Technical Paper No. 491

The Harvest and Use of Wild Resources, Unalaska, Alaska, 2020

by
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December 2022

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

Symbols and Abbreviations

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

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Measures (fisheries)

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

Mathematics, statistics

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

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ABSTRACT

This publication reports results from research to update information about the harvests and uses of fish, wildlife, and wild plant resources by residents of Unalaska, Alaska. Household surveys were conducted in spring 2021 to record harvests and uses of wild resources in the 2020 calendar year. Due to the COVID-19 pandemic, Division of Subsistence researchers employed novel survey methods to administer surveys remotely. Eleven percent of households returned a survey during the survey period. Researchers engaged in participant observation with Unalaska fishers during the salmon harvest season in 2022 and conducted in-depth interviews with residents who are knowledgeable about subsistence practices in fall 2021.

During the study year, most households relied on wild resources—obtained through sharing, hunting, fishing, or wild food gathering—for nutrition and to support their way of life. Three-quarters of households harvested wild resources and 85% of households used them. Sharing of subsistence resources remains important: nearly 65% of households received wild resources during the study year, though only 22% of households gave resources away. Per capita, Unalaskans harvested 80 lb of wild resources over the course of the study year. Households harvested more fish than any other resource. Salmon composed 42% of the total wild food harvest weight while nonsalmon fish composed 39%.

Compared to the previous subsistence harvest study conducted for 1994, the per capita harvest declined by more than one-half. The composition of the harvest also changed with salmon and vegetation composing a larger percentage of the harvest, increasing from 28% and 6% of the harvest in 1994, respectively, to 42% and 15% in 2020. Conversely, harvests of marine invertebrates declined from 14% of the harvest in 1994 to 2% in 2020. Declines in crab stocks locally are likely one factor driving this change.

Funding for the study was provided by U.S. Fish and Wildlife Service Office of Subsistence Management Fisheries Research Monitoring Program. Division of Subsistence research staff carried out the project with support from the Qawalangin Tribe of Unalaska and the City of Unalaska.

Key words: subsistence fishing, subsistence hunting, Aleutian Islands, Unalaska, demography, food security, wild resources

1. INTRODUCTION

Wild resources have always been extremely important to residents of Unalaska. The city of Unalaska (2020 population of 4,254 people [U.S. Census Bureau n.d.]) encompasses areas of the community referred to as Unalaska and Dutch Harbor (the port area) (Figure 1-1; Figure 1-2). In 2021, staff from the Alaska Department of Fish and Game (ADF&G) Division of Subsistence worked with the City of Unalaska and the Qawalangin Tribe of Unalaska to document residents' continued reliance on salmon and many other abundant local wild resources using a modified household survey method developed for completing this project during the COVID-19 pandemic. This report presents both quantitative (such as harvest amounts and participation rates) and qualitative (such as spatial, temporal, and cultural context) findings for the community harvest for the 2020 study year. The research results fill an information need identified by the federal U.S. Fish and Wildlife Service (USFWS) Office of Subsistence Management (OSM) while furthering the mission of the ADF&G Division of Subsistence to gather, quantify, evaluate, and report information about customary and traditional uses of fish and wildlife resources. Results of this study affirm that a wide variety of resources are used by Unalaska residents, and that subsistence practices continue to be an integral component of their livelihoods. Table 1-1 lists all the resources used by Unalaska residents in 2020.

Project Background

In its 2018 "Priority Information Needs" document, the USFWS OSM (hereafter referred to as OSM) requested reliable estimates of the harvest and use of salmon and other nonsalmon fish species for subsistence from Unalaska Bay. Additionally, at an Alaska Board of Fisheries (BOF) meeting in February 2016, Unalaska residents voiced concerns about a notable decrease in the availability of local sockeye salmon. At the time, the most current community harvest data available were 22 years old (Scarbrough and Fall 1997). With a clear need for updated comprehensive harvest information, division researchers submitted a successful proposal to OSM to update information on the harvests and uses of wild resources in Unalaska for the 2019 harvest year. However, due to the COVID-19 pandemic, fieldwork could not be conducted in 2020; therefore, the study year was revised to 2020 and researchers spent the summer and fall of 2020 redesigning the division's standard comprehensive household harvest survey and testing a self-administration method that could be conducted remotely. With the help of local research assistants (LRAs) in Unalaska, the modified survey effort was launched in February 2021 to document harvests for the 2020 study year; data collection concluded in April 2021. By August 2021, researchers were permitted to travel to Unalaska to conduct in-person key respondent interviews (KRIs) and participate in subsistence salmon fishing. As a result, this project updated community harvest data for salmon, nonsalmon fish species, and all other wild resources, and documented local traditional knowledge and participant observation information about the subsistence salmon fishery in Unalaska.

Regional Background[1]

Unalaska has a unique and complex geopolitical history. Today, it is commonly known as the location of the Port of Dutch Harbor—the foremost commercial fisheries center in the northern Pacific Ocean. The city of Unalaska, located approximately 800 miles southwest of Anchorage, incorporates residences in Unalaska, located on Unalaska Island, and Dutch Harbor, located directly adjacent on Amaknak Island (Plate 1-1; Figure 1-2). Unalaska is the hub and most populous community of the Bering Sea's Aleutian Islands archipelago.

1. James Van Lanen, ADF&G Subsistence Resource Specialist, authored the first draft of this section.

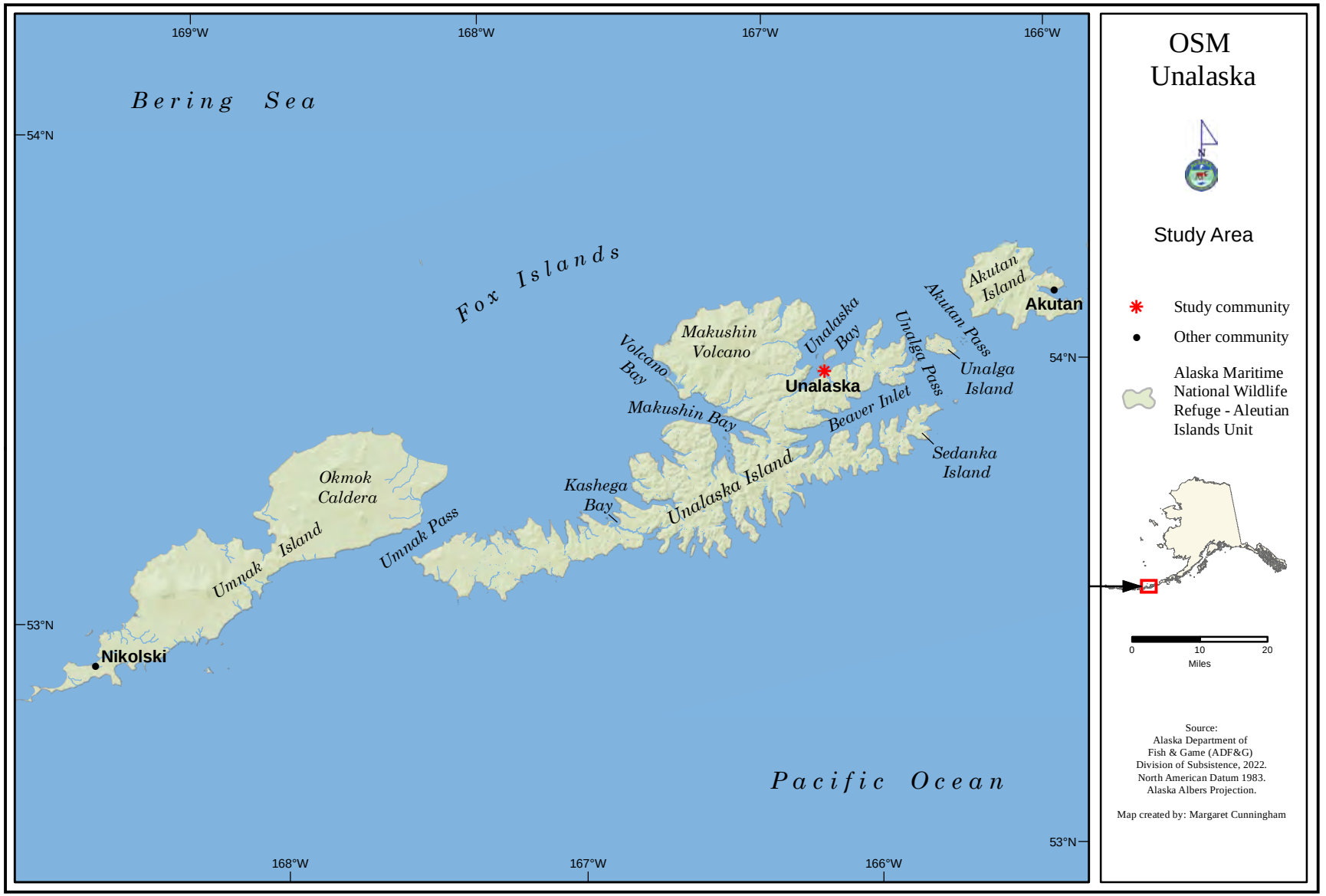


Figure 1-1.–Map of Unalaska area.

Figure 1-2.–Detailed map of Unalaska area.

Table 1-1.–Resources used by Unalaska households, 2020.

Resource	Scientific name
Chum salmon	*Oncorhynchus keta*
Coho salmon	*Oncorhynchus kisutch*
Chinook salmon	*Oncorhynchus tshawytscha*
Pink salmon	*Oncorhynchus gorbuscha*
Sockeye salmon	*Oncorhynchus nerka*
Pacific herring	*Clupea pallasi*
Pacific (gray) cod	*Gadus macrocephalus*
Walleye pollock (whiting)	*Theragra chalcogramma*
Arrowtooth flounder (turbot)	*Atheresthes stomias*
Greenland halibut (greenland turbot)	*Reinhardtius hippoglossoides*
Greenlings	
Pacific halibut	*Hippoglossus stenolepis*
Black rockfish	*Sebastes melanops*
Pacific ocean perch	*Sebastes alutus*
Unspecified rockfishes	
Sablefish (black cod)	*Anoplopoma fimbria*
Salmon shark	*Lamna ditropis*
Rock sole	*Lepidopsetta spp.*
Dolly Varden	*Salvelinus malma*
Rainbow trout	*Oncorhynchus mykiss*
Caribou	*Rangifer tarandus*
Deer	*Odocoileus hemionus*
Moose	*Alces alces*
Red fox	*Vulpes vulpes*
Arctic ground (parka) squirrel	*Spermophilus parryii*
Cattle–feral	*Bos taurus*
Northern fur seal	*Callorhinus ursinus*
Harbor seal	*Phoca vitulina*
Sea otter	*Enhydra lutris*
Steller sea lion	*Eumetopias jubatus*
Canvasback	*Aythya valisineria*
Gadwall	*Anas strepera*
Goldeneyes	*Bucephala spp.*
Mallard	*Anas platyrhynchos*
Common merganser	*Mergus merganser*
Red-breasted merganser	*Mergus serrator*
Scaups	*Aythya spp.*
Uspecified scoters	*Melanitta spp.*
Northern shoveler	*Anas clypeata*

-continued-

Table 1-1.–Page 2 of 2.

Resource	Scientific name
Teals	*Anas spp.*
Emperor goose	*Chen canagica*
Wilson's snipe	*Gallinago delicata*
Ptarmigan	*Lagopus spp.*
Black oystercatcher eggs	*Haematopus bachmani*
Large gull eggs	
Red (large) chiton	*Cryptochiton stelleri*
Black (small) chiton	*Katharina tunicata*
Butter clam	*Saxidomus gigantea*
Pacific littleneck clams (steamers)	*Protothaca staminea*
Razor clam	*Siliqua spp.*
Dungeness crab	*Cancer magister*
King crab	
Tanner crab	*Chionoecetes spp.*
Limpet	*Patella vulgata*
Blue mussel	*Mytilus trossulus*
Octopus	*Octopus vulgaris*
Sea urchins	
Shrimps	
Squid	*Loligo opalescens*
Berries	
Plants and greens	
Mushrooms	
Seaweeds	

Source ADF&G Division of Subsistence household surveys, 2021.

Plate 1-1.–View from the top of Pyramid Peak, looking north. The bridge connects Unalaska Island and the Port of Dutch Harbor on Amaknak Island. On the far left of the photo is the Carl E. Moses Boat Harbor. Iliuiliuk Bay is on the right-hand side of the photo and along the shores of the island in the distance are several of the the facilities of the port, including the Unalaska Marine Center/U.S. Coast Guard Dock, the Spit Dock, and the Light Cargo Dock.

Geography and Ecology[2]

The geographical and ecological setting of Unalaska is one of a far northern Pacific island. Unalaska Island lies near the easternmost end of the Aleutian Islands chain, which begins off the western terminus of the Alaska Peninsula and includes more than 200 islands extending approximately 1,120 miles to the international boundary between the United States and Russia. At approximately 1,900 square miles, Unalaska Island is the second largest of the Aleutians, and is part of the Fox Islands subset of the archipelago. The island's position at the interface between the waters of the Pacific Ocean and the Bering Sea provides a nutrient-rich marine upwelling system that generates excellent habitat for marine mammals, marine invertebrates, and fish. Varied marine mammals are known to frequent the area, including sea otters, harbor seals, Steller sea lions, northern fur seals, and many species of dolphins, whales, and porpoises. The island is rich in marine invertebrates, including sea urchins, shrimps, octopuses, limpets, mussels, chitons, clams, and crabs, although crab populations have recently been declining substantially (Nichols et al. 2022). Significant fish populations include all five species of salmon (Chinook, sockeye, chum, pink, and coho) found in the Pacific Ocean in Alaska, Dolly Varden, and Pacific halibut and cod. Marine life also includes hundreds of species of resident pelagic and migratory birds.

2. This section has been summarized from Veltre and Veltre (1982).

Unalaska's approximately 460-mile coastline features several deep bays and an abundance of lesser bays and coves. The main sockeye salmon systems on the island are McLees Lake/Wislow Bay, Unalaska Lake, Summer Bay, and Volcano Bay. On the northern portion of the island steep mountains and ridgelines rise from the shoreline, mostly to elevations from around 2,000–3,000 feet, and the Makushin volcano towers above at a height of 6,680 feet. The southwestern area of the island is mostly lower in elevation and consists of more gradual terrain.

There are no wild large land mammals on Unalaska Island (there are, however, feral cattle, sheep, and horses). The small land mammals residing on the island include red foxes, ground squirrels, shrews, collared lemmings, voles, and brown (Norway) rats. Upland bird species include rock ptarmigan. Vegetation consists of treeless tundra in the upland areas and meadow consisting of various grasses closer to sea level. Upland plants include sedges, marsh marigolds, bog blueberries, crowberries, salmonberries, mosses, and dwarf willows, and lichens are also present. Beach peas, cow parsnips, angelicas, sedges, and rye grasses grow around sea level.

The climate is northern Pacific maritime typified by regularly occurring overcast skies, frequent wind, and sometimes heavy precipitation. Seasonal temperature averages remain mostly consistent throughout the year; the summer average is approximately 50°F. In winter, the temperature will sometimes drop to slightly below freezing and snowfall occurs but does not tend to stay on the ground very long. Unalaska Island is too far south to experience winter sea ice.

History of Settlement

The Aleutian Islands have been used and inhabited by indigenous peoples for approximately 10,000 years (Dumond 1977; Maschner 1999; Reedy and Maschner 2014). Popularly referred to as Aleuts, a term used by Russian explorers who encountered indigenous inhabitants during the 18th century, the people themselves refer to one another as *Unangan*. The Unangan maintained a marine resource-based adaptation to the Aleutian Islands environment as highly skilled fishers and marine mammal hunters (Reedy 2016; Veltre and Veltre 1982). Numerous archaeological sites are present on Unalaska and Amaknak islands displaying thousands of years of indigenous use and occupation with evidence for strong reliance on not only fish and marine mammals, but also on many species of shellfish, birds, and terrestrial resources, including plants (Reedy and Maschner 2014). For example, archaeological shell middens are common on the island, containing the remains of clams, chitons, mussels, crabs, and shrimps (Veltre and Veltre 1982). The Unangan were expert builders of skin-covered ocean kayaks, accomplished sewers of marine mammal and bird skin clothing, and skillful makers of grass basketwork. Since at least the first millennia AD, the Unangan were complex hunter-gatherers with strict systems of ranked nobility and hierarchy, and were frequent practitioners of warfare, particularly against their equally complex *Alutiiq* neighbors who inhabited Kodiak Island and the lower Alaska Peninsula (Maschner and Reedy-Maschner 1998). When Russian explorers first arrived on Unalaska Island in the 18th century there were numerous Unangan settlements on the island, with likely more than one thousand individual Unangan residing on Unalaska Island at the time of first contact.

The arrival of Russian fur traders in the Aleutians in the mid-18th century, particularly the Glotov party who set up commercial operations on Unalaska and Umnak islands in 1759, initiated the first period of an ongoing colonial history on Unalaska Island of resource extraction for globalized markets (Reedy 2016; Sepez et al. 2007). In 1772, Russian traders developed an official settlement at Unalaska, which was the site of an Unangan village called Iliuliuk. Unalaska Bay provided an ideal harbor location for colonial vessels. By 1799, Unalaska had grown into Russia's administrative center in the eastern Aleutian Islands region and an important base for the Russian American Company (Veltre and Veltre 1982). These developments heralded the 18th and 19th centuries as periods of forceful occupation by Russian fur traders, instituting compulsory hunting by Unangans for the company. Both the Unangan and the sea otter populations were decimated by this contact: Unangan via forced labor, violence, and disease, and sea otters via overhunting. Unangan social and family ways of life were entirely disrupted by the effects of this Russian commercial activity. At the time of Russian arrival there were numerous Unangan settlements on the island other than Iliuliuk, but the Russians forced the Unangan to resettle into fewer communities as a measure to intensively control Unangan fur hunting practices (Hudson and Mason 2014; Sepez et al. 2007; Veltre and Veltre 1982).

Plate 1-2.–World War II bunker located on Unalaska Island, 2021.

The Unangan became strongly influenced by the Russians, with most adopting Russian orthodoxy as their religion (Reedy 2016). The viability of the Russian enterprise waned following its decimation of the sea otter population and in 1867 the Russian tsar sold Alaska to the United States. Following the transfer to United States control, Unalaska remained an important port of call for the Alaska Commercial Company and for resupplying fishing and trading vessels traveling through the Bering Sea.

During World War II the Aleutian Islands archipelago became a front between Japanese and United States armed forces. In 1941, the U.S. Navy and Army established a base and barracks on Unalaska Island (Plate 1-2). Hundreds of nonlocals from the military and construction companies flooded the community, adding another layer of colonialism for the Unangan inhabiting the island (Reedy 2016; Sepez et al. 2007; Veltre and Veltre 1982). In 1942, the Japanese invaded and occupied the Near Islands group of Aleutians at the furthest west portion of the archipelago, and soon bombed Unalaska. As a result, the U.S. military evacuated the Unangan residing across the Aleutian and Pribilof islands, forcing their relocation to internment camps in Southeast Alaska. This included removal from multiple inhabited traditional Unangan villages on Unalaska Island and adjacent Sedanka Island, such as Makushin, Chernofski, Kashega, and Biorka (Veltre and Veltre 1982). Repatriation of some Unangan villages occurred across the Aleutians in 1945 following World War II, but aside from Unalaska, the traditional villages on Unalaska and Sedanka islands were never permanently reoccupied by the Unangan. Moreover, many of the evacuated Unangan did not return home alive from the internment camps because of the unhealthy physical and social conditions present there. Those Unangan who were repatriated returned to find that their villages had been despoiled by the military occupation (Hudson and Mason 2014; Reedy 2016; Sepez et al. 2007). From this point forward, Unalaska became the only existing settlement on the island.

In the 1960s, Unalaska experienced its next burst of colonial activity when the commercial fishing industry for pollock, Pacific cod, salmon, and crabs developed as the foremost economic and sociopolitical influence in the community (Veltre and Veltre 1982). Nonlocals once again flocked to Unalaska, this time to work for the commercial fishing and crabbing industries. The local economy boomed, and traditional subsistence-oriented Unalaska residents found themselves experiencing more opportunities to work for

cash. By the late 1960s, commercial fisheries based out of Dutch Harbor became a multimillion-dollar enterprise (Sepez et al. 2007). In 1979, the National Marine Fisheries Service (NMFS) recognized the Port of Dutch Harbor as the highest volume and value commercial fisheries port in the United States (Sepez et al. 2007). The industry continued to grow rapidly through the 1980s and Dutch Harbor has remained one of the highest volume commercial fisheries ports, and has held the top spot annually since 1997.[3] Simultaneously, the social setting of Unalaska evolved into a state-of-affairs commonly encountered in Western industrial boomtowns: alcohol, drugs, violence, and crime became common among the population of seasonal commercial fishing workers (Sepez et al. 2007). Additionally, local politics and governance became driven primarily by the commercial fishing industry and the fish and crab processing companies that are Unalaska's largest employers. This industrial-political evolution was driven principally by demand from international markets. The large-scale demand for fisheries products by Asian countries has played a particularly influential role. As Sepez et al. (2007:203) reported:

> … ironically due to the demand of the Japanese market for fishery products and substantial investment [in Unalaska] by Japanese companies … territorial acquisition has been succeeded by the dynamics of economic globalization in this American periphery. … Japanese corporations invested heavily in Unalaska's shoreside processing industry, where plants turn walleye Pollock into surimi or pre-surimi white fish blocks bound for Japanese markets. The largest processors in Unalaska have huge Japanese parent corporations, such as Nissui and Maruha. … Japan also dominates the market for consumption of … seafood production.

The Subsistence Economy

Notwithstanding the largely globalized and industrialized context of 21st century Unalaska, subsistence foods remain highly important to most of Unalaska's permanent residents. Historically, local Unangan families relied heavily on marine mammals, especially Stellar sea lions and seals, with sea lion being a very important traditional food that is still widely shared (Unger 2014). Seal oil is also an important traditional food. Salmon have been important resources for Unalaskans for thousands of years and are the most important shared resources among households.

The primary salmon species used locally for subsistence is sockeye salmon. The Unangan traditionally used weirs and traps to harvest salmon as they arrived in the Makushin, Nateekin, Wislow, and Kashega rivers (Figure 1-1; Figure 1-2). Sockeye salmon begin returning to local streams by June, followed by pink salmon. Pink salmon represent the most abundant salmon run on the island but are less sought after for subsistence uses. Coho salmon run from August through October, and a small run of chum salmon comes in with the coho salmon. Chinook salmon do not return to any local streams but are available in marine waters during the winter. Pacific halibut and cod are the primary nonsalmon fish used for subsistence by Unalaskans. Reedy and Maschner (2014:376) reported that "wild cod is perhaps the most traditionally used fish in the 10,000 year history of the Aleut [Unangan], and a fish that is critical to all modern communities." Marine invertebrates, including crabs, octopuses, and chitons are major traditional resources, as are birds and eggs. Plants and berries are very important and popularly harvested subsistence resources for Unalaskan families, including wild roots from plants, such as chocolate lilies; stalks from cow parsnips; leaves of angelicas; kelps; fiddleheads; and numerous berries. Morel mushrooms have also been reported to be harvested abundantly on the island each year (Veltre and Veltre 1982).

Unalaskans obtain many subsistence foods not just by harvesting on their own but also through sharing, customary trading, and bartering within extensive local and regional social networks (Reedy 2016; Reedy and Maschner 2014). Unalaskans who participate in commercial fishing also retain portions of their commercial catches for home use (referred to as "home pack"). In the past it was common for some households to obtain significant amounts of crab for household use through home pack, "cementing crab as a critical subsistence

3. Kraegel, Laura. "Dutch Harbor Ranks as Nation's Top Port for 20th Consecutive Year," KUCB, November 2, 2017. Accessed September 2022. https://www.kucb.org/industry/2017-11-02/dutch-harbor-ranks-as-nations-top-port-for-20th-consecutive-year

resource and part of the social economy [and] also the status and social capital of the providers" (Reedy and Maschner 2014:374). While residents continue to harvest crabs under subsistence regulations, changed commercial king crab fishery regulations have limited employment opportunities for local residents in the industry, significantly reducing access to home pack crab resources (Reedy and Maschner 2014).

Previous research has revealed intense concern from local subsistence users pertaining to the environmental effects of the commercial fishing and processing industry in the area (Reedy 2016). These effects include large amounts of Pacific halibut bycatch from industrial trawlers and heavy seawater pollution in areas that are proximal to the Port of Dutch Harbor. Residents consider the disposal of extreme amounts of commercial processing waste and the discharge of sewage and industrial wastewater into the bay to be grossly contaminating the shellfish normally gathered locally by residents for generations, and residents have frequently reported observations of sores and tumors on fish and seals (Reedy 2016). Another effect stemming from the mass-commodification of local fish and shellfish resources is that access for subsistence users to both Pacific cod and crab, two important traditional foods, "is now embedded in a complex set of property rights allocated to individuals and corporations" (Reedy and Maschner 2014:364). Overall, the evolution of the commercial fishing industry on the island has presented contrasting circumstances to traditional subsistence-oriented Unangan families: on one hand they have income and the benefits of modernity but, on the other hand, they must compete with industrial operations for resources and are overwhelmed by the daunting power of such industry to harness resources and affect the environment (Reedy 2016; Sepez et al. 2007).

Contemporary Community

Since the industrial fishing emergence in the 1960s, commercial fishing and seafood processing has been the primary driver of Unalaska's social, economic, and political evolution. The international Port of Dutch Harbor continues to maintain its status as the highest volume commercial fisheries port in the United States (NMFS 2021). Several hundred commercial fishing vessels operate out of Dutch Harbor annually. Additionally, because it is a deep draft port and is ice-free year-round, it also serves as the most important international marine cargo shipping hub in the American far north. The port operates a container terminal and cranes for the transfer of marine cargo shipped on freighters between North America, Europe, and Asia. Unalaska residents therefore predominantly rely on this marine economy for employment and income. Local commercial fishing operations and crewing employment include trawling, seining, gillnetting, longlining, and pot fishing. Unalaska is home to three large onshore processing plants. There are a variety of other businesses that support the marine shipping and commercial fishing industries. Other employment opportunities are offered by two international shipping companies, the City of Unalaska, Aleutian Housing Authority, Ounalashka Corporation, Qawalangin Tribe of Unalaska, Aleutian-Pribilof Island Association Behavioral Health Clinic, and the Unalaska City School District. Additionally, some residents earn income through occasional construction jobs, performing maintenance, tourism-related businesses such as guiding sport fishing, journalism, and the medical field.

Unalaska is by far the most populous of the Aleutian Islands communities. There is a substantial annual seasonal increase in the presence of fishermen and seafood processors, which occurs during the peak of the commercial fishing season, sometimes swelling the population to more than 10,000 people (Sepez et al. 2005). Persons arriving in Unalaska seasonally for commercial fishing and processing jobs represent a diverse group of foreign-born workers and ethnicities (Sepez et al. 2007). Many processing employees have been seasonal migrants from the Philippines. However, over the decades many foreign workers have become permanent residents of Unalaska. The community thus contains a large percentage of foreign-born residents, the majority of whom were born in Asia. The large-scale influx of nonlocals becoming residents is part of the evolution of the community's population characteristics, driven by the industrial fishing and shipping economy on the island, and has led to a situation where Alaska Native persons now make up less than 10% of the Unalaska population, according to the 2020 federal census.

Unalaska is part of the Aleutians West Census Area but it is not within an organized State of Alaska borough. The City of Unalaska, Ounalashka Corporation, and the Qawalangin Tribe of Unalaska represent the political organizations of the community. The Qawalangin Tribe of Unalaska is a federally recognized

tribal government representing the community's indigenous Aleut/Unangan people. The Ounalashka Corporation, a for-profit village corporation formed after the Alaska Native Claims Settlement Act passed in 1971, is a major landowner and employer in Unalaska.[4] The three largest commercial fish processing companies (Unisea, Westward, and Alyeska), which provide the bulk of tax revenue to operate the city, are also heavy influencers of local politics (Reedy 2016). Infrastructure in the community includes numerous local residences, businesses, two schools, and a medical clinic operated by Iliuliuk Family and Health Services. There are 40 miles of roads on Unalaska and Amaknak islands, mostly providing access to marine infrastructure. The airport provides multiple daily commercial flights to and from Anchorage as well as air cargo services. Tourism infrastructure includes the Aleutian Islands World War II National Historic Area, the Museum of the Aleutians, and the Cathedral of the Holy Ascension, an original Russian Orthodox Cathedral registered as a National Historic Landmark.

Regulatory Context

This regulatory overview focuses on aquatic harvesting activities due to the absence of large land mammals on Unalaska Island, and the minimal role that hunting of terrestrial game plays in overall harvest patterns. Subsistence hunting and fishing opportunities in Alaska are offered under both state and federal regulations. In addition to state subsistence opportunities, many Alaskans bring home fish from their commercial catches or by harvesting under state sport fishing regulations. The Alaska Maritime National Wildlife Refuge encompasses much of the Aleutian Islands, within which federal regulations guide subsistence use of lands and waters. Outside of the boundaries of the refuge, the state manages most subsistence fisheries, including for salmon and crabs, but Pacific halibut subsistence harvests are regulated by the NMFS. Under the Marine Mammal Protection Act, marine mammals can be harvested by any Indian, Aleut, or Eskimo who resides in Alaska and who dwells on the coast of the North Pacific Ocean or the Arctic Ocean, as long as it is done for subsistence purposes, or for purposes of "creating and selling authentic native articles of handicrafts and clothing" (16 U.S.C. 1371 Sec. 101(b)). Subsistence uses of seals, sea lions, and whales are managed by the National Oceanic and Atmospheric Administration (NOAA) and sea otters and walruses are managed by the USFWS. Some marine mammal species are co-managed with Alaska Native organizations such as the Alaska Sea Otter and Steller Sea Lion Commission and Aleut Marine Mammal Commission, which are member organizations of the Indigenous People's Council for Marine Mammals.

Fish

For state fisheries management, Unalaska Island is considered part of the Aleutian Islands Management Area, which includes all waters of Alaska in and surrounding the Aleutian Islands west of Cape Sarichef Light and west of a line extending from Scotch Cap through the easternmost tip of Ugamak Island, including the waters in and surrounding the Pribilof Islands (5 AAC 01.350).

