work all together because our transportation options were so limited, so it became a whole community event when it came time to harvesting anything because everybody had to work together to get their winter supplies put away. (AK01)

An Old Harbor resident described a similar scene: "All the older ladies, my grandmas and aunts, and my mom would be on the beach splitting salmon. Everyone was laughing and having fun. Now everyone kind of does their own thing" (OH06). Many residents expressed concerns that younger generations no longer had the same level of interest in subsistence foods and practices. One Akhiok resident described this younger generation as "Safeway Natives" who "just don't eat seal anymore or sea lion. A lot of them don't eat fish either sometimes ..." (AK04). Another respondent suggested that younger generations enjoyed harvesting some resources, but lacked the desire or education to process them:

They have fun going to get 'em. But without them being taught ... how to process them I don't see it being a need for subsistence much longer, they're gonna go to the store and grab steak and a chicken rather than going out to get a deer and a goose. (AK01)

Others suggested that the divergence from traditional teachings led to a change in values and practical knowledge. An Old Harbor respondent provided a good example:

The elders ... that was their deal. I mean, nothing was wasted, so, you know, it's hard to ... get that instilled in some of the younger generation that hey, you know, if you, maybe you should look at the weather and realize if it's gonna be raining for two weeks, maybe you don't want to be doing some fish right at this point in time. (OH03)

Most respondents also spoke of concern over notable cultural changes, starting with the loss of local Native language speakers. One younger Old Harbor resident spoke of how her grandfather tried to help bring Native language back:

The losing [our language] was basically around mostly all the Native tribes in Alaska with everything, the Russians. A lot of everybody was ashamed to be Alaska Native and speak their language But our grandpa helped move people. He started by what he remembered, and he was helping the community make sure it's OK that they spoke their language. I don't know, a lot of the language got lost. (OH04)

Several respondents noted a broader cultural change that seemed to contribute to a shift away from communal subsistence activities, such as the introduction of cell phones and other digital technology. As one Akhiok resident put it: "I guess relying on your natural food supply is probably dwindling I think with more and more modernization. I'm not sure if it's electronics, or laziness" (AK03). Another spoke more specifically about the effects of digital technology on social life:

You can see it a lot in the kids now, especially in the older kids, the high school-age kids. Their idea of socialization in through their cell phone and internet and getting out like if today were a Saturday none of the older kids would be outside with this nice weather. Whereas when I grew up, you couldn't find a kid indoors at all. And we did everything. The whole village, the whole area was our playground. Nowadays you hardly see kids outside unless it's the younger ones. (AK04)

An Old Harbor respondent expressed similar sentiments, emphasizing that activities used to be more communal before digital technology:

Well, we used to do more community activities as a kid. Well, we didn't have TV and we didn't have internet. We didn't have all this other stuff that people have today. There was one TV and everybody watched it. (OH06)

This shift was often seen as a detriment. As one longtime resident explained: "People used to just sit down and sing, or talk, or yell to each other across the way. Things were closer. The area is expanding away from itself" (OH02).

Changes in Community Composition

Respondents in all three communities spoke of changes in the composition of communities and their effects on harvesting practices. The changes mostly fell under four categories: loss of elder population, outmigration of residents, past residents returning to harvest subsistence resources, and an increase in external competition for local resources. Multiple respondents in both Akhiok and Old Harbor noted that there are fewer elders than there used to be. As one Akhiok resident stated, "We used to have a lot of elders, we had fluent [Native language-]speaking elders in the village, a lot of them, and now we only have two" (AK01). Another noted, "Probably 80 percent of the elders have died off probably in the last 15, 10 to 15 years. There was a lot of them when I was growing up" (AK03). The sentiments in Old Harbor were similar: "Less. Few, very few. There's only a handful now, we lost quite a few of them, they're gone" (OH01). One resident expressed concern that the decrease in elder presence could be associated with wasteful harvest practices:

About the only thing that I, I fear with that, is ... back to the wanton waste. It's just ... I'm hoping that, I mean, we don't have a lot of elders in town anymore, and I'm just hoping that some of that [lesson to avoid waste] has rubbed off. (OH03)

Respondents in all three communities discussed a trend of people moving to larger communities due to lack of local income-earning opportunities or the high cost of living. As one Akhiok respondent described: "There's families moving out of here, too. Because there's not enough jobs to support a big family and they pull the kids out and put 'em in the city and just the population I see in most of the villages is slowly declining." She went on to say that healthcare also played a role in people moving:

They have health problems with their kids, or them, to move closer to the doctor. Before we had midwives and shamans and all that good stuff around here that knew how to make medicine out of the plants. But now it's just the doctors in town. (AK01)

Old Harbor residents expressed similar concerns about the lack of local job opportunities. One resident described the financial challenges with fishing for Pacific herring:

The herring price dropped from when we first started fishing herring, we were paid 10 percent [at] \$1,200–\$1,300 a ton. The last time I fished herring we were being paid for 10 percent [at] \$300 [a ton]. I didn't want to because of financial circumstances, and I went ahead and sold the permit. Our beach seine operation I just quit fishing. Got out of the business as well, sold the permit. (OH02)

Another Old Harbor fisherman described the drop in income for local commercial fishermen:

With me it probably would have to be the lack of jobs at this point for people. That comes back to the fishing economy and everything. Like we used to have 20-some seining permits here in Old Harbor, until the fishing went south fast, and really bad. People were going from making, you know, \$70,000 to going and making less than \$3,000. That just wasn't going to work at all. So a lot of these guys were selling their permits off to other people. You know, trying to make money any way they can. That in turn made less jobs for other people, and now we're down to eight boats. Not even eight boats, I think it's eight permits in Old Harbor. Not all of them are being fished at this point. (OH05)

Multiple respondents thought that lack of affordable housing and the high cost of living was contributing to decreasing local populations. As described in Akhiok, "I think that unless there's housing opportunity that opens up, probably has nothing to do with subsistence but, a lot of people would move back if they had a place to live" (AK03). Lack of housing was described similarly in both Larsen Bay—"There's not very many places to rent. There are not very many places for sale. The electricity is ridiculously priced" (LB01)—and Old Harbor—"It's kind of hard to live here because rent is really, really expensive. Fuel is really, really expensive for your homes. Just anything, water, sewer, electricity just any bills are going to be a ridiculous amount down here" (OH05). Finally, respondents expressed concern about local schools. The respondent in Larsen Bay described the consequences of closing the local school in 2018:

I mean when the schools shut down, that hurt. As soon as the schools shut down, you have a couple families that moved away. Lost jobs instantly, the teachers were gone that quick Nobody came in, nobody came. People left, but nobody moved here. Now there's more people that are talking about leaving this next fall. Several people say they're gone. The smaller the community gets, the harder it's going to get to bring back. (LB01)

An Old Harbor resident described similar concerns about the possibility of losing the local school:

We're hoping that we can keep those kids in the village that are now having kids, so we can keep our school open. If you don't, um, you're gonna be hard pressed to ... keep the village going. (OH03)

While respondents spoke of people leaving their communities, many also discussed that it was common for past residents to return to harvest foods seasonally, or to have subsistence foods sent to them. One Akhiok resident noted, "A lot of the younger generation that moved away from the village still want all the subsistence food but don't make the time to come and get it" (AK04). The Larsen Bay respondent noted that past residents especially appreciate deer:

Several people moved away. One thing in general I know, that they love to come back and get deer 'cause that's basically what they eat all winter. But it's a lot of money to fly out and get a couple deer, so I send them deer (LB01)

Multiple Old Harbor residents spoke of people coming back in the fall to harvest deer and coho salmon: "The younger kids will come down in the fall time, to get their silvers and their deer meat" (OH01).

There still are quite a few people that will come back and put away fish during the fall time. They'll come back during Christmas break, and Thanksgiving break and do deer hunting. (OH05)

Another resident explained how expensive it is to obtain wild foods when people move from their communities:

I think there's a lot of those people that got into Anchorage and realized, OK, well I'm here, um, do I really like it ... I mean, it's really not always cheaper to be in the towns. 'Cause what are you going to eat? If nobody's sending you fish from Old Harbor, you gonna go buy it? I mean, halibut's \$15 a pound. (OH03)

Finally, one mentioned how some former residents prefer to return to Old Harbor to fulfill subsistence needs rather than harvesting on mainland Alaska: “The kids come home to do their hunting/fishing. I guess it’s more fun than going to Seward or Homer to catch their fish and their deer” (OH01).

Finally, some respondents expressed frustration over the pressure on local resources from nonlocal users who live in urban areas.

All season long, spring, summer, fall, and winter, and these guys get to come in here and just take up all of our stuff and get out of here. Go next to Safeway and Walmart. They come in take our fish, come in take our crab, and leave us alone to fend for ourselves in the wintertime when all that stuff is gone. (AK02)

An Old Harbor resident who ran charter boats for visitors mentioned how the number of local charters had increased: “Back in the day there used to be just two of us ... and now we have a pretty, a pretty decent-sized fleet that run charter boats. So that takes its toll” (OH03). Another resident shared that even though she was involved with the industry, she thought that subsistence should be the priority:

Sport fishermen ... I’ve never really agreed with it because I think that fish need to stay with the subsistence users ... So, I feel that subsistence should come first by all means and then you can open it up to outsiders. And I cook for lodges, so I have to keep my opinions to myself. (OH06)

LOCAL TRADITIONAL KNOWLEDGE (LTK) OF HABITAT IMPORTANT TO SALMON LIFECYCLES NEAR OLGA AND AKALURA LAKES

Objective 4, “Collect local traditional knowledge (LTK) of habitat important to salmon lifecycles held by residents of Akhiok and Larsen Bay, with a specific focus on Olga and Akalura lakes,” focused on residents’ knowledge of salmon and habitat connected to Olga Bay, as well as observations of changes to habitat and salmon stocks over time. The majority of comments came from Akhiok respondents due to their proximity to the lakes. While one Old Harbor fisherman fished commercially in the area, he explained that most Old Harbor residents did not fish in that part of the island: “Then there’s a couple of guys that fish in Olga Bay still, but not so many. These guys won’t get as many fish” (OH05). For reference, most Akhiok residents referred to the lower Olga Lakes as Upper Station: “We call it, you know, Upper Station, the lower Olga Lakes” (AK03). Respondents shared observations about, and the differences between, Akalura and Olga lakes.

Akalura Lake

Akhiok respondents described Akalura as a location that provides a variety of fish, but is a less commonly used harvest area than in the past. While sockeye salmon return to Akalura, one resident noted that most people primarily traveled there to harvest coho salmon in the fall:

The most targeted fish up there is probably silvers in the fall. Like I said, nobody goes, there’s reds there in the summer months. But why go to there if you can get the nice bright ones down here? (AK03)

Another noted that the primary salmon harvest method for the Akalura system was snagging fish: “The Akalura we go there and snag fish, ‘cause it’s a shallow beach so you can’t use nets very well. We mostly use snaggers” (AK02). The same respondent shared that salmon returns to Akalura Lake are not actively counted: “There is a run, but there’s nobody there to count it. They have some, there’s the fish and wildlife thing [a USFWS remote fish counting camera] there but all they do is go and look at the tributary and get right back out of there” (AK02).

In addition to salmon, respondents from two communities talked about trout in the Akalura system. As one Akhiok respondent shared:

We like to go up to the Akalura lakes early spring for trout fishing. And then we like to go up there beginning of fall for silver fishing Not so much the lakes themselves. But as far as the lagoon that, before the lakes. (AK03)

When asked about his knowledge of Akalura, one Old Harbor fisherman specifically noted the presence of trout: “What’s interesting about Akalura is that it’s one of the few places that have rainbow trout. Rainbow trout go into Akalura right here, and it’s amazing” (OH02).

Most Akhiok residents expressed that Akalura was no longer a primary harvest area as one explained when asked if people still fish at Akalura: “Not anymore, but when we were kids we used to go up there all the time” (AK04). Similarly, another shared: “I don’t know anybody since I’ve been around that’s ever used Akalura Lake, that actually goes up there” (AK01). One respondent thought that distance was the primary barrier to fishing at Akalura: “It’s just not feasible for us unless you can do a two-day trip. Because once you leave from here to get there and get up to the lake it’s time to turn around and come back because we don’t have enough daylight wintertime when we need the fish...” and concluded, “I go for easier pickings than that, not all the way up to Akalura” (AK02). Finally, a longtime resident explained changes in harvest practices due to the number of fish returning to the Akalura system:

I know the numbers are low for Akalura Lake, really low. [How do you know that?] Just the years going up there. When I was little I could remember 15, 20 skiffs showing up there at once to get fish. Now you see one skiff up there, you’re lucky to get fish. Last year there was just no humpies anywhere. Or if there were humpies there wasn’t enough to put the gillnet out. You have more work picking the kelp out of the net than picking fish. (AK04)

Changes in Habitat

Two Akhiok respondents described notable habitat changes related to the Akalura system. One described changes in ice that prevented access:

Well, when the fish were running in the summertime we’d go to the lagoon. But in the wintertime we used to go up to the lake. [And why don’t you go anymore, what changed?] The parts where we needed to fish was on the other side of the lake, and it has to be frozen. So weather changes made it so we don’t go to Akalura anymore. It’s not safe anymore, it doesn’t get thick enough. Akalura Lake has a lot of creeks going into it, so it has to be cold for quite a long time for us to get to the other side. (AK04)

The same respondent went on to explain overall changes in water temperature that may affect salmon populations: “I believe water temperature has gotten warmer. Especially now, you can tell there’s no snow on these mountains The amount of snow doesn’t last all summer. And that could be another reason why numbers [of salmon] have gone down” (AK04). The other Akhiok respondent who spoke about habitat changes referred to Akalura Lake as “the dying one.” When asked why, he spoke of a beaver dam that prevented salmon from returning to the lake to spawn:

For a few years, I guess there was a dam, a beaver dam that kinda blocked everything off for a few years. The fish were entering the stream, but not making it up. I guess to the lake. And that I think played a big role. (AK03)

Harvests and Uses of Olga lakes

Respondents described Olga lakes as an important fishing location that was more accessible than Akalura. As one Akhiok resident described: “Upper Olga, Upper Station has always been the main return on this island. That one and Dog Salmon [River]. The fish that ... go to Upper Station are generally the larger” (AK03). Respondents explained that Olga lakes were primarily accessed in the winter.

You can't get up there really unless the ground is frozen because that's all marsh. Yeah, that's all swamp and it has to be pretty frozen to get through that. Summertime it's not used, nobody goes up there summertime it's only winter. (AK01)

We still go up to upper Olga Lake, we hike from this side here [pointing to map]. All winter. Mostly December and January. (AK04)

The last respondent elaborated on the difference in access between Olga and Akalura lakes:

With Akalura lake it has to be frozen in order for us to get to the fish on the other side of the lake. This one [Olga] doesn't have to be frozen because the fish are already on the side we need them on. (AK04)

However, one longtime resident also explained how the system was an important backup location in the fall if people did not put away enough fish during the summer months:

Let's say I'm working and I only got a few days off. The weather's bad, or there's no fish The only place for me to get my fish is up here [Olga lakes]. From the first week in August until about the first, second week of September. So if I don't get any fish in June, I don't get any fish in July, my brain's going, "Get fish get fish get fish you need to get fish or you're gonna ... be out of luck this winter." So the only place to go was here, but these numbers have to be in the 5- or 6 thousand-a-day numbers. So if they're in the 5- and 6-thousand-a-day numbers, I can go up there, I round haul, get my reds That's kinda like a last resort, up until the second week of September. (AK03)

Akhiok respondents were asked about observations of salmon stocks returning to Olga lakes. When asked about the two sockeye salmon runs returning to the system, one respondent noted that he thought the fish in the earlier run were better quality: "[Which run do you prefer?] The early one. The fish are cleaner" (AK02). Multiple respondents noted different colors and quality of sockeye salmon caught in the lakes.

So an interesting observation though, out here if you catch any red salmon, a majority of them will be green-back. And up here will be blue-back. We call them torpedo fish, torpedo reds. (AK04)

This lake we hike to in the winter, to get the black, uh watermarked reds, or just black. The old-timers really like for boiled fish, or for like curry. (AK03)

When I've seen some of the fish come out of Upper Station up there, they've got a bunch of sores on them. (AK01)

Change in Habitat and Use

One respondent initially expressed that he had not noticed any overly concerning environmental changes that were affecting the Olga lakes system:

Nope, haven't seen anything like, like, "Whoa, that's kinda messed up, kinda red flag" or anything. I haven't seen anything change as far as the lakes and the habitat around it, with the bear population around it, it's all been the same. (AK03)

However, when asked about climate change specifically, he shared that he had noticed a drastic difference around Akhiok in recent years:

The last three or four years it's been extremely warm here. Um, probably 90 percent less snow. Uh, I think, a little bit in December, I think we dropped to 12 degrees for about three days and that's the coldest weather we've had. Other than that, we've been averaging about 35 to 38 degrees all winter. Probably from, I'd have to say, from probably November 'til now. And even October was probably still, uh, low- to mid-40s. (AK03)

Most respondents generally noted that they used Olga lakes less. One explained how the decrease in local elders prevented people from going to Olga lakes more in the winter to harvest lake fish, because it was mostly elders who enjoyed eating lake fish:

Yeah, we don't go there as often anymore though. Mostly what we would do going up there to get fish is getting fish for the elders, but there's just not that many elders left. There was when I was growing up. (AK04)

Finally, an Old Harbor resident described stories he heard about older generations leaving boats near Olga lakes to harvest fish:

They used to drag boats up into some of those lakes and subsistence Put a small outboard motor on their back and small boat and drag it up the places, leave them up there and use that as a way to get in and out of those big lakes. (OH03)

SUMMARY

In conclusion, while changes in the use of Akalura and Olga lakes are evident, the comments on notable habitat changes were limited. Most were related to changes in temperature that likely affected salmon returns, as well as human access to both lake systems because warmer winters prevented the lakes from freezing.

Overall, Akhiok residents seemed to primarily attribute the decline in local salmon populations to excessive commercial fishing and management strategies that prioritized maximum harvest rather than allowing local salmon stocks to return to historical abundance levels. In combination, warming environmental conditions and changing social dynamics like outmigration and the influx of digital technology likely interact to alter traditional subsistence harvest practices. However, despite noted environmental and social changes, respondents overwhelmingly conveyed the resilience of subsistence ways of life, and the value they placed on being active members of their communities who thrive on harvesting and sharing wild resources.

6. DISCUSSION AND CONCLUSIONS

INTRODUCTION

This report describes the contemporary subsistence harvests and uses of fish, wildlife, and plant resources by three Kodiak Island communities. There are extensive similarities between the subsistence patterns in Old Harbor, Akhiok, and Larsen Bay, such as high rates of individual and household participation in subsistence activities, reliance on salmon, and strong patterns of resource sharing but declining total populations (particularly since 1980). However, there are also some notable differences between communities, including levels of resource harvest and use diversity and reported changes in abundance of specific local resources. This chapter provides an overview of findings for the three study communities and contextualizes these results within broader rural Alaska subsistence patterns. The discussion ends with a comparison of harvest patterns of the study communities over time.

OVERVIEW OF FINDINGS FOR THE STUDY COMMUNITIES, 2018

The subsistence way of life remains of paramount importance in the study communities. Through harvest survey results and in-depth interviews, the significant role that subsistence resources and practices play in the daily lives of these Kodiak Island residents was evident. Individual participation in subsistence harvesting and processing was high in all the study communities: 85% of individuals or more participated in harvesting efforts and processing resources (figures 2-11, 3-11, 4-11). At the household level there were similarly high rates of participation: 100% of households used subsistence resources in each community and 100% of households attempted to harvest subsistence resources in Akhiok and Larsen Bay and 93% in Old Harbor (tables 2-13, 3-13, and 4-13). Per capita harvests also indicate the continued importance of subsistence in these communities, ranging from 239 lb to 579 lb. These per capita harvests are similar to the most recent available estimates based on household surveys conducted by the Division of Subsistence for other Kodiak Island communities (Figure 6-1). According to the 2017 update on subsistence hunting and fishing across Alaska (Fall 2018), Kodiak Island communities¹ harvested an average of 159 lb per capita, substantially lower than the per capita harvest estimates of the three study communities in 2018. The Kodiak Island average per capita harvest is lower than the study communities at least in part due to the presence of Kodiak city and the road-connected areas; the average per capita harvest of just the Kodiak Island Borough rural communities² was 289 lb. Larger population centers and areas connected to them by road, as well as areas with lower Alaska Native populations, tend to have lower community harvest levels (Wolfe and Walker 1987). Of the three study communities, Larsen Bay had the lowest per capita harvest estimate in 2018 and also the lowest percentage of Alaska Native residents (Table 1-8). Interestingly, households in Larsen Bay on average also used and harvested the fewest number of resources. As will be discussed further, there are likely many factors contributing to Larsen Bay's subsistence patterns.

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1. Note that the Kodiak Island communities included Port Lions; Ouzinkie; Kodiak City and the road-connected areas of Kodiak Station, Chiniak, Woman's Bay, and the remainder areas; Karluk; Akhiok; Old Harbor; and Larsen Bay.
 2. Note that the rural Kodiak Island Borough communities are not road-connected and included Port Lions, Ouzinkie, Karluk, Akhiok, Old Harbor, and Larsen Bay.

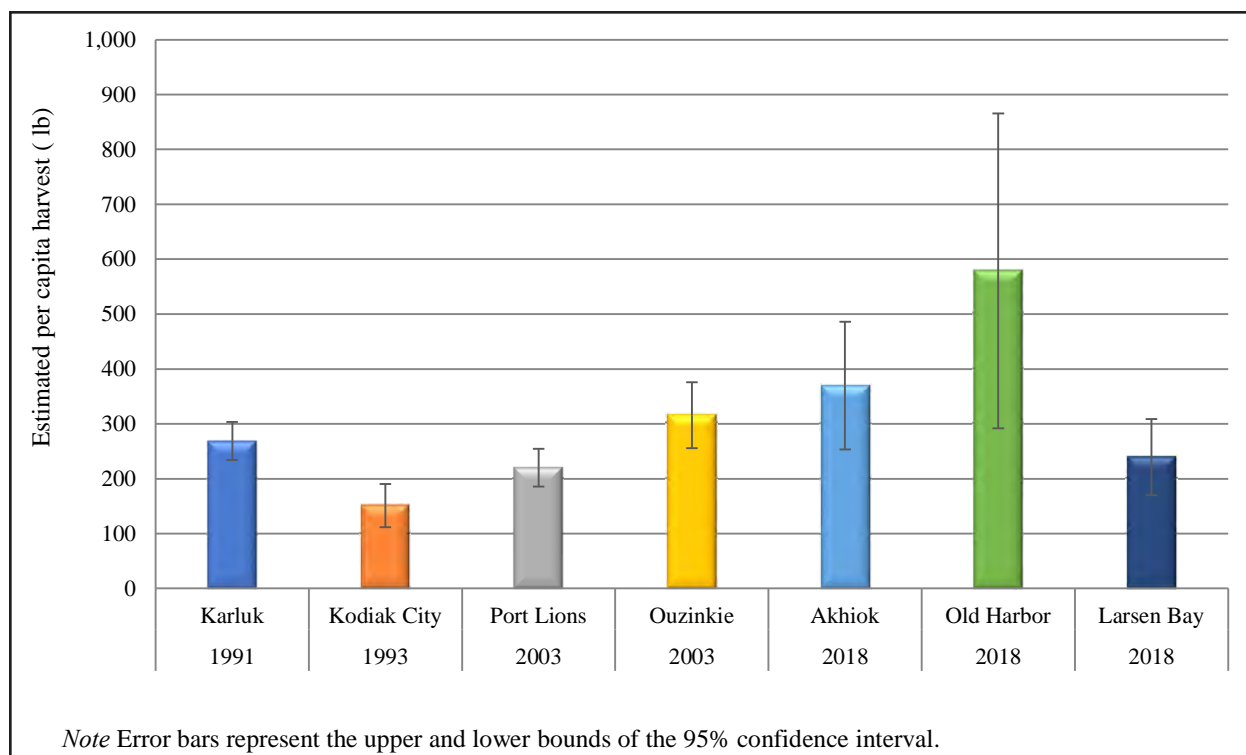


Figure 6-1.—Per capita harvest estimates, Kodiak Island communities, 1991–2018.

Resource Diversity

The number of resources used in a community, or resource diversity, is an important measure in understanding a community’s subsistence patterns. Resource diversity supports resilience and flexibility in terms of supporting a household’s diet when wild foods are not seasonally or annually available, as well as supporting involvement in food production by individuals with a range of age, skill, and ability (Fall and Kostick 2018). All the study communities used and harvested many kinds of resources in every resource category, reflecting the abundance and variety of resources available on Kodiak Island. Differences among the communities emerge when considering resource diversity at the household level, however. While the total number of resources used by Larsen Bay households (72) exceeded that of Akhiok households (52), for almost every measure of resource diversity, on average Larsen Bay households exhibited the lowest results (Table 1-2; Table 1-8).

The average household in Akhiok used 19 types of resources, in Larsen Bay an average household used 16, and in Old Harbor 20 different resources were used on average (Table 1-8). Similarly, the median and maximum numbers of resources used per household were higher in Akhiok and Old Harbor than in Larsen Bay (tables 2-12, 3-12, and 4-12). Where Larsen Bay households did not display the lowest resource diversity measure was that the lowest ranked 50% of harvesting households used slightly more resources, on average, than the similar group of households in either Old Harbor or Akhiok. Additionally, the per capita harvest for the lowest ranked 50% of households was higher in Larsen Bay (34 lb) compared to Old Harbor (28 lb). In contrast, the average number of resources used by the top 25% ranked households was much higher in Akhiok (30) and Old Harbor (34) compared to Larsen Bay (19). The difference between the average number of resources used for the top ranked and the lowest ranked households was smallest in Larsen Bay, indicating that there are fewer differences in resource use between top and lowest ranked households in Larsen Bay when compared to Akhiok and Old Harbor.

Despite slightly different resource bases and differing harvest compositions, there is remarkable uniformity in the resources most used by households in each community (tables 2-14, 3-14, 4-14). Coho and sockeye

salmon, Pacific halibut, and deer were the most used species in every community in 2018; further, butter clams, red king crab, and salmonberries were top used resources in all three study communities.

Sharing Patterns and Outmigration

Sharing of subsistence resources strengthens relationships between people and within a community and is an adaptive measure for reducing risks, including food insecurity, that are associated with living in an isolated community to protect households and a community as a whole. Each of these communities has robust sharing practices: more than 80% of households in each community gave away and more than 90% received some type of resource (tables 2-13, 3-13, 4-13). Looking at each resource category, interestingly, in Akhiok, generally more households gave away resources than received them (salmon, nonsalmon fish, large land mammals, birds and eggs, and vegetation); in contrast, in Old Harbor and Larsen Bay, generally fewer households gave away resources than received them. The data potentially illustrate that Akhiok residents were sharing their subsistence harvests with residents of other communities, or that there were a few households in the community that received the majority of shared resources. Residents in Old Harbor and Larsen Bay distribute food beyond their communities, too, but the frequency of a higher percentage of households giving from resource categories than receiving implies that there is wider intra-community sharing, especially in comparison to Akhiok.

Distribution and exchange networks are defining characteristics of subsistence-based economies (Magdanz et al. 2016; Wolfe et al. 1993). Such networks are important for community structure and cohesion and for the food security of all households, but particularly less productive ones. Interviews conducted during this project support the quantitative harvest survey results, with residents of each community discussing with researchers the cultural importance of sharing. Exchanges of resources strengthen and maintain existing relationships and develop new relationships between givers and receivers. Even for resources with high household participation in harvesting, there were still high levels of sharing, such as coho salmon in Old Harbor, Pacific halibut in Larsen Bay, or deer in Akhiok. Each of the past comprehensive studies has demonstrated high levels of sharing in the study communities, but in 2018 a higher percentage of households gave away resources than in almost any other study year (Figure 6-2). The year of the *Exxon Valdez* oil spill (1989) and the following years had similarly high levels of giving. The percentage of households receiving resources was similar to past study years.

Researchers expanded the exploration of changes in sharing practices as a result of concerns raised by community members at community scoping meetings and during preliminary communications with the study communities. Through these venues, researchers heard community members' concerns about the effects of outmigration on community persistence, how harvest and sharing patterns are changing in response, and how local resources are shared outside of the community as a result of former residents returning to harvest or receiving wild foods from current residents. To further investigate this concept, researchers added several questions to the survey concerning families leaving their community, and the effect those departures had on gathering and sharing resources outside of the community. In each community, survey respondents knew of specific families that had moved away in the last several years, but still returned most years to harvest subsistence resources (Table 6-1). Through conversations with residents and during key respondent interviews, researchers learned that families leave for myriad reasons: health, family, schooling, lack of housing or the high cost of it. The persistence of collaboratively harvesting and processing subsistence resources with these former residents, or sharing of foods, helps maintain these existing relationships. While some families who have left are able to return to their home communities for harvesting or processing, not all families that leave can return and residents of the study communities also discussed sending subsistence foods outside of their community (Table 6-2). External sharing networks also exist more broadly than just with former residents. For example, in Akhiok, residents spoke about the bounty of resources locally available, particularly of marine invertebrates, and the pleasure they took in being able to send a bucket of clams to other communities on the island. As residents of rural communities move to more populated areas like the city of Kodiak or mainland Alaska, external sharing of wild resources should continue to be a point of focus in future research in Kodiak Island communities to understand the widespread importance of local wild resources.

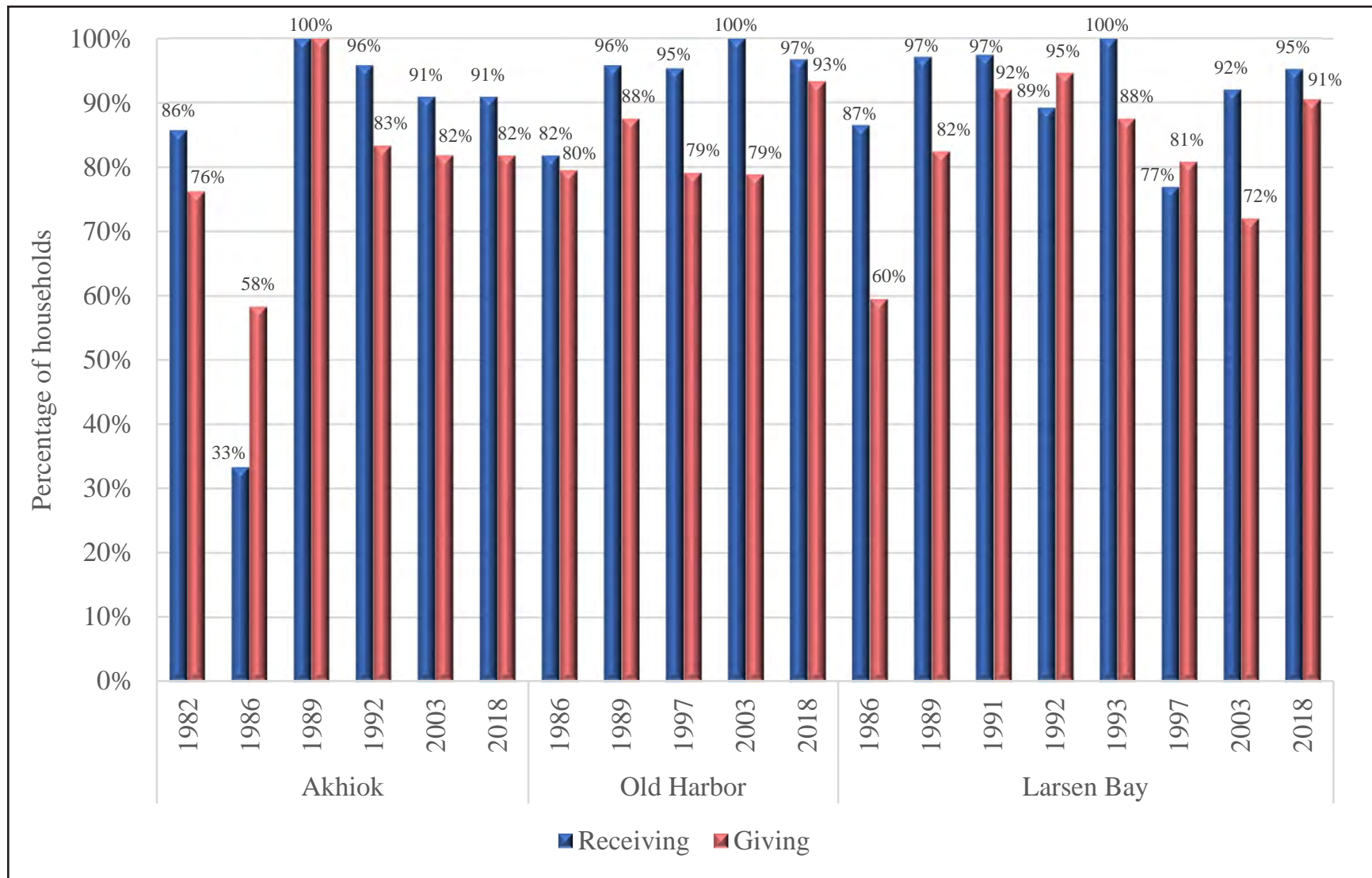


Figure 6-2.—Comparison of the percentages of households receiving and giving all resources, study communities, 1982–2018.

Table 6-1.–Responses to the question “Do you know anyone who moved out of town, but still returns to harvest wild resources,” study communities, 2018.

Study community	Number of households		
	Yes	No	Missing
Akhiok	10	1	0
Old Harbor	8	21	1
Larsen Bay	9	9	3

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

Table 6-2.–Responses to the question “Does your household share, barter, or trade wild resources with people living in other communities?” study communities, 2018.

Study community	Number of households		
	Yes	No	Missing
Akhiok	8	3	0
Old Harbor	19	10	1
Larsen Bay	9	12	0

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

Food Security

Robust sharing patterns support the most vulnerable households in a community. One measure of vulnerability is food security. Among the study communities, households in Akhiok were generally less food secure than in Old Harbor or Larsen Bay (Figure 6-3). Compared to the state average, both Old Harbor and Larsen Bay had a higher percentage of households considered food secure. Considering just the insecure households, a lower percentage of households in all the communities was considered to have low food security than the state average, but a higher percentage of households in Akhiok was in the very low food security category than the state average for 2018. Sources of food insecurity in the study communities were similar; residents in each place reported more instances of subsistence foods not lasting than store-bought foods (figures 2-10, 3-10, 4-10). Food security throughout Kodiak Island is not well understood at present. However, further research may help to elucidate several factors to food security levels. Note that in the several small Gulf of Alaska communities³ lacking road connectivity for which there is recent information, food security appears to increase as the per capita harvest increases (Table 6-3).

An analysis of food security scores in Yukon and Kuskokwim households from 2009–2011 found that household maturity, access to subsistence foods, and cash income were related to food security (Fall and Kostick 2018:4). These factors are also associated with higher per capita harvests (Wolfe et al. 2010). Greater subsistence harvests likely provide a buffer to the harvesting households in times when subsistence resources are scarce or when store-bought foods are unavailable, as well as to other households in the community who benefit from sharing within the community. Food security scores may also reflect the relationship of subsistence patterns and household income. Wolfe and Walker (1987) found an inverse relationship between a community’s average personal income and its subsistence productivity. However, Wolfe et al. (2010) found that household characteristics associated with high wild food production included higher wage incomes. Wage incomes support subsistence activities, such as procuring and operating

3. Results from comprehensive wild resources harvest and use surveys were published by Fall and Zimpelman (2016).

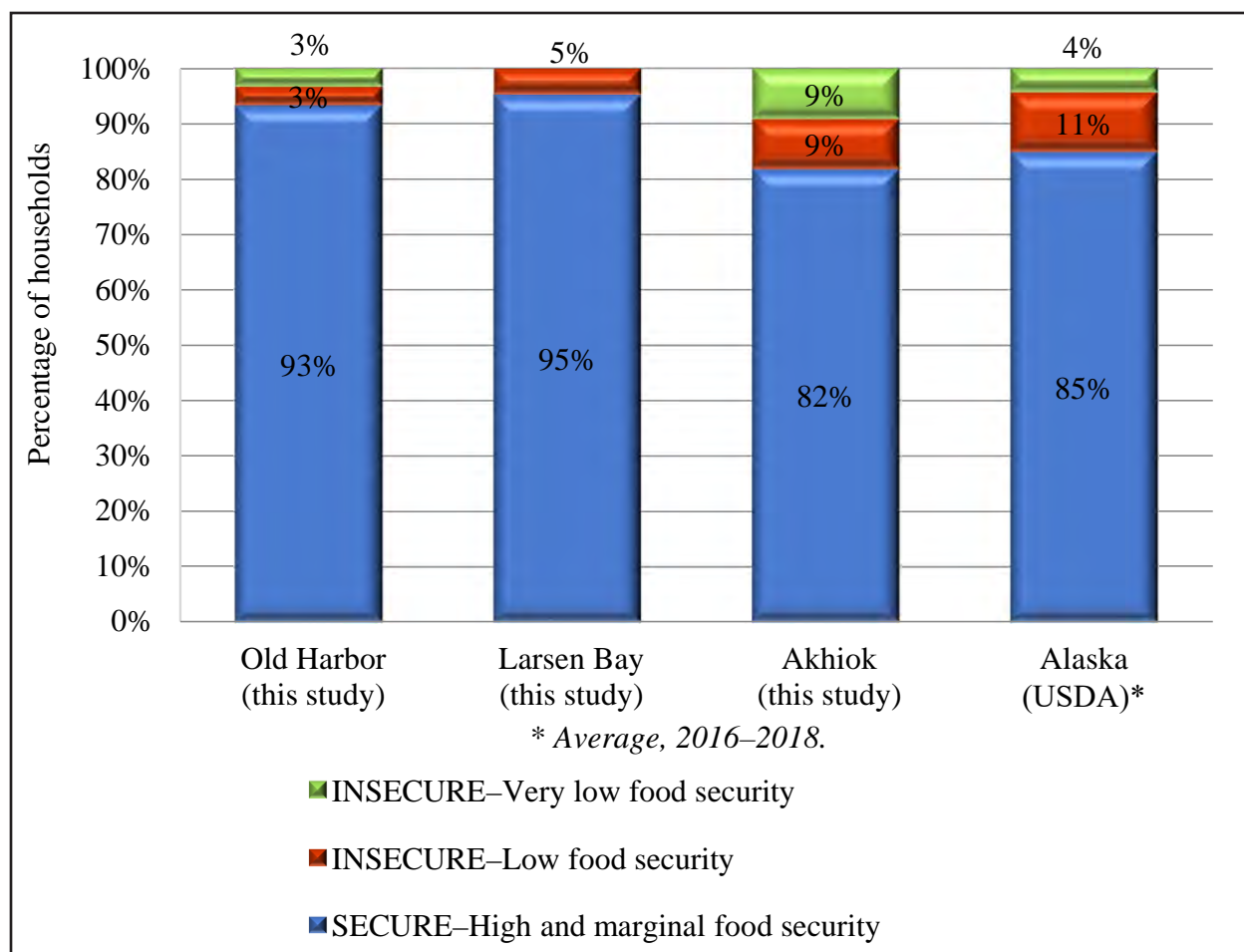


Figure 6-3.—Comparison of food security categories, study communities and Alaska, 2018.

Table 6-3.—Comparison of per capita harvests of wild resources and percentage of households with high or marginal food security, Gulf of Alaska communities, 2014.

Community	Per capita harvest (lb)	Percentage of households with high or marginal food security
Port Graham	218	85%
Nanwalek	253	89%
Chenega	254	92%
Tatitlek	294	100%

Source Fall and Zimpelman (2016).

equipment; additionally, households with higher wage incomes likely have an adult labor force that can engage in both subsistence activities and wage employment. Of the three study communities, household and per capita incomes were highest in Larsen Bay. The per capita income in Akhiok was the lowest, but the average household income in Akhiok was slightly higher than in Old Harbor (Table 1-8). Income can help insulate a community from food insecurity, either through the positive association between subsistence productivity and incomes or through purchasing power of store-bought foods. However, for a community like Akhiok that has no local store and inclement weather that can strand residents and goods for weeks at a time from leaving or entering the community, that insulation is thin.

Harvesting success

An interesting commonality among the communities was the general high rate of success in harvesting. Through the study years, each community has had similarly high levels of success. For 2018, within a resource category, most households in each community that attempted to harvest a resource from the category were able to do so. Even within resource categories, households were generally successful in harvesting at the species level. The most significant exception to this was with birds and eggs; residents of each community were consistently less successful in this endeavor—in Akhiok 73% of households hunted but only 64% were successful; in Larsen Bay 24% hunted and 19% harvested; and in Old Harbor 50% hunted and 47% harvested (tables 2-13, 3-13, 4-13).

On an individual community level, each community faced specific challenges in their harvesting practices. Akhiok households were not always successful in harvesting small land mammals and marine mammals; Old Harbor households failed to harvest salmon and nonsalmon fish; and Larsen Bay households were not always successful in harvesting large land mammals. During the surveys and key respondent interviews, residents spoke about particular difficulties with each of these resource categories. In Akhiok, one hunter discussed his difficulty in finding any snowshoe hares around town, explaining that the population was at a low level. Marine mammals, while not discussed in detail, were mentioned as populations in decline during the key respondent interviews. From the survey, the households that used less marine mammals attributed the decrease to unsuccessful harvesting efforts, implying that the resource was there, but for other reasons the hunter was not successful in harvesting. Multiple Larsen Bay survey respondents commented on the increasing presence of non-local hunters and some of those comments were concerns about the increasing pressure on the local resources. Residents of all the communities discussed their concerns with a perceived decrease in Pacific halibut abundance and size. In Old Harbor, residents noted a near-complete lack of Pacific halibut in the waters near town where people used to fish for them, with one respondent noting that the study year was the first where they did not catch a halibut, and another saying it had been a couple of years since he was able to harvest one.

HISTORICAL HARVEST COMPARISONS

Each of the study communities has several previous harvest estimates to compare with the 2018 study year (figures 2-36, 3-37, 4-37). In Old Harbor and Larsen Bay, a drop in per capita harvests is noted in 1989, the year of the *Exxon Valdez* oil spill; interestingly, no similar drop was estimated in Akhiok harvests, however if the 1982 and 1986 estimated harvests are averaged to account for the likely low estimate⁴ in 1986, there was a drop in harvests in the year of the spill. Per capita harvests in Old Harbor and Akhiok have fluctuated over the study years, but no definitive trend can be discerned. In Larsen Bay, there is a trend of declining per capita harvests since the 1993 study year. As discussed above, several factors are associated with the productivity of subsistence households, including community percentage of Alaska Natives, proximity to urban areas, and connections to a road system (Wolfe and Walker 1987). Wolfe et al. (2010) delves further into analyzing the factors associated with high-producing households (“super-households”). That study found that household characteristics associated with high wild food production included multiple working-age males, commercial fishing involvement, and high wage incomes. Factors associated with lower wild food production included female heads of households, the age of elders, non-Native household heads,

4. Fall and Walker (1993) caution that there is uncertainty in the 1986 data because of questions that arose during data analysis coupled with project staff turnover and a time-lag between collecting the data and analyzing it.

and single-person households. Finally, it is increasingly recognized that broader trends in subsistence involvement cannot be solely attributed to singular factors, but rather are part of a “total environment of change” that encompasses a variety of factors such as environmental changes, changing lifestyles, decreasing levels of interest in subsistence activities among younger generations, and economic challenges (Moerlein and Carothers 2012). The overall population of Larsen Bay has been declining since the late 1980s (Figure 4-3). In the 2018 study year, its population was the oldest, had the smallest mean household size, and had the smallest percentage of Alaska Native households of the three study communities (tables 2-2, 3-2, 4-2). While there is still high household use and harvest of wild resources in Larsen Bay, a smaller proportion of individuals engaged in the harvest of fish and large land mammal resources at the individual level (figures 2-11, 3-11, 4-11). These demographic characteristics of the Larsen Bay community may help explain the definitive trend of decreasing per capita harvests in the last several decades that is not observed in the other two study communities.

Harvest Composition

In addition to looking at the change in the magnitude of harvest over time, the change in composition of harvests over time can provide further insight into changing subsistence patterns. Subsistence harvesters adapt their harvests to changes in the resource populations, climate, and social and economic changes to continue meeting their needs. Some of these adaptations are short-lived, for example a year with a poor salmon harvest may mean residents increase their effort to harvest more deer that fall. Others are longer term trends, as is seen in the study communities with a shift away from Pacific halibut due to decreasing local abundance, or a change in marine mammal harvests because of changing demographics and reduced demand.

Fish

Salmon has composed a relatively high and stable percentage of the harvest in each of the communities over time (figures 6-4, 3-38, 6-5). In 2018, salmon composed a greater-than-average percentage of harvests in each community, though only very slightly in Larsen Bay. Salmon is a staple of residents’ diet and salmon fishing is a major component of the way of life in the study communities. Sockeye salmon runs on Kodiak Island are healthy, generally meeting or exceeding the established biological escapement goals in most monitored streams (McKinley et al. 2019). Conversely, nonsalmon fish harvests composed a smaller-than-average percentage in Old Harbor and Larsen Bay in 2018. During visits to the communities and through key respondent interviews, researchers heard from multiple sources their concerns about a decrease in local Pacific halibut abundance. While halibut were available, they were further offshore and deeper, making it more difficult to harvest, especially by handline (a preferred harvest gear type). Recent stock assessments and harvest statistics lend support to local observations that Pacific halibut are more challenging to fish for. Spawning biomass of Pacific halibut in Alaska has declined since the 1990s (Stewart and Hicks 2020); also, harvests of Pacific halibut from all sources have decreased from a recent high in the mid-2000s (Stewart et al. 2020:3). Additionally, the weight per unit effort in the commercial fishery of IPHC regulatory area 3A (the relevant area to the study communities) shows a decline since the late 1990s.⁵

5. Internal Pacific Halibut Commission. 2020. “Time Series Datasets: Primary Data Sets, Time-Series of Modelled FISS NPUE, IPHC Regulatory Area - (Numbers/Skate).” <https://www.iphc.int/data/time-series-datasets> (accessed May 5, 2021).