In March 2016, the BOF adopted a proposal submitted by the Unalaska Native Fishermen's Association and closed the waters of Unalaska Bay to commercial trawling for groundfish.[5] The proponents argued that continuous trawling in the bay since 2002 negatively affected subsistence and sport uses of salmon returning to spawn in rivers and streams in Unalaska Bay. Public comment submitted in support of the proposal indicated that commercial fishing in Unalaska Bay had affected not just salmon, but other important subsistence resources as well, including Pacific halibut and herring, crabs, and marine mammals. As a result, fishers have had to travel farther, out of the bay and through dangerous waters, and also travel through the commercial fishing fleet, in order to harvest fish for subsistence. Portions of a report written by Dr. Katherine Reedy were presented to the board as well, communicating local concerns for coho and sockeye salmon populations in Unalaska Bay, and for the fact that elders were unable to catch the fish they need from local beaches (Reedy 2016).

4. Ounalashka Corporation. 2019. "Welcome to The Ounalashka Corporation: A Real Estate Leasing & Development Company; Aang Aang Shareholders & Visitors!" Accessed August 2023. https://ounalashka.com/
5. Alaska Department of Fish and Game. 2016. "Alaska Board of Fisheries Meeting Information: Statewide Finfish and Supplemental Issues – March 8–11, 2016." Accessed August 2022. https://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=03-08-2016&meeting=anchorage

The BOF has determined that Pacific halibut and all other finfish in the Aleutian Islands Area and the waters surrounding the Pribilof Islands are customarily and traditionally taken or used for subsistence. Alaska state law requires that the BOF determine the amount of the harvestable portion of a fish population that is reasonably necessary for customary and traditional uses, known as the ANS ("amount necessary for subsistence"). An ANS provides the BOF with guidelines on typical numbers of fish harvested for customary and traditional uses under normal conditions and provides a metric about the provision of reasonable opportunity for subsistence harvests, as required by Alaska law (AS 16.05.258). Regulations may be re-examined if harvests for customary and traditional uses consistently fall below the ANS. For salmon populations customarily and traditionally used for subsistence in the Unalaska region, the BOF found that: (1) 13,500–23,000 salmon, and (2) 200,000–330,000 usable pounds of finfish other than salmon are reasonably necessary for subsistence uses in the Aleutian Islands Area as a whole (5 AAC 01.366).

Salmon

Figure 1-2 details bodies of water near the community of Unalaska, many of which are used for subsistence salmon fishing. State subsistence salmon permits are required to subsistence fish in the Unalaska District. With the exception of surveys conducted by the Division of Subsistence for 1994 and 2020, all documentation of subsistence salmon harvests relies on this permit program, which the ADF&G Division of Commercial Fisheries has administered since 1985. Under regulations in place in 2020, subsistence fishers in the Unalaska District were limited to 25 salmon per permit, of which no more than 10 sockeye salmon could be harvested from Front Beach in Unalaska Bay, plus an additional 25 salmon for each member of the same household whose name was listed on the permit, of which no more than 10 sockeye salmon could be harvested from Front Beach in Unalaska Bay (5 AAC 01.380(b)(1)). Subsistence fishers were required to record their daily harvests on a subsistence salmon fishing permit and return it to ADF&G by October 31 even if no fish were harvested (5 AAC 01.380(c)). Legal gear was limited to seines and gillnets, and subsistence nets could be fished from 6:00 am to 9:00 pm daily, year-round (5 AAC 01.360). Subsistence fishers had to attend their gillnets at all times while fishing (5 AAC 01.370(d)). From June 1 through September 15, a salmon seine vessel could not be used to take salmon for subsistence purposes during the 24 hours before and 12 hours after an open commercial salmon fishing period within an area open to commercial salmon fishing (5 AAC 01.360(a)(1)). Waters within the Unalaska District that were closed to subsistence fishing for salmon are defined in 5 AAC 01.375.

Salmon runs near Unalaska Island have declined since the mid- to late 1980s (Holmes 1997). In 1997, concerns of overexploitation of sockeye salmon stocks prompted waters near Unalaska Lake (one of the most accessible systems to Unalaska residents) to be closed for subsistence fishing (Holmes 1998); the area closure became permanent in 5 AAC 01.375 in 1998 (Shaul 1998:1, 5). This shifted subsistence effort toward Reese Bay and the McLees Lake watershed (Holmes 1998). More than 80% of salmon harvested annually by Unalaska residents are sockeye salmon, and the McLees Lake stock harvested in Reese Bay has historically provided 45%–94% of the sockeye salmon harvest in the community (Fox et al. 2021). In 2020, the McLees Lake weir fish count was historically low (5,037 sockeye salmon[6]). Inseason, ADF&G maintained a 500-yard closure around the terminus of the McLees Lake outlet stream for the duration of the sockeye run.[7] This action, while necessary for conservation of sockeye salmon, also reduced subsistence harvest opportunities for local users during the study year.

Residents of Unalaska are federally qualified to harvest salmon, trout, and char in fresh waters of the Alaska Maritime National Wildlife Refuge under federal subsistence regulations that mirror the state subsistence fishery regulations for seasons, bag limits, and closed waters (Federal Subsistence Management Program 2019). Other salmon harvesting opportunities for Unalaska residents include retention of salmon from

6. Fish Count Data Search, Search Fish Counts, s.v. "[Begin by selecting a location] McLees Lake; [Species] Sockeye; [Year] 2020" (by Alaska Department of Fish and Game). Accessed August 2022. https://www.adfg.alaska.gov/sf/FishCounts/
7. ADF&G Division of Commercial Fisheries, "Cold Bay Subsistence Salmon Fishery Advisory Announcement #01," news release, July 6, 2020. Accessed September 28, 2022. http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1179270913.pdf

commercial harvests (5 AAC 39.010) and the local sport fishery. There is little commercial salmon fishing in the waters near Unalaska, however. The ADF&G Division of Commercial Fisheries manages the small commercial salmon fishery with staff based in Cold Bay and Sand Point with assistance from the Dutch Harbor office. Sport fishing in circumjacent salt waters is open year-round for salmon (5 AAC 65.020(1)(B); 5 AAC 65.020(2)). Under sport fishing regulations, in Unalaska Bay freshwater and saltwater drainages, all salmon except for Chinook salmon have a daily bag and possession limit of five fish per day, of which only two may be coho and two may be sockeye salmon (5 AAC 65.022(e)). For Chinook salmon in salt water, the limit is two fish per day, two in possession, with no annual limit. Due to the growing population of Unalaska, waters connected with the road system are heavily used for salmon fishing using rod and reel gear.

Nonsalmon Fish

While there are a variety of nonsalmon fish harvested for subsistence uses, one of the most important is Pacific halibut. 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 NOAA, does distribute a biennial voluntary harvest survey to all SHARC holders. Pacific halibut fishers in the Unalaska area (halibut regulatory area 4A) 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) (50 CFR 300.65(h)(1)). Harvest limits are 20 fish per day and there is no possession limit (50 CFR 300.65(h)(2)). These and other regulations concerning halibut fishing in Alaska can be found at 50 CFR 300.65. Under state subsistence regulations, Pacific halibut may be taken only by a single handheld line with no more than two hooks attached (5 AAC 01.370(c)). The most recent harvest estimates for subsistence Pacific halibut in Unalaska show that, in 2020, 5,330 lb of Pacific halibut were caught by Unalaska residents who held SHARCs (Sill and Koster 2022:61). There are no annual harvest assessment programs for other subsistence finfish fisheries of the Aleutian Islands Area. Under state subsistence regulations, a permit is required for rainbow and steelhead trout (5 AAC 01.380), but otherwise nonsalmon fish may be harvested at any time with general subsistence gear as specified in 5 AAC 01.010.

Shellfish

Unalaska residents harvest a variety of marine invertebrates for subsistence. The BOF has made a positive customary and traditional use finding for king crab, Tanner crab, Dungeness crab, and miscellaneous shellfish. For most species except crabs, there are no bag limits, closed seasons, or reporting requirements for subsistence harvesting. Both a permit and harvest report are required for the subsistence harvest of king and Tanner crab in the waters around Unalaska (5 AAC 02.506). There are daily bag and possession limits for Dungeness crab (12 crab; 5 AAC 02.515), Tanner crab (12 crab; 5 AAC 02.525), and king crab (one crab in the waters around Unalaska, six crab elsewhere in the management area; 5 AAC 02.520), as well as minimum size requirements for each species. In recent years, the Tanner crab population has been declining, and subsistence harvests of king and Tanner crab have been below average (Nichols et al. 2022).

Study Objectives

The project had the following objectives for the study community of Unalaska:

1. Estimate community harvest levels and percentages of households using, harvesting, giving away, and receiving all wild resources for the calendar year 2019 [later revised to 2020 due to the COVID-19 pandemic causing project delays];
2. Document local knowledge related to traditional and contemporary patterns of subsistence salmon and nonsalmon fish harvests in Unalaska;
3. Participate in subsistence salmon fishing with Unalaska residents and record observations on salmon run timing, gear used, social and cultural practices associated with salmon fishing, and possible changes associated with the recent exclusion of commercial trawl fishers from Unalaska Bay.

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*[8] and by the National Science Foundation, Office of Polar Programs in its *Principles for the Conduct of Research in the Arctic*,[9] 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 Qawalangin Tribe of Unalaska and the City of Unalaska (Table 1-2). During development of the project, ADF&G staff contacted the city and tribal governments, as well as local organizations, by phone and email to gauge their interest in the study activities. Letters of support for the project were submitted by the Aleut Corporation, the City of Unalaska, the Unalaska/Dutch Harbor Fish and Game Advisory Committee, the Unalaska Native Fishermen's Association, and the ADF&G Division of Commercial Fisheries; the letters were included in the project proposal submitted to OSM (Appendix A). After the project was awarded funding, division staff developed a draft survey instrument based on previous research in Unalaska and the division's standard comprehensive household harvest survey. ADF&G researchers Lauren Sill and Amy Wiita traveled to Unalaska in June 2019 to conduct groundtruthing of housing units and present the project overview of the proposed project's goals, objectives, methods, and timeline to the Qawalangin Tribal Council. Due to postponements of the tribal council meeting, Wiita and Sill instead met with the tribe's Environmental Director and President and discussed the project, reviewed the survey form and species list, sought feedback on the project plans, and coordinated logistics of returning to the community to conduct the surveys. To determine the total number of households in Unalaska, researchers first obtained a list of households developed by the City of Unalaska in 2017. Researchers then drove every road in Unalaska, verifying the housing units listed on the document, adding new structures encountered, and removing structures that were clearly uninhabitable or abandoned. For each of the three seafood processing companies, researchers met with the employee most knowledgeable about housing on their campuses and determined which units were for permanent employees and which housed temporary workers. Through this groundtruthing, researchers created a comprehensive household list of all potentially occupied households in Unalaska. Researchers did not verify whether each unit was occupied, or whether the occupants would be eligible[10] for the survey. Per the funded proposal and prior to the project delays caused by the COVID-19 pandemic, survey data collection was planned for late winter/spring 2020 for the 2019 harvest year.

Jacqueline Keating replaced Wiita as the Southcentral Subsistence Resource Specialist in December 2019 and assumed the position of principal investigator. Fieldwork was scheduled for April 2020; however, in March, COVID-19 was declared a pandemic and the governor of Alaska issued stay-at-home orders. Fieldwork was postponed following the travel restrictions and due to safety concerns related to the COVID-19 pandemic. Staff drafted and proposed alternate plans for conducting the research, including sending two staff to Unalaska to quarantine and then lead the survey effort, and training LRAs to conduct a simplified survey rather than having staff travel to administer the survey. Researchers remained in contact with the Qawalangin Tribe throughout this period as the severity of the pandemic began to be better understood. By July, the City of Unalaska and Qawalangin Tribe officially stated that external visitors and in-person contact

8. Alaska Federation of Natives. 2013. "Alaska Federation of Natives Guidelines for Research." Alaska Native Knowledge Network. Accessed February 8, 2021. http://www.ankn.uaf.edu/IKS/afnguide.html
9. National Science Foundation Interagency Social Science Task Force. 2018. "Principles for Conducting Research in the Arctic." Accessed February 8, 2021. https://www.nsf.gov/geo/opp/arctic/conduct.jsp
10. Note that the survey form asked participants to identify people who lived in the household for more than three months in 2020.

Table 1-2.–Project staff.

Task	Name	Organization
Southern Regional Program Manager	Robin Dublin	ADF&G Division of Subsistence
Principal Investigators	Amy Wiita	ADF&G Division of Subsistence
	Lauren A. Sill	ADF&G Division of Subsistence
	Jacqueline M. Keating	ADF&G Division of Subsistence
Data Management Lead	David Koster	ADF&G Division of Subsistence
Administrative support	Pam Amundson	ADF&G Division of Subsistence
	Tamsen Coursey-Willis	ADF&G Division of Subsistence
	Cheryl Park	ADF&G Division of Subsistence
Programmer	Margaret Cunningham	ADF&G Division of Subsistence
	David Koster	ADF&G Division of Subsistence
Data entry	Margaret Cunningham	ADF&G Division of Subsistence
	Loraine S. Navarro	ADF&G Division of Subsistence
	Halia Valdez	ADF&G Division of Subsistence
Data cleaning/validation	Margaret Cunningham	ADF&G Division of Subsistence
Data analysis	David Koster	ADF&G Division of Subsistence
	Margaret Cunningham	ADF&G Division of Subsistence
Cartography	Margaret Cunningham	ADF&G Division of Subsistence
	Gayle P. Neufeld	ADF&G Division of Subsistence
Editorial Review Lead	Mary Lamb	ADF&G Division of Subsistence
Production Lead	Mary Lamb	ADF&G Division of Subsistence
Field research staff	Amy Wiita	ADF&G Division of Subsistence
	Lauren A. Sill	ADF&G Division of Subsistence
	Jacqueline M. Keating	ADF&G Division of Subsistence
	Lisa Hutchinson-Scarbrough	ADF&G Division of Subsistence
	Chance Wilcox	ADF&G Division of Subsistence
Subsistence Resource Specialist	James Van Lanen	ADF&G Division of Subsistence
Phone survey staff	Bronwyn Jones	ADF&G Division of Subsistence
	Lisa Hutchinson-Scarbrough	ADF&G Division of Subsistence
	Loraine S. Navarro	ADF&G Division of Subsistence
	Rebecca Dunne	ADF&G Division of Subsistence
	Adam Knight	ADF&G Division of Subsistence
Local Research Assistants	Victor Fisher	Unalaska
	Robin Stepetin	Unalaska

Plate 1-3.–Winning entry from the youth art contest held in Unalaska, 2020.

with LRAs would not be permitted. Additionally, the tribe expressed concerns, shared by division staff, about the safety of elders who would be candidates for KRIs and conveyed that the limited capacity of phone and internet services in Unalaska would make it difficult to conduct surveys and interviews remotely.

Due to funding considerations, the Division of Subsistence explored methods for conducting research remotely rather than delaying the work indefinitely until travel was permissible. Division staff met with OSM staff on July 31, 2020, to discuss contingency plans and to receive approval for testing an alternate survey method. Keating and Sill developed a draft research plan that included the creation of a self-administered survey, removing harvest area mapping data collection, survey testing, a rigorous outreach campaign in Unalaska, and remote survey delivery that relied solely on LRAs. Details of this contingency plan and the revised self-administered comprehensive survey are provided in the following sections.

COVID-19 Contingency Outreach Plan

Due to the unprecedented nature of conducting a comprehensive harvest survey remotely, Division of Subsistence staff developed a rigorous outreach plan to connect with the community of Unalaska and raise awareness of the survey (Appendix B). The plan included a radio announcement and classified ads with the local radio station (KUCB) to recruit LRAs, a youth art contest to solicit art that could be used on the survey cover sheet, flyers about the survey posted around town, incentives for survey participation, live radio interviews (KUCB), and follow-up phone calls if needed to reach the desired sample size.

Advertisements for hiring LRAs began in November 2020. The youth art contest was also advertised in November through KUCB, the Qawalangin Tribe's Facebook[11] page, and two teachers who offered to share the contest entry details with their class. All participants were required to have a parent or guardian submit a media release form. Seven entries were submitted, and one name was randomly drawn to receive an art supplies prize. The submission by 12-year-old Hedya Whitaker was chosen to be on the cover of the survey form (Plate 1-3).

One reviewer of the draft revised survey offered to anonymously donate $2,000 for cash prizes to encourage survey participation. At the request of the donor, the sum was split into five $200 prizes and one grand prize of $1,000. Any household that completed a survey was eligible to enter the raffle drawing, and the raffle was advertised on flyers posted around town and on the Qawalangin Tribe's Facebook page (Appendix C).[12] As advertised on the raffle flyer, bright green raffle cards were included with every survey, and each card stated that the card would be separated from the survey so that no individual identifying information would be associated with survey responses. Upon receiving a returned survey, staff checked for completeness and then removed the raffle card from the survey to protect anonymity of the survey data. Three raffle cards were discarded: two because they were returned without a survey and one because it was returned with a survey that was not filled out. Information from raffle cards was entered into a Microsoft Excel spreadsheet so that any duplicate entries could be removed (no duplicate entries were

11. Product names are given because they are established standards for the State of Alaska or for scientific completeness; they do not constitute product endorsement.
12. Per division policy, households are not directly compensated for participation in household harvest surveys. To increase response rates, however, incentives such as a raffle are sometimes used.

found). At the end of the data collection period, each entry was assigned a randomly generated number in Microsoft Excel, and the six smallest numbers were chosen as winners. The drawing was conducted live on air with KUCB, then winners were contacted individually to arrange payments.

As additional incentive, single-serve coffee packets were ordered from Kaladi Brothers in Anchorage to be delivered with each survey. The packets were printed with the ADF&G logo and text "Unalaska Subsistence Harvest Surveys." This method has been used in other division research to encourage participation and raise awareness of the Division of Subsistence (McDevitt et al. 2020).

Keating participated in a series of live radio interviews on KUCB to promote the survey (Table 1-3). The first interview in January 2021 introduced the Division of Subsistence and discussed the origins of the project, including concerns voiced at federal Subsistence Regional Advisory Council meetings and the need for updated subsistence harvest information, as well as ways that harvest data are used. The interview also covered how the self-administered survey would be delivered, how to participate in the raffle, and ways that anonymity is protected in research. The second interview covered similar topics but was recorded for a nightly newscast and a written online story. In February, Keating participated in a third interview along with the vice-mayor of Unalaska, Dennis Robinson, an avid subsistence harvester who had already completed a survey. This interview shared information on how to receive and complete a survey if people had not already done so, and discussed the importance of participating in the survey to inform decisions that provide reasonable opportunities for subsistence. On March 11, Keating gave a short radio interview to announce an extension to the raffle deadline and share that randomly selected households would be getting phone calls to invite them to complete a survey over the phone. The second-to-final interview was a live raffle drawing on April 7, where Keating also shared information about how project results would be shared, the timeline for project completion, and how to get involved in the regulatory process. Finally, Keating and Sill participated in a live radio interview from the KUCB radio station on September 1 to share key project findings and promote the in-person community data review meeting that took place that evening (Plate 1-4).

Systematic Household Surveys

The primary method for collecting subsistence harvest and use information in this project was a systematic household survey that was a pilot self-administered version due to the COVID-19 pandemic. Research Analyst David Koster converted the division's standard comprehensive household harvest survey instrument to a self-administered version (Appendix D). The key goal was to structure the survey instrument to collect demographic, resource harvest and use, and other economic data that are comparable with data in the Community Subsistence Information System (CSIS[13]). Additionally, food security and resource use assessment data were collected, and questions pertaining to the effects of pelagic trawling in Unalaska Bay were included in the survey to satisfy a project objective. Drafts of the survey produced by Koster were regularly shared with Keating and Sill, and also presented virtually at numerous research staff meetings. Near-final versions of the survey were shared more broadly throughout ADF&G and with OSM staff, agency partners, the Qawalangin Tribe, and members of the community in Unalaska. In total, 26 individuals provided written feedback on the draft survey. Keating compiled and organized all feedback using QSR International's NVivo 12 Pro to summarize feedback for each survey page. This effort produced a 15-page document used to guide survey form changes that Koster subsequently incorporated. The Qawalangin Tribe assisted with identifying 11 Unalaska residents who tested the final draft of the survey in December 2020 before the full survey was launched in January 2021.

Because of the size of Unalaska, there was a survey goal of 200 households. Rather than contacting a random selection of Unalaska households to achieve a sample of 200 households, the modified research plan for the pilot self-administered survey relied on LRAs to hand-deliver survey packages to every occupied household, including permanent residences in processor housing, based on the groundtruthing conducted in 2019. Survey packages were a plastic drawstring bag that contained a signed letter of explanation about the project and listed designated pickup days for surveys (Plate 1-5; Appendix E), the printed survey, a manila

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

Table 1-3.–Date and duration of radio interviews.

Date	Host	Duration
Wednesday, January 20, 2021	Victor Fisher	30 minutes
Tuesday, January 26, 2021	Maggie Nelson	15 minutes (recorded story)
Thursday, February 11, 2021	Victor Fisher	30 minutes
Thursday, March 11, 2021	Victor Fisher	15 minutes
Wednesday, April 07, 2021	Victor Fisher	15 minutes
Wednesday, September 01, 2021	Victor Fisher	30 minutes

Plate 1-4.–ADF&G Subsistence Resource Specialists, Sill and Keating, share survey results on KUCB, September 2021.

Plate 1-5.–One thousand survey packets being prepared for shipment to Unalaska.

postage-paid envelope to seal and return completed surveys, a green raffle card, a pen, and a single-serve coffee packet with the ADF&G logo and project name. Households were divided into 10 sections based on geographic region, including three sections that encompassed seafood processing plant housing for Alyeska Seafoods, Inc., Unisea, Inc., and Westward Seafoods, Inc., that had been identified as permanent residences. Due to challenges encountered during survey implementation, discussed below, not all identified households received a survey package. The number of households to receive a survey packet could be as high as 758 (76% of identified households; [Table 1-4]), however the number of packets that blew away or otherwise failed to make it inside a home is unknown. Table 1-5 presents the final sample achievement for the survey.

Table 1-4.–Household sample survey delivery estimate, Unalaska, 2020.

Area	Occupied households	Estimated delivery
Aerie	46	30
Airport	39	39
Alyeska[a]	23	–
Biorka	222	222
Captain's Bay	25	25
Downtown	145	144
East Point	36	36
Haystack	53	53
Ptarmigan	91	91
Steward	118	118
Unisea[a]	152	–
Westward[a]	48	–
Total	**998**	**758**

Source ADF&G Division of Subsistence household surveys, 2021.

a. Processor housing; note that no survey deliveries were made, as indicated by "–" for the estimated delivery.

Table 1-5.–Sample achievement, Unalaska, 2020.

Sample information	Community Unalaska
Number of dwelling units	998
Surveys distributed	758
Survey goal	200
Total households surveyed	114
Returned by mail	100
Phone surveys completed	14
Phone surveys attempted	100
Refused	17
Refusal rate	45.9%
No contact/wrong number[a]	63
Sent in paper surveys after phone call[b]	4
Already completed survey[b]	2
Final estimate of permanent households	998
Percentage of total households surveyed	11.4%
Percent of sampling goal	57.0%
Survey weighting factor	8.75
Sampled population	239
Estimated population	2,092.3

Source ADF&G Division of Subsistence household surveys, 2021.

a. Includes 10 households not contacted because the phone number from the random sample list matched one submitted with a raffle drawing entry already received by mail.

b. Survey counted as returned by mail.

Table 1-6.–Key dates for the household survey implementation.

Date	Event
January 15, 2021	Survey and accompanying materials finalized and sent to printer
January 20, 2021	Notification postcards sent to all P.O. boxes in Unalaska and Dutch Harbor
January 20, 2021	KUCB Interview 1 (Project Introduction)
January 21, 2021	Surveys printed, survey packet assembly initiated (5 days)
January 25, 2021	Survey boxes shipped to Unalaska with ACE Air Cargo
January 26, 2021	KUCB Interview 2 (Project Introduction)
January 27, 2021	LRA training (over the phone)
January 28, 2021	Surveys landed in Unalaska; first surveys delivered
February 5, 2021	First completed survey is received at ADF&G office in Anchorage via U.S. mail
February 10, 2021	Final surveys delivered to households
February 11, 2021	KUCB Interview 3 (Project Promotion with Vice-Mayor)
February 22, 2021	Reminder postcards sent to all P.O. boxes and survey raffle deadline extended to Wednesday, March 17
March 8, 2021	70 total surveys received by U.S. mail; staff meeting held to discuss survey return rate and phone survey plan
March 11, 2021	KUCB Interview 4 (Announcing Phone Surverys)
March 11, 2021	Phone survey training with Southern Region staff
March 11, 2021	86 total surveys receieved by U.S. mail; phone surveys launched
March 16, 2021	Phone survey training with Northern Region staff
April 6, 2021	114 total surveys completed; second wave of phone survey effort encountered minumum participation; staff meeting held to announce end of data collection
April 7, 2021	KUCB Interview 5 (Raffle Winners Announced); data collection closed

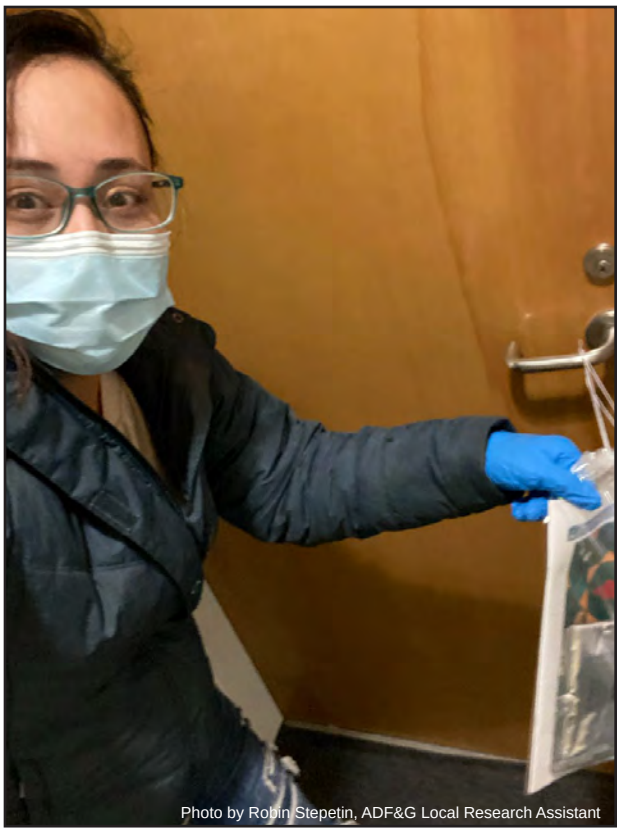


Plate 1-6.–Survey packets distributed by a local research assistant in Unalaska, February 2021.

Household Survey Implementation

Key dates for the household survey implementation are outlined in Table 1-6. Keating and Sill led a two-hour LRA training over the phone on January 27, 2021, for LRAs Victor Fisher and Robin Stepetin. Fisher served as the lead LRA and was responsible for retrieving survey packages from the airport and distributing them to Stepetin. Keating had daily contact with Fisher once survey distribution began on January 28. Fisher and Stepetin used the detailed descriptions of households from the 2019 groundtruthing list and delivered the waterproof survey bags to each door (Plate 1-6). LRAs were invited to knock when delivering packets, but due to COVID-19 concerns and social distancing guidelines they did not interact with household residents. LRAs were paid a flat rate for delivery in each of the 10 community sections based on the number of households in each section. The majority of the surveys were delivered within the first week, but poor weather and icy roads delayed completion of the process. The last survey packages were delivered to households by February 10.

Due to the spread of COVID-19 in processing plants, all three facilities were on lockdown for the duration of the study. Despite multiple attempts by Keating and Fisher, LRAs were not permitted to distribute surveys on those properties. In addition, one LRA was asked to leave a set of housing units in the Aerie section before she had distributed all of the surveys, despite wearing a mask and gloves. The sampling list for phone surveys conducted later included permanent households located in processor housing and the Aerie community area; phone surveys potentially captured responses from those households that did not receive a self-administered survey packet.

Completed surveys started arriving to ADF&G in the mail on February 5. In addition to having a pre-paid envelope to return surveys in the mail, residents had the option to leave their completed surveys outside in the sealed envelopes and plastic bags on one of four designated pickup days. The plan was to have LRAs drive the streets of their sections of town on pickup days to retrieve envelopes. Unlike the flat rate for survey deliveries, LRAs would be paid $15 for each survey they retrieved. In reality, the delay in distributing surveys made the survey distribution period conflict with all but one pre-designated pickup day, so LRAs did not have the capacity to check other areas of town for survey pickups. LRAs retrieved a total of six surveys from doors or directly from friends and colleagues, but two surveys were returned to ADF&G in the mail with a note that the completed surveys had been left outside multiple times and had never been picked up.

By March 8, only 70 surveys had been returned to ADF&G. Keating and Koster hosted a research staff meeting to discuss how to launch phone surveys to achieve a sufficient sample of total households. The phone survey sample was derived from a list of Unalaska phone numbers of residents who had registered for the most recent Alaska Permanent Fund dividend. From this list, Koster drew a random sample of 50 names to contact for the first round of phone calls. Keating removed phone numbers that matched numbers submitted to the raffle drawing to avoid contacting households that had already completed the survey. A phone survey training was held for division staff in the Anchorage office on March 11, and a second training was held for division staff in the Fairbanks office on March 16. Staff received an instruction sheet (Appendix F) and printed copies of the survey to fill in over the

Plate 1-7.–Researcher Jacqueline M. Keating conducting a key respondent interview in Unalaska, 2021.

phone. Staff started calling households on March 11. Research staff received a list of 10 names and phone numbers to contact following standard survey procedures, including trying each number three different days and times before declaring them a "no contact." Once contacts were made, staff conducted the survey over the phone or offered to help residents complete their surveys and informed them that they could still be entered in the raffle by completing the survey. From the first list of 50 households, 12 residents completed the survey over the phone, eight declined to participate, four promised to complete and return the printed copy they had received, two had already mailed their survey in, and the remaining were wrong numbers or no contacts (Table 1-5). After the first 50 phone numbers had been attempted three times, a new list of 50 randomly selected phone numbers was drawn. From this list, only two additional residents completed a survey over the phone while nine refused to participate and the remaining were wrong numbers or no contacts. Due to a combination of the amount of staff time required to conduct phone surveys, limited staffing availability, the sharply decreasing response rates, and the approaching 2021 harvest season, it was not worthwhile to continue extending the survey period for the 2020 harvest year. Koster ran a preliminary data analysis, found no evidence of bias in the sample, and determined that the response and representation were sufficient to produce reliable harvest estimates. On April 6, a total of 114 surveys had been returned or conducted over the phone (Table 1-5), and Keating led a staff meeting to officially conclude data collection. Keating held the live raffle drawing on KUCB the following day, April 7.