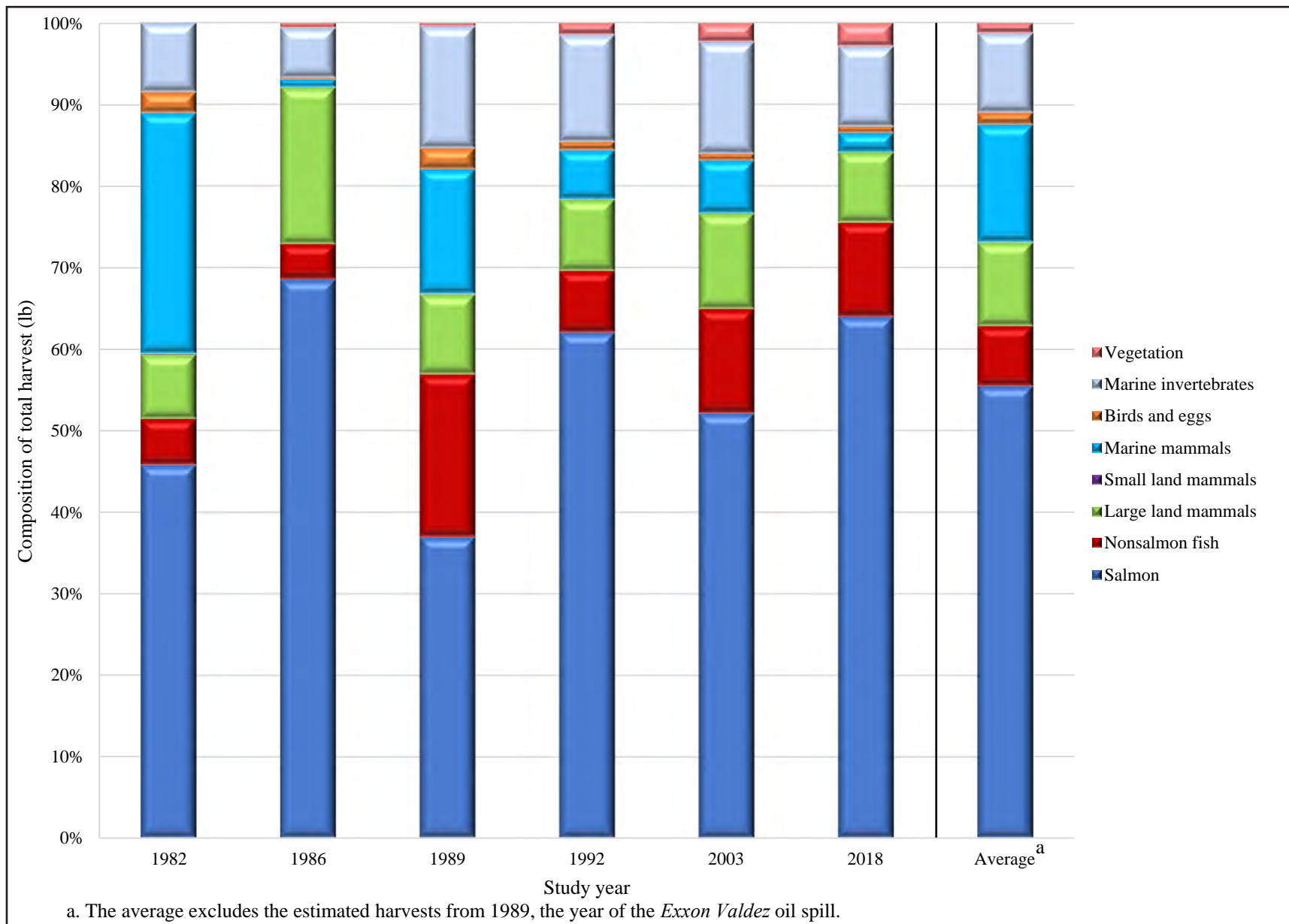


Figure 6-4.—Comparison of total harvest composition in pounds, by resource category, Akhiok, 1982, 1986, 1989, 1992, 2003, and 2018.

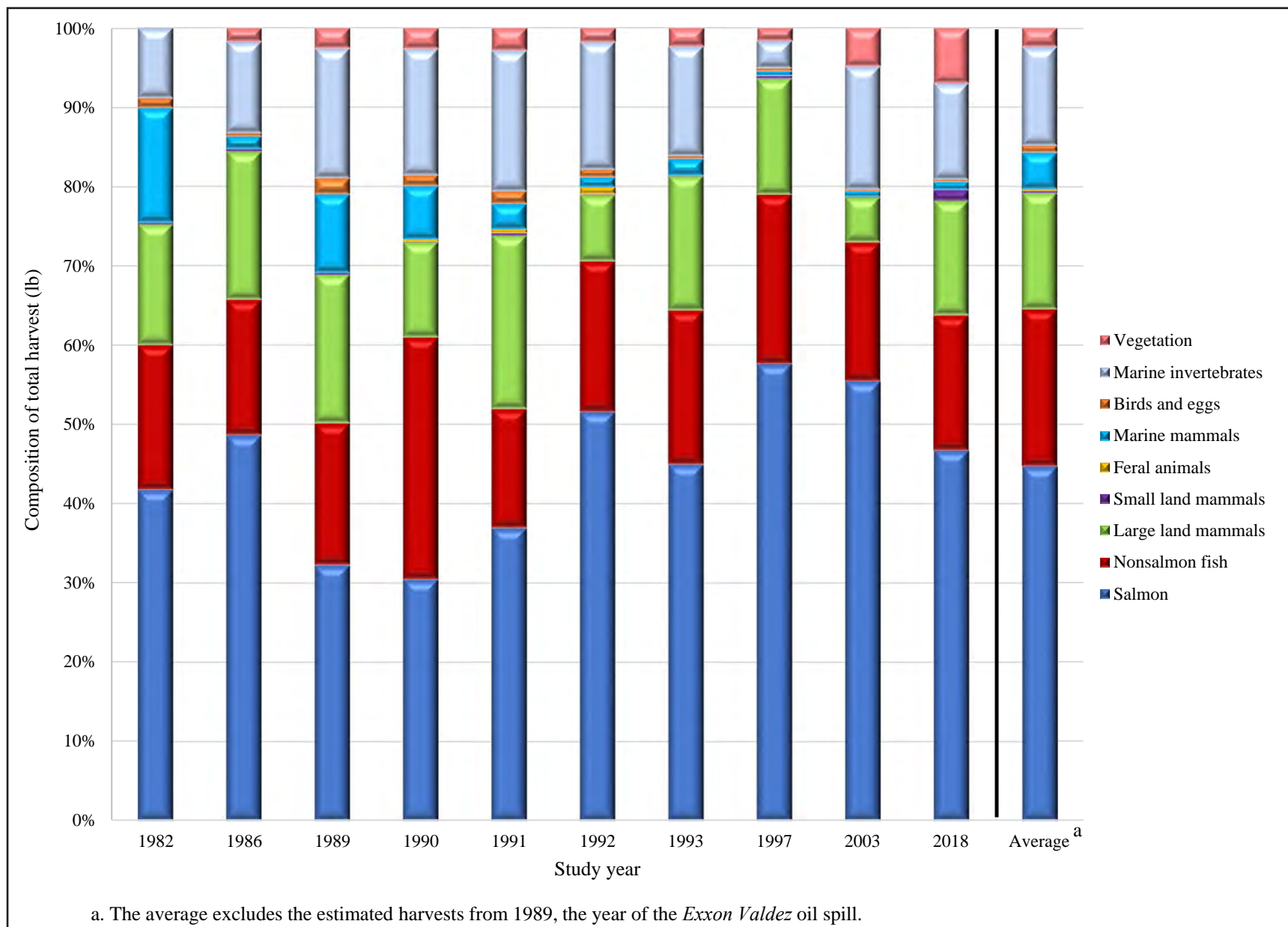


Figure 6-5.—Comparison of total harvest composition in pounds, by resource category, Larsen Bay, 1982, 1986, 1989–1993, 1997, 2003, and 2018.

Marine Mammals

Kodiak Island communities rely on harbor seals and sea lions for their marine mammal needs. One clear trend in harvest composition spanning the comprehensive study years is the decrease in marine mammal harvests, both as a percentage of community harvests and in total pounds (figures 6-4, 3-38, 6-5; tables 2-29, 3-29, 4-29). The decrease in harvest generally corresponds to a decrease in use of marine mammals, except in Old Harbor where variable use occurred based on previous division research (Figure 6-6). The annual marine mammal surveys conducted through the 1990s and early 2000s show variable harvests of harbor seals from Kodiak Island communities without a clear trend (Wolfe et al. 2012:25). However, since the highest island-wide harvest in 2005, harvests decreased steadily until the most recent marine mammal survey in 2011. No information is available island-wide since 2011, but, based on Division of Subsistence surveys, estimated total seal harvests in 2018 by Akhiok and Larsen Bay residents were below the average for all years of seal harvest data while in Old Harbor the total harvest was above average (Table 6-4). A clearer trend emerges in the harvest of sea lions, with decreasing harvests for Kodiak communities overall beginning in the late 1990s (Wolfe et al. 2012:29). In 2018, no sea lions were harvested in Akhiok or Larsen Bay, and the sea lion harvest in Old Harbor was well below the average harvest weight (Table 6-5). Despite the lower harvests in the study communities, more households in each community thought their use of marine mammals was the same or more than recent previous years (figures 2-34, 3-35, 4-35). Similarly, most sampled households assessed that they got enough marine mammals (figure 2-35, 3-36, 4-36). Coupled with the lower overall use of marine mammals (Figure 6-6), it appears there is a broader shift moving away from using and harvesting marine mammals in these communities, especially sea lions. Discussions with key respondents lend support to this observation. One Akhiok respondent noted that sea lion populations have been decreasing, but other respondents pointed to generational changes. “A lot of our younger generation just don’t eat seal anymore or sea lion” (AK04). In Old Harbor, the respondent noted that kids are not being taught how to process resources like seals or sea lions, and worried that was tied to the decrease in elders in the community.

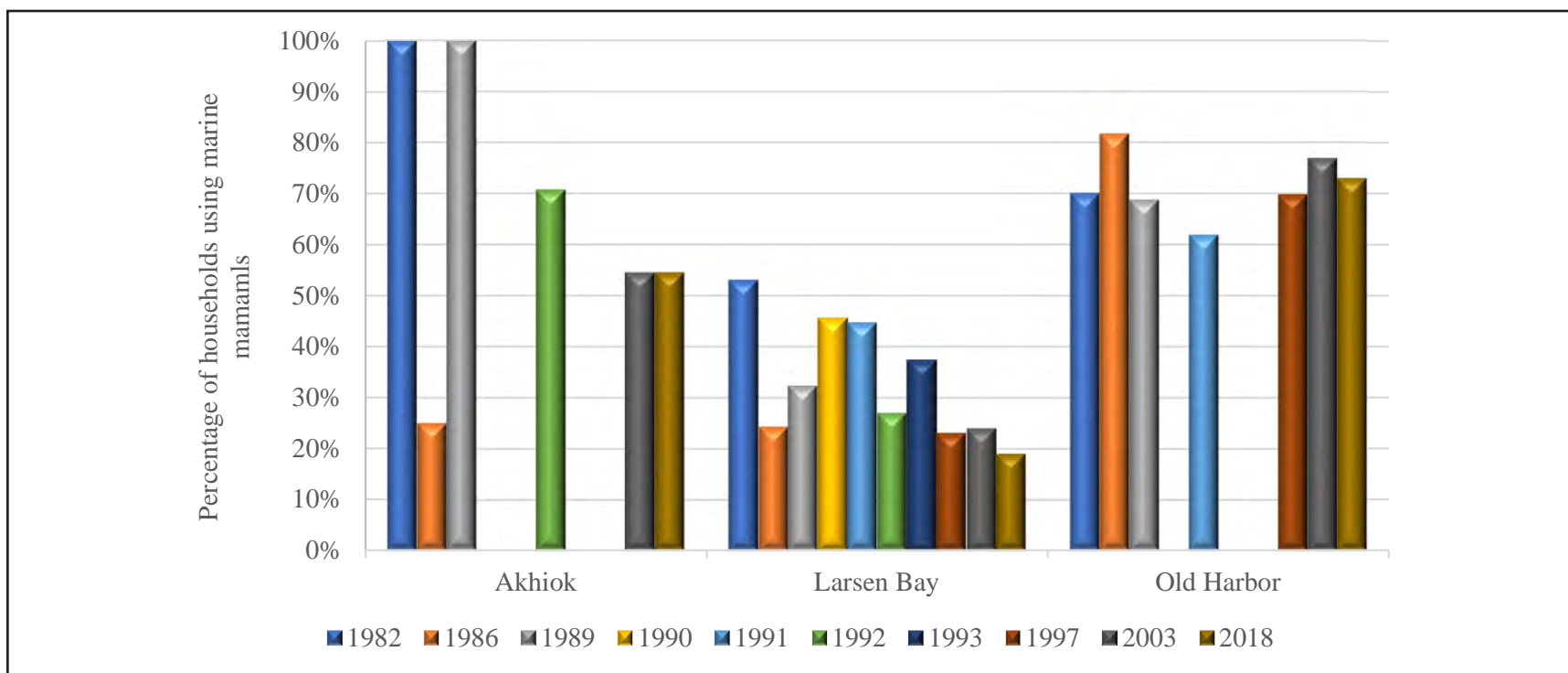


Figure 6-6.—Percentage of households that used marine mammals, study communities, 1982–2018.

Table 6-4.—Comparison of estimated total harvest of harbor seals, by individual animals harvested, study communities, 1982, 1986, 1989–1998, 2000–2008, 2011, and 2018.

Year	Total harbor seal harvest (ind)		
	Akhiok	Old Harbor	Larsen Bay
1982	89.0	156.0	56.0
1986	6.0	127.0	10.0
1989	13.0	45.0	26.0
1990			27.0
1991		46.0	17.0
1992	20.0	86.8	6.5
1993	13.3	67.6	7.7
1994	14.5	83.7	13.4
1995	5.0	112.0	11.0
1996	12.0	113.5	15.0
1997	7.9	80.0	9.8
1998	7.3	55.1	1.7
2000	17.6	59.1	18.6
2001	7.2	71.3	9.0
2002	6.3	40.5	3.3
2003	5.5	66.7	2.5
2004	4.2	37.8	12.5
2005	6.9	37.5	17.0
2006	13.6	20.2	20.3
2007	7.0	35.2	8.6
2008	10.5	35.2	5.2
2011	16.7	40.1	10.2
2018	7.6	87.1	2.9
Average ⁱ	13.9	68.3	13.5

Sources For 1982–1991, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2021; for 1992–2011, Wolfe et al. (2012:36); for 2018, ADF&G Division of Subsistence household surveys, 2019.

Note Blank cells indicate no harvest surveys were conducted for that year.

a. The average excludes the estimated harvests from 1989, the year of the *Exxon Valdez* oil spill.

Table 6-5.—Comparison of estimated total harvest of Steller sea lions, in pounds usable weight, study communities, 1982, 1986, 1989–1993, 1995–1998, 2008, and 2018.

Year	Total Steller sea lion harvest (lb)		
	Akhiok	Old Harbor	Larsen Bay
1982	10,800.0	19,044.0	7,256.0
1986	128.0	32,238.0	0.0
1989	1,820.0	4,456.0	1,147.0
1990			1,829.0
1991		3,457.0	453.0
1992	600.0		227.0
1993			490.0
1995	200.0	21,429.0	400.0
1996	1,200.0	8,986.0	0.0
1997	1,313.0	7,442.0	0.0
1998	629.0	2,065.0	0.0
2000	640.0	2,580.0	0.0
2001	289.0	5,265.0	0.0
2002	0.0	1,703.0	0.0
2003	545.0	5,553.8	0.0
2004	280.0	1,655.0	0.0
2005	0.0	3,643.0	0.0
2006	453.0	212.0	0.0
2007	600.0	1,406.0	0.0
2008	418.0		0.0
2018	0.0	2,680.0	0.0
Average ^a	1,106.4	7,283.2	562.0

Sources For 1982–2008, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2021; for 2018, ADF&G Division of Subsistence household surveys, 2019.

Note Blank cells indicate no harvest surveys were conducted for that year.

a. The average excludes the estimated harvests from 1989, the year of the *Exxon Valdez* oil spill.

CONCLUSIONS AND RECOMMENDATIONS

This study documented the continuing importance of wild resources to the Kodiak Island communities of Akhiok, Old Harbor, and Larsen Bay. The results of the study contribute to an understanding of the subsistence patterns on Kodiak Island. Analyses of harvest levels for specific species and resource categories, demographics, food security, community economies, and harvest and search areas help characterize contemporary subsistence harvest and use patterns in these communities but also contribute to an understanding of rural communities statewide, especially of those located on the coasts.

These three communities have undergone many environmental and social changes in the last half-century, including the 1964 earthquake that destroyed parts of town and changed the demographics and physical locations of other communities; the 1989 *Exxon Valdez* oil spill; and, more recently, continued outmigration, closing of local schools, and increasing competition with nonlocal users (including commercial fishing boats, charter boats, and guided hunting and fishing trips). Despite these changes and the concerns that the residents have expressed for their resources and their communities, subsistence practices remain strong. While residents in Akhiok expressed concern about the local salmon populations, potential

mismanagement, disturbances from the commercial fisheries, and decreased availability, they were still able to harvest an above-average amount of salmon in 2018. Old Harbor residents expressed concerns about the loss of communal subsistence activities and the younger generations not learning traditional harvesting and processing activities from elders, but in 2018 most people in town were engaged in some kind of harvesting and processing activity, and the estimated per capita harvest of resources in 2018 was the highest of all the study years. While per capita harvests have declined in Larsen Bay, other metrics of engagement such as household participation in using, harvesting, and sharing wild resources, and harvest diversity, remain evident. All of these examples demonstrate that while communities continue to be faced with significant environmental and social changes that effect subsistence ways of life, the resilience and adaptability of subsistence harvesters remains the most prevalent characteristic of these southwest Kodiak Island communities.

Over the course of this project, researchers have identified several avenues of further research that would be useful for understanding some of the patterns and trends highlighted throughout this work, as well as to better contextualize these findings within broader changes on Kodiak Island.

- Update comprehensive information of the other communities on Kodiak Island. Currently, data on subsistence harvests and uses of wild resources in the other five Kodiak Island communities range 18–30 years old. Not only is updated data important for the communities' use in regulatory and management applications, but such comprehensive data would allow household-level analyses of the entire region, rather than at the community level presented within this report.
- Investigate inter-island sharing more extensively. Outmigration from rural to urban communities has been an ongoing concern to rural Alaska for many years. How harvest and sharing patterns are changing as a result is not well understood at present. An investigation on Kodiak Island would have broader implications for rural and hub communities throughout the state.
- Alaska faces unique challenges to its food security. Kodiak Island communities embody many of these challenges, such as high costs of transportation, remoteness, and limited agricultural production. Based on the current research, subsistence harvests play an important role in supporting households' food security. To date, little research has occurred on Kodiak Island to explore how food secure these communities are, the role sharing plays in their food security, or differences between the smaller communities and Kodiak city.
- Based on the data collected for these study communities in 2018, there has been a marked decrease in the use and harvest of marine mammals. Unfortunately, funding ended for the annual marine mammal harvest survey of Kodiak Island communities after the 2011 study year. New sources of funding should be sought to continue documenting the use of marine mammals, and to further explore changing use patterns.

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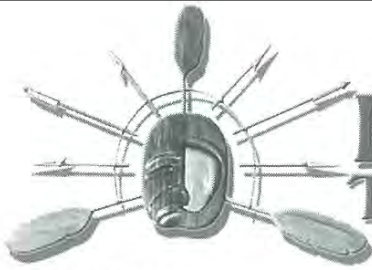
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APPENDIX A—PROJECT SUPPORT LETTERS



LARSEN BAY TRIBAL COUNCIL

PHONE (907) 847-2207
FAX (907) 847-2307

PO Box 50
LARSEN BAY
ALASKA 99624

December 5, 2016

Brian Davis, Program Manager
Division of Subsistence
Alaska Department of Fish and Game
333 Raspberry Road
Anchorage, Alaska 99518-2353

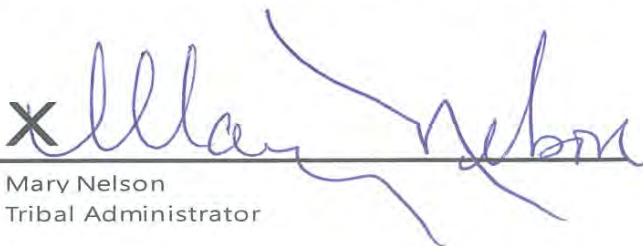
Dear Brian,

The Larsen Bay Tribe would like to express our support for the Alaska Department of Fish & Game's proposal to study relationships between the commercial fishing industry and local subsistence harvests in our community. Commercial fishing and subsistence have existed side-by-side in Larsen Bay for generations, but recent changes have raised concerns among our tribal members about maintaining a healthy subsistence tradition.

As we understand your proposed project, researchers will conduct household harvest surveys and in-depth interviews with residents of Larsen Bay. Questions will pertain to the historic and contemporary relationship between subsistence and commercial fishing, seeking to describe the way both practices have existed side-by-side over the years. We understand that participation in the survey is voluntary, that respondents are selected at random, and details of the household surveys will not be kept confidential.

You indicated a number of ways the Larsen Bay Tribe might assist with the research project, and we would appreciate the opportunity to do so by recommending a Local Research Assistant to help ADF&G staff with the surveys. We would also encourage participation by making to inform the community about the time and purpose of the survey work. The Tribe would also be pleased to identify community members with unique knowledge about the connections between commercial fishing subsistence, and facilitate in-depth interviews with those people.

We believe this research project will benefit our community by giving us a stronger voice in the management of resources in our region, and we offer our strong support.


Mary Nelson
Tribal Administrator

Letter of Support for ADF&G
12.5.16



Corporate Office

2702 Denali St., Suite 100, Anchorage, AK 99503

Phone: (907) 278.6100 Fax: (907) 276.3441

December 3, 2016

Brian Davis
ADF&G Division of Subsistence
Regional Program Manager
333 Raspberry Road
Anchorage, AK 99518-1599

Dear Brian,

The Old Harbor Native Corporation would like to express our support for the Alaska Department of Fish & Game's proposal to study relationships between the commercial fishing industry and local subsistence harvests in our community. Commercial fishing and subsistence have existed side-by-side in our community for generations, but recent changes have raised concerns among our tribal members about maintaining a healthy subsistence tradition.

As we understand your proposed project, researchers will conduct household harvest surveys and in-depth interviews with residents of Old Harbor. Questions will pertain to the historic and contemporary relationship between subsistence and commercial fishing, seeking to describe the way both practices have existed side-by-side over the years. We understand that participation in the survey is voluntary, that respondents are selected at random, and that participating households will be kept confidential.

You indicated a number of ways the Old Harbor Native Corporation might assist with the research project, and we would appreciate the opportunity. The Corporation could recommend Local Research Assistants to assist with surveys and community members with unique knowledge about the connections between commercial fishing and subsistence, and facilitate in-depth interviews with those people. We will also encourage participation by making efforts to inform the community about the time and purpose of the survey work.

Old Harbor Native Corporation is supporter of both commercial and subsistence fishing, as they are the backbone of our community's economy and provide the primary source of the food passing on traditional harvesting practice for our people. We believe this research project will benefit our community by giving us a stronger voice in the management of resources in our region, and we offer our strong support.

We would like a copy of research results sent to Melissa Berns at our Old Harbor village office location and Cynthia Berns here in Anchorage; to be viewed and used by the community.

Sincerely,



Carl H. Marrs, CEO
Old Harbor Native Corporation



United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Kodiak National Wildlife Refuge
1390 Buskin River Road
Kodiak, Alaska 99615-0323
(907) 487-2600



IN REPLY REFER TO

February 15, 2017

Brian Davis
Subsistence Program Manager
Southern Region
333 Raspberry Road
Anchorage, Alaska 99518-1565

Mr. Davis,

The Kodiak National Wildlife Refuge supports the Department of Fish and Game's proposal to conduct a comprehensive household subsistence harvest study in Akhiok, Larsen Bay, Old Harbor and Karluk. The Kodiak Refuge is committed to productive collaboration with the Department, other agencies, and communities to study and improve understanding of natural and cultural resources, and to sustain opportunities for continued subsistence uses by rural residents of the Kodiak Archipelago.

For all archipelago communities, subsistence continues to be a vital part of the cultural tradition as well as an important contributor to the local economy. Residents of the archipelago have noticed changes in the ecology upon which subsistence resources depend, and it is our understanding that in addition to providing a much needed update to baseline harvest and use data, the proposed study would collect information and document concerns held by the residents of Akhiok related to resource availability and the impacts of climate change. Moreover, such an update would ensure that the latest science results are available to support discussions and decisions regarding the conservation of fish, wildlife, and subsistence use opportunities.

In conclusion, the proposed research would fulfill some of the goals of the Refuge while giving rural residents a stronger voice in the management of resources in our region. I therefore endorse the Department's research proposal.

Respectfully,

Tevis Underwood
Acting Refuge Manager



February 14, 2017

Dear Federal Subsistence Board and Staff,

This letter is to support the proposal submitted by Lauren Sill and Amy Wiita of the Alaska Department of Fish and Game, Division of Subsistence, entitled *Subsistence harvest trends of salmon and nonsalmon fish in 4 southern Kodiak Island communities, with a focus on Olga and Akalura Lakes*. We support efforts by the Division of Subsistence to work collaboratively with our member communities to collect, analyze and report data on the harvest and use of wild foods that continue to sustain the people of Kodiak Island. The proposed project would generate systematic survey data describing the harvest of wild resources in each community, as well as the results of interviews conducted with knowledgeable individuals. Combined, these data will prove effective at representing community subsistence needs in the arena of state and federal resource management.

As we understand it, the Division of Subsistence will investigate the contemporary harvests of salmon, non-salmon fish, and other wild food resources in Akhiok, Larsen Bay, Old Harbor and Karluk. We understand that the participation of our community members in the project is voluntary, and that certain local residents who contract with the Division of Subsistence to serve as local research assistants will be compensated by the Division for their efforts.

Research will entail systematic household harvest surveys in each community to document harvests for the study year 2018, including harvest area mapping. Additional research will focus on knowledge residents of Akhiok and Larsen Bay have regarding the salmon rearing habitats of Olga and Akalura Lakes, one of the most important sources for salmon on the island.

We understand that the project will not involve any biological sampling or enhancement activities, but that community concerns regarding our salmon's health and habitat will be documented along with information about community residents' subsistence salmon harvest. Comprehensive harvest data is currently out-of-date for each of the four study communities, and an update is necessary to protect local access to subsistence resources.

In support of this project, the Alutiiq Museum also offers to add a copy of the project report to our library, and to act as a secondary repository for copies of interview tapes and transcripts. We would be like to add these materials to our holdings to make them accessible to our community, support future research projects, and preserve the knowledge of Alutiiq people.

Thank you for supporting this important project.

Sincerely,

A handwritten signature in blue ink, which appears to read "April Counciller", is written over a horizontal line.

April Counciller, Ph.D
Executive Director



February 15, 2017

Federal Subsistence Board and staff
Office of Subsistence Management
US Fish & Wildlife Service
1011 E. Tudor Rd.; MS 121
Anchorage, AK 99503

RE: Letter of Support for the Subsistence Harvest Trend Proposal

Dear Federal Subsistence Board and Staff,

Koniag, Inc. is the regional Alaska Native Corporation for the Kodiak Island region formed under the terms of the Alaska Native Claims Settlement Act of 1971. Koniag currently has approximately 3,900 Shareholders whose lineage traces back to Kodiak's original Alutiiq people. As such, our Shareholders and descendants have a rich culture and history of which subsistence activities are a central part.

Koniag, Inc. would like to express its support for the proposal submitted by Lauren Sill and Amy Wiita of the Alaska Department of Fish and Game, Division of Subsistence, entitled *Subsistence harvest trends of salmon and nonsalmon fish in 4 southern Kodiak Island communities, with a focus on Olga and Akalura Lakes*. We support efforts by the Division of Subsistence to work collaboratively with the communities in our region to collect, analyze and report data on the harvest and use of wild foods that continue to sustain the people of Kodiak Island. The proposed project would generate systematic survey data describing the harvest of wild resources in each community, as well as the results of interviews conducted with knowledgeable individuals. Combined, these data will prove effective at representing community subsistence needs in the arena of state and federal resource management.

As we understand it, the Division of Subsistence will investigate the contemporary harvests of salmon, non-salmon fish, and other wild food resources in Akhiok, Larsen Bay, Old Harbor and Karluk. We understand that the participation of our community members in the project is voluntary, and that certain local residents who contract with the Division of Subsistence to serve as local research assistants will be compensated by the Division for their efforts.

Research will entail systematic household harvest surveys in each community to document harvests for the study year 2018, including harvest area mapping. Additional research will focus on knowledge residents of Akhiok and Larsen Bay have regarding the salmon rearing habitats of Olga and Akalura Lakes, some of the most important sources for salmon on the island. In addition, the project will not involve any biological sampling or enhancement activities, but rather community concerns regarding our salmon's health and habitat will be documented along with information about community residents' subsistence salmon harvest.

Comprehensive harvest data is currently out-of-date for each of the four study communities, and an update is necessary to protect local access to subsistence resources. Koniag, Inc. urges you to support this important project.

Sincerely,

Elizabeth M. Perry, PhD
CEO

3800 Centerpoint Drive, Suite 502
Anchorage, Alaska 99503
(907) 561-2668

**APPENDIX B—SAMPLE SURVEY FORM
(AKHIOK)**

COMPREHENSIVE SUBSISTENCE SURVEY

AKHIOK, ALASKA

From January 1, 2018 to December 31, 2018

OSM SOUTHWEST
KODIAK

printed: 2019-02-19

This survey is used to estimate subsistence harvests and to describe the role of subsistence in the local economy of your community. We will publish a short summary report that will be available to community members. We share this information with the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service and the National Park Service. We work with the Federal Regional Advisory Councils and with local Fish and Game Advisory Committees to better manage subsistence, and to implement federal and state subsistence priorities.

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

HOUSEHOLD ID: _____

COMMUNITY ID: _____

2

2

INTERVIEWER #1: _____

INTERVIEWER #2: _____

INTERVIEW DATE: _____

START TIME: _____

STOP TIME: _____

DATA CODED BY: _____

DATA ENTERED BY: _____

SUPERVISOR: _____



photo by Meredith Marchioni

NATIVE VILLAGE OF AKHIOK

PO BOX 5030

AKHIOK, AK 99615

907-836-2312

ALASKA DEPARTMENT OF FISH & GAME

DIVISION OF SUBSISTENCE

PO BOX 115526

JUNEAU, AK 99811-5526

907-263-2353

HOUSEHOLD MEMBERS

HOUSEHOLD ID

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

Last year, that is, between January 1, 2018 and December 31, 2018, WHO were the head or heads of your household?

Is this person answering questions on this survey?	How is this person related to HEAD 1?	Is this person MALE or FEMALE?	Is this person an ALASKA NATIVE?	In what YEAR was this person born?	Where were parents living when this person was born?	years has this person lived in Akhiok?	Did this person participate in a commercial fishery last year ¹ ? If YES, was this person a CAPTAIN, CREW, or both?
ID #	(circle)	(circle)	(circle)	(year)	(AK city or state)	(number)	(circle) (circle one or both)
HEAD 1	Y N		M F	Y N			Y N CAPT / CREW
1		1					
NEXT enter spouse or partner. If a household has a SINGLE HEAD, leave HEAD 2 row BLANK and move to PERSON 3.							
HEAD 2	Y N		M F	Y N			Y N CAPT / CREW
2		2					
BELOW, enter children (oldest to youngest), grandchildren, grandparents, or anyone else living full-time in this household.							
PERSON 03	Y N		M F	Y N			Y N CAPT / CREW
3							
PERSON 04	Y N		M F	Y N			Y N CAPT / CREW
4							
PERSON 05	Y N		M F	Y N			Y N CAPT / CREW
5							
PERSON 06	Y N		M F	Y N			Y N CAPT / CREW
6							
PERSON 07	Y N		M F	Y N			Y N CAPT / CREW
7							
PERSON 08	Y N		M F	Y N			Y N CAPT / CREW
8							
PERSON 09	Y N		M F	Y N			Y N CAPT / CREW
9							
PERSON 10	Y N		M F	Y N			Y N CAPT / CREW
10							
PERSON 11	Y N		M F	Y N			Y N CAPT / CREW
11							
PERSON 12	Y N		M F	Y N			Y N CAPT / CREW
12							
PERSON 13	Y N		M F	Y N			Y N CAPT / CREW
13							
PERSON 14	Y N		M F	Y N			Y N CAPT / CREW
14							
PERSON 15	Y N		M F	Y N			Y N CAPT / CREW
15							

PERMANENT HH MEMBERS: 01

AKHIOK: 2

HOUSEHOLD PARTICIPATION

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

Between January 1, 2018 and December 31, 2018

Did this person

PERSON ID#	FISH		MARINE INVERTEBRATES		LARGE LAND MAMMALS		SMALL LAND MAMMALS		MARINE MAMMALS		BIRDS AND EGGS		PLANTS / BERRIES / WOOD	
	FISH FOR	PROCESS	GATHER	PROCESS	HUNT	PROCESS	HUNT / TRAP	PROCESS	HUNT	PROCESS	HUNT / GATHER	PROCESS	GATHER	PROCESS
	ID #	(circle)	(circle)	(circle)	(circle)	(circle)	(circle)	(circle)	(circle)	(circle)	(circle)	(circle)	(circle)	(circle)
HEAD 1	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
1														
HEAD 2	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
2														
PERSO N 03	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
3														
PERSO N 04	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4														
PERSO N 05	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5														
PERSO N 06	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
6														
PERSO N 07	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
7														
PERSO N 08	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
8														
PERSO N 09	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
9														
PERSO N 10	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
10														
PERSO N 11	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
11														
PERSO N 12	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
12														
PERSO N 13	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
13														
PERSO N 14	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
14														
PERSO N 15	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
15														

PERMANENT HH MEMBERS: 01

AKHIOK: 2

RETAINED COMMERCIAL HARVESTS: SALMONHOUSEHOLD ID 1. Do you or members of your household USUALLY participate in a commercial fishing?.....Y N *IF household member(s) DID NOT participate in a commercial fishery last year ¹, go to the SALMON HARVEST SECTION on page 7.**IF any household member(s) participated in a commercial fishery last year ¹, continue on this page ...***During the last year,¹****did you or members of your household...****A** ... FISH commercially for _____?**B** ... KEEP any _____ from your commercial catch for your own use² or to share?*if keep is "yes"*

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

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

Read names below in blanks above	A		B		How many were removed for your OWN USE ² ? <i>number</i>	How many were removed to give to OTHERS, NOT including CREW? <i>number</i>	Units ³ <i>specify</i>	Comments <i>comments</i>
	COMM FISH?	KEEP?						
CHUM SALMON	Y N	Y N						IND.
111000001								
COHO SALMON	Y N	Y N						IND.
112000001								
CHINOOK SALMON	Y N	Y N						IND.
113000001								
PINK SALMON	Y N	Y N						IND.
114000001								
SOCKEYE SALMON	Y N	Y N						IND.
115000001								
UNKNOWN SALMON	Y N	Y N						IND.
119000001								

Comments:

¹ "LAST YEAR" means between January 1, 2018 and December 31, 2018.² "USE" includes eating, feeding to dogs, sharing or trading with others, etc.³ UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.**COMMERCIAL FISHING: 03****AKHIOK: 2**

RETAINED COMMERCIAL HARVESTS: MARINE FISH

HOUSEHOLD ID

... Continued from previous page.

During the last year,¹**did you or members of your household...****A** ... FISH commercially for _____?**B** ... KEEP any ____ from your commercial catch for your own use² or to share?

if keep is "yes"

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

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

Read names below in blanks above	A COMM FISH?		B KEEP?		How many were removed for your OWN USE?	How many were removed to give to OTHERS, NOT including CREW?	Units ³	comments
	Y	N	Y	N	number	number	specify	
HERRING	Y	N	Y	N			IND.	
120200001								
PACIFIC (GRAY) COD	Y	N	Y	N			IND.	
121004001								
UNKNOWN COD	Y	N	Y	N			IND.	
121099001								
HALIBUT	Y	N	Y	N			LBS.	
121800001								
STEELHEAD	Y	N	Y	N			IND.	
126206001								
ROCKFISH (SPECIFY)	Y	N	Y	N			IND.	
122699001								
	Y	N	Y	N			IND.	
	Y	N	Y	N			IND.	
	Y	N	Y	N			IND.	
	Y	N	Y	N			IND.	

¹ "LAST YEAR" means between January 1, 2018 and December 31, 2018.² "USE" includes eating, feeding to dogs, sharing or trading with others, etc.³ UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.**COMMERCIAL FISHING: 03****AKHIOK: 2**

RETAINED COMMERCIAL HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID

.... CONTINUED from previous page

During the last year,¹

did you or members of your household...

A ... FISH commercially for _____?**B** ... KEEP any _____ from your commercial catch for your own use² or to share?

if keep is "yes"

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

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

Read names below in blanks above	A COMM FISH?		B KEEP?		How many were removed for your OWN USE? ⁵	How many were removed to give to OTHERS, NOT including CREW?	Units ³	
	Y	N	Y	N	number	number	specify	comments
TANNER CRAB								IND.
501012991								
GOLDEN KING CRAB								LBS.
501008041								
DUNGENESS CRAB								GAL.
501004001								
GIANT PACIFIC OCTOPUS								IND.
502200001								
SHRIMP								GAL.
503400001								
WEATHERVANE SCALLOPS								IND.
502602001								
SEA URCHIN								IND.
503299001								
RED SEA CUCUMBER								GAL.
503006001								
								GAL.
								GAL.

Comments:

¹ "LAST YEAR" means between January 1, 2018 and December 31, 2018.² "USE" includes eating, feeding to dogs, sharing or trading with others, etc.³ UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.**COMMERCIAL FISHING: 03****AKHIOK: 2**

HARVESTS: NONSALMON FISH

HOUSEHOLD ID

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

2. During the last year (between January 1, 2018 and December 31, 2018)

did you, or members of your household, USE or TRY TO HARVEST nonsalmon fish?..... Y N ☐IF the answers to QUESTIONS 1 & 2 are both NO, go to the *NEXT HARVEST SECTION*.

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

Please estimate how many nonsalmon fish ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2018, including with a rod and reel. INCLUDE nonsalmon fish you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with others, report ONLY YOUR SHARE of the catch. Do not include fish caught and released.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST WITH							
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	SET GILL NET	SET DRIFT NET	SEINE NET	LONG-LINE / SKATE	ROD & REEL	OTHER GEAR (specify type)	UNITS	
	(circle)					(number harvested by each gear type)						amount / type	specify
HALIBUT SAGIQ	Y N	Y N	Y N	Y N	Y N						/	LBS.	
121800000													
PACIFIC (GRAY) COD AMUTAQ	Y N	Y N	Y N	Y N	Y N						/	IND.	
121004000													
BLACK ROCKFISH CIRUPUK	Y N	Y N	Y N	Y N	Y N						/	IND.	
122602000													
YELLOW EYE ROCKFISH	Y N	Y N	Y N	Y N	Y N						/	IND.	
122606000													
ROCKFISH (SPECIFY)	Y N	Y N	Y N	Y N	Y N						/	IND.	
122699000													
FLOUNDER SAGIRUAQ	Y N	Y N	Y N	Y N	Y N						/	IND.	
121499000													
BULLHEAD SCULPIN KALUYUK	Y N	Y N	Y N	Y N	Y N						/	IND.	
123004000													
SCULPIN (SPECIFY)	Y N	Y N	Y N	Y N	Y N						/	IND.	
123099000													
HERRING	Y N	Y N	Y N	Y N	Y N						/	IND.	
120200000													
SKATES	Y N	Y N	Y N	Y N	Y N						/	IND.	
123400000													
LINGCOD	Y N	Y N	Y N	Y N	Y N						/	IND.	
121606000													
SABLEFISH (BLACK COD) (BUTTER FISH)	Y N	Y N	Y N	Y N	Y N						/	IND.	
122800000													

These columns should include ALL the nonsalmon fish HARVESTED by members of this household in 2018.

NONSALMON FISH: 06**AKHIOK: 2**

HARVESTS: NONSALMON FISH

HOUSEHOLD ID

... Continued from previous page.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST WITH						
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	SET GILL NET	SET DRIFT NET	SEINE NET	LONG-LINE / SKATE	ROD & REEL	OTHER GEAR (specify type)	UNITS
	(circle)					(number harvested by each gear type)					amount / type	specify
DOLLY VARDEN	Y N	Y N	Y N	Y N	Y N						/	IND.
125006990												
LAKE TROUT	Y N	Y N	Y N	Y N	Y N						/	IND.
125010000												
GRAYLING	Y N	Y N	Y N	Y N	Y N						/	IND.
125200000												
RAINBOW TROUT	Y N	Y N	Y N	Y N	Y N						/	IND.
126204000												
TROUT (UNKNOWN)	Y N	Y N	Y N	Y N	Y N						/	IND.
126299000												
STEELHEAD TROUT	Y N	Y N	Y N	Y N	Y N						/	IND.
126206000												
	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.
Comments:	These columns should include ALL the nonsalmon fish HARVESTED by members of this household in 2018.											

NONSALMON FISH: 06

AKHIOK : 2

HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID

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

2. During the last year (between January 1, 2018 and December 31, 2018)

did you, or members of your household, USE or TRY TO HARVEST marine invertebrates?..... Y N ☐IF the answer to QUESTION 2 is NO, go to the *NEXT SECTION*.

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

Please estimate how many marine invertebrates ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2018. INCLUDE marine invertebrates you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If harvesting with others, report ONLY YOUR SHARE of the harvest.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST....			
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	AMOUNT	UNITS	COMMENTS	
	(circle)					(amt)	specify	(text)	
RED KING CRAB	Y	N	Y	N	Y	N	Y	N	IND.
501008080									
TANNER CRAB, BAIRDI	Y	N	Y	N	Y	N	Y	N	IND.
501012020									
DUNGENESS CRAB SAKUUG	Y	N	Y	N	Y	N	Y	N	IND.
501004002									
UNKNOWN CRAB	Y	N	Y	N	Y	N	Y	N	IND.
501099000									
BUTTER CLAMS QAHMUQUQ	Y	N	Y	N	Y	N	Y	N	GAL.
500602000									
HORSE CLAMS (GAPER)	Y	N	Y	N	Y	N	Y	N	GAL.
500606000									
PACIFIC LITTLENECK CLAMS (STEAMERS)	Y	N	Y	N	Y	N	Y	N	GAL.
500608000									
RAZOR CLAMS	Y	N	Y	N	Y	N	Y	N	GAL.
500612000									
UNKNOWN CLAMS	Y	N	Y	N	Y	N	Y	N	GAL.
500699000									
RED (LARGE) CHITONS (RED BIDARKIS)	Y	N	Y	N	Y	N	Y	N	GAL.
500404000									
BLACK (SMALL) CHITONS URIITAQ	Y	N	Y	N	Y	N	Y	N	GAL.
500408000									
COCKLES	Y	N	Y	N	Y	N	Y	N	GAL.
500899000									

Include ALL the marine invertebrates HARVESTED by members of this household in 2018.

MARINE INVERTEBRATES: 08**AKHIOK: 2**

HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID

... Continued from previous page.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY ____ DID YOUR HOUSEHOLD HARVEST....		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	AMOUNT (amt)	UNITS specify	COMMENTS (text)
SNAILS IPUK	Y N	Y N	Y N	Y N	Y N		GAL.	
503600000								
BLUE MUSSELS QAPILAT	Y N	Y N	Y N	Y N	Y N		GAL.	
502002000								
SEA URCHIN UUTUK	Y N	Y N	Y N	Y N	Y N		GAL.	
503200000								
SEA CUCUMBER ANAQIITAQ	Y N	Y N	Y N	Y N	Y N		GAL.	
OCTOPUS UTGUIQ	Y N	Y N	Y N	Y N	Y N		IND.	
502200000								
LIMPETS (CHINAMAN'S CAP)	Y N	Y N	Y N	Y N	Y N		GAL.	
501800000								
SHRIMP	Y N	Y N	Y N	Y N	Y N		LBS.	
503400000								
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	

Comments: Include ALL the marine invertebrates HARVESTED by members of this household in 2018.

MARINE INVERTEBRATES: 08**AKHIOK: 2**

HARVESTS: LARGE LAND MAMMALS

HOUSEHOLD ID

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

2. During the last year (between January 1, 2018 and December 31, 2018)

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 SECTION*.

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

Please estimate how many large land mammals ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2018. INCLUDE large land mammals you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the harvest.

In 2018 did members of your household ...		In 2018 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST																				
		USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS	
Read names below		(circle)					M/F	(specify amount harvested per month)														(specify)
DEER		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
TUNTUQ		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
211200000																						IND.
211200001																						
211200002																						
211200009																						
MOOSE		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
TUNTURPAK		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
211800000																						IND.
211800001																						
211800002																						
211800009																						
CARIBOU		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
211000000																						IND.
211000001																						
211000002																						
211000009																						
ELK		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
211400000																						IND.
211400001																						
211400002																						
211400009																						
BROWN BEAR		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
210800000																						
GOAT		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
PARANAQ		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	
211600000																						
REINDEER - FERAL		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
230800000																						
		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.

Include ALL the large land mammals HARVESTED by members of this household in 2018.