Key Respondent Interviews

The purpose of the KRIs was to provide additional context for the quantitative data; gather information on community background, seasonal round, and community comments and concerns; and document local knowledge about traditional and contemporary patterns of subsistence fish harvests and factors causing changes over time. Researchers consulted with the Qawalangin Tribe and LRAs to identify key respondents to interview. Once in the field, snowball sampling was used to expand the key respondent pool by asking respondents to identify other local contacts who were especially knowledgeable about local subsistence issues. In total, 10 individuals agreed to participate in in-person interviews in August and September 2021 (Plate 1-7). Key respondent interviews were semi-structured and directed by a KRI protocol designed by ADF&G researcher James Van Lanen, reviewed by Keating and Sill, and approved by the Qawalangin Tribe (Appendix G). Key respondents were offered compensation for their time. In addition to gathering qualitative data through the KRI protocol, ADF&G staff took notes during surveys collected by phone to provide additional context to survey results. Researchers analyzed both transcribed KRIs and interview notes in preparation for writing this report. Key respondents were informed that, to maintain anonymity, their names would not be included in this report.

Plate 1-8.–Key respondent participant observation by researcher Jacqueline M. Keating, Front Beach, Unalaska, 2021.

Participant Observation

During participant observation, researchers recorded their observations and wrote notes from discussions with fishery participants on salmon run timing, gear used, social and cultural practices associated with salmon fishing, and possible changes associated with the recent exclusion of commercial trawl fishers from Unalaska Bay. Researchers consulted a participant observation guide (Appendix H), drafted by ADF&G researcher James Van Lanen, prior to beginning fieldwork for participant observation. Like key respondents, individuals selected for observation during subsistence fishing activities were suggested by the Qawalangin Tribe, LRAs, and through snowball sampling. Note that there were individuals who supported this project both as a key respondent and participant observation host, fulfilling those roles simultaneously when meeting with researchers.

During the first of two participant observation trips to Unalaska, researchers monitored salmon nets at Front Beach along with a total of four families in September 2021 (Plate 1-8). On the second trip, in June 2022, salmon were late returning to Unalaska, so researchers accompanied two local divers (both of whom were key respondents in 2021 and who dive for subsistence crab) on a scouting trip. Researchers drove a skiff while the divers explored a new area, and on the way back to Unalaska the divers took researchers to the primary salmon systems within Unalaska Bay and shared their thoughts and observations. Researchers analyzed participant observation notes in preparation for writing this report.

Data Analysis and Review

Survey Data Entry and Analysis

Surveys were reviewed for completeness by research staff and Information Management staff of the ADF&G Division of Subsistence. Due to the new self-administered survey format, responses did not require coding. Information Management staff Margaret Cunningham and Koster set up database structures within a Microsoft SQL Server housed at ADF&G in Anchorage to hold the survey data. The database structures included rules, constraints, and referential integrity to ensure that data were entered completely and accurately. Data entry screens were available on a secured internet network. Daily incremental backups of the database occurred, and transaction logs were backed up hourly. Full backups of the database occurred twice weekly. This process 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 was compared in order to minimize data entry errors.

Once data were entered and confirmed, information was processed with the use of R statistical software version 4.0.3 and the 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 I for conversion factors[14]).

14. For an overview of statewide conversion factors and their sources, see "Resource Conversion

Division of Subsistence staff also used R and 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 for harvest and use of resources and household demographics 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. Division researchers documented all adjustments. Typically, missing data are an uncommon, randomly occurring phenomenon in household surveys; no surveys returned by mail or completed by phone were missing a substantial amount of survey information, which would have been grounds for removal from the community estimate.

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

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

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

where:

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

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

h_i = the total harvest reported in returned surveys,

n_i = the number of returned surveys, and

S_i = the number of households in a community.

As an interim step, the standard deviation (SD) (or variance [V], which is the SD squared) was calculated with the raw, unexpanded data. The standard error (SE), or SD of the mean, was also calculated. This was used to estimate the relative precision of the mean, or the likelihood that an unknown value would fall within a certain distance from the mean. In this study, the relative precision of the mean is shown in the tables as a confidence interval (CI), expressed as a percentage or range of values. Once SE was calculated, the CI 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:

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

where:

s = sample standard deviation,

n = sampled households,

N = total number of households in the community,

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

$\bar{x}$ = sample mean.

Factors," ADF&G Division of Subsistence, CSIS: http://www.adfg.alaska.gov/sb/CSIS/index.cfm?ADFG=main.conversionFactorSelRes

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

Estimates for jobs and income were derived using a Monte-Carlo method referred to as bootstrapping (Efron and Tibshirani 1993). This method is used to account for confounding features of the data stemming from the complexity of interrelated variables and random missing elements, as well as small amounts of data. Small populations result in many unique records where it is not possible to identify a mean or median for estimation, so similar records must be used instead. These "similar" records are derived through resampling with replacement. The assumption is that the jobs and income present in the sample are reasonably representative of the whole community and therefore uncontacted households will have similar makeup and characteristics. Jobs and income estimates could be conducted using standard methods referenced earlier, as were applied to household harvest estimates, but it would be impossible to derive a confidence interval. Bootstrapping resolves both issues of the complexity of the data and small population size while resulting in an estimate that approximates using a sample mean to estimate the community mean.

The bootstrap method resamples surveyed households, with replacement, 1,000 times. An estimate is developed for each separate resample using a set of rules regarding missing data. To begin, known annual income amounts per job are divided by the number of months. Missing income from a job is replaced with the median of jobs having the same standard occupational classification (SOC) code. If no estimate can be obtained, then a median from the same industry is applied. A similar approach is used for missing information about job schedules and months, using the mean, rather than the median. Once missing value replacements were made, the expansion factor described for harvests was applied. For individuals between the ages of 16 and 65 who did not provide an employment status, an additional expansion factor was calculated and applied. Once estimates were created for each resample, the average of all 1,000 resamples was used as the estimate. This approach was used to estimate the number of jobs, total income, number of employed people, and the number of employed households. Ninety-five percent confidence intervals for income estimates by source were computed by selecting appropriate quantiles from the 1,000 resamples, using an approach adapted from Efron and Tibshirani (1993).

$$l = \sum_{i=1}^{(\hat{\theta}_i - \theta) < 0} 1 \tag{4}$$

$$\bar{\theta} = \frac{\sum_{i=1}^{N} \hat{\theta}_i}{N} \tag{5}$$

$$z_0 = \frac{l}{N} \tag{6}$$

$$t_2 = \sum_{i}^{N} (\hat{\theta}_i - \theta)^2 \tag{7}$$

$$t_3 = \sum_{i}^{N} (\hat{\theta}_i - \theta)^3 \tag{8}$$

$$\hat{\alpha} = \frac{t_3}{(6 \times t_2)^{1.5}} \tag{9}$$

$$\alpha_1 = NORMAL\left(\hat{z}_0 + \frac{\hat{z}_0 - 1.96}{(1 - \hat{\alpha} \times (\hat{z}_0 - 1.96)}\right) \tag{10}$$

$$\alpha_2 = NORMAL\left(\hat{z}_0 + \frac{\hat{z}_0 + 1.96}{(1 - \hat{\alpha} \times (\hat{z}_0 + 1.96)}\right) \tag{11}$$

$$CI(-) = \hat{\theta}_{N \times \alpha_1} \tag{12}$$

$$CI(+) = \hat{\theta}_{N \times \alpha_2} \tag{13}$$

where:

N = number of resamples taken (at least 1,000),

i = index of resamples ordered from smallest to largest estimate,

$\hat{\theta}_i$ = the ith resample estimate,

θ = the estimate of the income,

$CI(-) = \hat{\theta}_{N \times \alpha_2}$ = the estimate at $N \times \alpha_2$ in the sorted list of estimated resamples, and the lower bound of the 95% confidence interval,

$CI(+) = \hat{\theta}_{N \times \alpha_2}$ = the estimate at $N \times \alpha_2$ in the sorted list of estimated resamples, and the upper bound of the 95% confidence interval, and

NORMAL( ) = the normal cumulative distribution function (CDF), which returns a value corresponding to the position of the parameter within the normal distribution.

The corrected final data from the household survey will be added to the Division of Subsistence CSIS. The CSIS is a publicly accessible database maintained by the Division of Subsistence and includes community-level study findings.

Key Respondent Interview and Participant Observation Analysis

Key respondent interviews were audio recorded with permission from participants. Two 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 recording 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 G) 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 program technician Zay Kalalo each coded the same transcript from two of the nine interviews (although there were 10 respondents, two participated in one interview together) 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 eight primary nodes and 36

secondary nodes (see Appendix J for codebook). Individual respondents were assigned a unique identifier that combines the community name shorthand (DUT) with a respondent number; any quotes or references to information from the interviews included in this report use the unique identifier for attribution. Finally, notes from the two participant observation trips were reviewed and considered against the coding nodes developed from KRI transcription analysis. Lacking the emergence of significant new topics noted during participant observation activities, no additional nodes were added to the codebook.

Population Estimates and Other Demographic Information

As noted above, a goal of the research was to collect demographic information from Unalaska households that completed the survey to assist in the characterization of subsistence activities. The survey form asked for demographic characteristics about all people who lived in the household for more than three months in 2020. The population estimate was calculated by multiplying the average household size of surveyed households by the total number of dwellings, 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 Unalaska generated from the division's surveys and other demographic data developed by the 2020 federal census and the U.S. Census Bureau's American Community Survey (U.S. Census Bureau 2021) and the Alaska Department of Labor and Workforce Development (ADLWD n.d.). The timing of the sampling of households (when surveys were conducted), or eligibility criteria for inclusion in the survey, may explain differences in the population estimates.

Food Security Analysis

To assess whether households had enough food to eat, a "food security" section of the survey used a modified version of a standard 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). The modification differentiated subsistence sources from market sources as a cause for food insecurity. In 2018–2020, an annual average of approximately 105,000 U.S. households were interviewed, including 1,241 from Alaska (Coleman-Jensen et al. 2021:25). From CPS data, the USDA prepares an annual report on food security in the United States.

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 in this survey with the term "the kinds of food we wanted to eat" to reflect unique dietary and cultural circumstances in rural Alaska.

In 2015, the Division of Subsistence added a filter question to reduce the number of questions asked of 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. The surveys sent to Unalaska households continued to use that filtering process.

Plate 1-9.–Community data review meeting, Unalaska, September 2021.

Community Review Meetings

ADF&G staff presented preliminary survey findings at a public meeting in Unalaska on September 2, 2021 (Plate 1-9). The Qawalangin Tribe and KUCB assisted with advertising the meeting, and on the morning of September 1, Keating and Sill participated in a live radio interview with LRA Victor Fisher to discuss project outcomes and promote the meeting. The meeting was held at 6:00 pm at the Burma Road Chapel in its public meeting space adjacent to KUCB. The purpose of the meeting was to review draft survey results with the community, receive feedback on findings, share information on how to get involved with the regulatory process, and listen to other concerns about subsistence resources. Six community members attended, including representation from the Qawalangin Tribe and the City Council. Attendees affirmed the draft results and clarified that Dolly Varden are not locally harvested from fresh waters, but either in marine waters or where the rivers meet the ocean. Additionally, they shared thoughts on crab and Pacific halibut populations, which will be addressed in the following chapters.

Final Report Organization

This report summarizes the results of systematic household surveys, key respondent interviews, and participant observation conducted by staff from ADF&G. Chapter 2 includes tables and figures that report findings on demographic characteristics, employment characteristics, individual participation in harvesting and processing of wild resources, and characteristics of resource harvests and uses—including the sharing of wild foods—and food security, as well as assessments of resources and resource uses. Chapter 3 presents the qualitative data gathered through KRIs and participant observation. Chapter 4 discuses harvest and use trends over time and key findings, including an evaluation of the revised survey method. Table 1-7 shows selected study findings based on survey result analysis and will be referenced in later discussions of survey results.

ADF&G provided a draft report to the Qawalangin Tribe, the Unalaska ADF&G office, and OSM for review and comment in November 2022. After receipt of comments, the report was finalized. ADF&G mailed copies of a short (four-page) summary of the study findings to the Qawalangin Tribe, the local ADF&G office, the Ounalashka Corporation, the Unalaska city office, the Unalaska Native Fishermen's Association, the Museum of the Aleutians, the Aleut Corporation, and the local ADF&G Fish and Game Advisory Committee (Appendix K).

Table 1-7.–Selected study findings, Unalaska, 2020.

Category	Community Unalaska
Demography	
Population	2,092.3
Percentage of population that is Alaska Native	14.6%
Percentage of household heads born in Alaska[a]	–
Average length of residency of household heads (year)	22.4
Cash economy	
Average number of months employed	9.1
Percentage of employed adults working year-round	54.1%
Percentage of income from sources other than employment	10.3%
Average household income[b]	$110,509
Per capita income[b]	$52,712
Resource harvest and use	
Per capita harvest, pounds usable weight	79.5
Average household harvest, pounds usable weight	166.6
Number of resources used by 50% or more households	4.0
Average number of resources used per household	6.4
Average number of resources attempted to be harvested per household	4.4
Average number of resources harvested per household	3.8
Average number of resources received per household	2.9
Average number of resources given away per household	0.8
Percentage of total harvest taken by top 25% ranked households	81.3%
Percentage of households that harvested 70% of harvest	15.8%
Per capita harvest by lowest ranked 50% of households	4.7
Percentage of total harvest taken by lowest ranked 50% of harvesting households	2.6%
Average number of resources used by lowest ranked 50% of households	3.7
Average number of resources used by top 25% ranked households	10.1

Source ADF&G Division of Subsistence household surveys, 2021.

a. Question not asked.

b. Includes income from sources other than employment.

2. UNALASKA HARVEST SURVEY RESULTS

This chapter summarizes findings from 114 comprehensive household harvest surveys returned by Unalaska households via the mail or completed by phone in spring 2021 (Table 1-5). This chapter presents community demographic characteristics, employment activities, income, harvest estimates, and assessments about food security, wild resource use and availability changes, and harvest activity changes due to the COVID-19 pandemic. Select findings presented in this chapter are available online in the ADF&G Community Subsistence Information System.[1]

Seasonal Round

Household surveys produce detailed quantitative data about community characteristics and subsistence activities at the household level. However, a significant amount of qualitative information can also be derived from these quantitative data that, when combined with qualitative information documented through key respondent interviews (KRIs), can be used to characterize the general seasonal round for Unalaska residents' subsistence harvesting activities. This seasonal round summary provides important context for the quantitative harvest and use data analyzed in this chapter.

Subsistence activities occur year-round with different species targeted during specific seasons. The presence of trout [Dolly Varden] in marine waters in late spring alerts residents that the salmon harvest season is near:

> Um, reds, trouts. You know, they're the first ones usually out. When we start seeing trout moving out of the lake, uh, in the creeks, and then on the Front Beach, then you know the salmons are not too far behind. (DUT01)

Pacific halibut, which dwell farther offshore through much of the spring, are also harvested when they return to nearshore waters in the late spring and early summer. Sockeye salmon is the first salmon species to arrive and, depending on the location of fishing, fish are caught in nets starting in mid- to late June or early July, and continue being harvested into August. Fishers use mainly setnets to harvest subsistence sockeye and coho salmon, but a few people also use beach seines. The use of beach seines is limited to locations with sandy bottoms, such as Broad Bay: seines cannot be used in places having a rocky bottom or covered in eel grass, like Captains Bay. Pink salmon come in August after the sockeye salmon run and return to all the island streams (Plate 2-1). If fishers do not wish to harvest pink salmon, they may pull their

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

Plate 2-1.–Pink salmon swim upstream in Humpy Creek, 2021.

Plate 2-2.–Researcher holds a handful of blueberries picked while hiking the Mount Newhall trail.

nets in for a while because the pink salmon can be so abundant as to make harvesting other available species difficult. At the end of August and early September, coho salmon return, with the run usually peaking in October. There are some chum salmon that come in at the same time as coho salmon but not in abundance. During the salmon fishing season, fishers will also put out longlines or use rod and reel for Pacific halibut, rockfishes, and Pacific cod. Crab pots might also be put out, targeting Dungeness, Tanner, or king crab.

As the summer gives way to fall, residents continue marine harvests, but also bring their activities onshore—picking salmonberries and blueberries along the roadsides and hills surrounding Unalaska (Plate 2-2), hunting ducks and geese in local waterways, or traveling off-island to hunt large land mammals. Ducks and emperor geese are hunted throughout the fall and winter, and sometimes into the spring as well. Ptarmigan hunting is popular in the winter when the birds move down the mountain with the snow line and forage closer to town. Through the winter, fishers continue harvesting Pacific cod and halibut. Although there are no Chinook salmon runs in the Unalaska region, the fish do overwinter locally and some residents will troll for them. Crabs move into shallower waters of Unalaska Bay during the winter, so residents take advantage of their greater accessibility to fish for them during this season. In the late winter and early spring, before the marine fishes return, people spend time foraging for fireweed shoots and other roots or early vegetation. As the spring comes around again, Dolly Varden and trouts can be caught in the streams and nearshore marine waters, but fishing for these species was a more common activity in the past. Marine mammal hunters will hunt harbor seals year-round, depending on local needs for the animals, but most of the harvesting activity occurs in spring through fall.

Population Estimates and Demographic Information

This study estimated that in 2020 there were 2,092 residents living in 998 households in Unalaska (Table 2-1). This estimate was substantially lower than the 2020 federal census and the American Community Survey (ACS) five-year (2016–2020) average estimate. Much of the difference in determining total population likely had to do with a substantial population of people living in group quarters and how those individuals were counted. According to the decennial census, 2,577 individuals were living in group quarters, and these people were included in the census count for Unalaska (U.S. Census Bureau n.d.). Division of Subsistence estimates did not include group quarters housing. However, in Unalaska, group quarters as defined by the census likely referred to, among other places, the housing provided by the major local seafood processors: Alyeska, Unisea, and Westward, along with other industrial firms with a transient workforce. This study's estimate included limited seafood processor housing—those residences occupied by year-round, permanent workforce members, as identified by the employer—but not all. Although the overall population differs among the three sources, the Alaska Native population was similar in number, likely because Alaska Natives do not account for a significant component of group quarters (Figure 2-1). This study estimated 306 Alaska Native residents in Unalaska, compared to 326 counted by the 2020 federal census and 237 estimated through the ACS five-year average (Table 2-1).

Table 2-1.–Population estimates, Unalaska, 2010 and 2020.

	Census (2020)	5-year American Community Survey (2016–2020)		This study (2020)	
		Estimate	Range[a]	Estimate	Range[b]
Total population					
Households	641	1,107.0	955 – 1,259	998.0	
Population	4,254	4,758.0	4,630 – 4,886	2,092.3	1,874 – 2,311
Alaska Native					
Population	326	237.0	171 – 303	306.4	158 – 455
Percentage	7.7%	5.0%	3.6% – 6.4%	14.6%	7.6% – 21.7%

Sources U.S. Census Bureau (n.d.) for 2020 decennial census data and for American Community Survey (ACS) five-year average estimates for 2020; ADF&G Division of Subsistence household surveys, 2021, for 2020 estimates.

Note Division of Subsistence household survey eligibility requirements differ from those used by the U.S. Census and ACS.

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

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

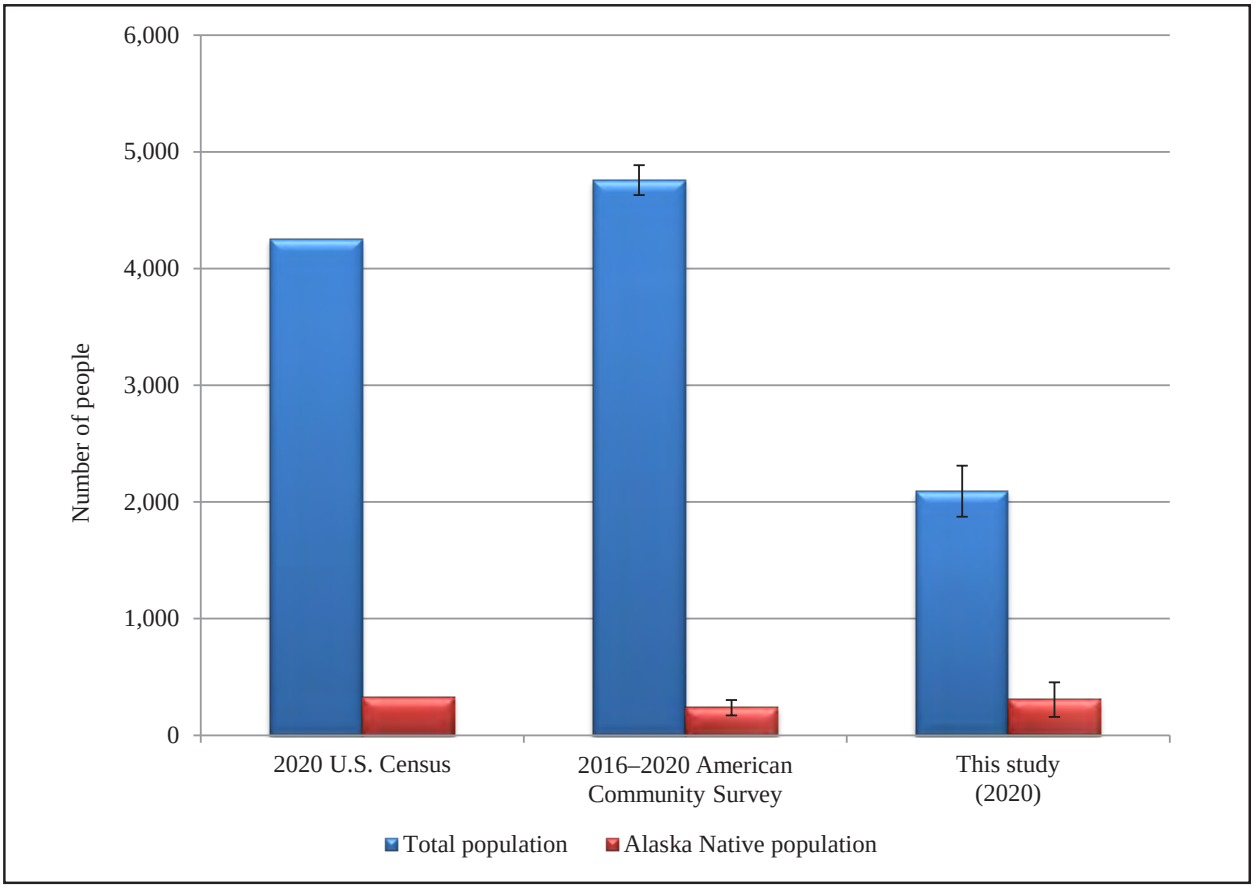
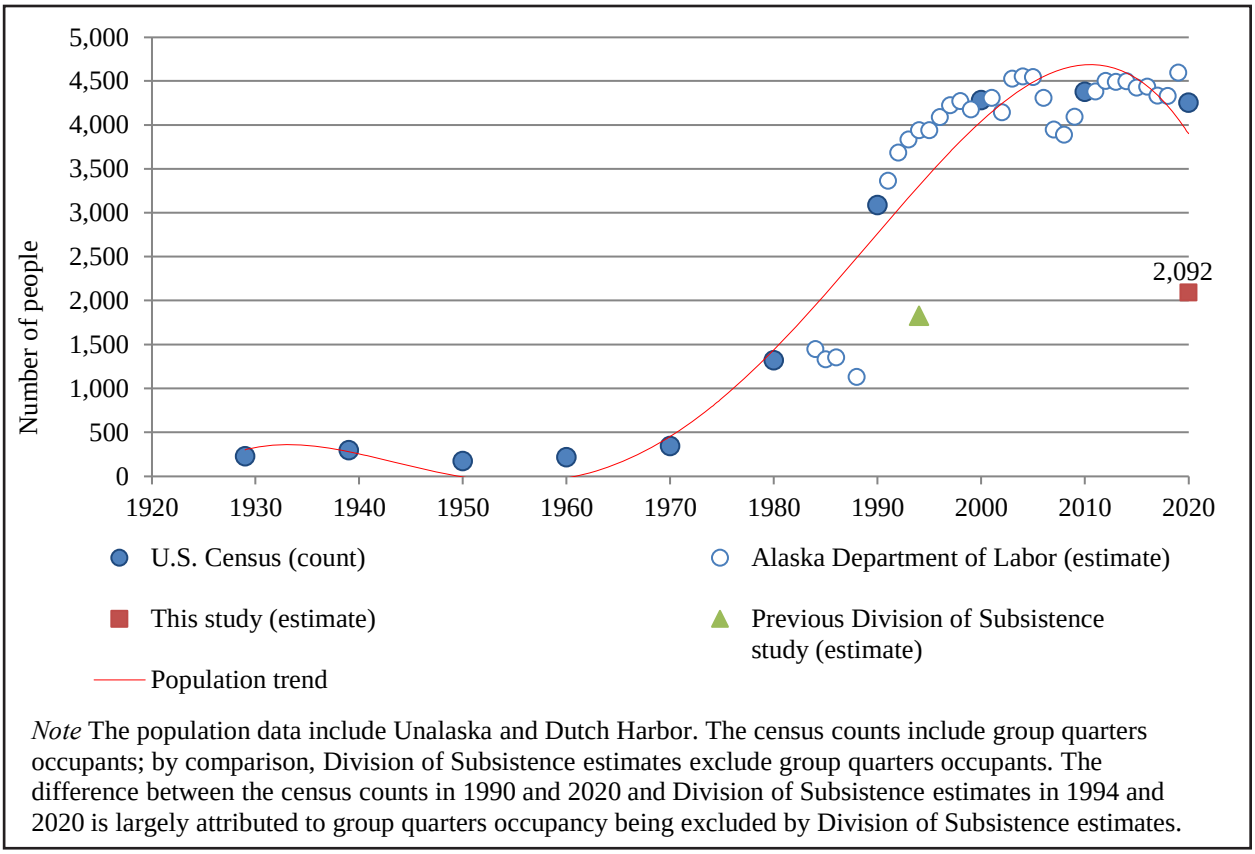


Figure 2-1.–Alaska Native and overall population estimates, Unalaska, 2010 and 2020.



Note The population data include Unalaska and Dutch Harbor. The census counts include group quarters occupants; by comparison, Division of Subsistence estimates exclude group quarters occupants. The difference between the census counts in 1990 and 2020 and Division of Subsistence estimates in 1994 and 2020 is largely attributed to group quarters occupancy being excluded by Division of Subsistence estimates.

Figure 2-2.–Historical population estimates, Unalaska, 1929–2020.

The first U.S. Census Bureau count of Unalaska documented 226 residents in 1929 (Figure 2-2). The community population remained below 1,000 residents through 1970 and then increased rapidly until the early 2000s, driven by the development of the commercial fishery industry. Based on Alaska Department of Labor annual population estimates, the population of Unalaska has remained stable for the past 20 years. Note that for the previous Division of Subsistence study for 1994, the total population estimate was lower than the most recent prior decennial census, similar to the results of this study. This likely indicates parallel challenges to and differing criteria for determining residency by the division and federal census for both study years.

One hundred and fourteen of 998 households (11%) completed surveys for this study (Table 2-2). Households ranged in size from one to eight people, with an average size of two household members. The average age of residents was 42; the youngest resident of any household was less than 1 year old and the oldest was 90. Nearly one-third (32%) of the population was between the ages of 50 and 64 (Table 2-3). Compared to a previous Division of Subsistence survey for 1994, the population of Unalaska has gotten older and spans a broader range of ages (Scarbrough and Fall 1997:3–4). In 2020, there were slightly more men living in Unalaska than women, but the distribution of genders among the age cohorts was similar (Table 2-3; Figure 2-3). There were more women than men older than the age of 75, but more men than women in the 35–49 age range. The average resident of Unalaska in 2020 had lived in the community for 19 years; among heads of households, the average length of residency was slightly higher at 22 years (Table 2-2).

Table 2-2.–Sample and demographic characteristics, Unalaska, 2020.

Characteristics	Community Unalaska
Sampled households	114
Eligible households	998
Percentage sampled	11.4%
Sampled population	239
Estimated community population	2,092.3
Household size	
Mean	2.1
Minimum	1
Maximum	8
Age	
Mean	41.5
Minimum[a]	0
Maximum	90
Median	44
Length of residency	
Total population	
Mean	19.4
Minimum[b]	0
Maximum	75
Heads of household	
Mean	22.4
Minimum[b]	0
Maximum	75
Alaska Native	
Estimated households[c]	
Number	175.1
Percentage	17.5%
Estimated population	
Number	306.4
Percentage	14.6%

Source ADF&G Division of Subsistence household surveys, 2021.

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

b. Residency length of 0 (zero) indicates residency of less than one year but more than three months

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

-continued-

Table 2-3.–Population profile, Unalaska, 2020.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	26.8	2.5%	2.5%	26.8	2.7%	2.7%	53.6	2.6%	2.6%
5–9	35.8	3.3%	5.7%	71.5	7.1%	9.8%	107.3	5.1%	7.7%
10–14	62.6	5.7%	11.5%	80.5	8.0%	17.9%	143.1	6.8%	14.5%
15–19	44.7	4.1%	15.6%	80.5	8.0%	25.9%	125.2	6.0%	20.5%
20–24	35.8	3.3%	18.9%	26.8	2.7%	28.6%	62.6	3.0%	23.5%
25–29	62.6	5.7%	24.6%	80.5	8.0%	36.6%	143.1	6.8%	30.3%
30–34	71.5	6.6%	31.1%	71.5	7.1%	43.8%	143.1	6.8%	37.2%
35–39	44.7	4.1%	35.2%	17.9	1.8%	45.5%	62.6	3.0%	40.2%
40–44	116.2	10.7%	45.9%	80.5	8.0%	53.6%	196.7	9.4%	49.6%
45–49	62.6	5.7%	51.6%	35.8	3.6%	57.1%	98.4	4.7%	54.3%
50–54	125.2	11.5%	63.1%	107.3	10.7%	67.9%	232.5	11.1%	65.4%
55–59	116.2	10.7%	73.8%	80.5	8.0%	75.9%	196.7	9.4%	74.8%
60–64	107.3	9.8%	83.6%	125.2	12.5%	88.4%	232.5	11.1%	85.9%
65–69	71.5	6.6%	90.2%	26.8	2.7%	91.1%	98.4	4.7%	90.6%
70–74	44.7	4.1%	94.3%	35.8	3.6%	94.6%	80.5	3.8%	94.4%
75–79	8.9	0.8%	95.1%	17.9	1.8%	96.4%	26.8	1.3%	95.7%
80–84	0.0	0.0%	95.1%	0.0	0.0%	96.4%	0.0	0.0%	95.7%
85–89	8.9	0.8%	95.9%	0.0	0.0%	96.4%	8.9	0.4%	96.2%
90–94	0.0	0.0%	95.9%	8.9	0.9%	97.3%	8.9	0.4%	96.6%
95–99	0.0	0.0%	95.9%	0.0	0.0%	97.3%	0.0	0.0%	96.6%
100–104	0.0	0.0%	95.9%	0.0	0.0%	97.3%	0.0	0.0%	96.6%
Missing	44.7	4.1%	100.0%	26.8	2.7%	100.0%	71.5	3.4%	100.0%
Total	**1,090.9**	**100.0%**	**100.0%**	**1,001.4**	**100.0%**	**100.0%**	**2,092.3**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2021.