LARGE LAND MAMMALS: 10**AKHIOK: 2**

HARVESTS: SMALL LAND MAMMALS

HOUSEHOLD ID

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

2. During the last year (between January 1, 2018 and December 31, 2018)

did you, or members of your household, USE or TRY TO HARVEST small land mammals?..... Y N ☐IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

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

Please estimate how many small land mammals ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2018. INCLUDE small land mammals you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting or trapping with others, report ONLY YOUR SHARE of the harvest.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY DID MEMBERS OF YOUR HOUSEHOLD HARVEST....												HOW MANY WERE USED FOR FUR ONLY?	UNITS		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER			UNKNOWN	(amount)
RED FOX KAUGYA'AQ	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
220804040																					
LAND OTTER AAQUYQAQ	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
221200000																					
BEAVER PALUQTAQ	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
220200000																					
SNOWSHOE HARE KUKAANAQ	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
221004000																					
WOLF KAGANAQ	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
223200000																					
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.

Include ALL the small land mammals HARVESTED by members of this household in 2018.

SMALL LAND MAMMALS: 14

AKHIOK: 2

HARVESTS: MARINE MAMMALS

HOUSEHOLD ID

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

2. During the last year (between January 1, 2018 and December 31, 2018)
did you, or members of your household, USE or TRY TO HARVEST marine mammals?..... Y NIF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

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

Please estimate how many marine mammals ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2018. INCLUDE marine mammals you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the harvest.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST....													HOW MANY WERE USED FOR FUR ONLY?	UNITS		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER			UNKNOWN	
HARBOR SEAL	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	M	IND.
ISUWIQ						F															IND.	
300806000						UNK															IND.	
300806001						1																
300806002						2																
300806009						-9																
SEA LION	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	M	IND.
WIINAQ						F															IND.	
301200000						UNK															IND.	
301200001						1																
301200002						2																
301200009						-9																
SEA OTTER	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		IND.
ARHNAQ																						
301000000																						
WHALE	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		IND.
ARWAQ																						
301699000																						
PORPOISE	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		IND.
300699000																						
SEAL (UNKNOWN)	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		IND.
300899000																						
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		IND.
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		IND.
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		IND.
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		IND.

Include ALL the marine mammals HARVESTED by
members of this household in 2018.**MARINE MAMMALS: 12****AKHIQ: 2**

HARVESTS: BIRDS

HOUSEHOLD ID

1. Do you or members of your household USUALLY hunt for birds?..... Y N ☐2. During the last year (between January 1, 2018 and December 31, 2018)
did you, or members of your household, USE or TRY TO HARVEST birds?..... Y N ☐If the answer to QUESTION 2 is NO, go to the *NEXT SECTION*.

If the answer is YES, continue on this page ...

Please estimate how many birds ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2018. INCLUDE birds you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the harvest.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY DID MEMBERS OF YOUR HOUSEHOLD HARVEST....									
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	WINTER		SPRING		SUMMER		FALL		UNKNOWN SEASON	UNITS
						NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE		
AMERICAN WIGEON	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
410236020															
TEAL	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
410232990															
MALLARD	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
NILLQITAAQ															
410214000															
NORTHERN SHOVELER	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
410230000															
NORTHERN PINTAIL	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
PAMYURTULIQ															
410220000															
BLACK SCOTER	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
410228020															
SURF SCOTER	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
410228040															
WHITE-WINGED SCOTER	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
410228060															
BUFFLEHEAD	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
(BUTTERBALL)															
410202000															
GOLDENEYE	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
410210990															
SCAUP	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
ALUNGUTGWALEK															
410226990															
COMMON EIDER	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	IND.
410206020															

Include ALL the birds HARVESTED by members of this household in 2018.

BIRDS: 15**AKHIOK : 2**

HARVESTS: BIRDS

HOUSEHOLD ID

... Continued from previous page.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST....							
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	WINTER	SPRING	SUMMER	FALL	UNKNOWN SEASON	UNITS		
						NOVEMBER DECEMBER JANUARY FEBRUARY MARCH	APRIL MAY JUNE	JULY AUGUST	SEPTEMBER OCTOBER				
(circle)						(specify amount harvested per season)						(specify)	
KING EIDER	Y N	Y N	Y N	Y N	Y N							IND.	
410206040													
STELLER EIDER	Y N	Y N	Y N	Y N	Y N							IND.	
410206080													
HARLEQUIN DUCK QA/NIAQ	Y N	Y N	Y N	Y N	Y N							IND.	
410212000													
LONG-TAILED DUCK AAARANGIIQ	Y N	Y N	Y N	Y N	Y N							IND.	
410218000													
MERGANSE PAIRPAK	Y N	Y N	Y N	Y N	Y N							IND.	
410216990													
BLACK BRANT	Y N	Y N	Y N	Y N	Y N							IND.	
410402000													
CAKCLING/CANADA GOOSE IAGIQ	Y N	Y N	Y N	Y N	Y N							IND.	
410404040													
GREATER WHITE-FRONTED GOOSE NEQLLEQ	Y N	Y N	Y N	Y N	Y N							IND.	
410410000													
EMPEROR GOOSE (BEACH GEESE)	Y N	Y N	Y N	Y N	Y N							IND.	
410406000													
SWAN	Y N	Y N	Y N	Y N	Y N							IND.	
410699000													
SANDHILL CRANE	Y N	Y N	Y N	Y N	Y N							IND.	
410802000													
PTARMIGAN	Y N	Y N	Y N	Y N	Y N							IND.	
421804000													
TERN	Y N	Y N	Y N	Y N	Y N							IND.	
411226990													
BLACK LEGGED KITTIWAKE	Y N	Y N	Y N	Y N	Y N							IND.	
411214020													

Include ALL the birds HARVESTED by members of this household in 2018.

BIRDS: 15**AKHIOK : 2**

HARVESTS: BIRDS

HOUSEHOLD ID

... Continued from previous page.

Read names below	In 2018 did members of your household ...						In 2018 HOW MANY _____ DID MEMBERS OF YOUR HOUSEHOLD HARVEST....										
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?		WINTER		SPRING		SUMMER		FALL		UNKNOWN SEASON	UNITS	
							NOVEMBER DECEMBER	JANUARY FEBRUARY	MARCH APRIL	MAY JUNE	JULY AUGUST	SEPTEMBER OCTOBER					
	(circle)						(specify amount harvested per season)										(specify)
BLACK OYSTERCATCHER	Y N	Y N	Y N	Y N	Y N												IND.
411004000																	
BONAPARTE'S/SABINE GULL EGYAAQ	Y N	Y N	Y N	Y N	Y N												IND.
411212100																	
MEW GULL	Y N	Y N	Y N	Y N	Y N												IND.
411212080																	
GLAUCOUS-WINGED GULL	Y N	Y N	Y N	Y N	Y N												IND.
411212040																	
HERRING GULL	Y N	Y N	Y N	Y N	Y N												IND.
411212060																	
AUKLET	Y N	Y N	Y N	Y N	Y N												IND.
411202990																	
MURRE	Y N	Y N	Y N	Y N	Y N												IND.
411218990																	
CORMORANT	Y N	Y N	Y N	Y N	Y N												IND.
411204990																	
	Y N	Y N	Y N	Y N	Y N												IND.
	Y N	Y N	Y N	Y N	Y N												IND.

Include ALL the birds HARVESTED by members of this household in 2018.

Comments:

BIRDS: 15**AKHIOK : 2**

HARVESTS: BIRD EGGS

HOUSEHOLD ID

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

2. During the last year (between January 1, 2018 and December 31, 2018)

did you, or members of your household, USE or TRY TO HARVEST bird eggs?..... Y N ☐IF the answer to QUESTION 2 is NO, go to the *NEXT SECTION*.

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

Please estimate how many bird eggs ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2018. INCLUDE bird eggs you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If harvesting with others, report ONLY YOUR SHARE of the harvest.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST....		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	AMOUNT	UNITS	COMMENTS
	(circle)					(amt)	specify	(text)
TERN EGGS	Y N	Y N	Y N	Y N	Y N	IND.		
431226990								
BLACK-LEGGED KITTIWAKE EGGS	Y N	Y N	Y N	Y N	Y N	IND.		
431214020								
MEW GULL EGGS	Y N	Y N	Y N	Y N	Y N	IND.		
431212080								
GLAUCOUS-WINGED GULL EGGS	Y N	Y N	Y N	Y N	Y N	IND.		
HERRING GULL EGGS	Y N	Y N	Y N	Y N	Y N	IND.		
431212060								
MALLARD EGGS	Y N	Y N	Y N	Y N	Y N	IND.		
430214000								
BLACK OYSTERCATCHER EGGS	Y N	Y N	Y N	Y N	Y N	IND.		
431004000								
MURRE EGGS	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.		

Include ALL the bird eggs HARVESTED by members of this household in 2018.

BIRD EGGS: 15**AKHIOK: 2**

HOUSEHOLD ID

430000000

Last year...

... did your household use LESS, SAME, or MORE bird eggs than in recent (about the past 5) years? X L S M

IF LESS or MORE ...

X = do not use

WHY was your use different?

1

2

Last year...

...did your household GET ENOUGH bird eggs?..... Y N

If NO...

What KIND of bird eggs did you need?

How would you describe the impact to your household from not getting enough bird eggs last year? .. *not noticeable?* ... *minor ?* ... *major?* ... *severe?*

(0) (1) (2) (3)

...did your household do anything DIFFERENTLY because you did not get enough bird eggs?..... Y N

If YES...

What did your household do differently?

1

2

Comments:

ASSESSMENTS: 66**AKHIOK: 2**

HARVESTS: PLANTS AND BERRIES

HOUSEHOLD ID

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

2. During the last year (between January 1, 2018 and December 31, 2018)

did you, or members of your household, USE or TRY TO HARVEST plants and berries?..... Y N ☐IF the answer to QUESTION 2 is NO, go to the *NEXT SECTION*.

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

Please estimate how many plants and berries ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED in 2018. INCLUDE plants and berries you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If harvesting with others, report ONLY YOUR SHARE of the harvest.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY ____ DID YOUR HOUSEHOLD HARVEST....		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	AMOUNT	Units	COMMENTS
	(circle)					(amt)	specify	(text)
SALMONBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
ALAGNAT								
601022000								
BLUEBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
CUAWAQ								
601002000								
TRAILING RASPBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
PUYURNIT								
601020000								
LOWBUSH CRANBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
KENEGTAT								
601004000								
HIGHBUSH CRANBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
AMARYAQ								
601006000								
CLOUD BERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
AQAGWIK								
601016000								
CROWBERRY/ BLACKBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
ARURYAQ								
601007000								
WATERMELON BERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
MUUGUAT								
601032000								
ELDERBERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
601008000								
OTHER WILD BERRY	Y N	Y N	Y N	Y N	Y N		GAL.	
601099000								
WILD RHUBARB	Y N	Y N	Y N	Y N	Y N		GAL.	
AATUNAT								
602006000								
GOOSE TONGUE	Y N	Y N	Y N	Y N	Y N		GAL.	
602004000								

Include ALL the plants and berries HARVESTED by members of this household in 2018.

PLANTS AND BERRIES: 17**AKHIOK: 2**

HARVESTS: PLANTS AND BERRIES

HOUSEHOLD ID

... Continued from previous page.

Read names below	In 2018 did members of your household ...					In 2018 HOW MANY _____ DID YOUR HOUSEHOLD HARVEST....		
	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	AMOUNT (amt)	Units specify	COMMENTS (text)
NETTLE UQAAYANAQ	Y N	Y N	Y N	Y N	Y N		GAL.	
602016000								
MUSHROOMS	Y N	Y N	Y N	Y N	Y N		GAL.	
602040000								
BEACH GREENS UKULLEGAQ	Y N	Y N	Y N	Y N	Y N		GAL.	
602051000								
SEA LOVAGE	Y N	Y N	Y N	Y N	Y N		GAL.	
602049000								
WILD PARSLEY PETRUSKAQ	Y N	Y N	Y N	Y N	Y N		GAL.	
602034000								
WILD CELERY UGYUTAK	Y N	Y N	Y N	Y N	Y N		GAL.	
602032000								
FIDDLEHEAD FERNS QATAQUTAQ	Y N	Y N	Y N	Y N	Y N		GAL.	
602014000								
FIREWEED SHOOTS CILLQAAQ	Y N	Y N	Y N	Y N	Y N		GAL.	
602042000								
SOURDOCK QU'UNARLEQ	Y N	Y N	Y N	Y N	Y N		GAL.	
602028000								
BULL KELP NASQULUK	Y N	Y N	Y N	Y N	Y N		GAL.	
603004000								
UNKNOWN SEAWEED/ KELP KAPUUSTAQ	Y N	Y N	Y N	Y N	Y N		GAL.	
603099000								
	Y N	Y N	Y N	Y N	Y N		GAL.	

Include ALL the plants and berries HARVESTED by members of this household in 2018.

FIREWOOD

	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?	Please estimate the percentage of your household's heating needs in 2018 that came from firewood.					
FIREWOOD	Y N	Y N	Y N	Y N	Y N	0%	1% - 25%	26% - 50%	51% - 75%	76% - 99%	100%
604000000						(0)	(1)	(2)	(3)	(4)	(5)
						(circle one)					

PLANTS AND BERRIES: 17**AKHIOK: 2**

HARVEST SUMMARY: ALL RESOURCES

HOUSEHOLD ID

ASSESSMENTS: ALL RESOURCES

0

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

During the last year,¹

... did your household use *LESS, SAME, or MORE* wild resources than in recent (about the past 5) years? X L S M ☐

IF LESS or MORE ...

X = do not use

WHY was your use different?

1 ☐

2 ☐

During the last year,¹

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

If NO...

What KIND of wild resources did you need?

How would you describe the impact to your household from not .. *not noticeable*: ... *minor* ? ... *major*? ... *severe*?
getting enough wild resources last year? (0) (1) (2) (3) ☐

...did your household do anything DIFFERENTLY because you did not get enough overall?..... Y N ☐

If YES...

What did your household do differently?

1 ☐

2 ☐

COMMUNITY HOUSEHOLD PATTERNS

We would like to ask you about families you know outside of Akhiok.

1. Do you know anyone who has moved out of town, but still returns to harvest wild resources?..... Y N ☐

If YES...

	Family 1	Family 2	Family 3	Family 4	Family 5
Who are they? (Names are for cross-reference)					
Where did they move to? (community)					
What time of year do they return to harvest wild resources?					
How long do they return for (months)					
What activities do they engage in?					

We would also like to ask about the exchange of wild resources between families living in Akhiok and families living elsewhere, regardless of whether they have ever lived in Akhiok or not....

2. Does your household share², barter³, or trade⁴ wild resources with people living in OTHER communities?..... Y N ☐

If YES...

Which communities?

--	--	--	--	--	--

Comments:

¹ "LAST YEAR" means between January 1, 2018 and December 31, 2018.

² Share means those subsistence resources you gave TO OTHER households or resources GIVEN TO your household.

³ Barter means to exchange subsistence goods for something other than cash

⁴ Customary trade means exchange of cash for goods

FOOD SECURITY

HOUSEHOLD ID

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

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

- (Circle one)
- ① **STATEMENT 1.** We had enough of the kinds of food we wanted to eat.....
- ② **STATEMENT 2.** We had enough food, but not always the KIND of food we wanted to eat.....
- ③ **STATEMENT 3.** Sometimes, or often, we did **NOT HAVE ENOUGH** food to eat.....

(Circle one)

1 2 3

HH1

If 2 or 3

If STATEMENT 2 or STATEMENT 3 was TRUE, continue with food security questions 4-8 on this page. Otherwise, go to next section...

Now I am going to read you several statements about different food situations.

Please tell me whether EACH statement was true for your household (HH) in the last 12 months.

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

HH2

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

If YES...

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

...did this happen because you worried your household could not get WILD FOOD,
your HH could not get STORE-BOUGHT food, or your HH could not get BOTH KINDS of food?..... WILD STORE BOTH

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

HH4

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

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

If YES...

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

...did this happen because your household could not get WILD FOOD,
your HH could not get STORE-BOUGHT food, or your HH could not get BOTH KINDS of food?..... WILD STORE BOTH

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

HH3

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

If YES...

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

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

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

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

If YES...

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

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

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

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

If YES...

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

If any ONE of the STATEMENTS 4, 5, OR 6 was "YES," continue with food security questions 9-13 on next page. Otherwise, go to next section...

FOOD SECURITY: 201

AKHIOK: 2

FOOD SECURITY

HOUSEHOLD ID

... Continued from previous page.

If any ONE of the STATEMENTS 4, 5, or 6 on previous page was "YES," continue with food security questions 9-13 below. Otherwise, go to next section...

- 9 In the past 12 months, did you or other adults in your household ever CUT THE SIZE OF YOUR MEALS OR SKIP MEALS because the HH could not get the food that was needed? Y N ? AD1
- If YES...
 ↳ ...in which months did this happen?..... J F M A M J J A S O N D
- 10 In the last 12 months, did you or other adults in your household ever EAT LESS THAN YOU FELT YOU SHOULD because the HH could not get the food that was needed?..... Y N ? AD2
- 11 In the last 12 months, were adults in the HH ever HUNGRY BUT DID NOT EAT because there was not enough food?..... Y N ? AD3
- 12 In the last 12 months, did adults in the HH LOSE WEIGHT because there was not enough food?..... Y N ? AD4
- 13 In the last 12 months, were adults in the HH ever NOT EAT FOR A WHOLE DAY because there was not enough food?..... Y N ? AD5
- If YES...
 ↳ ...in which months did this happen?..... J F M A M J J A S O N D

EMPLOYMENT

HOUSEHOLD ID

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

Between January 1, 2018 and December 31, 2018 ...

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

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

For each member of this household born before 2003, list EACH JOB held in 2016. For household members who did not have a job, write: RETIRED, UNEMPLOYED, STUDENT, HOMEMAKER, DISABLED, etc.

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

1
If a person FISHES COMMERCIALY or is otherwise SELF-EMPLOYED, list that as a separate job. For job title, enter COMMERCIAL FISHER, CARVER, SEWER, BAKER, etc. Work schedule usually will be ON CALL. For gross income from self-employment, enter revenue MINUS expenses.

1
If a person does not earn money from any kind of work, enter RETIRED, UNEMPLOYED, DISABLED, STUDENT, or HOMEMAKER or other appropriate description as the job title.

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

2
WORK SCHEDULE
FT - Full time (35+ hr/wk)
PT - Part time (<35 hr/wk)
SF - Shift (2 wks on/2 wks off, etc.)
SP - Shift - part time
OC - Irregular, on call

3
GROSS INCOME is the same as TAXABLE INCOME on a W-2 form. Self-employment, enter revenue - expense

EMPLOYMENT: 23

AKHIOK: 2

OTHER INCOME

HOUSEHOLD ID

1. Between January 1, 2018 and December 31, 2018 ...

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

IF NO, go to QUESTION 2 on this page.

IF YES, continue below...

		Did anyone in your household receive income from		TOTAL amount all members of your household received from		Alaska PFD IN 2018		Regional corporations		Dividend	
		in 2018 (circle one)		2018 (dollars)							
DIVIDENDS	ALASKA PERMANENT FUND DIVIDEND	Y	N	\$	/ YR	1	PFD = \$1,600	<div>Village Corporation(s)</div> <div>Dividend</div>			
	32					2	PFDs = \$3,200				
	NATIVE CORPORATION DIVIDENDS	Y	N	\$	/ YR	3	PFDs = \$4,800				
	13					4	PFDs = \$6,400				
						5	PFDs = \$8,000				
						6	PFDs = \$9,600				
						7	PFDs = \$11,200				
						8	PFDs = \$12,800				
						9	PFDs = \$14,400				
						10	PFDs = \$16,000				
						11	PFDs = \$17,600				

2. Between January 1, 2018 and December 31, 2018 ...

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

IF NO, go to the NEXT SECTION.

IF YES, continue below...

		Received?		Total amount?				Received?		Total amount?	
		(circle one)		(dollars)				(circle one)		(dollars)	
EMPLOYMENT RELATED	UNEMPLOYMENT	Y	N	\$	/ YR	FAMILY & CHILD	TANF (say "tanif," used to be AFDC)	Y	N	\$	/ YR
	12						2				
	WORKERS' COMP	Y	N	\$	/ YR		CHILD SUPPORT	Y	N	\$	/ YR
	8						15				
	SOCIAL SECURITY	Y	N	\$	/ YR		FOSTER CARE	Y	N	\$	/ YR
	7						41				
	PENSION & RETIREMENT	Y	N	\$	/ YR		FUEL VOUCHERS	Y	N	\$	/ YR
	5						49				
	DISABILITY	Y	N	\$	/ YR		MEETING HONORARIA (not per diem*)	Y	N	\$	/ YR
	31						50				
VETERANS ASSISTANCE	Y	N	\$	/ YR	OTHER (describe)	Y	N	\$	/ YR		
35					OTHER (describe)	Y	N	\$	/ YR		
ENTITLEMENTS	FOOD STAMPS (QUEST CARD)	Y	N	\$	/ YR	<div>OTHER</div> <div>* per diem covers travel expenses, and is not counted as income.</div> <div>Scratch paper for calculations</div> <div>Senior Benefits of \$125 per month for 12 months = \$1,500 per elder</div> <div>Senior Benefits of \$175 per month for 12 months = \$2,100 per elder</div> <div>Senior Benefits of \$250 per month for 12 months = \$3,000 per elder</div>					
	11										
	ADULT PUBLIC ASSISTANCE	Y	N	\$	/ YR						
	3										
SUPPLEMENTAL SECURITY INCOME (SSI)	Y	N	\$	/ YR							
10											
ENERGY ASSISTANCE	Y	N	\$	/ YR							
9											
ALASKA SENIOR BENEFITS (LONGEVITY)	Y	N	\$	/ YR							
6											

OTHER INCOME: 24**AKHIOK: 2**

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DO NOT FORGET TO FILL IN THE STOP TIME

[illegible]**AKHIOK: 2**

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APPENDIX C—KEY RESPONDENT INTERVIEW PROTOCOL

**KRI Protocol
Akhiok/Old Harbor
2/25/19
SW Kodiak OSM project**

1. Tell me a bit about Yourself

- Where were you born/raised
- How long in Akhiok/Old Harbor
- What brought you here (if applicable)
- What do you do here/role in community/profession/etc.?

2. Primary issues of concern for wild resource use/harvest for Larsen Bay?

- Now?
- In the past?
- What's getting better?
- What's gotten worse over time?
- Contamination?
- Regulations?

3. Salmon (in general (areas outside Olga & Akalura lake watersheds))

- What changes have you noticed in salmon stocks at fishing locations you are familiar with
 - why do you think these changes are occurring? (i.e., explain these trends)
- What changes have you noticed in the salmon (at different stages of life) due to habitat?
 - Species specific?
- How were runs this past year (species specific?)
- How has they been over the years (species specific?)
- Concerns—tell me more

4. Olga and Akalura lake watersheds

- Tell me about the areas
 - Olga
 - How reference lakes & area/watershed (Upper Station/upper Olga Lake/lower lake?)
 - Resources available
 - Resources they harvest/use
 - salmon runs, populations, habitat, and harvest, historic harvest locations vs current
 - Tell me about the runs; how are the returns for each?
 - (Two runs exist: an early run from late May to mid-July and a late run from mid-July until September)
 - Early-run returns are more variable than the late run?
 - Favorable or unfavorable habitat/env conditions for spawning?