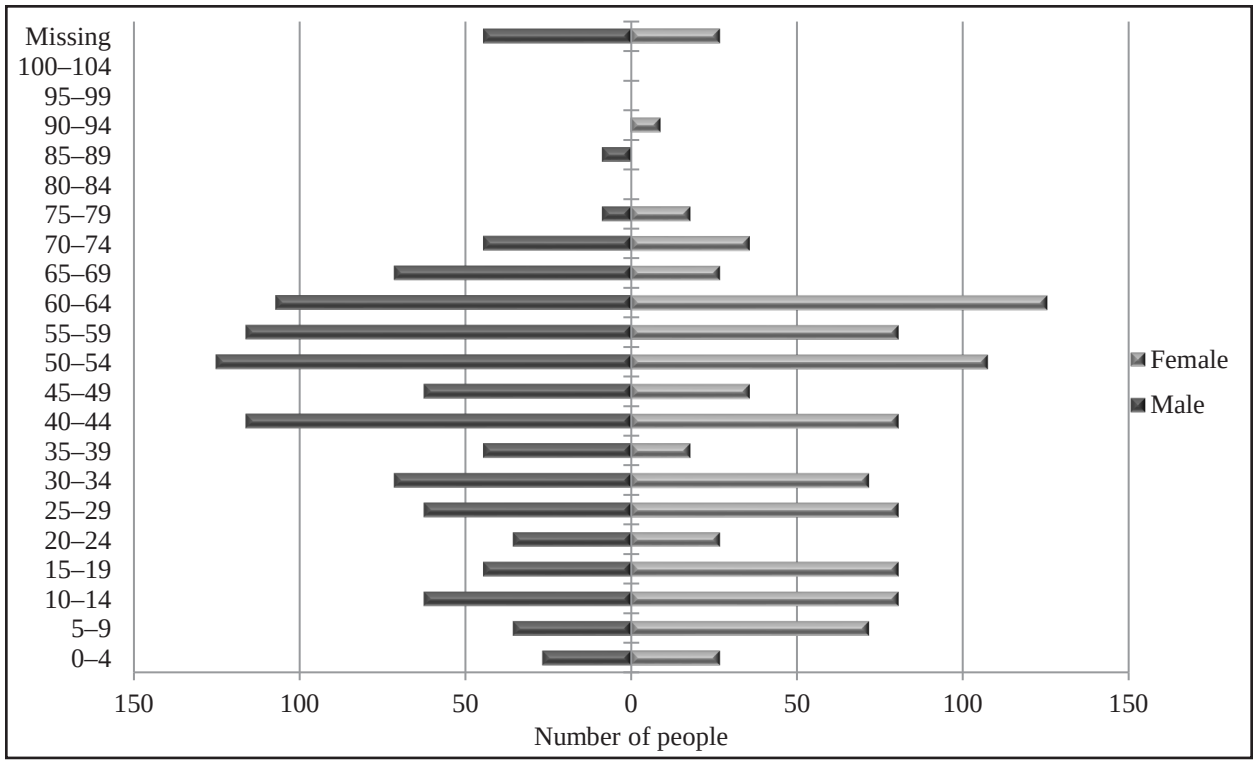


Figure 2-3.–Population profile, Unalaska, 2020.

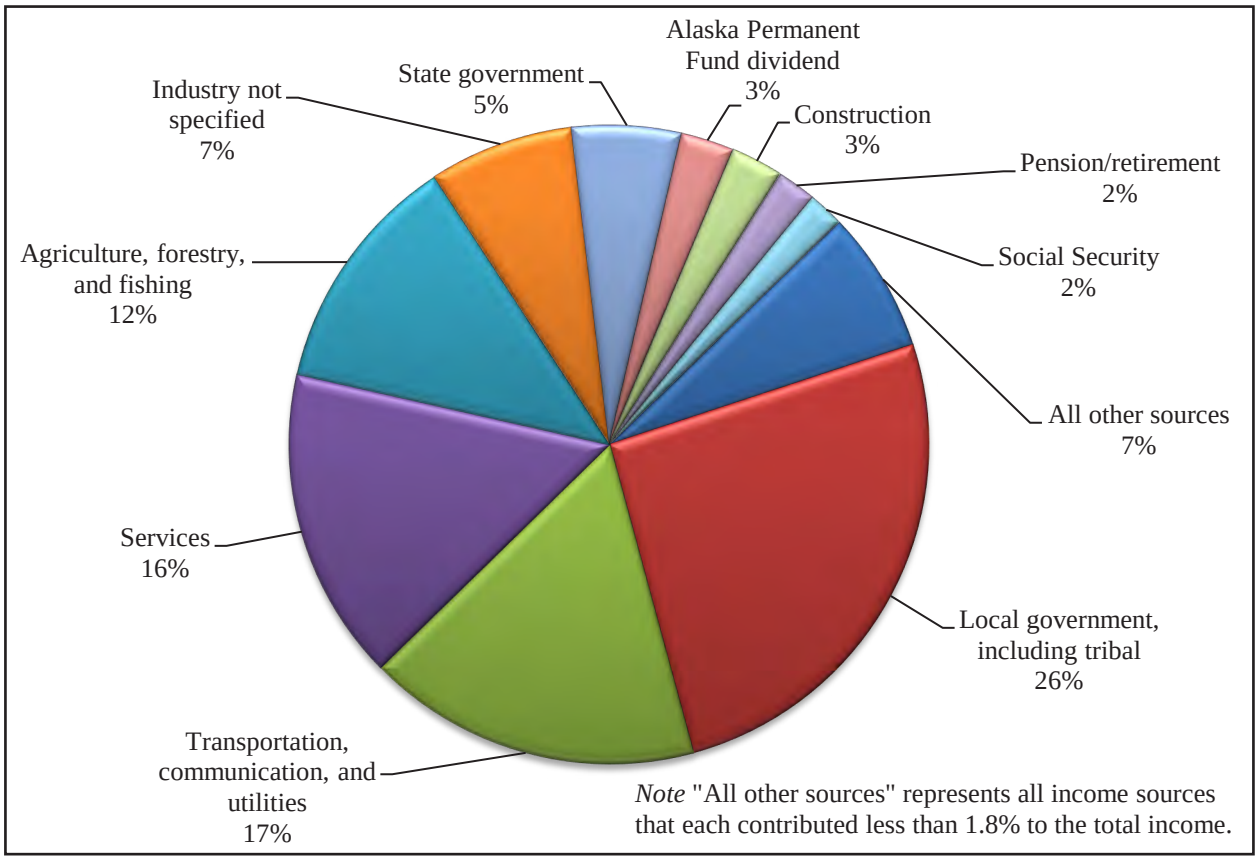


Figure 2-4.–Top income sources, Unalaska, 2020.

Income and Cash Employment

During the study period, the majority of income in Unalaska came from four sectors of the economy: local government, including tribal government (26%); transportation, communication, and utilities (17%); services (16%); and agriculture, forestry, and fishing (12%) (the income in this category was exclusively from employment related to commercial fishing and seafood processing) (Figure 2-4). Most of the community income was earned income (90%) and the remainder came from other sources, particularly Alaska Permanent Fund dividends (3%), pension/retirement income (2%), and Social Security (2%) (Table 2-4). The average household income in 2020 was $110,509 while the median household income was approximately the same at $108,000 (Table 2-4; Table 2-5). Note that the median income estimated through this study was slightly higher than that estimated through the ACS five-year average, which was $90,938. Both estimates were substantially greater than the estimated median income of households in Alaska overall ($77,790). At the individual level, per capita income in Unalaska was $52,712 in 2020 (Table 1-7).

Changing the focus to job-related, or earned, income, Table 2-6 illustrates that the local government sector of the economy contributed the most (29%) to wage earnings in 2020. Both the transportation, communication, and utilities and the services sectors composed the next highest proportions of earned income at 19% and 18%, respectively. Agriculture, forestry, and fishing, with 14% of the wage earnings, completed the economic sectors composing more than 8% of the total income in 2020 (Table 2-6; Table 2-4). In general, the percentage of community jobs originating from each sector aligns with the percentage of wage earnings attributed to that sector. The majority (68%) of jobs in Unalaska were full-time and 19% were part-time (Table 2-7). Eighty-four percent of working-age adults (age 16 or older) and 89% of households were employed in 2020 (Table 2-8). Adults living in employed households worked an average of two jobs combined, with a maximum of six jobs held by adults in any household. Slightly more than one-half (54%) of employed adults were employed year-round, with the average employed adult employed for 47 weeks of the year.

Table 2-4.–Estimated earned and other income, Unalaska, 2020.

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	468.4	361.5	$28,502,919	$20,073,806 – $40,485,602	$28,560	25.8%
Transportation, communication, and utilities	323.0	274.2	$18,621,182	$10,487,561 – $27,364,688	$18,658	16.9%
Services	325.9	275.9	$17,511,796	$9,405,328 – $26,877,635	$17,547	15.9%
Agriculture, forestry, and fishing	165.2	165.2	$13,513,319	$6,998,993 – $22,127,299	$13,540	12.3%
Industry not specified	59.7	49.8	$8,079,317	$1,178,820 – $17,200,597	$8,096	7.3%
State government	87.2	87.2	$6,058,782	$2,435,841 – $10,269,742	$6,071	5.5%
Construction	78.5	69.0	$2,910,998	$997,553 – $7,764,736	$2,917	2.6%
Manufacturing	28.6	28.6	$1,713,102	$200,000 – $4,838,634	$1,717	1.6%
Federal government	48.3	48.3	$1,142,145	$64,450 – $2,759,432	$1,144	1.0%
Retail trade	48.3	48.3	$834,330	$57,244 – $3,252,119	$836	0.8%
Earned income subtotal	**1,455.2**	**889.0**	**$98,887,890**	**$90,839,400 – $125,451,820**	**$99,086**	**89.7%**
Other income						
Alaska Permanent Fund dividend		937.2	$2,975,779	$1,611,394 – $6,450,224	$2,982	2.7%
Pension/retirement		237.5	$2,209,580	$194,056 – $4,926,582	$2,214	2.0%
Social Security		281.4	$2,008,831	$758,005 – $3,762,024	$2,013	1.8%
Workers' compensation/ insurance		211.1	$870,395	$758,005 – $3,762,024	$872	0.8%
Unemployment		306.8	$740,342	$80,036 – $3,402,273	$742	0.7%
Rental income		219.6	$571,716	$319,360 – $1,321,467	$573	0.5%
Supplemental Security Income (SSI)		210.5	$368,300	$97,763 – $1,460,809	$369	0.3%
Meeting honoraria		202.0	$318,664	$6,818 – $1,423,365	$319	0.3%
Disability		227.6	$313,253	$19,835 – $1,189,106	$314	0.3%
Native corp. dividend		333.4	$256,605	$22,682 – $902,447	$257	0.2%
Dividend/interest		210.9	$221,163	$105,834 – $499,580	$222	0.2%
Economic impact payment (stimulus check)		296.9	$185,572	$21,234 – $928,372	$186	0.2%
Adult Public Assistance (OAA, APD)		210.2	$64,981	$76,676 – $336,283	$65	0.1%
Food stamps		227.6	$56,726	$15,594 – $225,256	$57	0.1%
Fuel vouchers		201.9	$49,673	$13,842 – $141,987	$50	0.0%
Longevity bonus		219.1	$35,733	$31,646 – $195,261	$36	0.0%
Veteran disability		202.0	$32,418	$5,366 – $119,720	$32	0.0%
Child support		193.0	$30,990	$14,058 – $66,181	$31	0.0%
Foster care		193.0	$30,990	$13,023 – $63,016	$31	0.0%
Other		210.8	$25,006	$13,023 – $63,016	$25	0.0%
TANF (Temp. cash asst. for needy families)		193.0	$23,954	$9,763 – $62,512	$24	0.0%
Energy assistance		201.6	$9,910	$2,878 – $83,255	$10	0.0%
Other income subtotal		**989.3**	**$11,400,580**	**$6,983,694 – $16,948,078**	**$11,423**	**10.3%**
Community income total			**$110,288,470**	**$90,839,400 – $125,451,820**	**$110,509**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2021.

Table 2-5.–Comparison of median household income estimates, Unalaska, 2020.

Data source	Median[a]	Range[b, c]
2020 Division of Subsistence estimate	$108,000	$97,905 – $130,000
2016–2020 ACS (Unalaska)	$90,938	$84,252 – $97,624
2016–2020 ACS (All Alaska)	$77,790	$76,656 – $78,924

Sources ADF&G Division of Subsistence household surveys, 2021, for 2020 estimate; U.S. Census Bureau (n.d.) for American Community Survey (ACS) five-year average estimates.

a. Division of Subsistence 2020 estimate does not include categories of income excluded by the ACS median 2016–2020 average estimate, including food stamps, housing assistance, and one-time payments.

b. Range is a 95% confidence interval of the estimated median.

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

Table 2-6.–Employment by industry, Unalaska, 2020.

Industry	Jobs[a]	Employed households	Employed individuals	Percentage of wage earnings
Estimated total number	**1,703.3**	**889.0**	**1,455.2**	
Federal government	**2.8%**	**5.4%**	**3.3%**	**1.2%**
Executive, administrative, and managerial	0.6%	1.1%	0.7%	0.2%
Technologists and technicians, except health	0.6%	1.1%	0.7%	0.0%
Administrative support occupations, including clerical	0.6%	1.1%	0.7%	0.4%
Transportation and material moving occupations	0.6%	1.1%	0.7%	0.0%
Military occupations	0.6%	1.1%	0.7%	0.4%
State government	**5.7%**	**9.8%**	**6.0%**	**6.1%**
Natural scientists and mathematicians	4.0%	7.6%	4.6%	5.0%
Teachers, librarians, and counselors	0.6%	1.1%	0.7%	0.3%
Technologists and technicians, except health	0.6%	1.1%	0.6%	0.1%
Occupation not specified	0.6%	1.1%	0.7%	0.7%
Local government, including tribal	**28.7%**	**40.7%**	**32.2%**	**28.8%**
Executive, administrative, and managerial	3.5%	6.7%	4.1%	5.4%
Teachers, librarians, and counselors	4.0%	7.7%	4.7%	4.5%
Administrative support occupations, including clerical	6.9%	13.2%	8.1%	7.0%
Service occupations	4.5%	6.6%	5.3%	2.7%
Mechanics and repairers	1.2%	2.3%	1.4%	0.9%
Precision production occupations	1.7%	3.2%	2.0%	2.6%
Transportation and material moving occupations	4.0%	7.6%	4.7%	3.6%
Handlers, equipment cleaners, helpers, and laborers	1.7%	3.3%	2.0%	0.4%
Occupation not specified	1.2%	2.3%	1.4%	1.7%

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Table 2-6.–Page 2 of 3.

Industry	Jobs[a]	Employed households	Employed individuals	Percentage of wage earnings
Agriculture, forestry, and fishing	**9.7%**	**18.6%**	**11.4%**	**13.7%**
Executive, administrative, and managerial	1.7%	3.3%	2.0%	3.4%
Service occupations	0.6%	1.1%	0.7%	0.1%
Agricultural, forestry, and fishing occupations	6.3%	12.0%	7.3%	8.7%
Mechanics and repairers	1.2%	2.2%	1.4%	1.5%
Construction	**4.6%**	**7.8%**	**5.4%**	**2.9%**
Executive, administrative, and managerial	0.6%	1.1%	0.7%	0.5%
Engineers, surveyors, and architects	0.6%	1.1%	0.7%	0.9%
Mechanics and repairers	0.6%	1.1%	0.7%	0.3%
Construction and extractive occupations	2.3%	3.3%	2.6%	0.9%
Transportation and material moving occupations	0.6%	1.1%	0.7%	0.3%
Manufacturing	**1.7%**	**3.2%**	**2.0%**	**1.7%**
Writers, artists, entertainers, and athletes	0.6%	1.1%	0.7%	0.0%
Production working occupations	1.1%	2.1%	1.3%	1.7%
Transportation, communication, and utilities	**21.3%**	**30.8%**	**22.2%**	**18.8%**
Executive, administrative, and managerial	1.7%	3.2%	1.9%	2.6%
Writers, artists, entertainers, and athletes	2.3%	4.4%	2.7%	0.8%
Technologists and technicians, except health	1.2%	2.2%	1.3%	0.3%
Administrative support occupations, including clerical	1.7%	3.3%	2.0%	1.4%
Mechanics and repairers	1.2%	2.3%	1.4%	3.1%
Transportation and material moving occupations	12.1%	16.4%	11.4%	9.5%
Occupation not specified	1.2%	2.3%	1.4%	1.1%
Retail trade	**2.8%**	**5.4%**	**3.3%**	**0.8%**
Executive, administrative, and managerial	0.6%	1.1%	0.7%	0.6%
Administrative support occupations, including clerical	0.6%	1.1%	0.7%	0.2%
Service occupations	1.1%	2.2%	1.3%	0.0%
Handlers, equipment cleaners, helpers, and laborers	0.6%	1.1%	0.6%	0.0%
Services	**19.1%**	**31.0%**	**22.4%**	**17.7%**
Executive, administrative, and managerial	2.3%	4.4%	2.7%	3.3%
Social scientists, social workers, religious workers, and lawyers	1.2%	2.3%	1.4%	0.5%
Teachers, librarians, and counselors	0.6%	1.1%	0.7%	0.0%
Health diagnosing and treating practitioners	1.2%	2.3%	1.4%	2.9%
Registered nurses, pharmacists, dietitians, therapists, and physicians	1.2%	2.3%	1.4%	1.3%
Administrative support occupations, including clerical	4.5%	8.6%	5.3%	2.4%
Service occupations	0.6%	1.1%	0.7%	0.0%

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Table 2-6.–Page 3 of 3.

Industry	Jobs[a]	Employed households	Employed individuals	Percentage of wage earnings
Agricultural, forestry, and fishing occupations	0.6%	1.1%	0.7%	0.2%
Mechanics and repairers	2.3%	4.4%	2.7%	4.7%
Precision production occupations	0.6%	1.1%	0.7%	0.7%
Handlers, equipment cleaners, helpers, and laborers	1.2%	2.2%	1.4%	1.0%
Occupation not specified	3.0%	4.5%	3.5%	0.7%
Industry not specified	**3.5%**	**5.6%**	**4.1%**	**8.2%**
Executive, administrative, and managerial	1.8%	2.2%	2.1%	2.5%
Mechanics and repairers	0.6%	1.1%	0.7%	1.9%
Occupation not specified	1.2%	2.2%	1.3%	3.8%

Source ADF&G Division of Subsistence household surveys, 2021.

a. Bootstrapping produces slightly different estimated numbers depending on the categories used for aggregation.

Table 2-7.–Job schedules, Unalaska, 2020.

	Jobs[a]		Employed persons[b]		Employed households[b]	
Schedule	Number	Percentage	Number	Percentage	Number	Percentage
Full time	1,149.3	67.5%	1,119.7	76.9%	780.2	87.8%
Part time	324.4	19.0%	234.8	16.1%	176.4	19.8%
Other	108.3	6.4%	108.3	7.4%	98.8	11.1%
Schedule not reported	122.0	7.2%	101.5	7.0%	50.0	5.6%

Source ADF&G Division of Subsistence household surveys, 2021.

a. Bootstrapping produces slightly different estimated numbers depending on the categories used for aggregation.

b. 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 2-8.–Employment characteristics, Unalaska, 2020.

Characteristic	Community Unalaska
All adults	
Number	1,725.2
Mean weeks employed	39.2
Employed adults	
Number	1,455.2
Percentage	84.3%
Jobs	
Number	1,703.3
Mean	1.2
Minimum	1
Maximum	3
Months employed	
Mean	10.7
Minimum	2
Maximum	12
Percentage employed year-round	54.1%
Mean weeks employed	46.5
Households	
Number	998.0
Employed	
Number	889.0
Percentage	89.1%
Jobs per employed household	
Mean	1.9
Minimum	1
Maximum	6
Employed adults	
Mean	
Employed households	1.6
Total households	1.5
Minimum	1
Maximum	5
Mean person-weeks of employment	76.1

Source ADF&G Division of Subsistence household surveys, 2021.

Table 2-9.–Households' assessments of food security conditions, Unalaska, 2020.

Statement	Percentage of sampled households
Had enough of the kinds of food desired	69.3%
Had enough food, but not the desired kind	18.4%
Somestimes, or often, did not have enough food	0.0%

Source ADF&G Division of Subsistence household surveys, 2021.

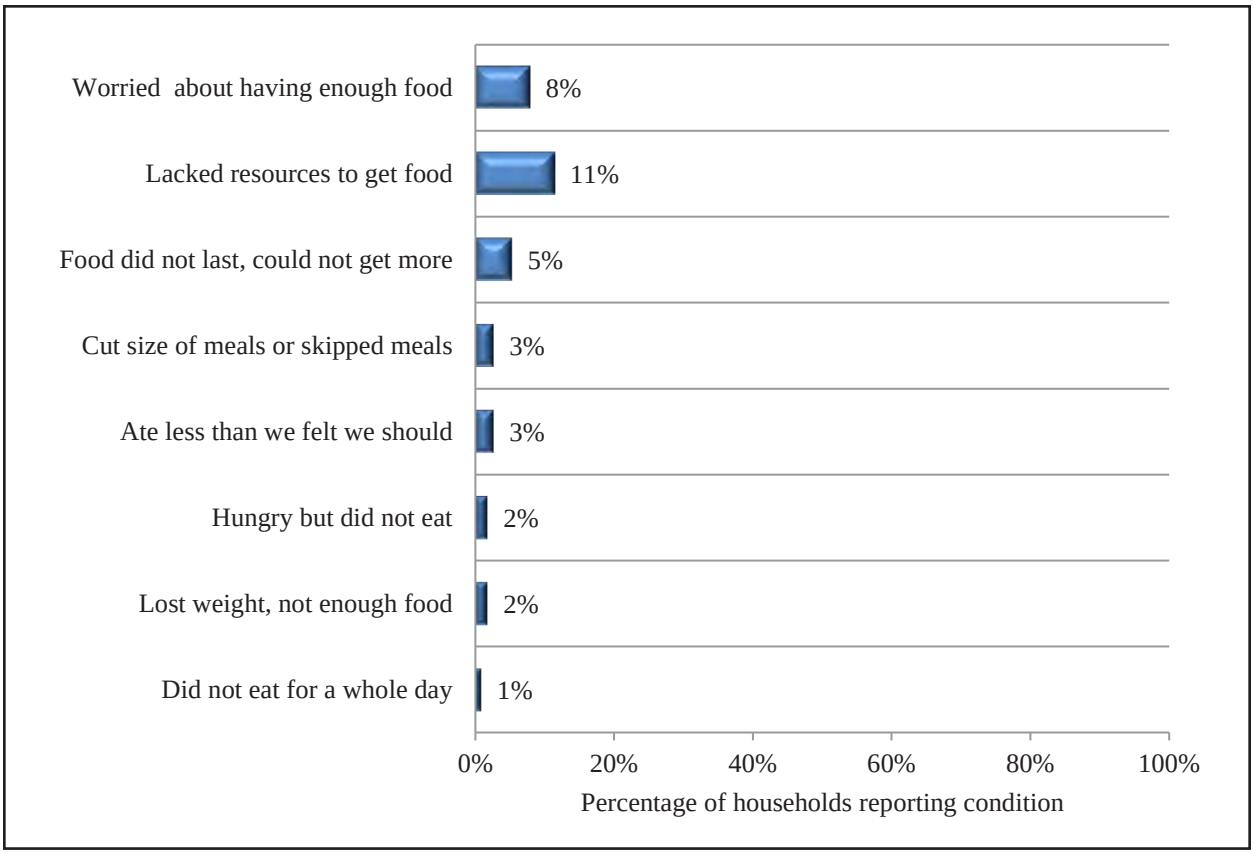


Figure 2-5.–Responses to questions about food insecure conditions, Unalaska, 2020.

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. 2020). 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 divided into two subcategories—low food security or very low food security.

Households in the high food security category did not report any food access problems or limitations. Households in the marginal food security category 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 in the low food security category 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. 2020).

In 2020, 69% of surveyed households reported that they had enough of the kinds of food they wanted to eat during the study year (Table 2-9). Figure 2-5 summarizes affirmative responses to food insecurity conditions experienced by Unalaska households that did not have enough of the kinds of food they wanted to eat. Lacking resources needed to get food and worrying about having enough food were the two conditions experienced by the most households (11% and 8%, respectively). Other food insecurity conditions were experienced by 5% of households or fewer in 2020.

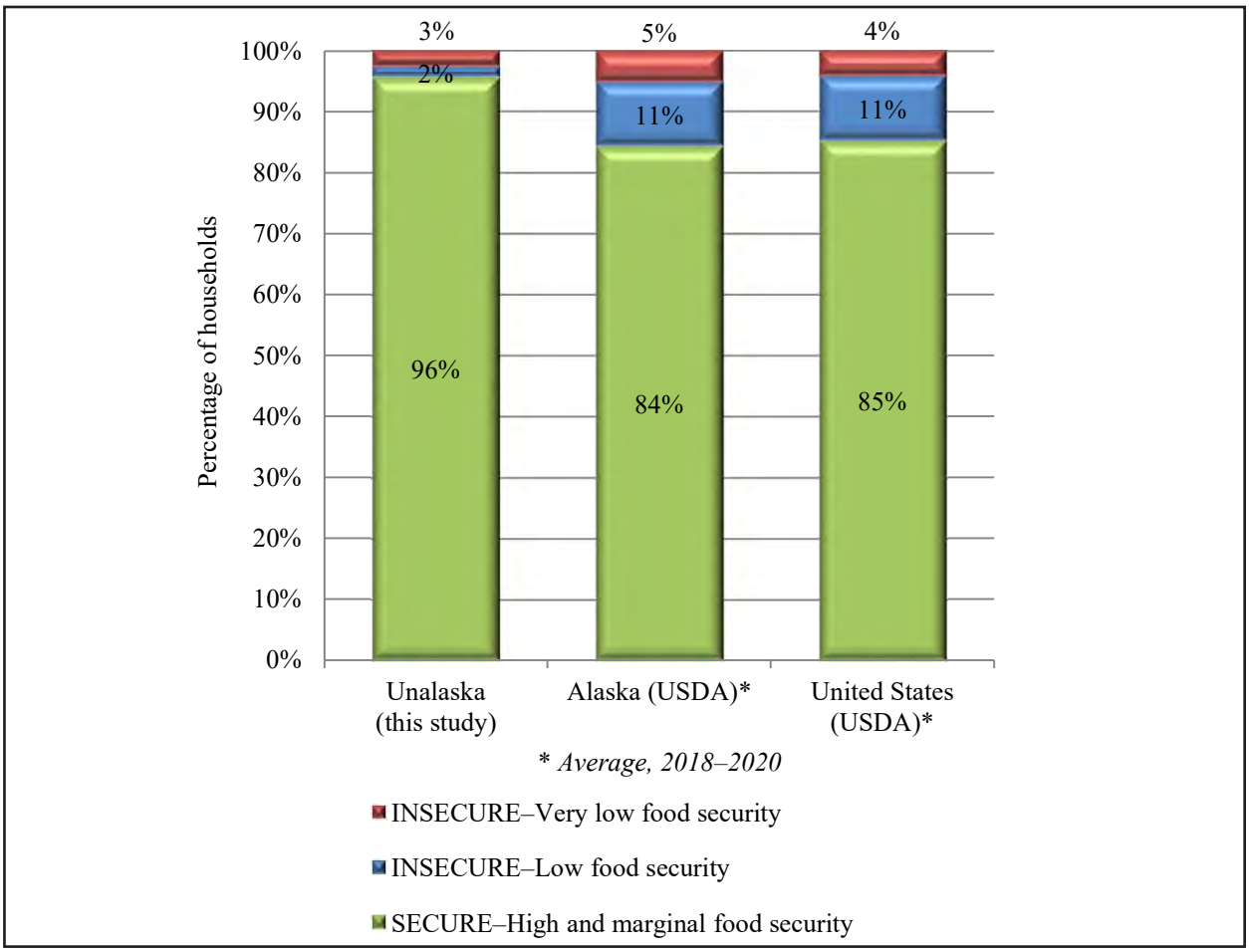
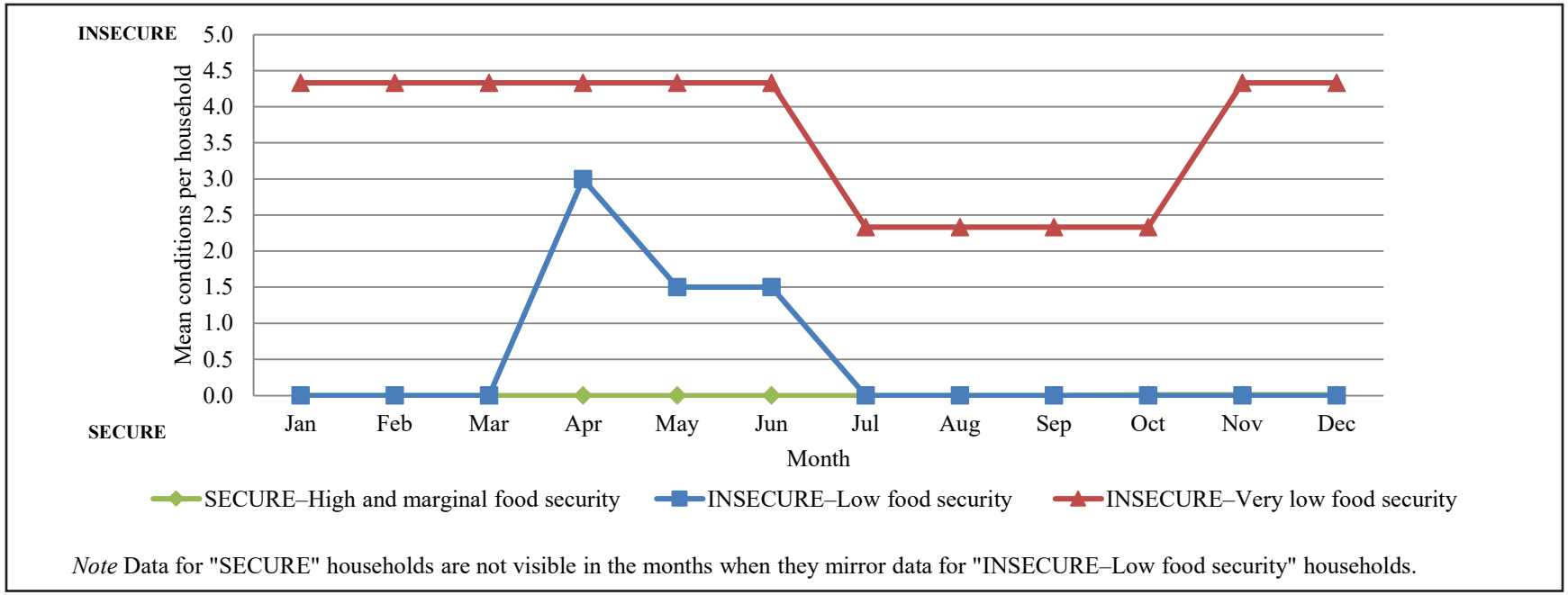


Figure 2-6.–Comparison of food security categories, Unalaska, Alaska, and United States, 2020.