- Akalura
 - How reference lakes & area/watershed
 - Resources available
 - Resources they harvest/use
 - salmon runs, populations, habitat, and harvest, historic harvest locations vs current
 - Tell me about the runs (early & late?); how are the returns for each?
 - Favorable or unfavorable habitat/env conditions for spawning?
- Olga Lakes
 - What changes have you noticed in salmon stocks at Olga lakes
 - why do you think these changes are occurring? (i.e., explain these trends)
 - What changes have you noticed in salmon (at different stages of life) due to habitat here?
 - why do you think these changes are occurring? (i.e., explain these trends)
- Akalura Lakes
 - What changes have you noticed in salmon stocks at Akalura lakes
 - why do you think these changes are occurring? (i.e., explain these trends)
 - What changes have you noticed in salmon (at different stages of life) due to habitat here?
 - why do you think these changes are occurring? (i.e., explain these trends)
 - Run sizes decreasing
 - So, I understand the run sizes have been decreasing here; tell me about that
- Tell me about the environmental conditions in each system:(veg/habitat/weather/sp competition/landscape/climate chng)
 - Olga/Akalura (ferret out separately if different in ea. Locale)
 - What changes have you observed in:
 - vegetation
 - presence of absence of salmon in different areas at different times of the year,
 - presence of other fish like sticklebacks/other species competition (bears?)
 - occurrence of algal blooms
 - high ice/extreme winter events
 - changes in the landscape
 - due to climate change or no?
 - Climate change concerns
 - Olga lakes
 - Akalura lakes
- Tell me about the similarities and difference between the two lake systems

5. Mapping info.

- areas they fished while living in the community:
 - years fished
 - approximate harvest
 - months harvested
 - transportation
 - methods used
- Also on the maps: (this is to put the above collected information into geographic context)
 - observations of salmon at different stages of life and the associated habitat, especially with regards to Olga and Akalura lakes.
 - describe observations regarding changes in salmon stocks at fishing locations they are familiar with
 - and provide information to help explain these trends

6. Thoughts on regulations

- Impacts
- Experience with BOF/BOG

7. Changes over time (general)

- What's changing?

8. Other?

APPENDIX D—CONVERSION FACTORS

The following table presents the conversion factors used in determining how many pounds were harvested of each resource surveyed. For instance, if respondents reported harvesting 3 individual steelhead, the quantity would be multiplied by the appropriate conversion factor (in this case 1.4) to show a harvest of 4.2 lb of steelhead.

Resource name	Reported units	Conversion factor
Chum salmon	Individual	5.9470
Chum salmon [CF retention]	Individual	5.9470
Coho salmon	Individual	6.1189
Coho salmon [CF retention]	Individual	6.1189
Chinook salmon	Individual	4.9134
Chinook salmon [CF retention]	Individual	4.9134
Pink salmon	Individual	2.8005
Pink salmon [CF retention]	Individual	2.8005
Sockeye salmon	Individual	3.7536
Sockeye salmon [CF retention]	Individual	3.7536
Unknown salmon	Individual	0.0000
Unknown salmon [CF retention]	Individual	0.0000
Pacific herring	Individual	0.1800
Pacific herring	Pounds	1.0000
Pacific herring [CF retention]	Individual	1.0000
Pacific herring roe on hemlock branches	Gallons	6.0000
Rainbow smelt	Individual	0.1800
Pacific (gray) cod	Individual	3.2000
Pacific (gray) cod [CF retention]	Individual	3.2000
Unknown cod	Individual	0.0000
Unknown cod [CF retention]	Individual	0.0000
Unknown flounder	Individual	3.0000
Kelp greenling	Individual	1.0000
Lingcod	Individual	4.0000
Pacific halibut	Individual	20.1800
Pacific halibut	Pounds	1.0000
Pacific halibut [CF retention]	Pounds	1.0000
Black rockfish	Individual	1.5000
Black rockfish [CF retention]	Individual	1.5000
Yelloweye rockfish	Individual	4.0000
Quillback rockfish	Individual	4.0000
Dusky rockfish	Individual	1.5000
Unknown rockfish	Individual	0.0000
Unknown rockfish [CF retention]	Individual	0.0000
Sablefish (black cod)	Individual	3.1000
Bullhead sculpin	Individual	0.5000
Unknown sculpin	Individual	0.0000
Dogfish	Individual	9.0000
Unknown shark	Individual	9.0000

-continued-

Appendix D.—Page 2 of 5.

Resource name	Reported units	Conversion factor
Skates	Individual	5.0000
Dolly Varden	Individual	1.4000
Lake trout	Individual	2.7000
Arctic grayling	Individual	0.7000
Rainbow trout	Individual	0.7000
Steelhead	Individual	0.7000
Steelhead [CF retention]	Individual	0.7000
Unknown trout	Individual	0.7000
Brown bear	Individual	141.0000
Caribou	Individual	130.0000
Deer	Individual	43.2000
Elk	Individual	225.0000
Mountain goat	Individual	72.5000
Moose	Individual	450.0000
Beaver	Individual	20.0000
Red fox	Individual	0.0000
Snowshoe hare	Individual	2.0000
River (land) otter	Individual	0.0000
Gray wolf	Individual	0.0000
Reindeer—feral	Individual	130.0000
Harbor seal	Individual	56.0000
Sea otter	Individual	0.0000
Steller sea lion	Individual	200.0000
Unknown whale	Individual	0.0000
Bufflehead	Individual	0.5700
Common eider	Individual	3.2800
King eider	Individual	2.2500
Steller's eider	Individual	1.2000
Gadwall	Individual	1.2300
Goldeneye	Individual	1.2700
Barrow's goldeneye	Individual	1.3100
Harlequin duck	Individual	0.8500
Mallard	Individual	1.6100
Merganser	Individual	1.7400
Long-tailed duck	Individual	1.1600
Northern pintail	Individual	1.1800
Unknown scaup	Individual	1.3500
Black scoter	Individual	1.5100
Surf scoter	Individual	1.4600
White-winged scoter	Individual	2.6100
Northern shoveler	Individual	0.8600

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Appendix D.—Page 3 of 5.

Resource name	Reported units	Conversion factor
Unknown teal	Individual	0.4700
American wigeon	Individual	1.0500
Unknown ducks	Individual	1.1111
Brant	Individual	1.8900
Cackling goose	Individual	4.3000
Emperor goose	Individual	3.0800
White-fronted goose	Individual	3.1800
Unknown geese	Individual	3.8706
Unknown swans	Individual	0.0000
Sandhill crane	Individual	5.4000
Black oystercatcher	Individual	0.7700
Unknown auklet	Individual	0.0000
Unknown cormorant	Individual	0.0000
Glaucous-winged gull	Individual	1.5400
Herring gull	Individual	1.5500
Mew gull	Individual	0.5600
Sabine's gull	Individual	0.2700
Black-legged kittiwake	Individual	0.6200
Unknown murre	Individual	0.0000
Unknown tern	Individual	0.0000
Unknown ptarmigan	Individual	0.7700
Mallard eggs	Individual	0.1150
Black oystercatcher eggs	Individual	0.1010
Glaucous-winged gull eggs	Individual	0.2030
Herring gull eggs	Individual	0.2090
Mew gull eggs	Individual	0.1150
Black-legged kittiwake eggs	Individual	0.1150
Unknown murre eggs	Individual	0.0000
Unknown tern eggs	Individual	0.0420
Red (large) chitons	Gallons	3.0000
Red (large) chitons	Quarts	0.7500
Black (small) chitons	Individual	0.6667
Black (small) chitons	Gallons	4.0000
Black (small) chitons	Quarts	1.0000
Butter clams	5 gallon buckets	15.0000
Butter clams	Gallons	3.0000
Horse clams	Gallons	3.0000
Pacific littleneck clams (steamers)	Gallons	3.0000
Razor clams	Gallons	3.0000
Unknown clams	Gallons	0.0000
Unknown cockles	Individual	0.4200
Unknown cockles	Gallons	3.0000
Dungeness crab	Individual	0.7000
Dungeness crab [CF retention]	Gallons	3.0000
Brown king crab [CF retention]	Pounds	1.0000
Red king crab	Individual	2.3000
Tanner crab, <i>bairdi</i>	Individual	0.4000

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Appendix D.—Page 4 of 5.

Resource name	Reported units	Conversion factor
Unknown Tanner crab [CF retention]	Individual	0.4000
Unknown crab	Individual	0.0000
Limpets	Gallons	3.0000
Blue mussels	Gallons	1.5000
Octopus	Individual	4.0000
Octopus [CF retention]	Individual	4.0000
Weathervane scallops [CF retention]	Individual	0.0000
Unknown scallops	Individual	0.0000
Unknown scallops	Gallons	0.0000
Sea cucumber	Individual	0.1000
Sea cucumber	Gallons	2.0000
Sea cucumber	Quarts	0.5000
Red sea cucumber [CF retention]	Gallons	2.0000
Sea urchin	Individual	0.5000
Sea urchin	Gallons	0.5000
Sea urchin	Quarts	0.1300
Shrimp	Pounds	1.0000
Shrimp	Gallons	2.0000
Shrimp [CF retention]	Gallons	2.0000
Snails	Gallons	1.5000
Blueberry	Gallons	4.0000
Blueberry	Half-pints	0.2500
Lowbush cranberry	Gallons	4.0000
Lowbush cranberry	Quarts	1.0000
Highbush cranberry	Gallons	4.0000
Highbush cranberry	Quarts	1.0000
Crowberry	Gallons	4.0000
Elderberry	Gallons	4.0000
Cloudberry	Gallons	4.0000
Cloudberry	Quarts	1.0000
Raspberry	Gallons	4.0000
Raspberry	Quarts	1.0000
Raspberry	Pints	0.5000
Salmonberry	Gallons	4.0000
Salmonberry	Quarts	1.0000
Salmonberry	Half-pints	0.2500
Strawberry	Gallons	4.0000
Strawberry	Quarts	1.0000
Strawberry	Pints	5.0000
Twisted stalk berry (watermelon berry)	Gallons	4.0000
Twisted stalk berry (watermelon berry)	Pints	0.5000
Other wild berry	Gallons	4.0000
Beach asparagus	Gallons	1.0000
Goose tongue	Gallons	1.0000
Goose tongue	Half-pints	0.0600
Wild rhubarb	Gallons	1.0000
Fiddlehead ferns	Gallons	1.0000
Fiddlehead ferns	Quarts	0.2500

-continued-

Appendix D.—Page 5 of 5.

Resource name	Reported units	Conversion factor
Nettle	Gallons	1.0000
Nettle	Quarts	0.2500
Sourdock	Gallons	1.0000
Wild celery	Pounds	1.0000
Wild celery	Gallons	1.0000
Wild celery	Quarts	0.2500
Wild parsley	Pounds	1.0000
Wild parsley	Gallons	1.0000
Wild parsley	Quarts	0.2500
Wild rose hips	Gallons	4.0000
Other wild greens	Gallons	1.0000
Unknown mushrooms	Gallons	1.0000
Fireweed	Gallons	1.0000
Fireweed	Quarts	0.2500
Sea lovage	Gallons	1.0000
Beach greens	Gallons	1.0000
Bull kelp	Gallons	1.0000
Bull kelp	Quarts	0.2500
Bladder wrack	Quarts	0.2500
Seaweed/kelp used for fertilizer	Gallons	1.0000
Unknown seaweed	Gallons	1.0000
Unknown seaweed	Quarts	0.2500
Wood	Cords	0.0000

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

APPENDIX E—KEY RESPONDENT INTERVIEW ANALYSIS CODEBOOK

OSM Southwest Kodiak

Nodes

Name	Description
Changes in resource abundance	Comments related to observed changes in the abundance of subsistence resources
Berries and plants	Comments related to observed changes in abundance of berries and plants
Crab	Comments related to observed changes in abundance of crab
Deer	Comments related to observed changes in abundance of deer
Halibut	Comments related to observed changes in abundance of halibut
Nonsalmon fish	Comments related to observed changes in abundance of nonsalmon fish
Other resources	Comments related to observed changes in abundance of other miscellaneous resources
Otters	Comments related to observed changes in abundance of otters
Salmon	Comments related to observed changes in abundance of salmon
Changes in resource quality	Comments related to observed changes in the quality of subsistence resources
Halibut	Comments related to observed quality of halibut
Jack population	Comments related to jack salmon population
Other resources	Comments related to observed quality of other miscellaneous resources

Name	Description
Salmon	Comments related to observed quality of salmon
Commercial fishing	Comments related to all aspects of commercial fishing and affects on local communities
Health of local industry	Comments related to the health of local commercial fisheries
Management focus on maximum harvest	Comments related to perceived management of fisheries based on maximum harvest possible for each system
Management issue - counting jack salmon	Comments related to frustration with management over including jack salmon in fish return numbers
Management preference for commercial fishing	Comments related to the perceived preference for managing for commercial fisheries rather than for subsistence uses
Misc. management issues	Miscellaneous comments related to commercial fisheries management issues
Nonsalmon fisheries	Comments related to management issues surrounding nonsalmon species
Preference for limiting commercial fisheries	Comments related to the desire to limit commercial fishing due to perceived overfishing
Regulatory issues - commercial fishing boundaries	Comments related to issues with physical boundaries of commercial fishing
Trawling	Comments related specifically to commercial trawling
Environmental conditions	Comments related to changing environmental conditions

Name	Description
Great quotes	Noteworthy quotes for publications
Harvest and processing methods	Comments related to methods for harvesting and processing fish
Other species	Comments related to the harvesting and processing of resources other than salmon
Salmon harvesting	Comments related to methods of harvesting salmon
Salmon processing and preserving	Comments related to methods of processing and preserving salmon
Local observations of salmon	Comments related to local knowledge and observations of salmon stocks, run timing, and other miscellaneous comments
Misc. salmon comments	Additional comments on local observations of salmon
Observations of local stocks	Comments related to observations of local salmon stocks
Observations of run timing	Comments related to observations of timing of local salmon runs
Olga and Akalura lake watersheds	Comments related to general information about the area
Akalura	Comments related to access, environmental changes, and fish populations for Akalura Lake and watershed
Dog Salmon River	Comments related to the Dog Salmon River
Olga Lakes	Comments related to habitat, differences in upper and lower station, access, fish populations, and environmental changes

Name	Description
People returning to communities to harvest	Comments regarding people who leave the community but come back to harvest resources, or receive resources from people still living in the community
Regulatory (positive)	Comments related to positive feedback on regulations and management
Resource access	Comments related to ability to access subsistence resources including boats, fuel, fishing gear, and proximity of resources
Resource sharing	Comments related to the sharing of subsistence resources
Social change	Comments related to any observed social changes affecting subsistence communities
Changes in elder population	Comments related to elders dying, moving, or changing practices
Cultural changes	Comments related to observed cultural changes including Native language, traditional practices, and the impact of digital technology
External competition for local resources	Comments related to changes in external pressure on local subsistence resources
Generational changes in subsistence uses	Comments related to changes in engagement in subsistence activities based on generational differences
Out migration	Comments related to local population declines due to out-migration
Village life characteristics	Comments related to characteristics of village life and community values

APPENDIX F—PROJECT SUMMARIES FOR EACH COMMUNITY



Akhiok

Harvest and Use of Wild Resources in Akhiok, Old Harbor, and Larsen Bay, 2018. Alaska Department of Fish and Game, Division of Subsistence Technical Paper Number 477. Published 2021. By Lauren A. Sill, Jacqueline M. Keating, and Gayle P. Neufeld

Russian Orthodox church in Akhiok. Photo by Lauren A. Sill, ADF&G

"I just love living the subsistence lifestyle down here. I like helping people out, getting their stuff for them." –Akhiok resident, 2019

Study Overview

In February 2019, ADF&G researchers, in collaboration with local tribal governments, conducted comprehensive subsistence harvest surveys in Akhiok, Old Harbor, and Larsen Bay. The purpose of the surveys was to document information about subsistence harvest practices and areas used for harvesting wild foods, and overall use of subsistence resources in the participating communities. In addition, researchers spoke at length with several knowledgeable residents to learn more about how subsistence practices and subsistence resources have changed over time, and to document local and traditional knowledge of sockeye salmon in the Olga and Akalura lakes region of Kodiak Island. Project results will help ensure the sustainable management of local resources and continued provision of reasonable opportunity to harvest subsistence resources. The research was funded by the U.S. Fish & Wildlife Service, Office of Subsistence Management.

Harvest Survey Results: Akhiok

In Akhiok, researchers interviewed 11 of the 14 permanent households in 2018 (79%). Every household interviewed used some kind of subsistence resource during 2018: all households (100%) used marine invertebrates and 91% used salmon, nonsalmon fish, large land mammals, and vegetation. More than one-half of households used birds and eggs (73%) and marine mammals (55%), and the fewest households used small land mammals (9%). The 10 resources used by the most households are shown in Table 1. These are similar to, but not the same as, the resources with the most harvest weight. For example, chum salmon was one of the most harvested resources (6% of total harvest weight), but it was not among the resources used by the most households. Conversely, bidarkis composed a small percentage of the overall harvest (2%), but were used by 73% of community households.

The majority of the 2018 harvest was salmon; more than 2,800 salmon were harvested, equaling 11,437 lb usable weight, or 237 lb per person (Figure 1). Nonsalmon fish and marine invertebrates were the next most harvested resource categories, followed by land mammals. Making up the smallest proportions of the harvest by weight were vegetation, marine mammals, and birds and eggs.

Table 1.—Top wild resources used and harvested, Akhiok, 2018.

Top used resources	Percentage of households using	Rank ^a	Top harvested resources	Estimated total harvest (lb)
Sockeye salmon	90.9%	1. – 1.	Sockeye salmon	6,817.2
Pacific halibut	90.9%	1. – 2.	Coho salmon	2,048.2
Deer	90.9%	1. – 3.	Pacific halibut	1,713.6
Coho salmon	81.8%	4. – 4.	Deer	1,539.5
Pink salmon	81.8%	4. – 5.	Pink salmon	1,404.3
Butter clams	81.8%	4. – 6.	Chum salmon	1,029.4
Red king crab	81.8%	4. – 7.	Butter clams	559.4
Sea urchin	81.8%	4. – 8.	Harbor seal	427.6
Salmonberry	81.8%	4. – 9.	Salmonberry	384.4
Black (small) chitons	72.7%	10. – 10.	Black (small) chitons	361.5

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

a. Resources used by the same percentage of households share the highest rank value instead of having sequential rank values.

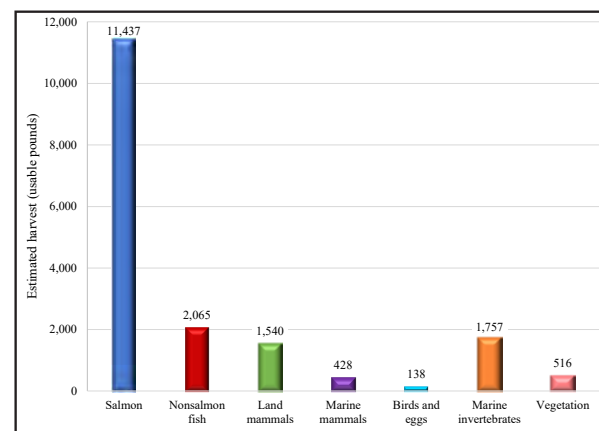


Figure 1.—Estimated pounds harvested by category, Akhiok, 2018.

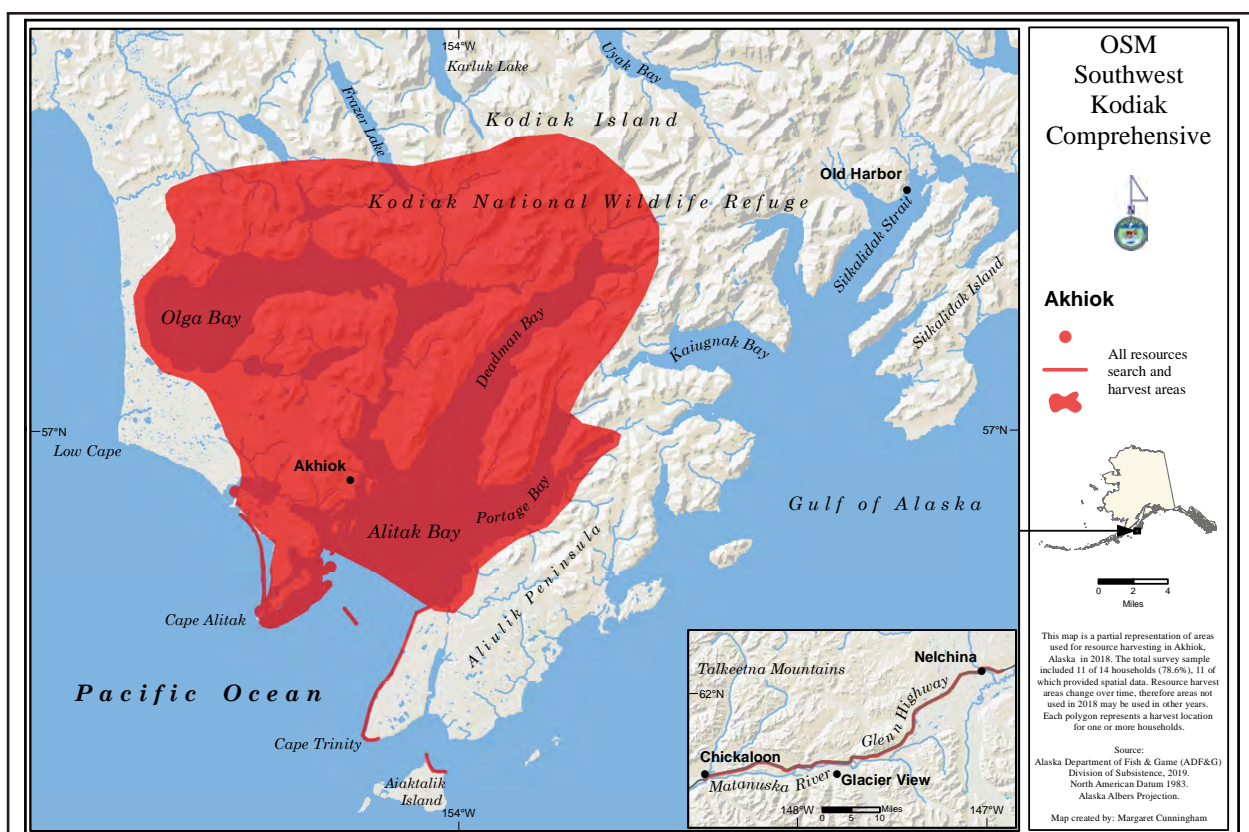


Figure 2.—Wild resources search areas and harvest locations, Akhiok, 2018.

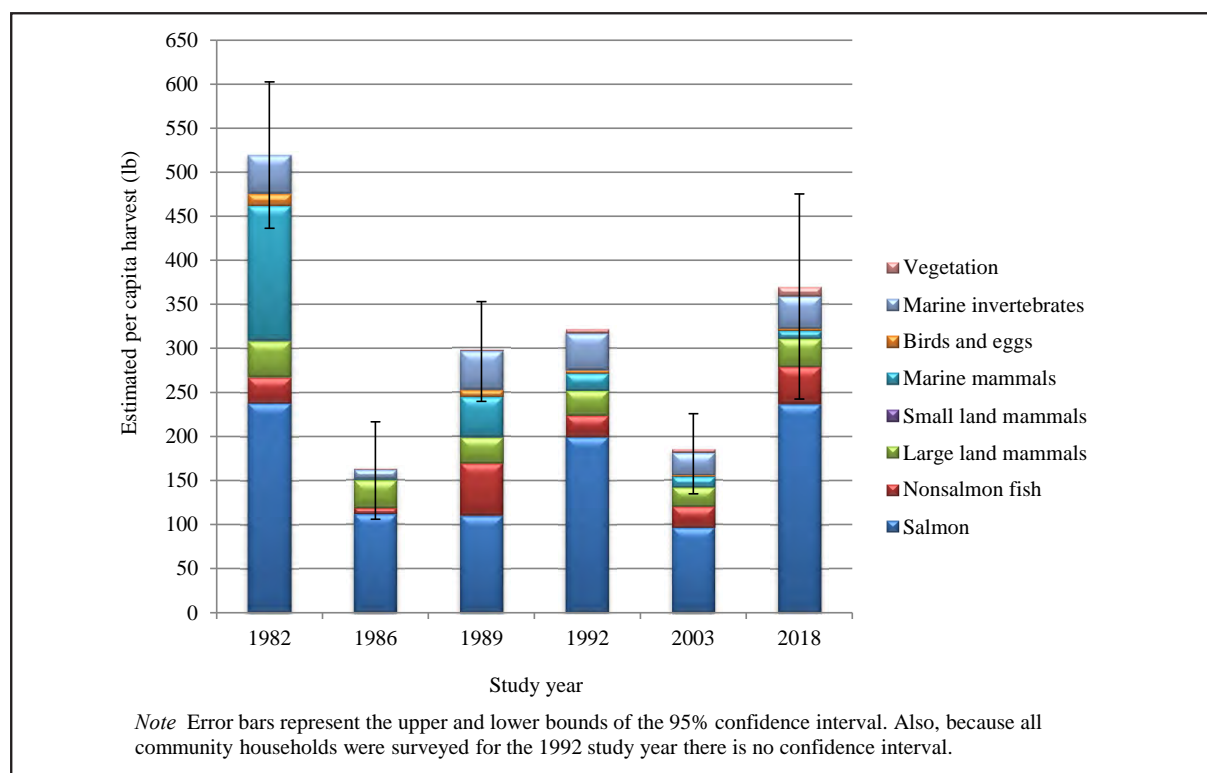


Figure 3.—Historical estimated harvests, by category in pounds per capita, Akhiok, 1982, 1986, 1989, 1992, 2003, and 2018.

Most of the documented subsistence harvesting in 2018, with the exception of hunting in the Matanuska–Susitna Valley, occurred within a 24-mile radius of the community (Figure 2). Because researchers only asked about activities in 2018 and did not interview every household during this project, the map likely does not show all of the areas that are important for subsistence.

ADF&G researchers have conducted similar studies estimating subsistence harvests since 1982 (Figure 3). While overall harvest amounts have changed, the composition of the subsistence harvest has remained relatively constant, with salmon composing the majority of the harvest in each study year. One noticeable change has been a decline in marine mammal harvests since 1982.

Key Respondent Interviews

The harvest survey captured in-depth information about harvesting activities during 2018. It provided a snapshot of community life and subsistence activities, but could not provide the necessary context for understanding all the results. Through key respondent interviews, residents created a broader picture of life in the community and the important role subsistence activities play. This qualitative information also provided a temporal component that was unavailable through the harvest surveys. Researchers spoke with four individuals in Akhiok, six in Old Harbor, and one in Larsen Bay. Overall, several themes emerged during these interviews, focused on:

- The importance of salmon and subsistence;
- Perceptions of abundance of subsistence resources;
- Changes in quality of subsistence resources;
- Access to subsistence resources;

- Local commercial fishing effects;
- ADF&G management practices;
- Observations of environmental patterns and changes;
- Salmon harvest and processing methods;
- Sharing of resources;
- Characteristics of rural life;
- Subsistence practices and culture;
- Changes in community composition; and
- Habitat changes and use of Olga and Akalura lakes.

Acknowledgments

Division of Subsistence staff acknowledge all those who helped make this research possible. In particular, thanks are extended to the Native Village of Akhiok, Alutiiq Tribe of Old Harbor, and Native Village of Larsen Bay for approving this research. In Old Harbor and Akhiok, the tribal staff allowed researchers the use of their buildings as the center of our research efforts, for which we are very grateful. In Larsen Bay, we appreciate the use of the clinic apartment for lodging and fieldwork. Without Frieda Panamaroff in Larsen Bay, Jeanetta Rastopsoff in Akhiok, and Katherine Alexanderoff and Lepani Nadore in Old Harbor, our survey efforts would have been nowhere near as successful as they were. Finally, we would like to especially acknowledge all the people in these communities who opened their homes to us, talked for hours about subsistence and community life, took us on tours of the town, participated in the survey, and made us feel welcome. We hope that this summary and information in the report will be useful to the residents of these communities.

“My husband and I go out and do a lot of subsistence for the community for people that don’t have boats or ways of getting subsistence food. They’ll usually pitch in and either help buy gas or something just to get us out there to go and get it but we provide the community with the fish, salmon, clams, and octopus.” –Akhiok resident, 2019



View of the beach at Akhiok. Photo by Lauren A. Sill, ADF&G

Subsistence Harvests on Kodiak Island

During this study, researchers documented subsistence harvests and uses in three Kodiak Island communities in 2018: Akhiok, Old Harbor, and Larsen Bay. Most households in all the communities used subsistence resources during the study year, and nearly all households hunted, fished, or gathered wild resources (Figure 4).

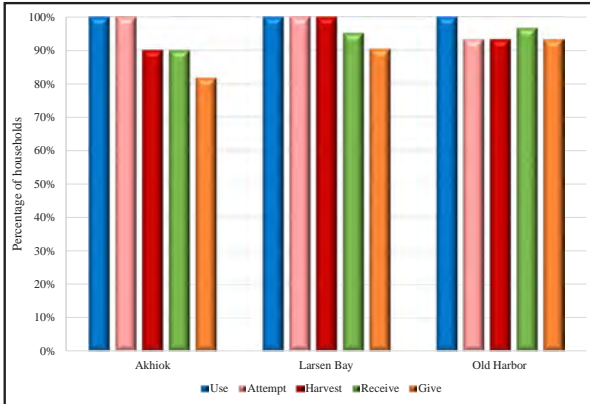


Figure 4.—Estimated household participation, all communities, 2018.

Figure 5 shows the harvests of wild resources in each study community as estimated in pounds usable weight per person. Harvests ranged from 252 lb per person in Larsen Bay to 578 lb per person in Old Harbor. Sharing of subsistence resources was widespread: in Akhiok, 82% of households gave away a subsistence resource, as did 91% and 93% of households in Larsen Bay and Old Harbor. More than 90% of households received subsistence resources during the study year. Salmon composed the largest part of the overall estimated harvest, but the composition of the salmon harvest varied among the three communities.

Salmon harvests in Larsen Bay and Akhiok were dominated by sockeye salmon (73% of the total harvest in Larsen Bay, 60% in Akhiok), followed by coho salmon at 24% and 18% of harvests, respectively (Figure 6). The converse was true in Old Harbor: sockeye salmon composed only 26% of the harvest while coho salmon composed 48%. Chum and pink salmon were also important components of the harvest in Akhiok and Old Harbor, but few Chinook salmon were harvested in any community.

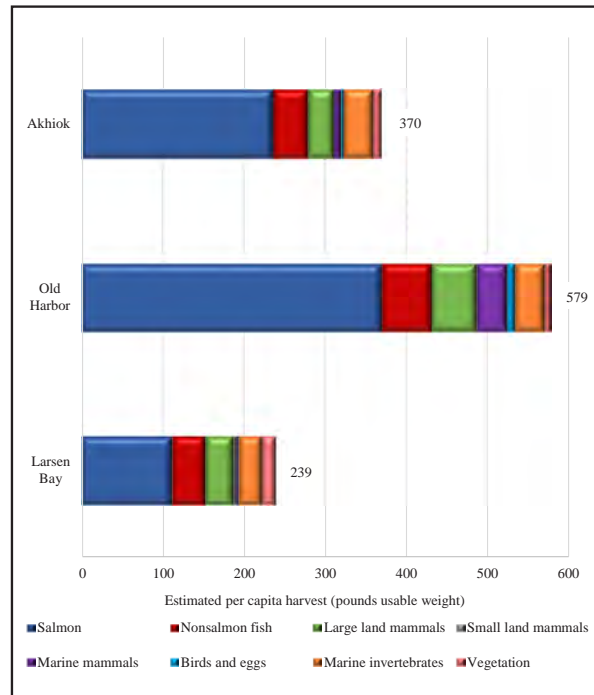


Figure 5.—Estimated per capita harvest, by resource category, all communities, 2018.

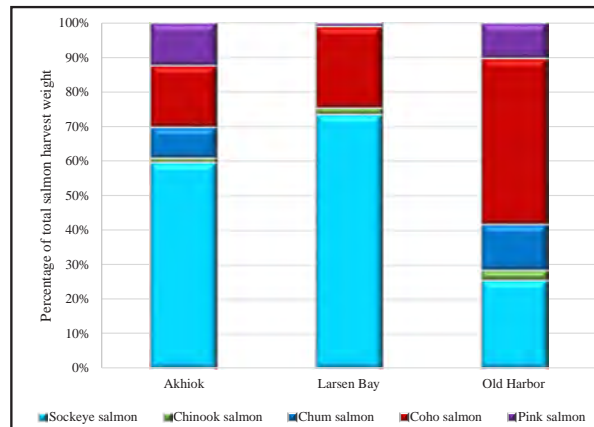


Figure 6.—Salmon harvest composition, all communities, 2018.

Source for this information


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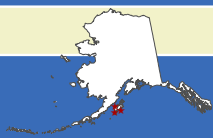


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Old Harbor

Harvest and Use of Wild Resources in Akhiok, Old Harbor, and Larsen Bay, 2018. Alaska Department of Fish and Game, Division of Subsistence Technical Paper Number 477. Published 2021. By Lauren A. Sill, Jacqueline M. Keating, and Gayle P. Neufeld

Small boat harbor in Old Harbor. Photo by Lauren A. Sill, ADF&G

"Then a lot of the times it's us catching fish for other people. ... [A friend will] come and we'll put 300 reds or something like that and send them back here. Just because a lot of people can't catch reds as easy here."
-Old Harbor resident, 2019

Study Overview

In February 2019, ADF&G researchers, in collaboration with local tribal governments, conducted comprehensive subsistence harvest surveys in Akhiok, Old Harbor, and Larsen Bay. The purpose of the surveys was to document information about subsistence harvest practices and areas used for harvesting wild foods, and overall use of subsistence resources in the participating communities. In addition, researchers spoke at length with several knowledgeable residents to learn more about how subsistence practices and subsistence resources have changed over time, and to document local and traditional knowledge of sockeye salmon in the Olga and Akalura lakes region of Kodiak Island. Project results will help ensure the sustainable management of local resources and continued provision of reasonable opportunity to harvest subsistence resources. The research was funded by the U.S. Fish & Wildlife Service, Office of Subsistence Management.

Harvest Survey Results: Old Harbor

In Old Harbor, researchers interviewed 30 of the 67 permanent households in 2018 (45%). Every household interviewed used salmon during 2018, and more than 70% of households used nonsalmon fish, large land mammals, marine mammals, birds and eggs, marine invertebrates, and vegetation. A smaller percentage of households used small land mammals (17%). The resources used by the most households are shown in Table 1. These are similar to the resources with the most harvest weight, but with some notable differences. For example, while pink salmon was the fifth most harvested resource, it was not among the resources used by the most households. Conversely, salmonberries, Tanner crab, and red king crab each composed less than 2% of the overall harvest weight, but were used by 60% or more of community households.

The majority of the 2018 harvest was salmon; nearly 16,000 salmon were harvested, equaling 75,232 lb, or 370 lb per person (Figure 1). Nonsalmon fish and land mammals were the next most harvested, followed by marine mammals and marine invertebrates. The harvests of birds and eggs and vegetation were both nearly 2,000 lb total.

Table 1.—Top wild resources used and harvested, Old Harbor, 2018.

Top used resources	Percentage of households using	Rank ^a	Top harvested resources	Estimated total harvest (lb)
Coho salmon	93.3%	1. – 1.	Coho salmon	36,022.5
Deer	93.3%	1. – 2.	Sockeye salmon	19,272.7
Sockeye salmon	86.7%	3. – 3.	Chum salmon	10,027.6
Pacific halibut	86.7%	3. – 4.	Deer	8,104.3
Salmonberry	80.0%	5. – 5.	Pink salmon	7,693.1
Tanner crab, <i>bairdi</i>	73.3%	6. – 6.	Harbor seal	4,877.6
Chinook salmon	70.0%	7. – 7.	Pacific halibut	4,695.4
Harbor seal	70.0%	7. – 8.	Pacific herring	2,724.7
Chum salmon	60.0%	9. – 9.	Steller sea lion	2,680.0
Butter clams	60.0%	9. – 10.	Chinook salmon	2,216.6
Red king crab	60.0%	9. – 11.	Butter clams	2,137.3

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

a. Resources used by the same percentage of households share the highest rank value instead of having sequential rank values.

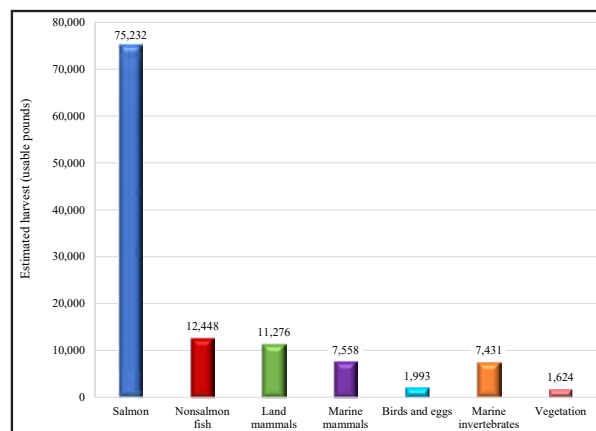


Figure 1.—Estimated pounds harvested by category, Old Harbor, 2018.

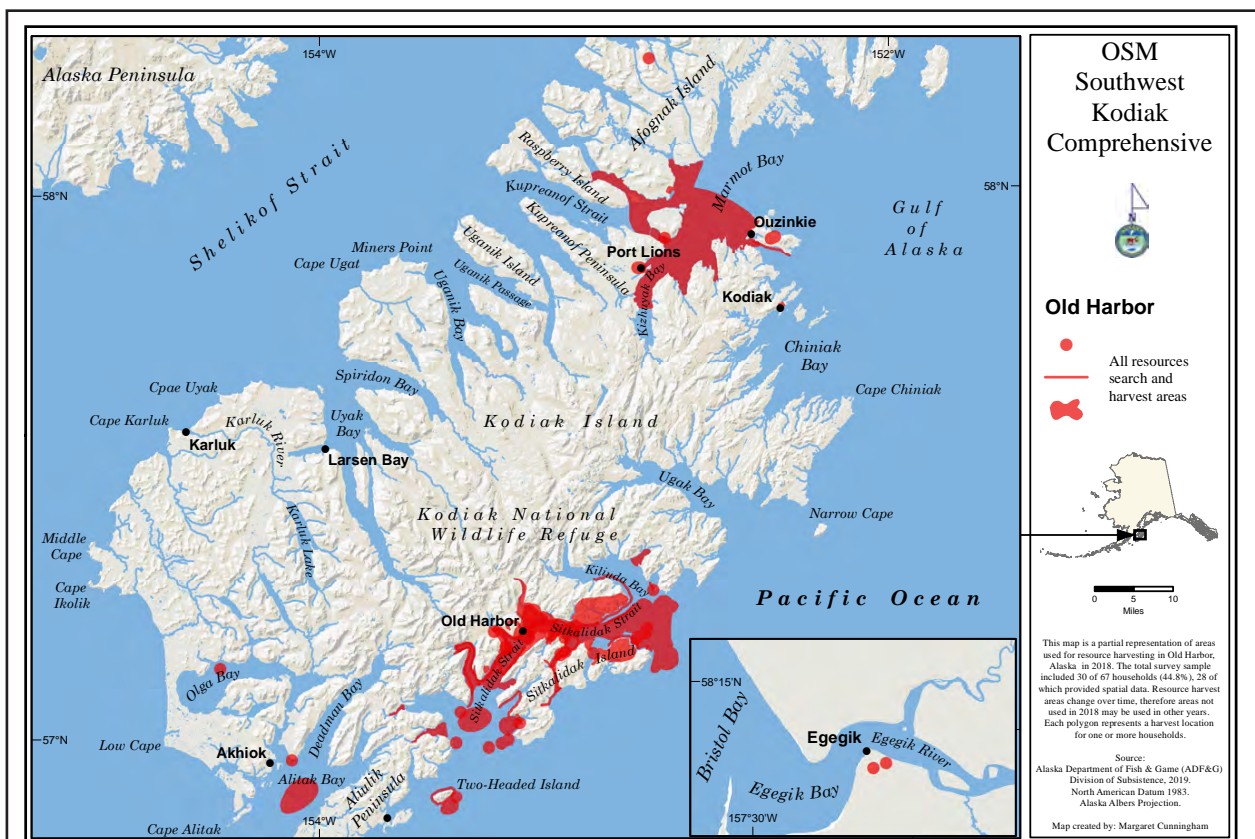


Figure 2.—Wild resources search areas and harvest locations, Old Harbor, 2018.

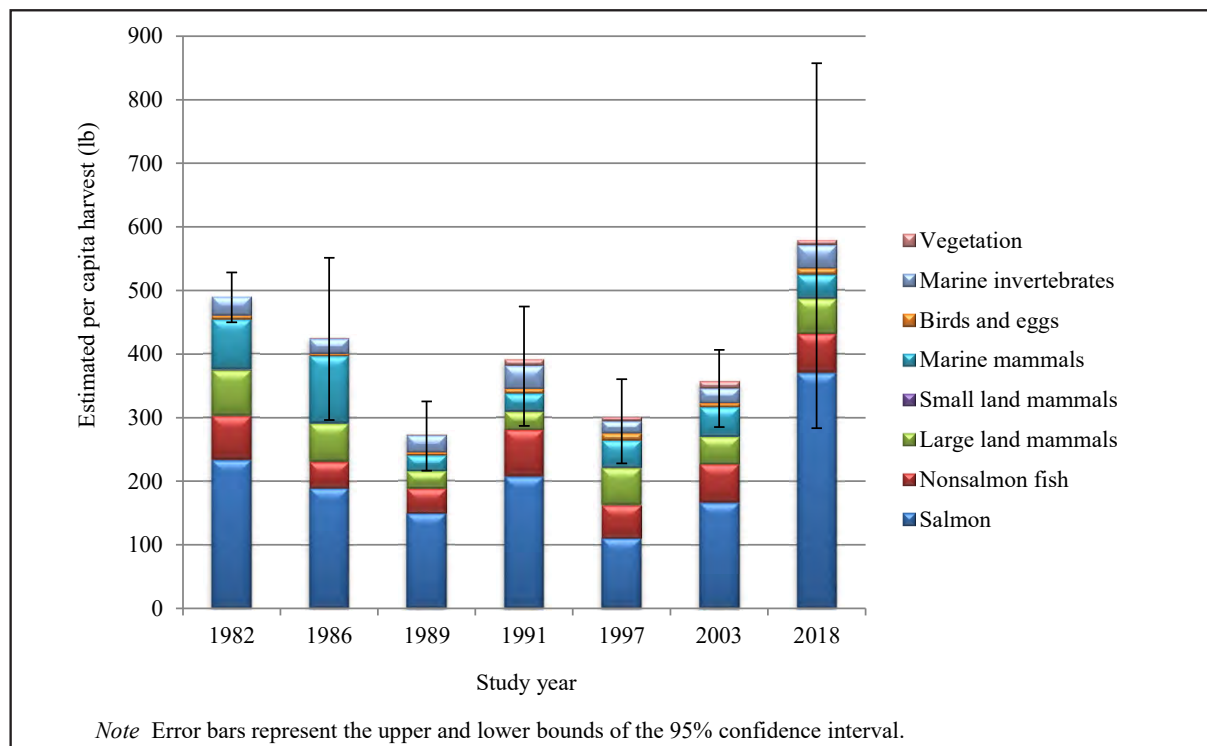


Figure 3.—Historical estimated harvests, by category in pounds per capita, Old Harbor, 1982, 1986, 1989, 1991, 1997, 2003, and 2018.

Most of the documented subsistence harvesting in 2018 occurred within a 19-mile radius of the community (Figure 2). Because researchers only asked about activities in 2018 and did not interview every household during this project, the map likely does not show all of the areas that are important for subsistence.

ADF&G researchers have conducted similar studies estimating subsistence harvests since 1982 (Figure 3). Overall harvest amounts vary across study years, but the composition of the subsistence harvest has remained relatively consistent, with salmon, nonsalmon fish, large land mammals, and marine mammals composing the majority of the harvest in each study year. The estimated 2018 harvest of salmon was larger than average, while the estimated harvests of nonsalmon fish, large land mammals, and marine mammals were smaller than average.

Key Respondent Interviews

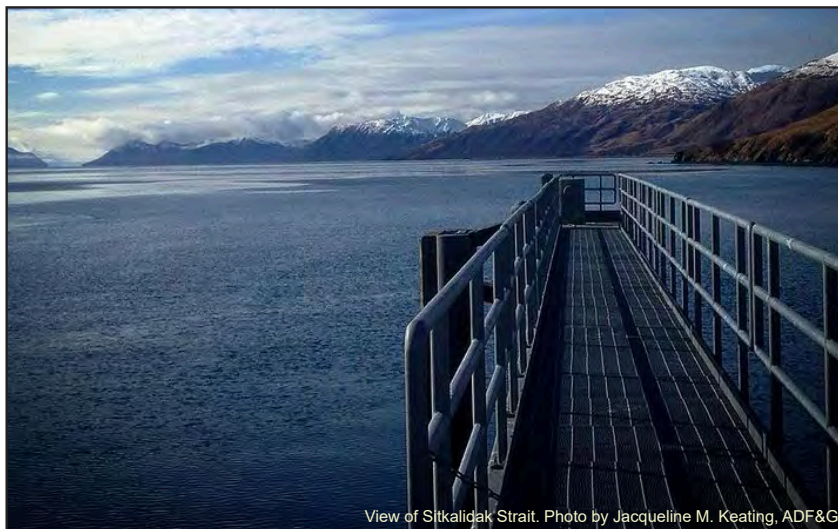
The harvest survey captured in-depth information about harvesting activities during 2018. It provided a snapshot of community life and subsistence activities, but could not provide the necessary context for understanding all the results. Through key respondent interviews, residents created a broader picture of life in the community and the important role subsistence activities play. This qualitative information also provided a temporal component that was unavailable through the harvest surveys. Researchers spoke with four individuals in Akhiok, six in Old Harbor, and one in Larsen Bay. Overall, several themes emerged during these interviews, focused on:

- The importance of salmon and subsistence;
- Perceptions of abundance of subsistence resources;
- Changes in quality of subsistence resources;

- Access to subsistence resources;
- Local commercial fishing effects;
- ADF&G management practices;
- Observations of environmental patterns and changes;
- Salmon harvest and processing methods;
- Sharing of resources;
- Characteristics of rural life;
- Subsistence practices and culture;
- Changes in community composition; and
- Habitat changes and use of Olga and Akalura lakes.