Food security results for surveys for Unalaska, the state of Alaska, and the United States are summarized in Figure 2-6. Households in Unalaska were more food secure than households in Alaska or the United States. Although the community is remote, it is better connected to the rest of Alaska than other similarly remote communities because of daily jet service and summer ferry service. As mentioned above, the median household income in Unalaska is higher than that of Alaska in general, which may provide a buffer against causes of food insecurity for Unalaska households.

Figure 2-7 portrays the mean number of food insecure conditions per household by food security category by month. Figure 2-8 shows which months households reported food not lasting. In Figure 2-8, a distinction is not made between store-bought foods and wild foods. Households experiencing very low food security reported a higher number of food insecure conditions in every month, as compared to households experiencing low food security or high and marginal food security (Figure 2-7). Households with very low food security reported an average of four insecure conditions most months of the year, although from July through October the average number of reported conditions dropped to two. Households experiencing low food security reported no insecure conditions most months of the year, however the number of insecure conditions spiked to an average of three in April before falling to two through May and June. Households with high and marginal food security reported no instances of food insecure conditions throughout the year. The greatest percentage of households reported that food did not last in the month of April, with responses falling through the month of July before rising again from September through December (Figure 2-8). The seasonal variation observed in food security is likely due to a combination of factors, including seasonal variations in abundance of wild foods to harvest and existing stores of preserved food, as well as the availability of store-bought foods and the resources to purchase them.



Note Data for "SECURE" households are not visible in the months when they mirror data for "INSECURE–Low food security" households.

Figure 2-7.–Mean number of food insecure conditions by month and by household food security category, Unalaska, 2020.

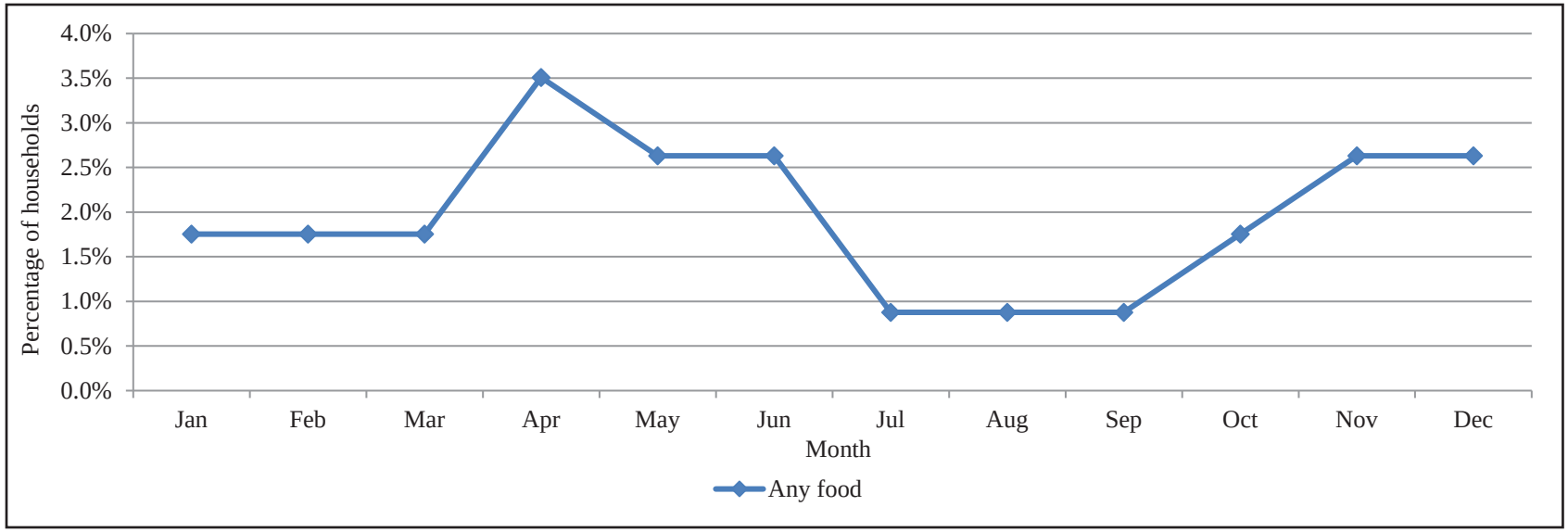


Figure 2-8.–Comparison of months when food did not last, Unalaska, 2020.

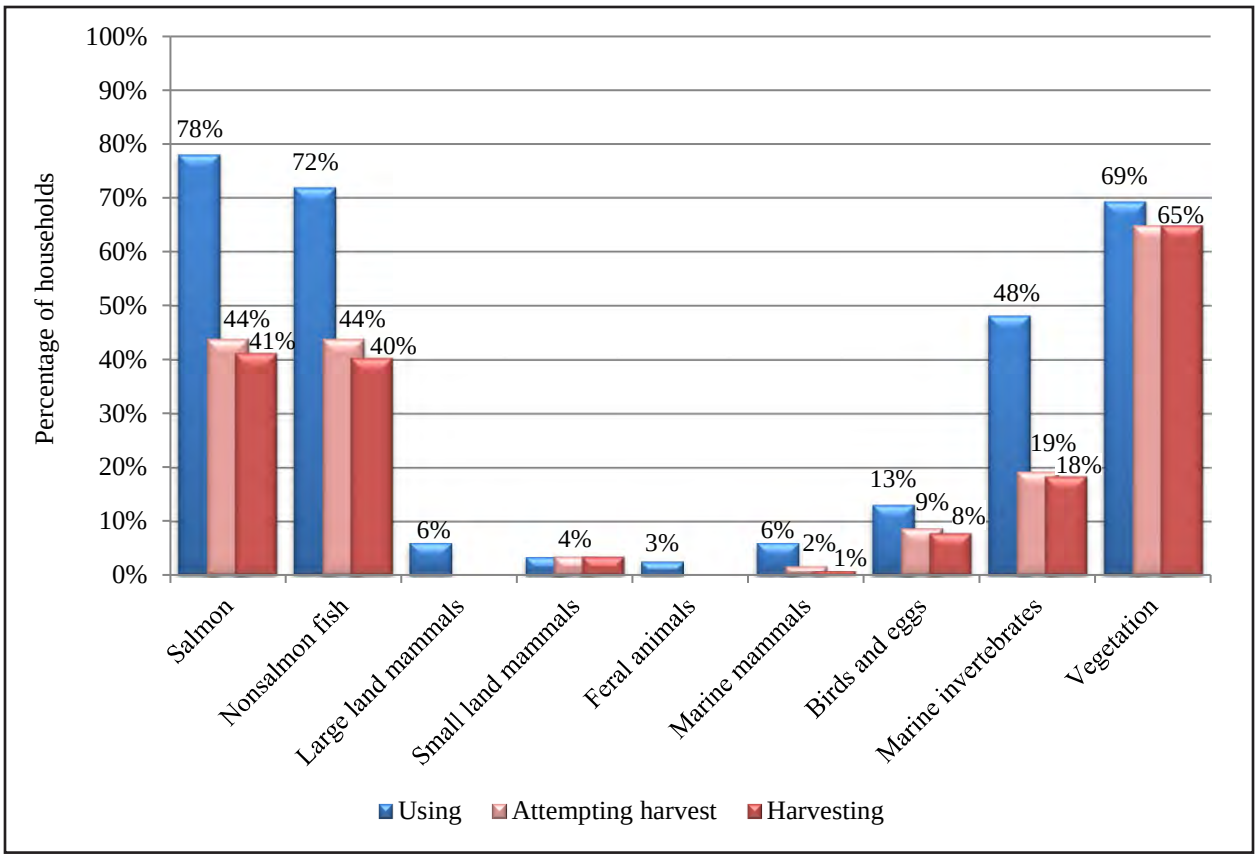


Figure 2-9.–Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Unalaska, 2020.

Summary of Harvest and Use Patterns

Harvest and Use of Wild Resources at the Household Level

Figure 2-9 shows the percentages of households that used wild resources, attempted to harvest wild resources, and harvested them, by resource category. More households used salmon than any other resource category (78%), but nonsalmon fish and vegetation followed close behind (72% and 69% of households). Marine invertebrates was the other category with substantial use by Unalaska households (48%); all other categories were used by 13% of households or fewer. Interestingly, while a small percentage of households used large land mammals or feral animals, none of the surveyed households hunted for these resources. For nearly all resource categories, more households used the resource than harvested it themselves, indicating the existence of sharing within the community. In general, households that attempted to harvest at least one resource within a category were successful.

Table 2-10 summarizes resource harvest and use characteristics for Unalaska in 2020 at the household level. The average harvest was 167 lb usable weight per household, or 80 lb per capita. During the study year, community households harvested an average of four kinds of resources and used an average of six kinds of resources. The maximum number of resources used by any household was 28. In addition, households gave away an average of one kind of resource. Overall, Unalaska households reported using 63 different kinds of resources (Table 1-1). In 2020, 85% of households in Unalaska used some type of wild resource (Table 2-10). Less than one-quarter of households gave away some type of resource, but more households (65%) received resources.

Table 2-10.–Resource harvest and use characteristics, Unalaska, 2020.

Characteristic	
Mean number of resources used per household	**6.4**
Minimum	0
Maximum	28
95% confidence interval (±)	14.6%
Median	5.5
Mean number of resources attempted to harvest per household	**4.4**
Minimum	0
Maximum	25
95% confidence interval (±)	20.6%
Median	3
Mean number of resources harvested per household	**3.8**
Minimum	0
Maximum	23
95% confidence interval (±)	20.4%
Median	2
Mean number of resources received per household	**2.9**
Minimum	0
Maximum	18
95% confidence interval (±)	19.9%
Median	2
Mean number of resources given away per household	**0.8**
Minimum	0
Maximum	13
95% confidence interval (±)	49.3%
Median	0
Household harvest (pounds)	
Minimum	0
Maximum	3,176
Mean	166.6
Median	40
Total harvest weight (lb)	166,273.0
Community per capita harvest (lb)	79.5
Percentage using any resource	85.1%
Percentage attempting to harvest any resource	75.4%
Percentage harvesting any resource	75.4%
Percentage receiving any resource	64.9%
Percentage giving away any resource	21.9%
Number of households in sample	114
Number of resources asked about and identified voluntarily by respondents	74

Source ADF&G Division of Subsistence household surveys, 2021.

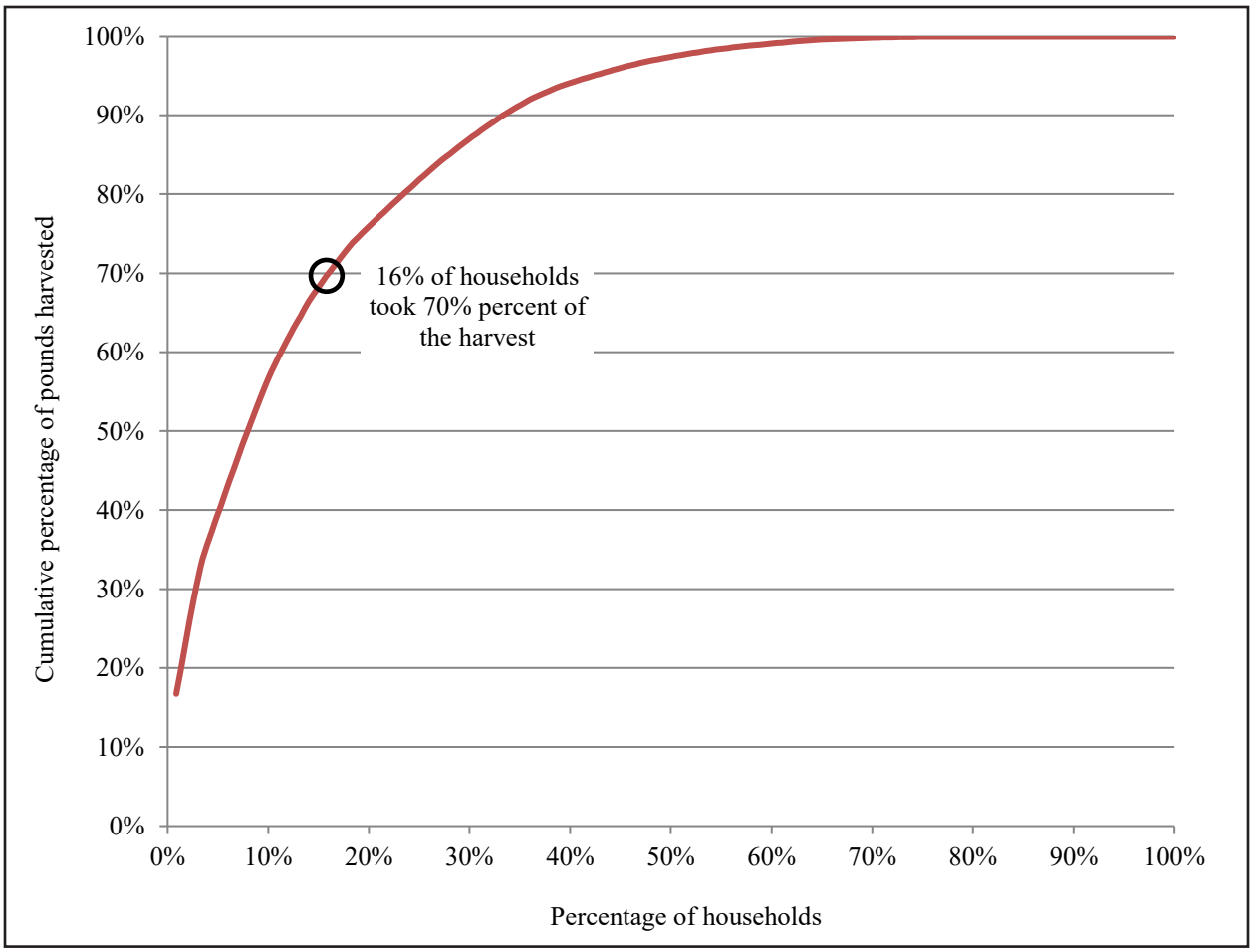


Figure 2-10.–Household specialization, Unalaska, 2020.

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 2-10, in the 2020 study year in Unalaska, about 70% of the harvests of wild resources as estimated in pounds usable weight were harvested by 16% 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 Unalaska.

Harvest Quantities and Composition

Table 2-11 reports estimated wild resource harvests and uses by Unalaska residents in 2020 and is organized first by general category and then by species. All edible resources are reported in pounds usable weight (see Appendix I for conversion factors[2]). 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 trade, through hunting partnerships, or as meat given by hunting guides and non-local hunters. Purchased foods

Table 2-11.–Estimated use and harvest of fish, game, and vegetation resources, Unalaska, 2020.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence interval (±) harvest
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Mean per household	Per capita	Total	Unit	Mean per household	
All resources	**85.1**	**75.4**	**75.4**	**64.9**	**21.9**	**166,273.0**	**166.6**	**79.5**	**166,273.0**	**lb**	**166.6**	**38.1**
Salmon	**78.1**	**43.9**	**41.2**	**48.2**	**12.3**	**69,726.7**	**69.9**	**33.3**	**69,726.7**	**lb**	**69.9**	**33.5**
Chum salmon	11.4	10.5	7.0	5.3	0.9	958.7	1.0	0.5	183.8	ind	0.2	80.3
Coho salmon	53.5	36.0	29.8	27.2	6.1	23,658.3	23.7	11.3	4,715.8	ind	4.7	44.4
Chinook salmon	19.3	18.4	7.0	12.3	4.4	1,551.5	1.6	0.7	253.9	ind	0.3	73.5
Pink salmon	29.8	23.7	21.1	8.8	2.6	7,320.1	7.3	3.5	3,064.4	ind	3.1	55.1
Sockeye salmon	67.5	36.8	33.3	36.0	11.4	36,238.1	36.3	17.3	9,375.9	ind	9.4	37.5
Nonsalmon fish	**71.9**	**43.9**	**40.4**	**45.6**	**8.8**	**64,915.8**	**65.0**	**31.0**	**64,915.8**	**lb**	**65.0**	**75.5**
Pacific herring	3.5	3.5	2.6	0.9	0.0	269.5	0.3	0.1	44.9	gal	0.0	181.7
Pacific (gray) cod	36.0	19.3	18.4	18.4	4.4	7,675.8	7.7	3.7	2,398.7	ind	2.4	62.6
Walleye pollock (whiting)	6.1	1.8	1.8	4.4	1.8	245.1	0.2	0.1	175.1	ind	0.2	131.3
Arrowtooth flounder (turbot)	0.9	0.9	0.9	0.0	0.0	26.3	0.0	0.0	8.8	ind	0.0	186.5
Greenland halibut (greenland turbot)	0.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Greenlings	7.9	7.9	7.0	0.9	0.9	761.6	0.8	0.4	761.6	ind	0.8	83.4
Pacific halibut	64.0	36.0	30.7	39.5	7.0	46,276.1	46.4	22.1	46,276.1	lb	46.4	88.3
Black rockfish	22.8	18.4	16.7	7.0	3.5	6,447.6	6.5	3.1	4,298.4	ind	4.3	81.4
Pacific ocean perch	0.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified rockfishes	1.8	0.9	0.9	0.9	0.9	131.3	0.1	0.1	87.5	ind	0.1	186.5
Sablefish (black cod)	5.3	0.9	0.9	4.4	0.0	542.8	0.5	0.3	175.1	ind	0.2	186.5
Salmon shark	0.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Rock sole	0.9	0.9	0.9	0.0	0.0	8.8	0.0	0.0	8.8	ind	0.0	186.5
Dolly Varden	19.3	18.4	16.7	4.4	0.9	2,512.5	2.5	1.2	1,794.6	ind	1.8	52.0
Rainbow trout	3.5	1.8	1.8	1.8	0.0	18.4	0.0	0.0	26.3	ind	0.0	138.5

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Table 2-11.–Page 2 of 4.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence interval (±) harvest
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Large land mammals	**6.1**	**0.0**	**0.0**	**6.1**	**0.9**	**0.0**	**0.0**	**0.0**	**0.0**	**lb**	**0.0**	**0.0**
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Caribou	1.8	0.0	0.0	1.8	0.9	0.0	0.0	0.0	0.0	ind	0.0	0.0
Deer	1.8	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Moose	2.6	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Small land mammals	**3.5**	**3.5**	**3.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**lb**	**0.0**	**0.0**
Red fox	2.6	2.6	2.6	0.0	0.0	0.0	0.0	0.0	140.1	ind	0.1	123.7
Alaska hare	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Arctic ground (parka) squirrel	1.8	1.8	1.8	0.0	0.0	0.0	0.0	0.0	43.8	ind	0.0	153.4
Feral animals	**2.6**	**0.0**	**0.0**	**2.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**lb**	**0.0**	**0.0**
Cattle–feral	2.6	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Marine mammals	**6.1**	**1.8**	**0.9**	**5.3**	**0.9**	**1,961.0**	**2.0**	**0.9**	**1,961.0**	**lb**	**2.0**	**186.5**
Northern fur seal	1.8	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Harbor seal	3.5	0.9	0.9	2.6	0.0	1,961.0	2.0	0.9	35.0	ind	0.0	186.5
Sea otter	0.9	1.8	0.9	0.0	0.9	0.0	0.0	0.0	12.0	ind	0.0	1,632.3
Steller sea lion	3.5	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Birds and eggs	**13.2**	**8.8**	**7.9**	**6.1**	**0.0**	**753.5**	**0.8**	**0.4**	**753.5**	**lb**	**0.8**	**85.7**
Bufflehead	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Canvasback	1.8	0.9	0.9	0.9	0.0	30.5	0.0	0.0	17.5	ind	0.0	186.5
Gadwall	0.9	0.9	0.9	0.0	0.0	21.5	0.0	0.0	17.5	ind	0.0	186.5
Goldeneyes	0.9	1.8	0.0	0.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Harlequin duck	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Mallard	4.4	3.5	2.6	1.8	0.0	84.6	0.1	0.0	52.5	ind	0.1	131.3

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Table 2-11.–Page 3 of 4.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence interval (±) harvest
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Birds and eggs, continued												
Common merganser	0.9	0.9	0.9	0.0	0.0	73.9	0.1	0.0	35.0	ind	0.0	186.5
Red-breasted merganser	0.9	0.9	0.9	0.0	0.0	11.9	0.0	0.0	8.8	ind	0.0	186.5
Long-tailed duck	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Scaups	1.8	0.9	0.9	0.9	0.0	11.8	0.0	0.0	8.8	ind	0.0	186.5
Surf scoter	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified scoters	0.9	0.9	0.9	0.0	0.0	38.3	0.0	0.0	26.3	ind	0.0	186.5
Northern shoveler	0.9	0.9	0.9	0.0	0.0	7.5	0.0	0.0	8.8	ind	0.0	186.5
Teals	7.0	4.4	3.5	3.5	0.0	135.8	0.1	0.1	288.9	ind	0.3	121.4
Brant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Canada/cackling geese	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	4.4	4.4	3.5	0.9	0.0	107.9	0.1	0.1	35.0	ind	0.0	92.0
Snow goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Swans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Wilson's snipe	0.9	0.9	0.9	0.0	0.0	12.3	0.0	0.0	87.5	ind	0.1	186.5
Ptarmigan	7.0	6.1	4.4	2.6	0.0	195.5	0.2	0.1	253.9	ind	0.3	89.9
Black oystercatcher eggs	1.8	1.8	0.9	0.9	0.0	22.1	0.0	0.0	218.9	ind	0.2	186.5
Large gull eggs	0.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Marine invertebrates	**48.2**	**19.3**	**18.4**	**36.8**	**7.9**	**3,616.7**	**3.6**	**1.7**	**3,616.7**	**lb**	**3.6**	**62.0**
Red (large) chiton	0.9	0.9	0.9	0.0	0.0	26.3	0.0	0.0	8.8	gal	0.0	186.5
Black (small) chiton	4.4	2.6	2.6	1.8	0.0	122.6	0.1	0.1	30.6	gal	0.0	121.3
Butter clam	2.6	0.9	0.9	1.8	0.0	26.3	0.0	0.0	8.8	gal	0.0	186.5
Pacific littleneck clams (steamers)	0.9	0.9	0.9	0.0	0.0	26.3	0.0	0.0	8.8	gal	0.0	186.5

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Table 2-11.–Page 4 of 4.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence interval (±) harvest
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Marine invertebrates, continued												
Razor clam	0.9	1.8	0.9	0.0	0.0	6.6	0.0	0.0	2.2	gal	0.0	186.5
Dungeness crab	17.5	8.8	6.1	12.3	1.8	790.5	0.8	0.4	1,129.3	ind	1.1	109.9
King crab	28.1	9.6	4.4	23.7	3.5	527.0	0.5	0.3	229.1	ind	0.2	100.2
Tanner crab	19.3	11.4	7.9	11.4	1.8	549.8	0.6	0.3	1,374.4	ind	1.4	74.9
Limpet	0.9	0.9	0.9	0.0	0.0	0.7	0.0	0.0	4.4	ind	0.0	186.5
Blue mussel	3.5	3.5	3.5	0.0	0.9	183.8	0.2	0.1	122.6	gal	0.1	108.9
Octopus	19.3	7.9	7.0	14.0	4.4	1,295.6	1.3	0.6	323.9	ind	0.3	77.3
Sea urchins	0.9	1.8	0.9	0.0	0.0	8.8	0.0	0.0	17.5	gal	0.0	186.5
Shrimps	5.3	3.5	1.8	3.5	0.9	52.5	0.1	0.0	52.5	lb	0.1	158.2
Squid	0.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Vegetation	**69.3**	**64.9**	**64.9**	**14.9**	**12.3**	**25,299.3**	**25.4**	**12.1**	**25,299.3**	**lb**	**25.4**	**25.7**
Berries	69.3	64.9	64.9	11.4	12.3	22,647.6	22.7	10.8	5,661.9	gal	5.7	24.9
Plants and greens	19.3	18.4	18.4	1.8	3.5	434.2	0.4	0.2	434.2	gal	0.4	48.6
Mushrooms	22.8	20.2	19.3	4.4	0.9	694.2	0.7	0.3	694.2	gal	0.7	99.5
Seaweed	9.6	9.6	8.8	0.9	0.9	1,523.3	1.5	0.7	520.9	gal	0.5	99.7

Source ADF&G Division of Subsistence household surveys, 2021.

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

are not included. Differences between harvest and use percentages reflect sharing among households, which results in a wider distribution of wild foods.

A total of 166,273 lb of wild foods were harvested by Unalaska residents in 2020 (Table 2-11). The majority of this harvest was fish: salmon composed 42% of the harvest and nonsalmon fish an additional 39% (Figure 2-11). Following distantly behind fish was vegetation, composing 15% of the harvest weight, then marine invertebrates, marine mammals, and birds and eggs, all composing 2% or less of the harvest. No harvest of large land mammals was documented through the survey and no small land mammals were harvested for food, only fur. Unalaskans harvested an estimated 69,727 lb of salmon, or 33 lb per person, and 64,916 lb of nonsalmon fish, or 31 lb per person (Table 2-11). At 25,299 lb, the vegetation harvest equated to about 12 lb per person. Less than 2 lb per person of the remaining resource categories were harvested: 3,617 lb of marine invertebrates, 1,961 lb of marine mammals, and 754 lb of birds and eggs.

Use and Harvest Characteristics by Resource Category

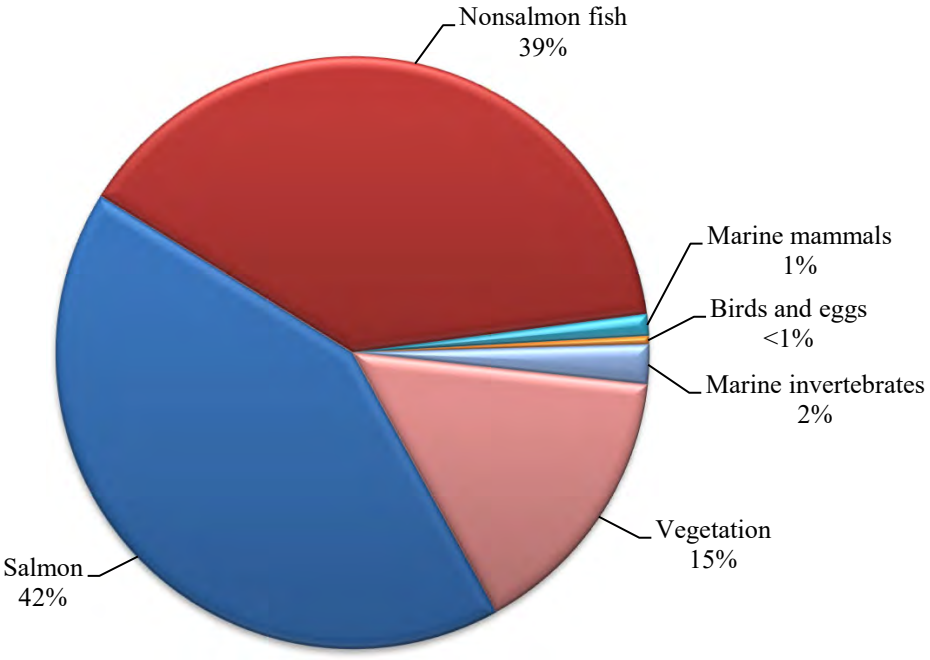
In 2020, three-quarters (75%) of Unalaska households attempted to harvest and harvested at least one wild resource (Table 2-11). More households (12%) shared salmon and vegetation than any other resource category. While more households received salmon than any other resource category (48%), nonsalmon fish was the next most commonly received resource category (46% of households). Other more commonly received resources included marine invertebrates (37% of households) and vegetation (15%). Other resource categories were received by 6% or fewer households. No households shared or received small land mammals, and no households shared feral animals or birds and eggs.

Table 2-12 lists the top ranked resources used by households and Figure 2-12 shows the species with the highest harvests (in pounds usable weight) during the 2020 study year. Almost all of the top species harvested were from the marine environment, reflecting the lack of wild large game on Unalaska and Amaknak islands. Berries in general was one resource that proved to be an exception and was also among the top five resources harvested. Pacific halibut and sockeye salmon combined composed one-half of the total harvest weight in 2020 and both species were used by more than one-half of Unalaska households. Coho salmon were also used by more than one-half of Unalaska households. Although still among the most used resources, the remaining 10 resources listed in Table 2-12 were used by a relatively small percentage of households: five resources tied for the tenth ranking with just 19% of households using. The species used by the most households were very similar to the most harvested. Some of the species used by a smaller proportion of households—such as king and Tanner crab, mushrooms, Chinook salmon, and octopus—were not among the most harvested species. In part, this could be because some of these species—like king and Tanner crab, and Chinook salmon—require traveling farther distances or owning specialized gear to harvest; however, they are highly prized species and may be shared more broadly than other, more easily accessible resources. Other of the most used species, like mushrooms and other wild greens, do not weigh much, so their contribution to the overall harvest weight would remain small.