Acknowledgments

Division of Subsistence staff acknowledge all those who helped make this research possible. In particular, thanks are extended to the Native Village of Akhiok, Alutiiq Tribe of Old Harbor, and Native Village of Larsen Bay for approving this research. In Old Harbor and Akhiok, the tribal staff allowed researchers the use of their buildings as the center of our research efforts, for which we are very grateful. In Larsen Bay, we appreciate the use of the clinic apartment for lodging and fieldwork. Without Frieda Panamaroff in Larsen Bay, Jeanetta Rastopsoff in Akhiok, and Katherine Alexanderoff and Lepani Nadore in Old Harbor, our survey efforts would have been nowhere near as successful as they were. Finally, we would like to especially acknowledge all the people in these communities who opened their homes to us, talked for hours about subsistence and community life, took us on tours of the town, participated in the survey, and made us feel welcome. We hope that this summary and information in the report will be useful to the residents of these communities.



View of Sitkalidak Strait. Photo by Jacqueline M. Keating, ADF&G

"We eat salmon, we preserve it, we put it away for my mom, we help my brother who's not here. I mean we help a lot of people in the community. My husband goes out and gets ducks for all the elders and he's taught my son to do that. They've done that for years. Not only does he get them, he cleans them and delivers them."

—Old Harbor resident, 2019

Subsistence Harvests on Kodiak Island

During this study, researchers documented subsistence harvests and uses in three Kodiak Island communities in 2018: Akhiok, Old Harbor, and Larsen Bay. Most households in all the communities used subsistence resources during the study year, and nearly all households hunted, fished, or gathered wild resources (Figure 4).

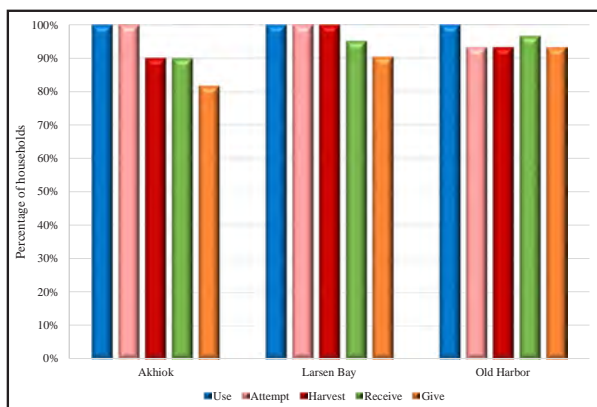


Figure 4.—Estimated household participation in subsistence activities, all communities, 2018.

Figure 5 shows the harvests of wild resources in each study community as estimated in pounds usable weight per person. Harvests ranged from 252 lb per person in Larsen Bay to 578 lb per person in Old Harbor. Sharing of subsistence resources was widespread: in Akhiok, 82% of households gave away a subsistence resource, as did 91% and 93% of households in Larsen Bay and Old Harbor. More than 90% of households received subsistence resources during the study year. Salmon composed the largest part of the overall estimated harvest, but the composition of the salmon harvest varied among the three communities.

Salmon harvests in Larsen Bay and Akhiok were dominated by sockeye salmon (73% of the total harvest in Larsen Bay, 60% in Akhiok), followed by coho salmon at 24% and 18% of harvests, respectively (Figure 6). The converse was true in Old Harbor: sockeye salmon composed only 26% of the harvest while coho salmon composed 48%. Chum and pink salmon were also important components of the harvest in Akhiok and Old Harbor, but few Chinook salmon were harvested in any community.

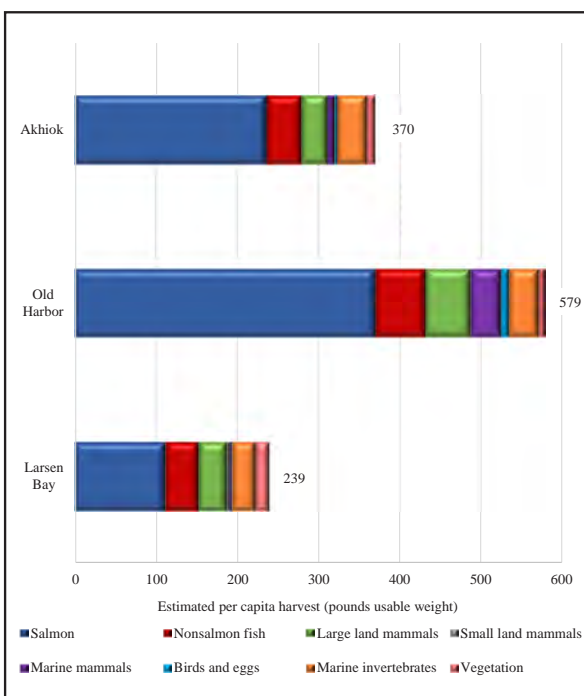


Figure 5.—Estimated per capita harvest, by resource category, all communities, 2018.

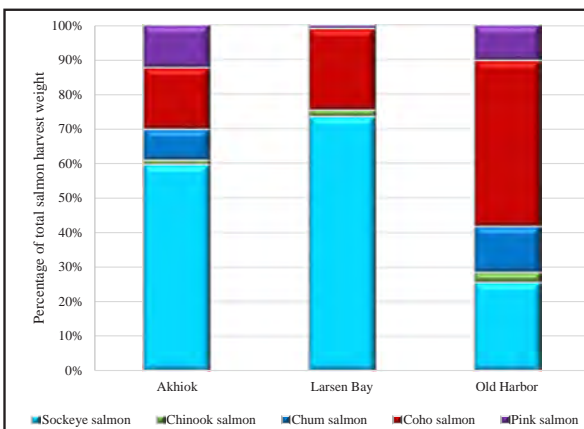


Figure 6.—Salmon harvest composition, all communities, 2018.

Source for this information

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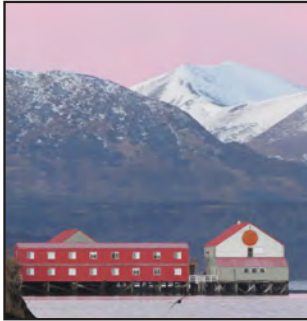
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Larsen Bay

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Larsen Bay Cannery, February 2019. Photo by Jacqueline M. Keating, ADF&G

"Everybody is pretty good about sharing around here. Especially once you get to know people. It's a pretty good community in that aspect. ... Everybody is good. I get lots of deer, and I give people deer meat, all they want."
-Larsen Bay resident, 2019

Study Overview

In February 2019, ADF&G researchers, in collaboration with local tribal governments, conducted comprehensive subsistence harvest surveys in Akhiok, Old Harbor, and Larsen Bay. The purpose of the surveys was to document information about subsistence harvest practices and areas used for harvesting wild foods, and overall use of subsistence resources in the participating communities. In addition, researchers spoke at length with several knowledgeable residents to learn more about how subsistence practices and subsistence resources have changed over time, and to document local and traditional knowledge of sockeye salmon in the Olga and Akalura lakes region of Kodiak Island. Project results will help ensure the sustainable management of local resources and continued provision of reasonable opportunity to harvest subsistence resources. The research was funded by the U.S. Fish & Wildlife Service, Office of Subsistence Management.

Harvest Survey Results: Larsen Bay

In Larsen Bay, researchers interviewed 21 of the 30 households in 2018 (70%). Every household interviewed used some kind of subsistence resource during 2018, and 100% used salmon, nonsalmon fish, large land mammals, marine invertebrates, and vegetation. Smaller percentages of households used birds and eggs (33%), small land mammals (19%), and marine mammals (19%). The 10 resources used by the most households are shown in Table 1. These are similar to the resources with the most harvest weight, but with some notable differences. For example, while Pacific herring was the sixth most harvested resource, it was not among the resources used by the most households. Another key exception is that red king crab composed less than 1% of the overall harvest weight, but this resource was used by 52% of community households. Salmon species are among the most harvested and most used resources by Larsen Bay households. The majority

of the 2018 harvest was salmon; more than 1,800 salmon were harvested, equaling 7,503 lb, or 112 lb per person (Figure 1). Nonsalmon fish and land mammals were the next most harvested, followed closely by marine invertebrates. Birds and eggs and marine mammals made up the smallest proportion of the harvest weight.

Table 1.—Top wild resources used and harvested, Larsen Bay, 2018.

Top used resources	Percentage of households using	Rank ^a	Top harvested resources	Estimated total harvest (lb)
Deer	100.0%	1. – 1.	Sockeye salmon	5,512.5
Sockeye salmon	95.2%	2. – 2.	Deer	1,913.1
Pacific halibut	95.2%	2. – 3.	Coho salmon	1,774.5
Coho salmon	71.4%	4. – 4.	Pacific halibut	1,527.4
Octopus	71.4%	4. – 5.	Octopus	560.0
Butter clams	66.7%	6. – 6.	Pacific herring	542.9
Raspberry	61.9%	7. – 7.	Butter clams	535.7
Salmonberry	57.1%	8. – 8.	Raspberry	459.8
Red king crab	52.4%	9. – 9.	Pacific (gray) cod	297.1
Tanner crab, <i>bairdi</i>	52.4%	9. – 10.	Fiddlehead ferns	294.6

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

a. Resources used by the same percentage of households share the highest rank value instead of having sequential rank values.

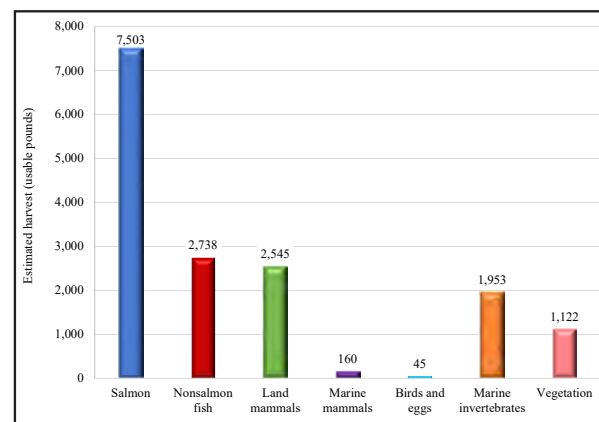


Figure 1.—Estimated pounds harvested by category, Larsen Bay, 2018.

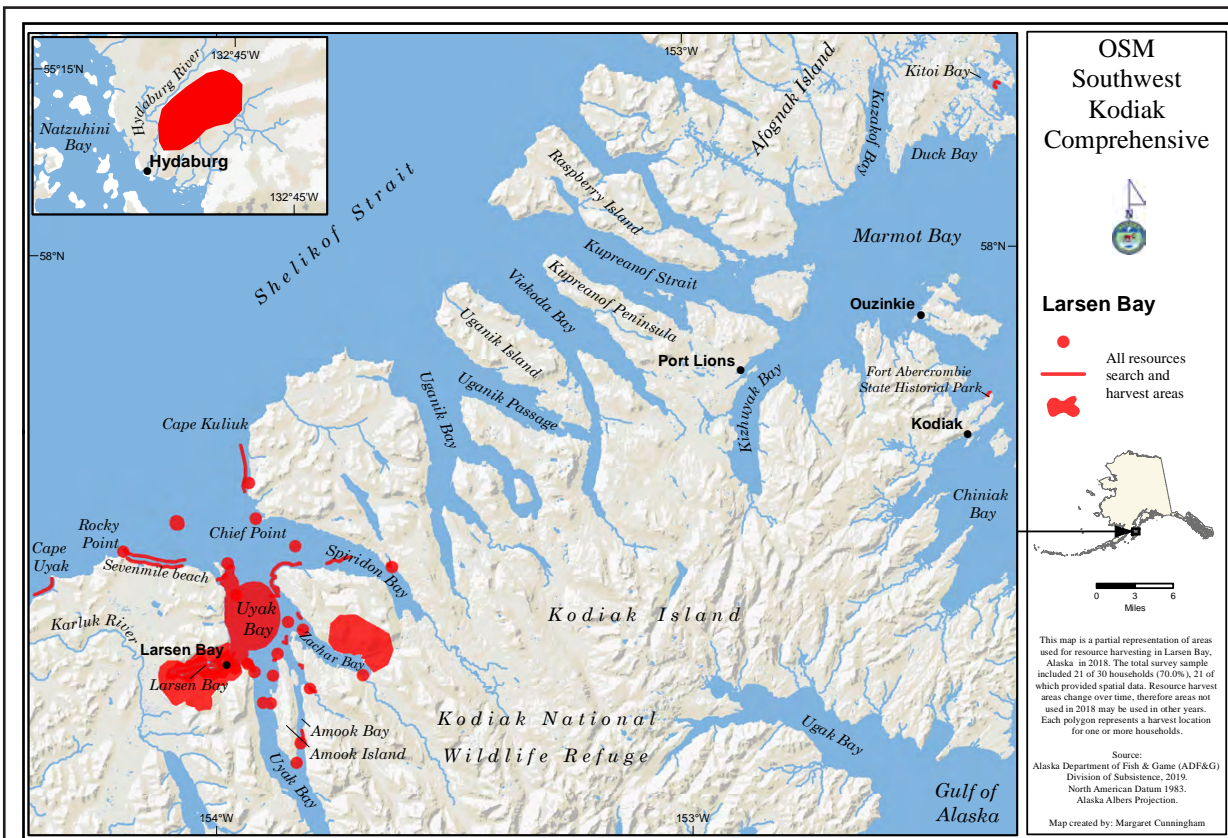


Figure 2.—Wild resources search areas and harvest locations, Larsen Bay, 2018.

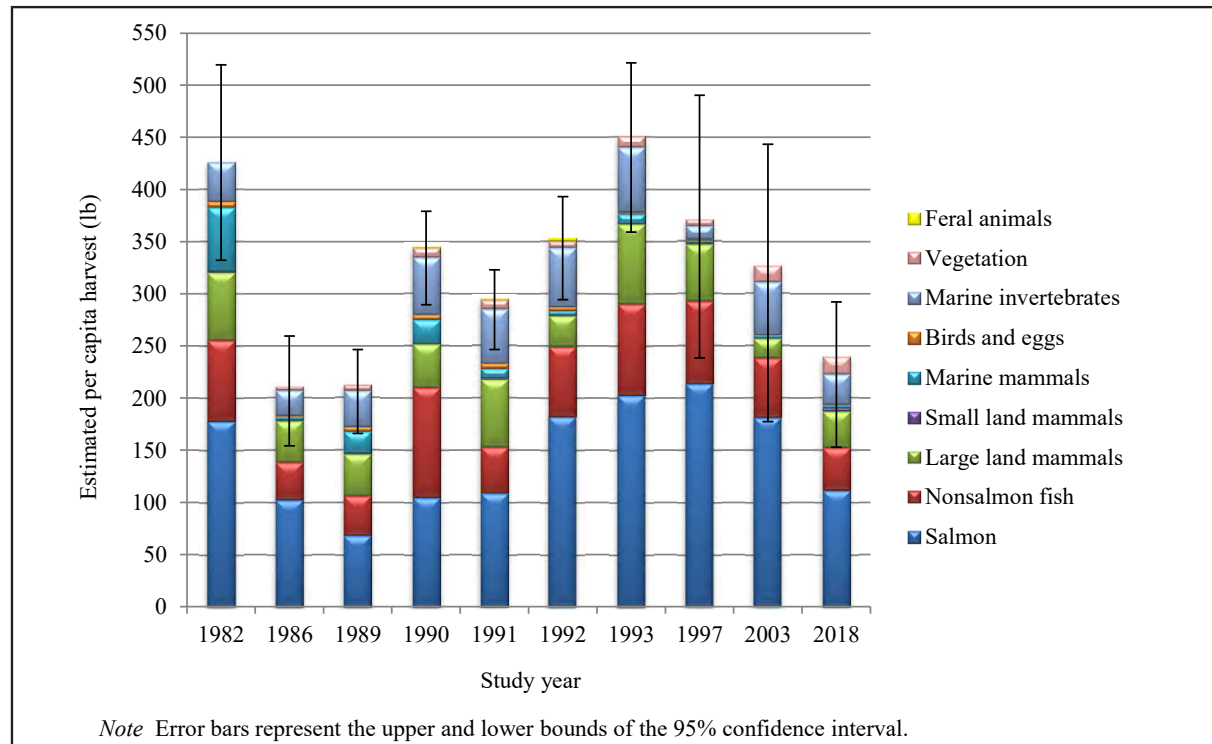


Figure 3.—Historical estimated harvests, by category in pounds per capita, Larsen Bay, 1982, 1986, 1989–1993, 1997, 2003, and 2018.

Most of the documented subsistence harvesting in 2018 occurred within an 18-mile radius of the community (Figure 2). Because researchers only asked about activities in 2018 and did not interview every household during this project, the map likely does not show all of the areas that are important for subsistence.

ADF&G researchers have conducted similar studies estimating subsistence harvests since 1982 (Figure 3). The total harvest amount varies across study years, but the composition of the subsistence harvest has remained relatively consistent, with salmon and nonsalmon fish composing the majority of the harvest. Like other Kodiak Island communities, the marine mammals harvest in 2018 declined notably compared to 1982.

Key Respondent Interviews

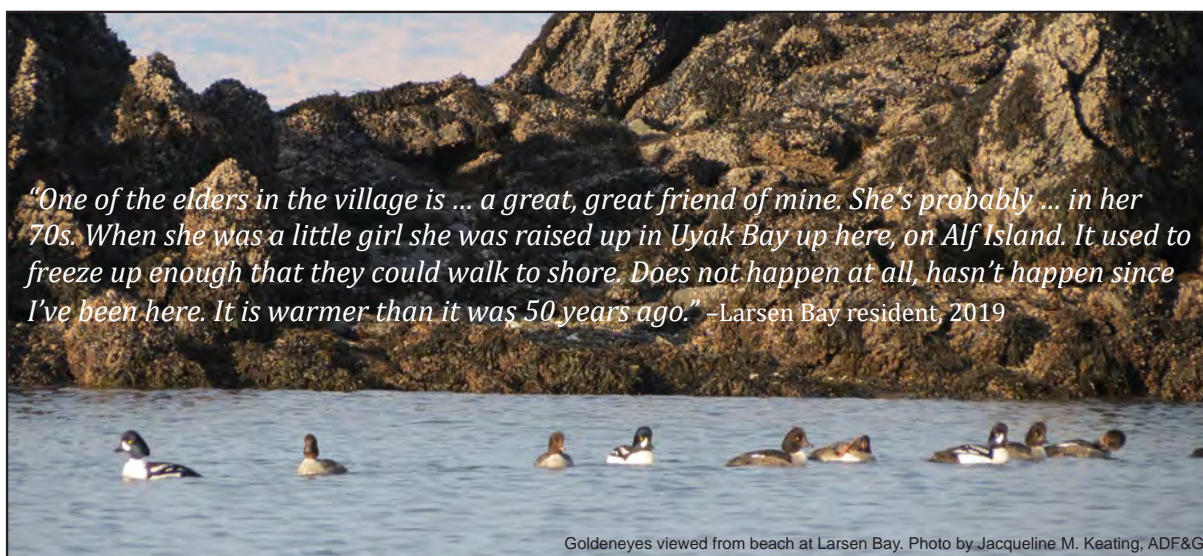
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Subsistence Harvests on Kodiak Island

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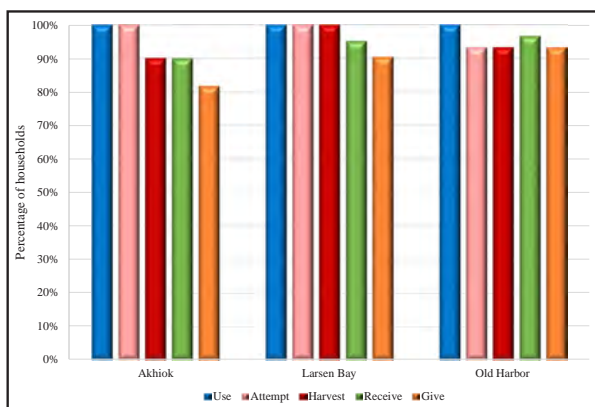


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Salmon harvests in Larsen Bay and Akhiok were dominated by sockeye salmon (73% of the total harvest in Larsen Bay, 60% in Akhiok), followed by coho salmon at 24% and 18% of harvests, respectively (Figure 6). The converse was true in Old Harbor: sockeye salmon composed only 26% of the harvest while coho salmon composed 48%. Chum and pink salmon were also important components of the harvest in Akhiok and Old Harbor, but few Chinook salmon were harvested in any community.

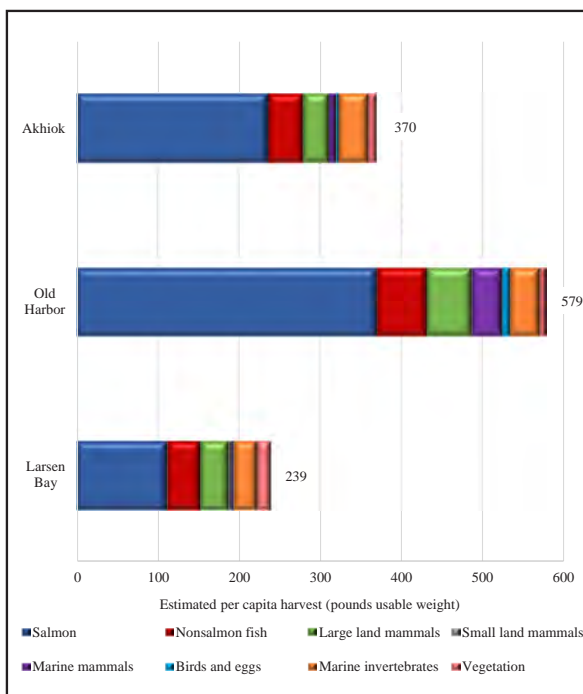


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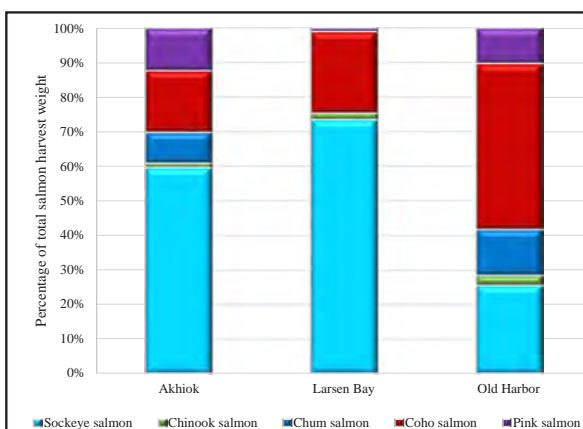


Figure 6.—Salmon harvest composition, all communities, 2018.

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