Salmon

Together, sockeye, coho, and pink salmon composed nearly the entire salmon harvest by weight; Chinook and chum salmon combined composed just 3% of the harvest (Figure 2-13). Unalaskans harvested a total of 36,238 lb of sockeye salmon, which equated to 17 lb per capita, and 23,658 lb of coho salmon, or 11 lb per capita (Table 2-11). Fewer pink salmon were harvested, but the total harvest weight equaled 7,320 lb, or 4 lb per capita. Households harvested less than 1 lb per capita of Chinook salmon (1,552 lb total) and chum salmon (959 lb total). Pink, coho, and sockeye salmon are generally more accessible to more residents to harvest because they come back to road-accessible local systems, such as Unalaska Lake, Summer Bay, Morris Cove, and Humpy Cove. Other systems with sockeye salmon populations are only accessible by boat. Chinook salmon do not return to any of the rivers on Unalaska Island, but residents with access to boats and sportfishing gear can be successful harvesting them in the marine waters around the island. As one resident recounted:

> Because our rivers are so small, kings [Chinook salmon] need a really big system. But they do go through and so people still catch them, you can catch them like



Note Categories having 0 lb of usable weight are not included.

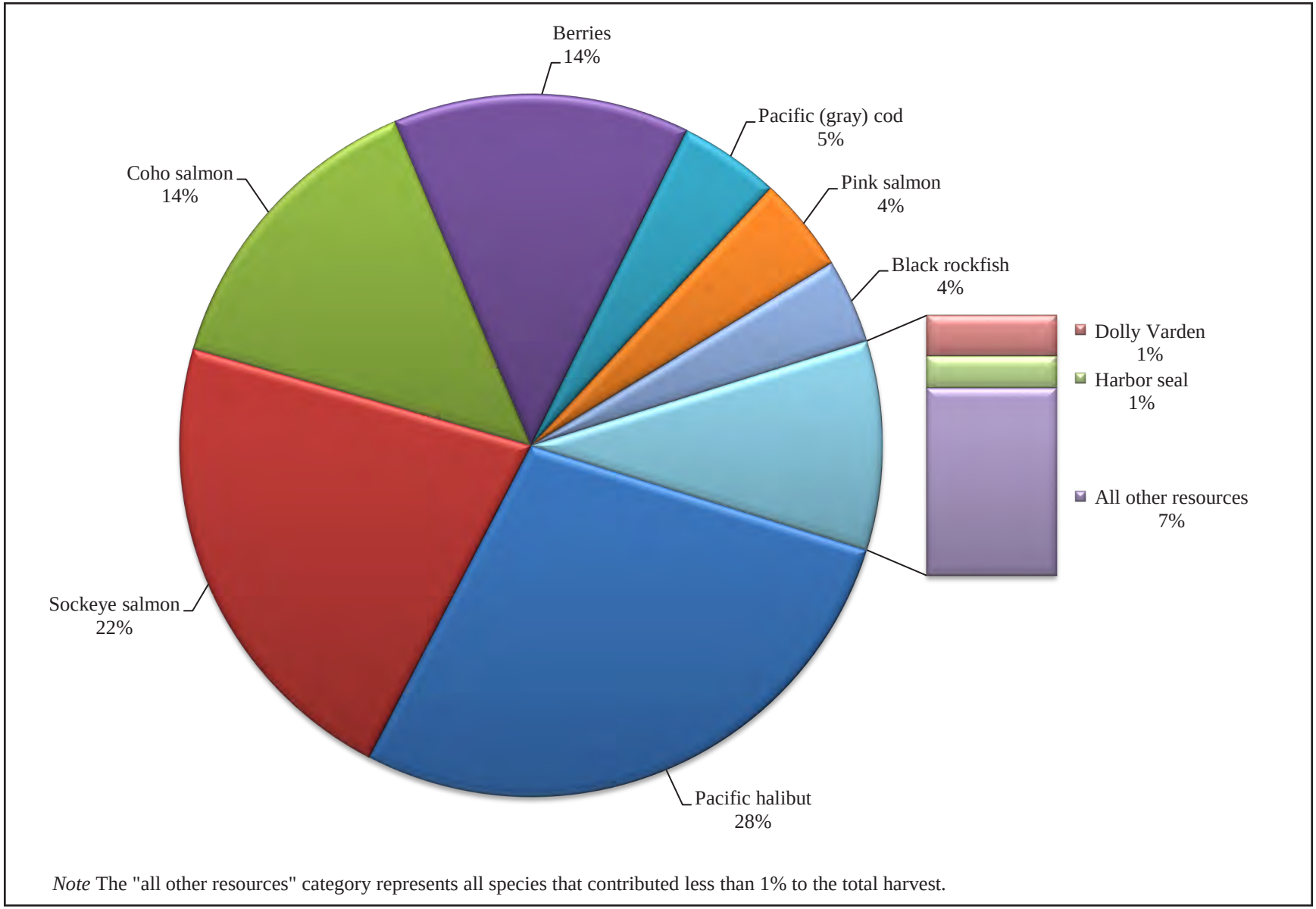
Figure 2-11.–Composition of harvest in pounds usable weight, by resource category, Unalaska, 2020.

Table 2-12.–Top ranked resources used by households, Unalaska, 2020.

Rank[a]	Resource	Percentage of households using
1.	Berries	69.3%
2.	Sockeye salmon	67.5%
3.	Pacific halibut	64.0%
4.	Coho salmon	53.5%
5.	Pacific (gray) cod	36.0%
6.	Pink salmon	29.8%
7.	King crab	28.1%
8.	Black rockfish	22.8%
8.	Mushrooms	22.8%
10.	Chinook salmon	19.3%
10.	Dolly Varden	19.3%
10.	Tanner crab	19.3%
10.	Octopus	19.3%
10.	Other wild greens	19.3%

Source ADF&G Division of Subsistence household surveys, 2021.

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



Note The "all other resources" category represents all species that contributed less than 1% to the total harvest.

Figure 2-12.–Top resources harvested by percentage of total harvest in pounds usable weight, Unalaska, 2020.

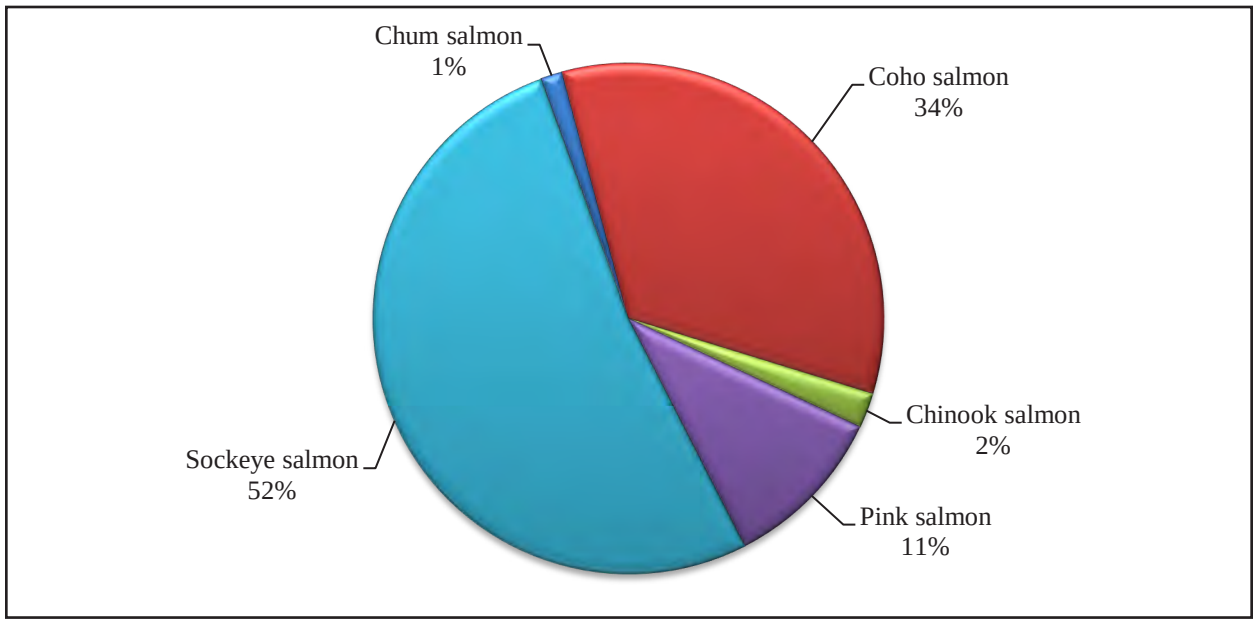


Figure 2-13.–Composition of salmon harvest in pounds usable weight, Unalaska, 2020.

> sports fishing. You know, and people kind of troll for them. So we get 'em, the, in the bays, but they don't spawn in the Aleutians. (DUT03)

Salmon was used by more households than any other resource category (78%), and, unsurprisingly, more households used the salmon species harvested in the greatest amounts: sockeye salmon (68% of households used), coho salmon (54%), and pink salmon (30%) (Table 2-11). The same percentage of households (44%) fished for salmon as fished for nonsalmon fish, but households were slightly more successful salmon fishing, with 41% of households harvesting salmon. Again, more households fished for and harvested sockeye, coho, and pink salmon. Salmon overall was the most shared resource category and the percentages of households sharing individual species follows a similar pattern as those for using and harvesting. More households gave away and received sockeye salmon and coho salmon than any other salmon species. Anomalous to the pattern, more households shared and received Chinook salmon than pink salmon. Chinook salmon are larger, generally more highly valued, and more challenging to harvest than pink salmon, which are abundant and more accessible for people to harvest on their own.

More than 10,600 salmon (43,304 lb) were harvested using subsistence gear, 5,040 salmon (18,484 lb) were harvested with rod and reel gear, and 1,891 salmon (7,939 lb) were removed from commercial harvests for home use (Table 2-13). Figure 2-14 is a visual representation of the salmon harvest weight by gear type. An estimated 62% of the salmon harvest weight was caught using subsistence gear (Table 2-14). For three species, rod and reel gear was the most commonly used harvest method: 71% of pink salmon, 52% of Chinook salmon, and 48% of chum salmon. Sockeye and coho salmon were mostly harvested in subsistence nets: 74% of sockeye salmon and 59% of coho salmon. Although none of the species were predominantly harvested through commercial retention, all types of salmon were retained during the study year. Sockeye salmon composed three-quarters (74%) of the commercial retention amount, followed by coho salmon (19%); pink salmon contributed the least, at less than 1%.

Nonsalmon Fish

Unalaska residents harvested nearly 65,000 lb of nonsalmon fish in 2020 (Table 2-11). Pacific halibut composed the majority (71%) of this harvest with a total harvest of 46,276 lb, or 22 lb per person (Figure 2-15; Table 2-11). Another one-quarter (26%) of the nonsalmon harvest weight was made up of Pacific cod (12%), black rockfish (10%), and Dolly Varden (4%) (Figure 2-15). There were 7,676 lb of Pacific cod,

Table 2-13.–Estimated harvest of salmon by gear type and resource, Unalaska, 2020.

Resource	Removed from commercial catch		Subsistence methods							
			Unspecified subsistence net		Subsistence gear, any method		Rod and reel		Any method	
	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**1,890.9**	**7,939.0**	**10,662.8**	**43,304.1**	**10,662.8**	**43,304.1**	**5,040.1**	**18,483.6**	**17,593.9**	**69,726.7**
Chum salmon	61.3	319.6	35.0	182.6	35.0	182.6	87.5	456.5	183.8	958.7
Coho salmon	350.2	1,756.7	2,783.9	13,966.1	2,783.9	13,966.1	1,581.8	7,935.4	4,715.8	23,658.3
Chinook salmon	70.0	428.0	52.5	321.0	52.5	321.0	131.3	802.5	253.9	1,551.5
Pink salmon	8.8	20.9	866.7	2,070.3	866.7	2,070.3	2,189.0	5,228.9	3,064.4	7,320.1
Sockeye salmon	1,400.7	5,413.7	6,924.7	26,764.1	6,924.7	26,764.1	1,050.5	4,060.3	9,375.9	36,238.1

Source ADF&G Division of Subsistence household surveys, 2021.

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

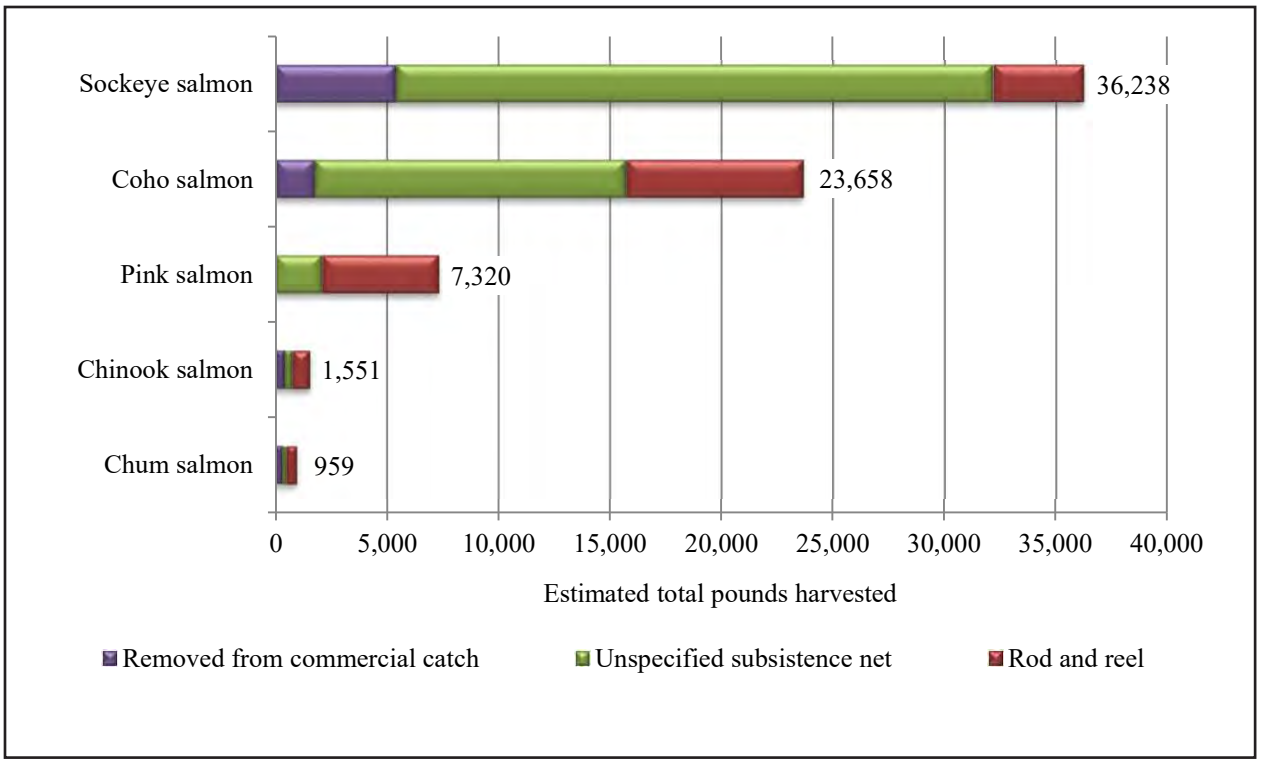


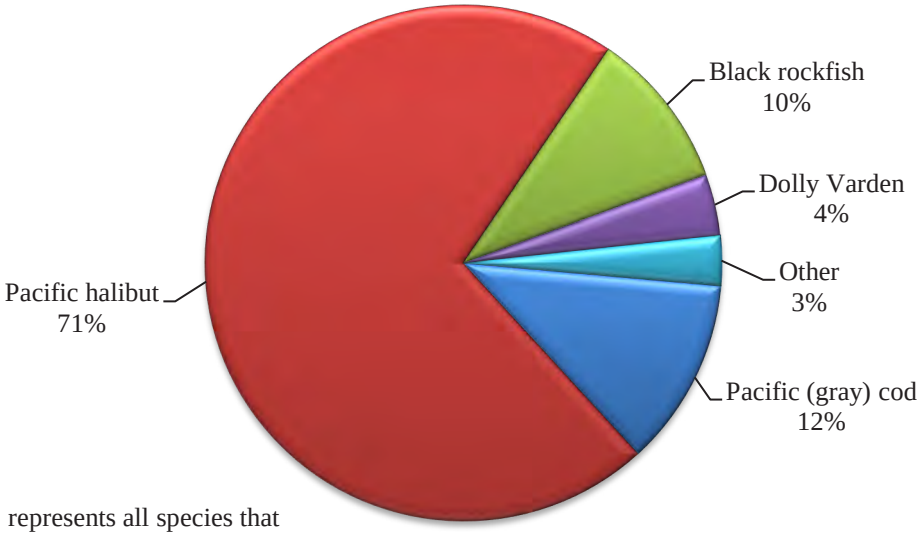
Figure 2-14.–Estimated harvest of salmon in pounds usable weight by gear type and resource, Unalaska, 2020.

Table 2-14.–Estimated percentages of salmon harvested by gear type, resource, and total salmon harvest, Unalaska, 2020.

Resource	Percentage base	Removed from commercial catch		Subsistence methods: Unspecified subsistence net		Subsistence methods: Subsistence gear, any method		Rod and reel		Any method	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**Gear type**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**10.7%**	**11.4%**	**60.6%**	**62.1%**	**60.6%**	**62.1%**	**28.6%**	**26.5%**	**100.0%**	**100.0%**
	Total	**10.7%**	**11.4%**	**60.6%**	**62.1%**	**60.6%**	**62.1%**	**28.6%**	**26.5%**	**100.0%**	**100.0%**
Chum salmon	Gear type	3.2%	4.0%	0.3%	0.4%	0.3%	0.4%	1.7%	2.5%	1.0%	1.4%
	Resource	33.3%	33.3%	19.0%	19.0%	19.0%	19.0%	47.6%	47.6%	100.0%	100.0%
	Total	0.3%	0.5%	0.2%	0.3%	0.2%	0.3%	0.5%	0.7%	1.0%	1.4%
Coho salmon	Gear type	18.5%	22.1%	26.1%	32.3%	26.1%	32.3%	31.4%	42.9%	26.8%	33.9%
	Resource	7.4%	7.4%	59.0%	59.0%	59.0%	59.0%	33.5%	33.5%	100.0%	100.0%
	Total	2.0%	2.5%	15.8%	20.0%	15.8%	20.0%	9.0%	11.4%	26.8%	33.9%
Chinook salmon	Gear type	3.7%	5.4%	0.5%	0.7%	0.5%	0.7%	2.6%	4.3%	1.4%	2.2%
	Resource	27.6%	27.6%	20.7%	20.7%	20.7%	20.7%	51.7%	51.7%	100.0%	100.0%
	Total	0.4%	0.6%	0.3%	0.5%	0.3%	0.5%	0.7%	1.2%	1.4%	2.2%
Pink salmon	Gear type	0.5%	0.3%	8.1%	4.8%	8.1%	4.8%	43.4%	28.3%	17.4%	10.5%
	Resource	0.3%	0.3%	28.3%	28.3%	28.3%	28.3%	71.4%	71.4%	100.0%	100.0%
	Total	0.0%	0.0%	4.9%	3.0%	4.9%	3.0%	12.4%	7.5%	17.4%	10.5%
Sockeye salmon	Gear type	74.1%	68.2%	64.9%	61.8%	64.9%	61.8%	20.8%	22.0%	53.3%	52.0%
	Resource	14.9%	14.9%	73.9%	73.9%	73.9%	73.9%	11.2%	11.2%	100.0%	100.0%
	Total	8.0%	7.8%	39.4%	38.4%	39.4%	38.4%	6.0%	5.8%	53.3%	52.0%

Source ADF&G Division of Subsistence household surveys, 2021.

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



Note "Other" represents all species that each contributed less than 2% to the total category harvest weight.

Figure 2-15.–Composition of nonsalmon fish harvest in pounds usable weight, Unalaska, 2020.

6,448 lb of black rockfish, and 2,513 lb of Dolly Varden harvested, equaling per capita harvests ranging from 4 lb to 1 lb (Table 2-11). Eight other types of nonsalmon fish composed the remainder of the harvest (3%), none of which were harvested in amounts exceeding 0.5 lb per capita.

Compared to salmon, slightly fewer households used, harvested, or shared nonsalmon fish in 2020 (Table 2-11). Approximately 72% of households used nonsalmon fish, 40% harvested the resources, and 9% of households gave away and 46% received nonsalmon fish. The three most harvested species were used, harvested, and shared by the most households. As with its harvest weight, Pacific halibut stands out in all household participation metrics: 64% of households used Pacific halibut, 36% of households fished for halibut and 31% harvested, while 40% of households received halibut from another household and 7% gave away this resource. Although Pacific halibut was the most used and harvested species, residents spoke of changes in the abundance and size of halibut over the past 20 years, especially in the local bays. One resident summed up the changes as follows:

> Ten minutes from the boat launch you could drop your water, drop your line in 70 feet of water and you have a halibut, and you've got your catch for the day and you're back to the boat in an hour-and-a-half. Now it's drive all the way out to Priest Rock to get something over 30 pounds. (DUT06)

Pacific cod were used by the next most households (36%), followed by black rockfish (23%), and Dolly Varden (19%). Between 17% and 19% of households fished for or harvested these species. About 4% of households gave away Pacific cod or black rockfish and these resources were received by 18% and 7% of households, respectively. With the exception of greenling, no other species were fished for, harvested, given, or received by more than 5% of households. Several harvested species were not shared by any surveyed households: Pacific herring, arrowtooth flounder, sablefish, rock sole, and rainbow trout.

An estimated total of 54,788 lb of nonsalmon fish were harvested using rod and reel gear, and 10,127 lb were harvested using subsistence gear (Table 2-15). No nonsalmon fish were removed from commercial harvests. Figure 2-16 is a visual representation of the nonsalmon fish harvest weight by gear type. As estimated in total pounds of fish, 84% of the nonsalmon fish harvest was caught using rod and reel gear (Table 2-16). For all species except sablefish, rod and reel gear was the most commonly used harvest method. All sablefish were harvested in a subsistence net; conversely all walleye pollock, arrowtooth flounders,

greenlings, rockfishes, and rock sole were harvested with rod and reel gear. Nearly all the harvest weight of Pacific herring and Dolly Varden was also caught with rod and reel gear (98% and 95%, respectively), with the remainder harvested in a subsistence net. Pacific halibut and cod were the only two species harvested by longline: 18% of the Pacific halibut and 15% of the Pacific cod harvest.

Large Land Mammals

Wild large land mammals are not found on Unalaska Island or any of the nearby islands. No surveyed households reported hunting for or harvesting any large land mammals or feral animals in 2020.[3] Despite the lack of hunting activity, 6% of households used large land mammals, and 3% used feral animals (Table 2-11). The used species included caribou, deer, moose, and feral cattle. All of the households that used these species received them from other households, likely from outside of the community since the only resource given away was caribou, by 1% of households. Occasionally residents will travel off island to hunt, especially for caribou, which are found on the Aleutian Islands chain. In speaking about sharing networks, one resident was unaware of any networks for sharing large game meat but did consider that people will go harvest their own animals.

> But, you know, for caribou, I mean, that's something that I don't know a lot of, uh, a lot of our people here that, uh, that participate in that. And if they do, they'll go down to Atka or Adak, or Umnak and harvest their own. (DUT02)

Small Land Mammals/Furbearers

A small percentage of Unalaska households hunted for small land mammals and no animals were shared among households. The same percentage of households used, hunted, or harvested small land mammals: for small land mammals generally, this was 4% of households, for red foxes it was 3% of households, and for Arctic ground (parka) squirrels it was 2%. Additionally, 1% of households hunted unsuccessfully for Alaska hares. A total of 140 red foxes (76%) and 44 parka squirrels (24%) were harvested (Table 2-11; Figure 2-17). None of these animals were harvested for food, so harvest amounts were given an edible conversion factor of zero in Table 2-11.

Marine Mammals

Although four types of marine mammals were used by Unalaska households in 2020, only harbor seals and sea otters were hunted or harvested. In terms of numbers of animals, 74% of the harvest was harbor seals (35 animals) and 26% was sea otters (12 animals) (Figure 2-18; Table 2-11). In terms of harvest weight, 1,961 lb of harbor seals were harvested, equaling nearly 1 lb per capita. Because sea otters were not eaten, they were given a conversion factor of zero on Table 2-11. As with residents in other coastal communities, Unalaskans have noted an increase in the population of sea otters and share concerns about the effect the otters are having on local populations of crabs and other marine invertebrates. One respondent recounted:

> I think they [sea otters] moved out of that area and moved into Atka. Wiped out almost all of their sea urchins. Now they've moved out of Atka, they've moved into Nikolski, wiped out a lot of their beach food. And now they're out of there, pretty much, and they're in our area. I notice now, they're moving more towards Akutan. (DUT01)

Substantially more households used marine mammals than hunted them, and not all hunting households successfully harvested an animal (Table 2-11). For marine mammals generally, 6% of households used the resource but only 2% of households hunted and 1% harvested. The most households used harbor seals and Steller sea lions (4%), followed by northern fur seals (2%) and sea otters (1%). No surveyed households hunted fur seals or sea lions, and the 1% of households that hunted harbor seals were successful in their harvest, whereas only one-half of the households that hunted sea otters were successful. Sharing of marine mammals was not widespread. Only sea otters were given away, and no households reported receiving sea

3. The Alaska Department of Fish and Game (ADF&G) Division of Wildlife Conservation harvest database "WinfoNet" indicated one caribou was harvested by an Unalaska resident in 2020 (database accessed June 2022).

Table 2-15.–Estimated harvest of nonsalmon fish by gear type and resource, Unalaska, 2020.

Resource	Unit[a]	Removed from commercial catch		Subsistence methods: Unspecified subsistence net		Subsistence methods: Longline/skate		Subsistence methods: Subsistence gear, any method		Rod and reel[b]		Any method	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Nonsalmon fish			**0.0**		**672.2**		**9,455.2**		**10,127.3**		**54,788.4**		**64,915.8**
Pacific herring	gal	0.0	0.0	1.1	6.8	0.0	0.0	1.1	6.8	43.8	262.6	44.9	269.5
Pacific (gray) cod	ind	0.0	0.0	0.0	0.0	358.9	1,148.6	358.9	1,148.6	2,039.8	6,527.3	2,398.7	7,675.8
Walleye pollock (whiting)	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	175.1	245.1	175.1	245.1
Arrowtooth flounder (turbot)	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	26.3	8.8	26.3
Greenlings	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	761.6	761.6	761.6	761.6
Pacific halibut	lb	0.0	0.0	0.0	0.0	8,306.6	8,306.6	8,306.6	8,306.6	37,969.5	37,969.5	46,276.1	46,276.1
Black rockfish	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,298.4	6,447.6	4,298.4	6,447.6
Unspecified rockfishes	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	87.5	131.3	87.5	131.3
Sablefish (black cod)	ind	0.0	0.0	175.1	542.8	0.0	0.0	175.1	542.8	0.0	0.0	175.1	542.8
Rock sole	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	8.8	8.8	8.8
Dolly Varden	ind	0.0	0.0	87.5	122.6	0.0	0.0	87.5	122.6	1,707.1	2,389.9	1,794.6	2,512.5
Rainbow trout	ind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.3	18.4	26.3	18.4

Source ADF&G Division of Subsistence household surveys, 2021.

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. Under federal regulations, rod and reel is legal gear for subsistence harvests of Pacific halibut taken by residents of eligible rural communities and members of eligible tribes who have a Subsistence Halibut Registration Certificate (SHARC).

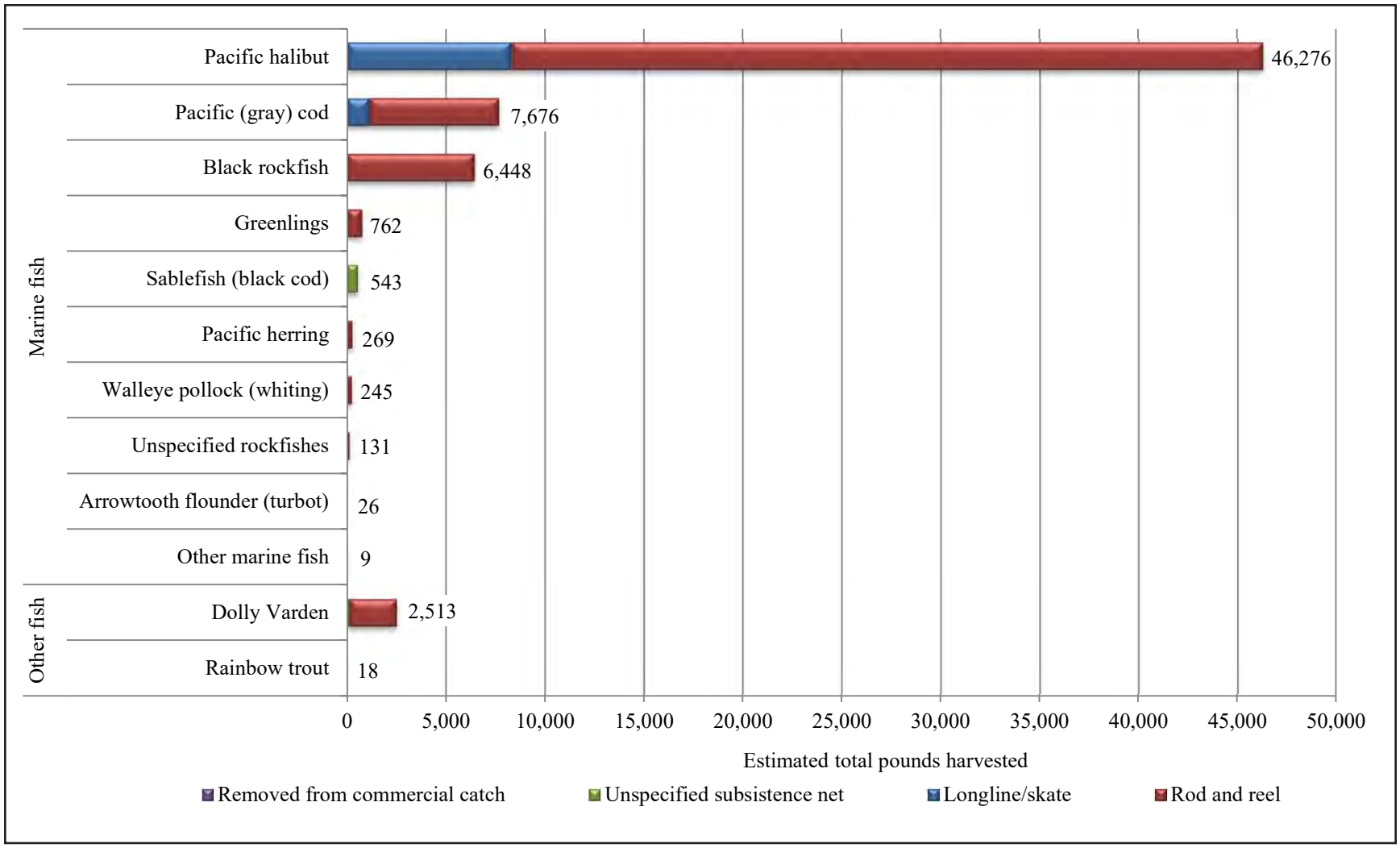


Figure 2-16.–Estimated harvest of nonsalmon fish in pounds usable weight by gear type and resource, Unalaska, 2020.

Table 2-16.–Estimated percentages of nonsalmon fish harvest in pounds usable weight by gear type, resource, and total nonsalmon fish harvest, Unalaska, 2020.

Resource	Percentage base	Removed from commercial catch	Longline/ skate	Unspecified subsistence net	Subsistence gear, any method	Rod and reel[a]	Any method
Nonsalmon fish	**Gear type**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**0.0%**	**14.6%**	**1.0%**	**15.6%**	**84.4%**	**100.0%**
	Total	**0.0%**	**14.6%**	**1.0%**	**15.6%**	**84.4%**	**100.0%**
Pacific herring	Gear type	0.0%	0.0%	1.0%	0.1%	0.5%	0.4%
	Resource	0.0%	0.0%	2.5%	2.5%	97.5%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
Pacific (gray) cod	Gear type	0.0%	12.1%	0.0%	11.3%	11.9%	11.8%
	Resource	0.0%	15.0%	0.0%	15.0%	85.0%	100.0%
	Total	0.0%	1.8%	0.0%	1.8%	10.1%	11.8%
Walleye pollock (whiting)	Gear type	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
	Resource	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
Arrowtooth flounder (turbot)	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	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%
Greenlings	Gear type	0.0%	0.0%	0.0%	0.0%	1.4%	1.2%
	Resource	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%
Pacific halibut	Gear type	0.0%	87.9%	0.0%	82.0%	69.3%	71.3%
	Resource	0.0%	18.0%	0.0%	18.0%	82.0%	100.0%
	Total	0.0%	12.8%	0.0%	12.8%	58.5%	71.3%

-continued-

Table 2-16.–Page 2 of 2.

Resource	Percentage base	Removed from commercial catch	Longline/ skate	Unspecified subsistence net	Subsistence gear, any method	Rod and reel[a]	Any method
Black rockfish	Gear type	0.0%	0.0%	0.0%	0.0%	11.8%	9.9%
	Resource	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	9.9%	9.9%
Uspecified rockfishes	Gear type	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
	Resource	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
Sablefish (black cod)	Gear type	0.0%	0.0%	80.8%	5.4%	0.0%	0.8%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.8%	0.8%	0.0%	0.8%
Rock sole	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	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%
Dolly Varden	Gear type	0.0%	0.0%	18.2%	1.2%	4.4%	3.9%
	Resource	0.0%	0.0%	4.9%	4.9%	95.1%	100.0%
	Total	0.0%	0.0%	0.2%	0.2%	3.7%	3.9%
Rainbow trout	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	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%

Source ADF&G Division of Subsistence household surveys, 2021.

a. Under federal regulations, rod and reel is legal gear for subsistence harvests of Pacific halibut taken by residents of eligible rural communities and members of eligible tribes who have a Subsistence Halibut Registration Certificate (SHARC).

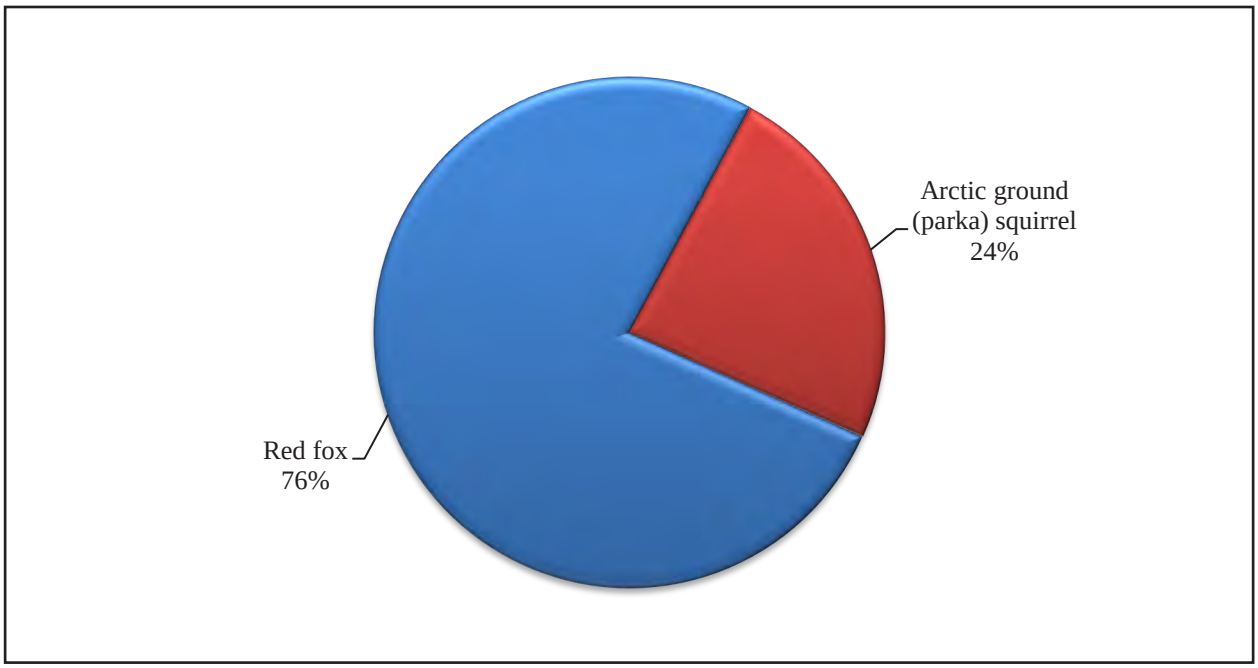


Figure 2-17.–Composition of small land mammal/furbearer harvest by individual animals harvested, Unalaska, 2020.

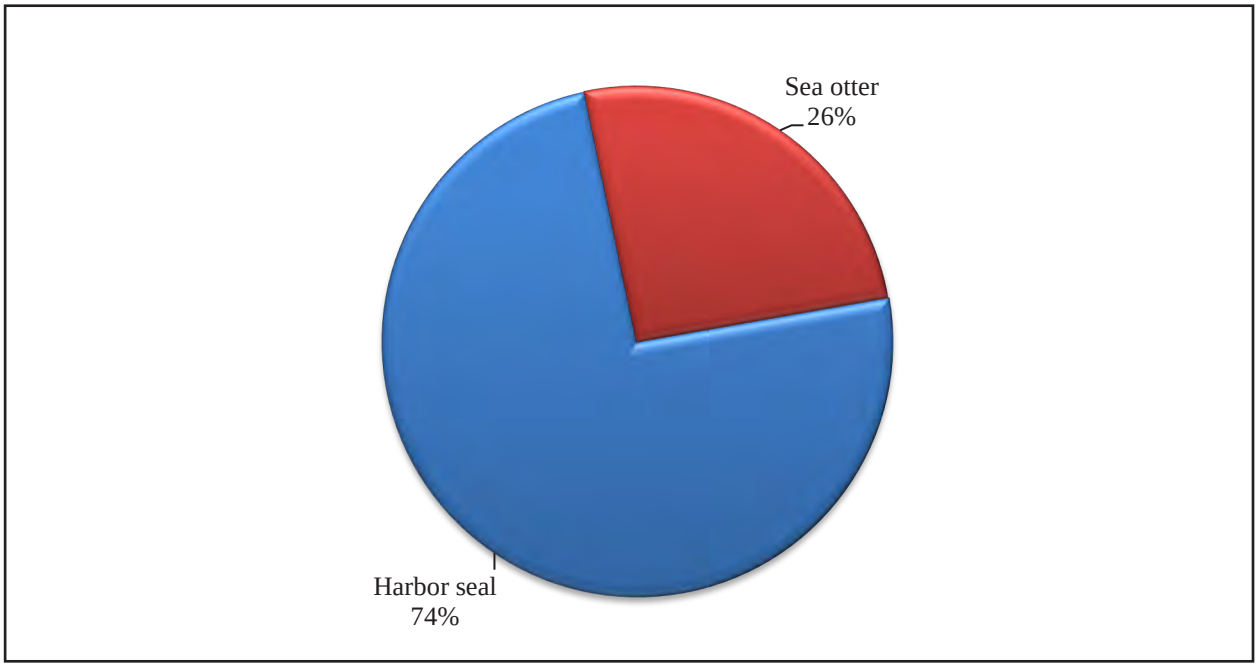


Figure 2-18.–Composition of marine mammal harvest by individual animals harvested, Unalaska, 2020.

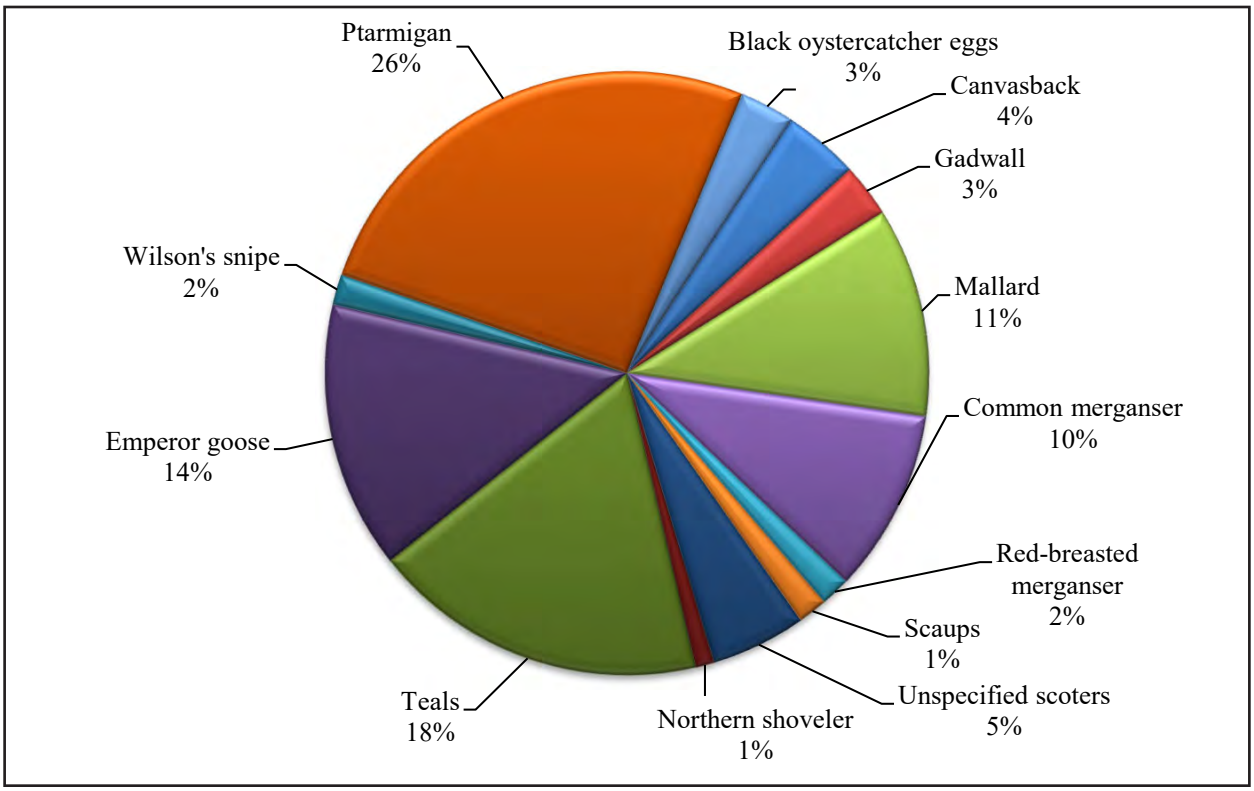


Figure 2-19.–Composition of bird and bird egg harvest in pounds usable weight, Unalaska, 2020.

otters. The households that used fur seals and sea lions were given those resources, and 3% of households also received harbor seals.

Birds and Eggs

Many species composed the bird and egg harvest of Unalaskans in 2020 (Figure 2-19). The largest percentage of the harvest weight came from harvests of ptarmigan (26%), followed by teals (18%), emperor geese (14%), mallards (11%), and common mergansers (10%). At least eight other bird and bird egg resources were harvested in amounts equaling 5% or less of the total bird and egg harvest weight. There was a total of 754 lb of birds and eggs harvested, equaling 0.4 lb per capita: 196 lb of ptarmigan, 136 lb of teals, and 108 lb of emperor geese were harvested, all equaling approximately 0.1 lb per capita (Table 2-11). No other species were harvested in amounts greater than 0.1 lb per capita. For bird eggs, only black oystercatcher eggs were harvested (by 1% of households) and in amounts smaller than 0.1 lb per capita. The majority of birds were harvested in the winter or fall, but some were also harvested in the spring (Table 2-17). No birds were harvested solely in the spring. Many bird species were harvested during multiple seasons. There was some harvest of all birds in the winter months, except for northern shovelers and Wilson's snipe.

Overall, 13% of households used birds in 2020 (Table 2-11). The most commonly used birds were ptarmigan and teals, used by 7% of households, followed by emperor geese and mallards, used by 4% of households. All other bird species and bird eggs were used by 2% or fewer households. Most households that hunted birds were successful. An estimated 9% of households hunted and 8% of households harvested birds during the study year. The majority of birds used were hunted and harvested by 1% of households, and for all these species, the hunting households were successful. For mallards, teals, and emperor geese, 4% of households hunted these birds but not all households were successful. Six percent of households hunted ptarmigan and 4% of households harvested this resource. Two percent of households attempted to harvest black oystercatcher eggs and 1% of households did harvest. In addition, 1% of households unsuccessfully hunted buffleheads, harlequin ducks, long-tailed ducks, and surf scoters, and no households used these

Table 2-17.–Estimated bird harvests by season, Unalaska, 2020.

Resource	Estimated harvest by season					
	Spring	Summer	Fall	Winter	Season unknown	**Total**
All birds	**61.3**	**0.0**	**315.2**	**437.7**	**26.3**	**840.4**
Bufflehead	0.0	0.0	0.0	0.0	0.0	**0.0**
Canvasback	0.0	0.0	0.0	17.5	0.0	**17.5**
Gadwall	0.0	0.0	8.8	8.8	0.0	**17.5**
Goldeneyes	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	43.8	8.8	0.0	**52.5**
Common merganser	0.0	0.0	8.8	26.3	0.0	**35.0**
Red-breasted merganser	0.0	0.0	0.0	8.8	0.0	**8.8**
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	**0.0**
Scaups	0.0	0.0	0.0	8.8	0.0	**8.8**
Surf scoter	0.0	0.0	0.0	0.0	0.0	**0.0**
Unspecified scoters	0.0	0.0	0.0	26.3	0.0	**26.3**
Northern shoveler	0.0	0.0	8.8	0.0	0.0	**8.8**
Teals	26.3	0.0	122.6	113.8	26.3	**288.9**
Brant	0.0	0.0	0.0	0.0	0.0	**0.0**
Canada/cackling geese	0.0	0.0	0.0	0.0	0.0	**0.0**
Emperor goose	0.0	0.0	8.8	26.3	0.0	**35.0**
Snow goose	0.0	0.0	0.0	0.0	0.0	**0.0**
Swans	0.0	0.0	0.0	0.0	0.0	**0.0**
Wilson's snipe	35.0	0.0	52.5	0.0	0.0	**87.5**
Ptarmigan	0.0	0.0	61.3	192.6	0.0	**253.9**

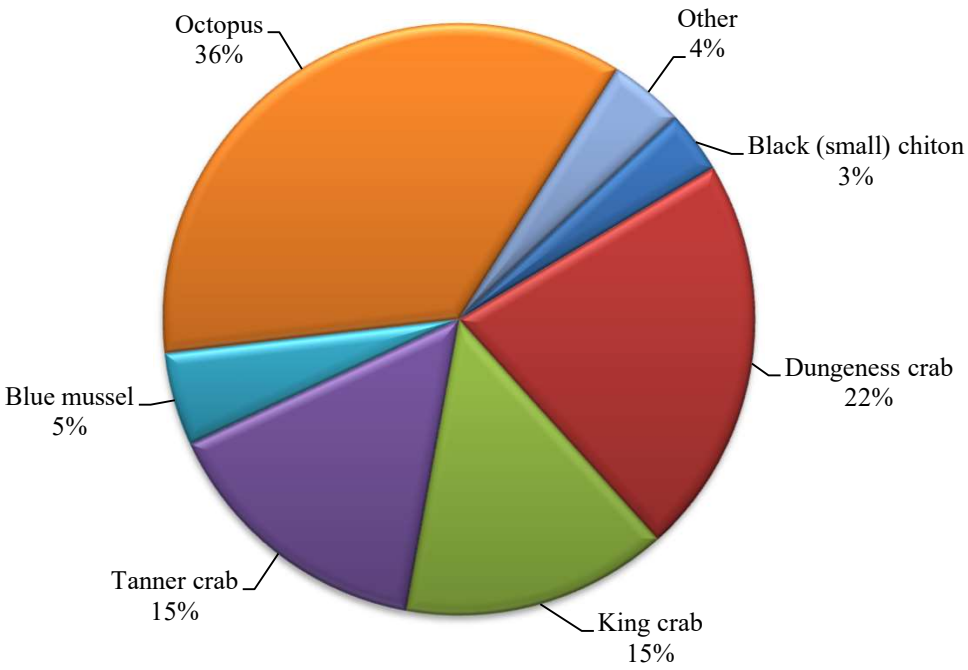
Source ADF&G Division of Subsistence household surveys, 2021.

Note Fall = September and October; Winter = January, February, and March, and also November and December; Spring = April, May, and June; Summer = July and August.

birds. Only goldeneyes were hunted unsuccessfully (by 2% of households) but used regardless of harvest failure because 1% of households were gifted goldeneyes. Birds were not widely shared. No household reported giving away any species of bird. Teals were received by the most households (4%), followed by ptarmigan (3%), and mallards (2%). One percent of households received canvasbacks, goldeneyes, scaups, emperor geese, black oystercatcher eggs, and unspecified large gull eggs. No other species were received by surveyed households.

Marine Invertebrates

Four species of marine invertebrates composed nearly 90% of the total marine invertebrate harvest in 2020 (Figure 2-20). These species were octopus (36%), Dungeness crab (22%), Tanner crab (15%), and king crab (15%). Harvests of nine other species accounted for the rest of the harvest weight. A total of 3,617 lb of marine invertebrates were harvested, or approximately 2 lb per person (Table 2-11). Unalaska households harvested nearly 1,300 lb of octopuses (0.6 lb per person), as well as 791 lb of Dungeness crab (approximately 1,130 crab; 0.4 lb per capita). The harvests of king crab and Tanner crab were nearly equal



Note "Other" represents all species that each contributed less than 2% to the total category harvest weight.

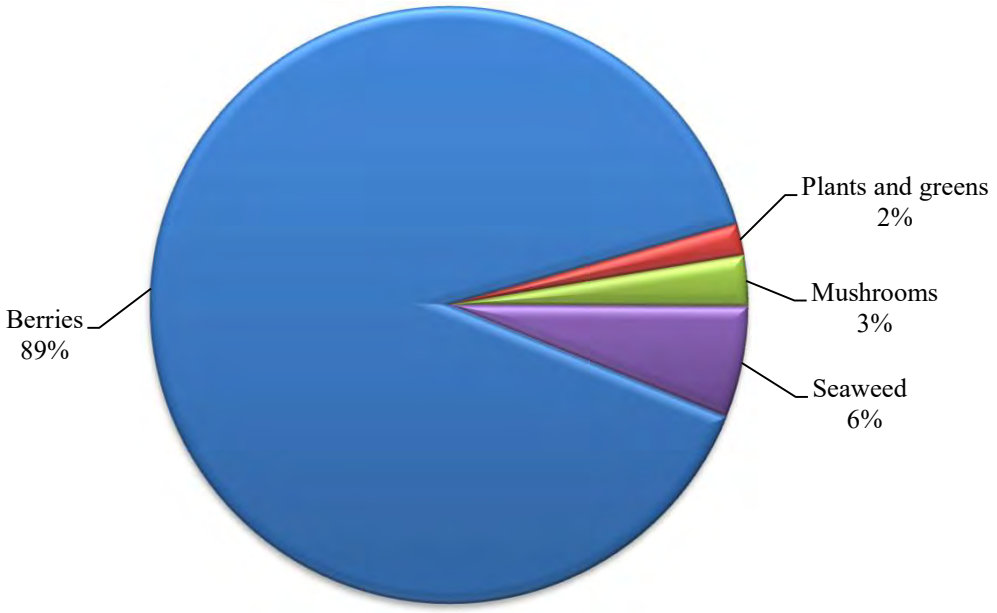
Figure 2-20.–Composition of marine invertebrate harvest in pounds usable weight, Unalaska, 2020.

(527 lb and 550 lb, respectively), but because of the relatively larger size of king crab, a smaller amount of king crab (only 229) was harvested compared to Tanner crab (1,374). Of the remaining harvested marine invertebrates, only harvests of blue mussels (184 lb; 0.1 lb per capita) and black chitons (123 lb; 0.1 lb per capita) exceeded a harvest weight of 100 lb for the community.

Overall, 48% of households used marine invertebrates. The most widely used species were king crab (28% of households), octopus (19%), Tanner crab (19%), and Dungeness crab (18%) (Table 2-11). Five percent of households used shrimps and 4% used black chitons. No other resource was used by more than 5% of households. A substantially smaller percentage of households harvested marine invertebrates: 19% of households attempted to harvest and 18% of community households harvested these resources. For about one-half of the species harvested, all households that attempted a harvest were successful. Some amount of failure to harvest occurred in the other species, such as for king crab—10% of households fished for king crab but overall 4% of households harvested them. The most households (8%) harvested Tanner crab, but 11% of households attempted to harvest the resource. Few households shared marine invertebrates and more than one-half of the used resources were not given away by any household. The most households (4%) gave away octopuses or king crab. King crab were received by 24% of households, more than any other resource that was received. The second most received resource was octopus (14%), followed by Dungeness crab (12%) and Tanner crab (11%). No other resource was received by more than 5% of households. Squid was the only species used but not harvested, and the 1% of households that used squid received it from other households.

Vegetation

Berries composed the majority of the vegetation harvest: 89% of the harvest weight came from the harvest of berries, 6% was the harvest of seaweeds, 3% came from mushrooms harvested, and 2% stemmed from the harvest of plants and greens (Figure 2-21). The total vegetation harvest weight was approximately 25,300 lb, for a per capita harvest of 12 lb (Table 2-11). The per capita harvest of berries was 11 lb (5,662 gallons total) compared to just 0.7 lb (521 gallons total) for seaweeds. Slightly more mushrooms were



Note The seaweed category does not include amounts used for fertilizer.

Figure 2-21.–Composition of vegetation harvest by type in pounds usable weight, Unalaska, 2020.

harvested than plants and greens: 694 gallons of mushrooms (0.3 lb per capita) and 434 gallons of plants and greens (0.2 lb per capita).

Approximately two-thirds (69%) of households used vegetation resources in 2020, and a similar percentage harvested them (65%) (Table 2-11). All households that searched for berries or plants were successful in gathering them, but some households were unsuccessful in their search for mushrooms or seaweeds. More households harvested and used berries than any other type of vegetation, and the fewest household used and harvested seaweeds. Of the different types of vegetation, berries were shared by the most households (12% of households) followed by plants and greens (4%). Just 1% of households gave away mushrooms or seaweeds. Interestingly, while berries were also the most received type of vegetation (11%), mushrooms were the next most received (4%). Two percent of households received plants or greens, and 1% received seaweeds.

Comparing Harvests and Uses in 2020 with Previous Years[4]

Harvest Assessments

Researchers asked respondents to assess their own harvests in two ways: whether they used more, less, or about the same amount of wild resources in 2020 as in the past five years, and to provide reasons if their use was different. Not all households responded to these questions. Of the 105 households that did respond to the first question, 36% explained that they used the same amount of wild resources in 2020 as they did in

4. A comparison of harvest quantities in 2020 with available data from previous years is presented in Chapter 4.

previous years, 37% reported that they used less, and 11% said they used more (Table 2-18; Figure 2-22). When asked why they used less, 26% of responding households indicated that they did so due to family or personal reasons, such as illnesses, or death or birth in a family (Table 2-19). Other stated reasons for using less wild resources included lack of effort, less available resources, and the COVID-19 pandemic. For those households that used more wild resources in the study year and provided a reason for why, 40% indicated that it was due to an increased effort to harvest resources (Table 2-20). Seven other reasons were provided for why a household used more resources, and each of these reasons was cited by one household.

Additional Assessments

Researchers included several questions on the survey designed to elicit information about specific changes survey respondents may have noted over the study year and recent past in terms of harvesting behaviors, resource health and availability, seasonality, environmental changes, and changes in harvest locations. A standout feature of 2020 as a study year was the beginning of the COVID-19 pandemic.[5] It is not clear how the pandemic affected subsistence harvesting patterns throughout the state, but it likely varied significantly depending on local and individual circumstances. More responding Unalaska households indicated that COVID-19 did not impact their subsistence activities in 2020 than indicated the pandemic did change activities (Table 2-21). For those respondents who were affected by COVID-19, the explanations provided often pointed to less harvest opportunity or less receipt of resources, although some respondents did explain that they had more time to focus on harvesting and were therefore positively impacted. The explanations of less harvest opportunity included loss of opportunity to harvest with others, inability to travel off-island or keep equipment maintained, and the general pandemic guidance to stay home.

Regarding observing changes in the health or availability of resources in the past 10 years, survey respondents were equally divided: 38 observed changes, 33 had not, and 33 did not know whether they had observed changes (Table 2-22). For those respondents who had noticed changes, the main resources highlighted were salmon, Pacific halibut and cod, and crabs. None of the comments offered as follow up to the question noted greater abundance or availability of these populations, but rather smaller population abundance and smaller size of animals. A related question about whether survey respondents, over the past 10 years, had observed changes in the time of year that resources are available to harvest garnered slightly more clear-cut responses: 40 households had not observed any such changes, 26 had observed them, and 34 were unsure (Table 2-23). An additional 14 households chose to not answer the question. Households that responded in the affirmative to the question were further asked for which resources had they noted a change (Table 2-24). Blueberries and salmon were the most frequently listed resources, followed by berries in general, sockeye salmon specifically, and salmonberries. When asked whether Unalaska households had observed environmental changes in the last 10 years that had impacted their access to salmon, 26 households responded affirmatively and 65 in the negative (Table 2-25). Finally, households were asked if, in the past 10 years, they had to travel further to harvest wild foods, and if yes, which foods. More households (52) responded that they had not had to travel further than agreed they had had to (21) (Table 2-26). Twenty-nine households were unsure how to answer the question. The most common resource that households reported traveling further for was Pacific halibut (9 households), followed by salmon (7 households), sockeye salmon (5 households), and berries and sea urchins (3 households each) (Table 2-27).

Current and Historical Harvest Areas

Little spatial data concerning search and harvest areas of Unalaska residents exist. During this study, researchers did not collect spatial data during the survey because of the COVID-19-related modifications to research methods. An earlier division study conducted for 1994 also did not document search and harvest areas. In the early 1980s, Veltre (1982) engaged in ethnographic research with Unalaska residents and

5. In March 2020, COVID-19 was officially declared as a global pandemic. Governor Dunleavy issued a health mandate on March 27 requiring most individuals to remain at their place of residence and practice social distancing. Alaska Department of Health and Social Services, "COVID-19 Health Mandate 11," March 27, 2020. Accessed October 6, 2021. https://content.govdelivery.com/accounts/AKDHSS/bulletins/283a713

Table 2-18.–Changes in household uses of resources compared to recent years, Unalaska, 2020.

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
All resources	114	105	89	84.8%	39	37.1%	38	36.2%	12	11.4%	16	15.2%

Source ADF&G Division of Subsistence household surveys, 2021.

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

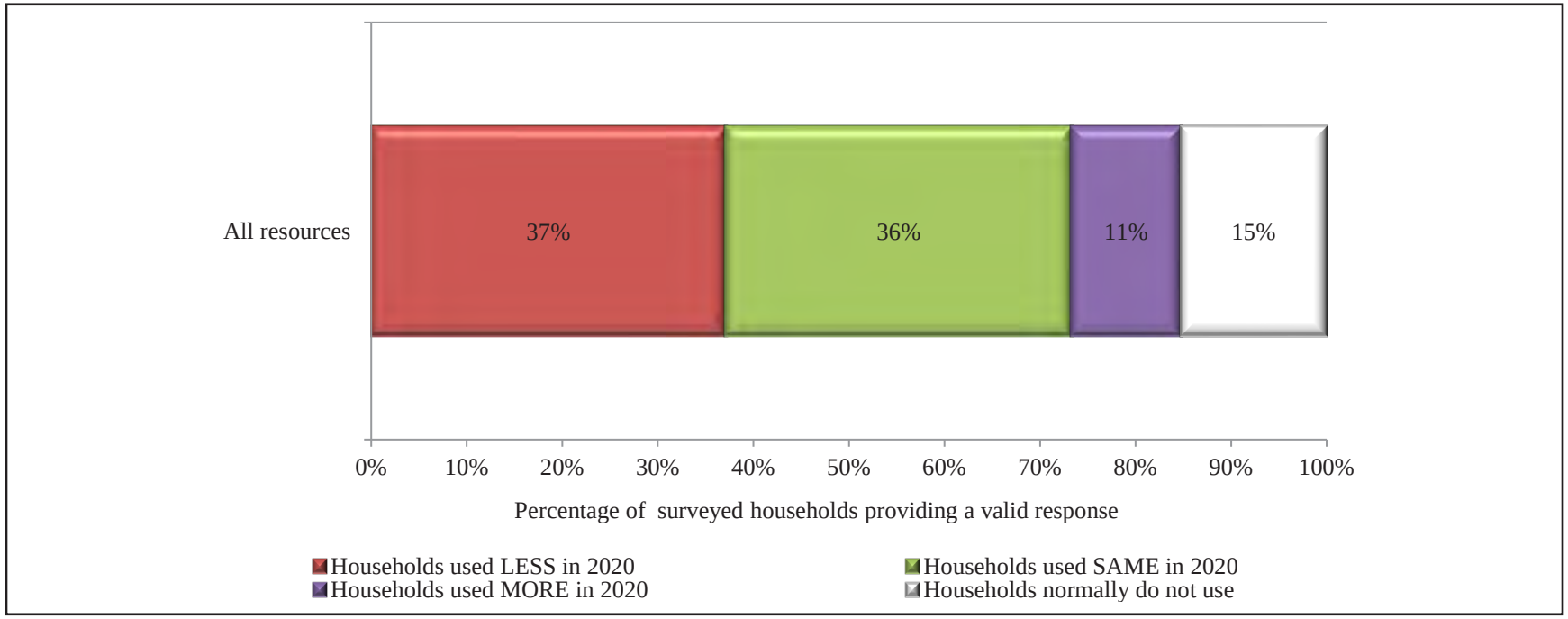


Figure 2-22.–Changes in household uses of resources compared to recent years, Unalaska, 2020.

Table 2-19.–Reasons for less household uses of resources compared to recent years, Unalaska, 2020.

Resource category	Valid responses[a]	Households reporting reasons for less use	Family/ personal		Resources less available		Lack of equipment		Less sharing		Lack of effort		Unsuccessful	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	105	35	9	25.7%	7	20.0%	5	14.3%	1	2.9%	8	22.9%	1	2.9%

-continued-

Table 2-19.–Continued.

Resource category	Valid responses[a]	Households reporting reasons for less use	Weather/ environment		Working/ no time		Needed less		Competition		COVID-19	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	105	35	3	8.6%	3	8.6%	1	2.9%	2	5.7%	6	17.1%

Source ADF&G Division of Subsistence household surveys, 2021.

Note Respondents could provide multiple reasons, so the percentages may sum to more than 100%.

a. Valid responses do not include households that did not provide any response to the less, same, or more use assessment question.

Table 2-20.–Reasons for more household uses of resources compared to recent years, Unalaska, 2020.

Resource category	Valid responses[a]	Households reporting reasons for more use	Family/ personal		Increased availability		Received more		Increased effort	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	105	10	1	10.0%	1	10.0%	1	10.0%	4	40.0%

-continued-

Table 2-20.–Continued.

Resource category	Valid responses[a]	Households reporting reasons for more use	Favorable weather		Had more time		Store-bought too expensive		Needed more	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All resources	105	10	1	10.0%	1	10.0%	1	10.0%	1	10.0%

Source ADF&G Division of Subsistence household surveys, 2021.

Note Respondents could provide multiple reasons, so the percentages may sum to more than 100%.

a. Valid responses do not include households that did not provide any response to the less, same, or more use assessment question.

Table 2-21.–Responses indicating household subsistence activities were affected by the COVID-19 pandemic, Unalaska, 2020.

		Households experienced change in subsistence activities			
Sampled households	Valid responses	Yes	No	Do not know	No response
114	98	35	63	0	16

Source ADF&G Division of Subsistence household surveys, 2021.

Table 2-22.–Assessment of whether households observed changes in the past 10 years in availability or health of resources, Unalaska, 2020.

		Households observed resource health or availability changes			
Sampled households	Valid responses	Yes	No	Do not know	No response
114	104	38	33	33	10

Source ADF&G Division of Subsistence household surveys, 2021.

Table 2-23.–Assessment of whether households observed changes in the past 10 years to the time of year resources are available to harvest, Unalaska, 2020.

		Households observed timing changes			
Sampled households	Valid responses	Yes	No	Do not know	No response
114	100	26	40	34	14

Source ADF&G Division of Subsistence household surveys, 2021.

Table 2-24.–Resources cited by sampled households for which there were observed timing availability changes in the past 10 years, Unalaska, 2020.

	Households reporting changes in the time of year resources are available to harvest_____.	
Resource	Number	Percentage of sampled households
Blueberry	9	7.9%
Salmon	8	7.0%
Berries	7	6.1%
Sockeye salmon	6	5.3%
Salmonberry	3	2.6%
Coho salmon	2	1.8%
Cod	2	1.8%
Crabs	2	1.8%
King crab	1	0.9%
Tanner crab	1	0.9%
Plants, greens, and mushrooms	1	0.9%
Sea ribbons	1	0.9%

Source ADF&G Division of Subsistence household surveys, 2021.

Table 2-25.–Assessment of whether households observed environmental change affecting access to salmon, Unalaska, 2020.

		Households identified environmental change affecting access to salmon			
Sampled households	Valid responses	Yes	No	Do not know	No response
114	93	26	65	2	21

Source ADF&G Division of Subsistence household surveys, 2021.

Table 2-26.–Households reporting having traveled further to harvest resources in the past 10 years, Unalaska 2020.

		Households reported traveling further to harvest resources			
Sampled households	Valid responses	Yes	No	Do not know	No response
114	102	21	52	29	12

Source ADF&G Division of Subsistence household surveys, 2021.

Table 2-27.–Resources cited by sampled households for which harvesters had to travel further to access within the past 10 years, Unalaska, 2020.

	Households reporting having traveled further to harvest_____.	
Resource	Number	Percentage of sampled households
Pacific halibut	9	7.9%
Salmon	7	6.1%
Sockeye salmon	5	4.4%
Sea urchins	3	2.6%
Berries	3	2.6%
Fish	2	1.8%
Chitons (bidarkis, gumboots)	2	1.8%
Clams	2	1.8%
Mussels	2	1.8%
Pacific herring	1	0.9%
Cod	1	0.9%
Dolly Varden	1	0.9%
Steller sea lion	1	0.9%
Crabs	1	0.9%
Other wild greens	1	0.9%

Source ADF&G Division of Subsistence household surveys, 2021.

documented primary locations for noncommercial salmon and Pacific halibut fishing, as well as seal and sea lion hunting.

Local Comments and Concerns

Following is a summary of local observations of wild resource populations and trends that were recorded during the surveys. Chapter 3, in which key respondent observations are discussed, provides more information and detail on some of these topics. Some households did not offer any additional information on the survey, so not all households are represented in the summary. In addition, respondents expressed their concerns about wild resources during the community review meeting of preliminary data. These concerns have been included in the summary.

Fish

The most comments were provided on the topic of fish, especially salmon.

Salmon

Comments on salmon ranged from population observations to run timing to rules and enforcement.

- One resident observed that the Morris Cove coho salmon run had been "badly damaged," and another shared an observation that the sockeye salmon population at Summer Bay was depleted. Similarly, a respondent thought a salmon stocking program in Summer Bay would be beneficial. In the same vein, another survey respondent would like to see a Chinook salmon hatchery program that integrates the local schools with hatcheries.
- Two respondents commented that the salmon runs were late in 2020, with one also noting that late runs happen once in a while.
- While direct connections were not drawn to changes in population size, several respondents presented concerns they had for overfishing and abuse of sport and subsistence fishing rules. Changes to regulations suggested by respondents included disallowing all snagging of salmon (during the study year, snagging was a legal sport fish method outside of fresh waters6) and creating a 500-foot buffer around all river and stream mouths where gillnetting is not allowed (during the study year there was a 250-foot buffer around any anadromous streams per 5 AAC 01.375 (2)).
- Respondents did not always have the same experience with regulatory limits on fishing. For example, one respondent shared their need to be able to get more fish per day, while another commented that they were glad to see limits on harvests in some areas.
- Finally, several respondents thought that there needed to be better local enforcement of fishing rules. Specific needs included enforcement of regulations concerning snagging and bag limits and harvest reporting based on a belief that salmon harvest reporting is inaccurate and that not all fishers report their harvest. Another respondent was not sure of how to report their observations of overfishing to enforcement. Finally, one respondent stated that "as long as you follow the rules, it's easy to fish here."

Other Fish

- Concerning Pacific halibut, a respondent commented that there are now only small halibut in Unalaska Bay and that halibut fishing regulations in the area should be changed to a limit

6. Alaska Department of Fish and Game. [2020]. "Southwest Alaska: Sport Fishing Regulations Summary, Effective until the 2021 Summary is issued." Accessed November 2022. https://ravline.com/wp-content/uploads/2020/07/Southwest-Alaska-Sport-Fishing-Regulations-2020.pdf

of six halibut per person and minimum size limit of 40 inches. It was not clear if this change was in reference to federal subsistence halibut fishing (a 20 halibut per day per person limit) or state sport fishing for halibut (a two halibut per day per person limit). There are no size limits under either regulatory scheme.

- In addition to Pacific halibut, one respondent recounted catching an Arctic grayling in a local lake years ago and another thought that more educational programs on identifying fish would be helpful.

Commercial Fishing

Respondents expressed concern for the effects of commercial fishing on local subsistence resources. Several respondents commented that commercial fishing should not be allowed too close to the bay, and specifically that trawling should be kept out of the bay to reduce the incidental harvest of salmon and Pacific halibut and habitat degradation. One respondent observed that commercial pelagic trawling seemed to be happening further out than in the past. Another respondent expressed a desire for a decrease in the amount of halibut and salmon that trawlers are allowed to incidentally harvest.

Large Land Mammals

Only one comment was offered concerning large land mammals. The respondent expressed a desire to see a subsistence caribou hunt for Unalaska residents on Unimak Island. Currently there is a general season hunt for all of Game Management Unit 10, open to Alaska residents and nonresidents, but the respondent may have been referring to the creation of a federal subsistence hunt, open only to federally qualified hunters.

Birds and Eggs

The only comment concerning birds and eggs provided on the survey form was that the respondent thought that there were fewer ptarmigan.

Marine Invertebrates

Comments about marine invertebrates generally expressed concerns with observed declines in marine invertebrates, particularly all species of crabs, but also clams and sea urchins.

- Along with the decline in marine invertebrates, one respondent noted that there were "tons" of sea otters and some respondents explained that they thought sea otters and seals were eating crabs. One respondent expressed a wish that something be done about the marine mammal predation.
- Focusing on the decline in clams, one respondent noted that Summer Bay and Captains Bay used to have great razor clam beds, but they no longer do.
- Another respondent discussed concerns for harvesting shellfish because of paralytic shellfish poisoning (PSP) and expressed a desire for a quick PSP test that could be done at home so that they could harvest shellfish with confidence.

Vegetation

Survey comments concerning berries included the observation that berries and mushrooms appeared to be damaged by summer heat and that blueberries and salmonberries seemed to have been ripening early the past several years, including 2016 when vegetation ripened at least a month early.

Other

A few survey respondents offered comments of a more general nature and not about a specific resource category.

Habitat

One respondent observed that both fresh and salt waters were warming. Another commented that the Town Creek (Iliuliuk River) system needs help to restore habitat. Specific habitat degradation examples were not offered. Still another expressed that local streams generally needed more protection.

Subsistence

Several respondents provided comments about subsistence generally.

- One thought that there should be a state holiday for people to leave work and collect subsistence resources.
- Another shared that they believed access to wild food while in the city is too limited. A slightly different perspective came from another respondent who shared their belief that there are not enough resources in the region for people to practice a subsistence way of life. Specifically, there is too high a concentration of people, there are local effects of industrial pollution, there is inadequate habitat protection, and there is excessive commercial trawling.
- One respondent wrote that people abuse subsistence practices, and that how they live and harvest resources is not reflective of the real subsistence way of life. This respondent continued that there are people who catch more than they need as a way to show off, and then the resources get wasted in the freezer to be later discarded, or they are shipped out of state, or sold.
- The inability of some parts of the population to access subsistence resources was highlighted by another respondent. This person thought that there should be an organized effort to ensure seniors receive subsistence salmon since many are not able to harvest, do not necessarily have family in town to provide for them, or live in senior housing.
- A final respondent shared that their family used to have a camp to put up fish, but they stopped using it in the 1970s.

3. QUALITATIVE FINDINGS

This chapter addresses two project objectives: 2) "document local knowledge related to traditional and contemporary patterns of subsistence salmon and nonsalmon fish harvests in Unalaska," and 3) "participate in subsistence salmon fishing with Unalaska residents and record observations on salmon run timing, gear used, social and cultural practices associated with salmon fishing, and possible changes associated with the recent exclusion of commercial trawl fishers from Unalaska Bay."

Objective 2 focused on attaining knowledge of local resources used for subsistence and changes in abundance, knowledge about local salmon habitat, and changes in use and access to primary fishing locations. Objective 3 involved two trips to Unalaska to observe subsistence salmon fishing in September 2021 and June 2022 to record important aspects of subsistence fishing practices and observe salmon systems off the road system in Unalaska Bay that are important for subsistence fishing.

Ten Unalaska residents participated in nine key respondent interviews (KRIs). The length of interviews ranged from 21 minutes to 2 hours and 25 minutes. There was one respondent in the 70–79 age range, two in the 60–69 range, three in the 50–59 range, and four in the 40–49 range. Eight respondents were male and two were female. Three respondents had lived in Unalaska for their entire lives, while the remaining seven moved to Unalaska as adults and now consider it their permanent home. Three respondents were Alaska Native, primarily Unangan. Note that there were individuals who supported this project both as a key respondent and participant observation host, but that not all key respondents were present during researchers' participant observation outings. As such, local knowledge was shared by some respondents in the setting of important subsistence locations or during subsistence activities.

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," and chum salmon were referred to as "dog salmon" or "dogs." Additionally, to demonstrate the breadth of individuals addressing key topic issues, quotes are attributed to respondents using a code that combines the community airport code with a respondent number.

Multiple respondents who had grown up in Unalaska spoke about participating in subsistence harvests since before they could remember. One said he learned how to fish from his grandmother. When asked how old he was, he replied: "Probably when I started walking. I mean, I lived in the [fish] camp, so, almost until I was eight or nine" (DUT01). Another lifelong resident shared a similar answer: "With my parents, just grew up. Ever since, probably even before I could walk" (DUT02). Respondents who had moved to Unalaska as adults shared a common answer on learning to participate in subsistence from friends, neighbors, and residents who needed assistance with physically demanding fishing efforts. One described his first fishing experience with a coworker: "He invited me to go fishing with him, um, because it's a lot of work [laughing] and so that was the first, my first fishing experience with a gillnet" (DUT07). He then went on to describe the thrill of his first fishing experience:

> Never had caught a salmon before in my life. And we went and fished Reese Bay, um, and caught a hundred fish in a, probably an hour-and-a-half of fishing with a gillnet … . We were fishing for reds and it was, it was pretty astonishing to me. I had never seen anything like that before. I've always fished salmon, pretty much every year since then. Uh, just for subsistence. (DUT07)

Another resident who first moved to Unalaska when he was in his late thirties described a similar introduction to subsistence fishing: "Roommates, neighbors, people who had gillnets … people that had boats, I went out with them" (DUT06). He further described his initial introduction to subsistence fishing with a gillnet:

> I was out fishing one day, just trolling, and a gentleman came up who set a net and I helped him. So, he was great, he was thankful for that because I had a small boat and he had a big boat so we could run up and down his net picking, picking the

> fish out of the net. But that was my, I think that was my first introduction into the gillnetting. (DUT06)

Primary Subsistence Resources and Changes in Abundance and Quality

Respondents were asked about salmon and all other wild resources used for subsistence, including observations of changes in resource abundance and quality. Consistent with quantitative survey results, all respondents actively used and harvested salmon and nonsalmon fish. Similarly, most respondents spoke about a decline in the use of crab associated with a decline in local crab abundance. Comments related to use, abundance, and quality are presented in the following section by resource category.

Salmon

All 10 respondents were active salmon harvesters. While most referred to the different species of salmon by their common names: "No [local names], other than the standard king, red, silver, pink, that other people don't know about," (DUT02), one respondent shared her recollection of the local Unangan names that she had learned from her late husband's family, one of which referenced body condition:

> I think that red salmon is *aanux*: A-A-N-U-X, and when you put the little cap over the "x," that makes it singular. And let's see here, I think *adgayux* is pink salmon, and *qungaayux* like I said was the humpy once it turns into a humpy.[1] (DUT03)

When asked about observed changes in the abundance of local salmon, respondents shared different observations depending on salmon species. Most expressed concerns over declines in sockeye salmon, especially those returning to systems accessible by the Unalaska road system:

> I haven't fished this Front Beach for years because I don't think it can sustain too much fishing. You know, it's gotten to be a really small run and there's issues, I mean people fish all down this beach and the other beach, and the creek, there's hardly any greenbelt left, and the valley's all filled in, the lake's silting up, and it's just lots going on, you know. (DUT03)

Plates 3-1 and 3-2 show the same view of Town Creek [Iliuiliuk River] in 1971 and 2020. Not only is the development of the area shown, the narrowing of the river through siltation is also observed. One lifelong resident said that the local coho salmon population was affected by the 1997 grounding of the freighter *Kuroshima* but noted that the population seemed to be rebounding: "*Kuroshima* did affect the silvers. You know when they [the freighter] went ashore on the beach over there several years ago. But it's starting to respond, and fish are coming back. That's a good sign" (DUT01). The same respondent noted how Chinook salmon were becoming more abundant in Captains Bay, which were uncommon when he was a child:

> What I saw, five years ago, was increase of king salmon in this area, I never saw. Even when I was growing up. There might be one or two or three, uh, one a year, anyway, caught in a gillnet somehow. Uh, and that was a big day, you know, to catch a king salmon in your gillnet. But, even I've caught 'em up head of Captains Bay. Uh, last year, I caught two. They weren't very big, you know, 25 pounder or something. But I was surprised that they were way up inside of Captains Bay. (DUT01)

Multiple respondents shared observations of changes in the abundance of pink salmon, but with various levels of concern. One worried that pink salmon populations were decreasing due to overspawning events:

> I'm really concerned with the pink salmon. I think … a lot of it may have been, uh, due to an overspawn two years ago that, uh, that we're seeing the results of now. So, there isn't any, any in the creek to speak of. It's usually, uh, I mean, a lot more. (DUT02)

1. Alaska Native terms were cross-checked using Bergsland (1994), where the term red salmon is spelled "haanuŝ."

Plate 3-1.–View of Town Creek, Unalaska, 1971.

Plate 3-2.–View of Town Creek, Unalaska, 2020.

Another noted that pink salmon seemed to be abundant, but were returning to spawn later than usual:

> They were end of July [2021], almost the second or third [day of August], well they were around but they weren't coming close to the beach. You could see 'em out there, two or three hundred yards off the beach, but they weren't coming in. They weren't hitting the rivers, and when they did, they were right at the mouth and they wouldn't come up. I think a lot of that had to do with no rain. Being warm and no rain. (DUT01)

Finally, one respondent shared that pink salmon seemed to be the most abundant of any species: "It seems that we've had a lot more, maybe because I'm watching it, and paying attention, but over the years I've seen a lot more pinks come in than anything else." He then elaborated, "I think about the, the amount of pinks that come up Town Creek [Iliuliuk River], you can almost walk across the river, walk across that creek because they're so thick" (DUT06).

Few respondents expressed concerns about changes in salmon quality, although one shared that over the past two years he started noticing that some sockeye salmon were inedible:

> In the red salmon, um, I don't know whether there's a parasite in them or not, but every once in a while, I'll catch one, and, and uh, the flesh would be kinda, like, mushy. You know? And, uh, and, uh, mottled. I don't even try to eat 'em. I discard 'em. (DUT02)

Another active harvester noted that he had heard accounts of unhealthy sockeye salmon, but he had not yet harvested any himself: "Um, some people said they've seen like cysts in them when they cut them open, but as for me, I haven't seen any of that" (DUT04).

Nonsalmon Fish

When asked about nonsalmon fish, it was common for respondents to discuss declines in the abundance and size of Pacific halibut within Unalaska Bay. As one described:

> People say it's harder to get halibut, but you know there are still halibut out there. Guys with the bigger boats are getting out a little bit further, but you know, again, it's, it's a limited resource, you know? It used to be you could pretty much drop a line and get fish. (DUT03)

A lifelong resident also noted the decrease in size, and suggested that commercial Pacific halibut fishing has immediate effects on the size and abundance of subsistence catches:

> It seems like there's smaller halibut in the bay than before. And you can notice, sometimes there's people that have a IFQ [Individual Fishing Quota[2]], you can tell the difference when you're going out doing your subsistence and then they go out and do their, uh, IFQ right here in the bay, you can tell the difference right away. (DUT04)

For quality of nonsalmon fish, one fisherman shared concerns about the sores he had observed on flounders:

> And I notice a lot of the flounders that are caught in the net, they have a lot of sores on their belly. We've, uh, told people about it, but nothing's ever been done about it. I've seen it more and more within the last 10 years. I don't know, from what, I don't know. I haven't seen them on halibut or the fish, just the flounders, for some reason. (DUT04)

2. An Individual Fishing Quota (IFQ) Program was implemented in 1995 to manage Pacific halibut fixed gear commercial fishing. A summary about the IFQ Program is available online: North Pacific Fishery Management Council. 2022. "Halibut/Sablefish IFQ Program." Accessed September 2022. https://www.npfmc.org/fisheries-issues/catch-shares-allocations/ifq/

Shellfish

More than one-half of the respondents were active crab harvesters, and they all described sharp declines in most crab species. One member of the local diving club described the species of crab known to be common in Unalaska Bay and Captains Bay: "Yeah, mostly red [king crab] here. Tanners, the other word is *bairdi*" (DUT06). When asked about other species of king crab, he responded: "The brown king don't come in here, they're deep, deep water" (DUT06). All three lifelong residents specifically commented on the decline in local king crab:

- Well, we used to be able to just go off the dock. You could look down and you'd see a king crab, and take a treble hook down there and snag him with a fishing pole. And, uh, but, yeah, you don't see that anymore. (DUT02)
- I used to see big balls of king crab rolling around up the Captains Bay. Like a big basketball. I haven't seen one of them in about a year-and-a-half up there at all. (DUT01)
- Um, just within the bay here in Unalaska, um, right where the, the new boat harbor is now, we used to subsistence in there for king crab. Now there's, you, you put your pot around there and nothing around anymore. (DUT04)

Some respondents specifically elaborated on the effects of declining crab populations on subsistence harvests:

> You could say those things have kind of dropped off. I would say the last 30 or, 20, 30 years. From where they were. I mean, yeah, the abundance is not there that I recall when I first showed up here. Like, um, the king crab, subsistence king crab fishing was a big deal when I first got here. And now I hardly hear about anybody getting king crab. (DUT09)

As another fisherman stated, "And as for the crab I used to subsistence, now I don't even do that anymore because it's hit and miss with the king crab. Now we're like everybody else, we have to go and buy the box [processed crab packaged for sale]" (DUT04).

Two respondents were avid divers, and both of them spoke on the recent disappearance of Tanner crab:

> We no longer see crab in diving depths. That's the main one. We have a lot of dive logs of a lot of dives, catching a lot of crab. In '14, '15, '16, '17, we would see king and, red king, and Tanner. From, you know, anywhere from 20 to 30 feet on sometimes, the kings when they'd move in. And then Tanner, you know, all the way down to 130 [feet]. And um, we just haven't for a few years. (DUT08)

The other diver shared more observations specific to the last few years leading up to 2021:

> But the last time I saw Tanner was, um, this is, I want to say '18. Yeah, summer of '18. And they were all baseball size, softball size, on the bottom, just everywhere. Thousands of them. And that was out at Dead Man's Curve, which is between Westward [seafood plant] and, uh, Crowley dock. There's an "s" curve there on the road, um. That's always been a great spot for Tanners and kings over the years. (DUT06)

Finally, two respondents spoke of older generations' accounts of Dungeness crab being abundant on the local beaches. A lifelong resident shared his father's stories:

> He used to tell me stories about them going down just on the Front Beach and being able to, the Dungeness, being able to just, not even using a crab pot and just using a wet suit and getting them with a rake. Now you, now, uh, nowadays, um, I know you don't need to have a permit for Dungeness, for subsistence. Um, I've tried it, but lately I, these last few years I haven't had any luck within Broad Bay or Nateekin. (DUT04)

The other shared an elder's account of harvesting Dungeness crab on the beach as a child:

> The Dungeness, I've always known them to be over in Nateekin, on the beach. There was a Native woman here, she grew up here and she remembers as a kid, Dungees would roll up onto the shore here in storms. You'd get 3-foot, 3- or 4-foot rollers coming in, they would, they would unbury the Dungees. And they'd just go around there with 5-gallon buckets and throw them in the buckets. That's when she was a kid. (DUT06)

For other shellfish, there was only one account of declining clam populations, as described by a local elder:

> I mean, they [sea otters] wiped out the clams on the Front Beach within a year-and-a-half. I used to get clams off the Front Beach in town. Cockles. Uh, now you can't find a one. I was over in Makushin, two years ago in my boat, uh, camped out over there to get some clams. All I got was clamshells. In an area I know used to be nice, big, butter clams, about that big [raised hands held apart to indicate size]. Find shells, that's all I found there. Very few, maybe one or two clams. But I wasn't, uh, very successful. (DUT01)

Marine Mammals

Most comments on changes in marine mammal abundance were related to a notable increase in local otter populations. One respondent suggested that otters contributed to the decrease in local shellfish populations: "Otters, there's too many of 'em. Why we don't see crab anymore" (DUT02). Multiple respondents spoke about how it used to be an anomaly to see an otter close to town. As one elder described:

> I've never seen so many sea otters in the last three years. When I was growing up, I never saw a sea otter. It was very, uh, unusual to see a sea otter, and where there was one, people would get in their boats and, and go see it. And they wouldn't shoot it. They told us that they were part of our ancestry and that we shouldn't bother them if they're alone. (DUT01)

Similarly, another resident shared an anecdote of how otter populations changed since he arrived 20 years prior:

> One sea otter, yeah. Called the old man because he was all gray. And people were like oh, I saw *the* otter! So three of four people would get in their car and drive out to see *the* otter. So, you go over to Carl E. Moses [boat harbor] now and there's a raft of 40 or 50 of them. (DUT06)

When asked about changes in quality for marine mammals, one long-time resident described concerns over changes in the health of seals: "There's been a lot of sickness in the sea mammals, like seals, a lot of parasites and stuff in seals. And that's been attributed to warmer temps and different foods" (DUT03).

Birds

Respondents commented on a variety of changes in local bird populations, from the appearance of species of geese that were uncommon in Unalaska, "You know, first time I've seen land geese [Canada/cackling geese] here was last year. Uh, they landed in, in the Captains Bay, along the beach" (DUT01), to seabird die-offs:

> We also have a lot of seabird die-offs, and that's supposedly attributed to sea temp changes. Because some of these birds are diving birds, and the feed drops down into the cooler water column if the top temperature is too warm, and they just, you know, they just starve. (DUT03)

Another respondent reported seeing more eagles and less ptarmigan: "We have too many eagles. Well, right now they're all out in the salmon streams, now, so, but, uh, getting fat. But, uh, yeah, um, don't see as many ptarmigan as we used to" (DUT02). Finally, a respondent who was an avid birder shared that changes in habitat were attracting and sustaining new species of birds:

> But now we're seeing, like on the Amaknak side, on Dutch Harbor side, there's at least a thousand new spruce trees over there. Easily. Maybe twice that. All over the place. And I'm pretty sure that the cones are now becoming viable. Because the trees are starting to produce cones now, like big things of cones, and so a lot of spruce. So, they're doing better, they're getting bigger and taller and reproducing, and that also attracts, well I don't know if it attracts, but it also allows some migrating and incidental cone-eating birds to stay. Like in other words, those little spruce groves over there are super good bird spots during certain times of year. Like if you get a rare bird that comes in, and they find those spruce, and I don't know how they do it, but they do, they'll stay in there for quite a while because they've got that food source where they never did before. So, you know, there's probably shifts going on, you know. Plants, you know, with the warmer climate I would think plants that are kind of marginal here are maybe thriving more, you know. And birds maybe that were kind of marginal before, like those little warblers that you guys get on the mainland, we just get 'em come through here in the fall on their way south, but in the last few years we've had a couple of them overwinter. Like not just linger into the fall, but stay through the winter. And they're only doing that because they can get into those spruce trees and eat.

Plants

Consistent with survey results, numerous respondents spoke of the prevalence of berries on the island: "My wife does more than I do, but certainly berries. Um, salmonberries, blueberries primarily" (DUT08); "We still get out, everybody goes berry picking and walking and hiking and fishing ..." (DUT03). One respondent had asked two local women if their harvest practices changed as a result of COVID, and he reported that they remained avid berry harvesters:

> I talked to two women just recently, um, about their berry picking. And they're like, nope, we're still the same. We haven't done any less. We're out there, we get the salmonberries, we pick as much as we can. We get the blueberries, we pick as much as we can. And then we take them home and freeze them, and they use them for pies or whatever it may be. (DUT06)

For other plants, one respondent actively harvested seaweed, and spoke about traveling to Morris Cove to harvest at low tide: "There's some good rocks out there in the right position that have a good amount of, uh, what is it, valeria [alaria]? I forget. It's kind of like a mini kelp that grows fairly shallow, so at low tide we can get it" (DUT05). The elder who had lived in Unalaska his whole life noted an increase in kelp abundance, which he attributed as an effect of the growing otter population:

> And the kelp has grown, more kelp. Once they [otters] have eaten up the sea eggs [sea urchins] and the, uh, the bidarkis, the gumboots they call 'em [or chitons], and clams. You know, it just seems to build up the kelp, the bull whip, you know the bull kelp. Pods of them. I've never seen them so many, these last two years. (DUT01)

Two respondents described harvesting mushrooms, "But yeah here the mushrooms are pretty easy. The boletes, if it's got the sponge on the bottom it's good, and if it's a morel, there's no false morels here, so if it looks like a morel, it's good to go" (DUT05). One suggested that 2021 had been a good year for morels: "Morels were good in the spring this year, they were abundant. Now I look for the boletes, you know, the big orange boletes. I look for the smaller ones" (DUT06).

Effects of 2016 Trawl Closure on Resource Abundance

To address the latter part of Objective 3, assess "possible changes associated with the recent exclusion of commercial trawl fishers from Unalaska Bay," all respondents were asked if they observed any effects on

salmon resulting from the closure of the commercial trawl fishery in Unalaska Bay in 2016.[3] One fisherman spoke specifically about the effects on Pacific halibut: "Yes. Very, a noticeable change. Almost immediately. So, uh, we were able to get out and get halibut, instead of having to go, you know, 50 or 60 miles to try to catch one" (DUT02). This respondent also noted effects on salmon:

> Um, immediately, we've seen more and more king salmon caught in the bay. Um, they're here pretty much year-round. They're feeder kings, they're just, they're here because this is where they grow up. Silver salmon the same way. Seen an increase in being able to catch those. (DUT02)

Another resident suggested that the removal of trawlers from the bay left more fish for other users:

> It just makes it easier because the draggers aren't dragging through everybody's, you know, we used to set little longlines and the draggers would just drag right through that stuff. So yeah, you know, now the halibut that are in the bay and the salmon that are in the bay are available, and not being scooped up. So that's helped. (DUT03)

Finally, another local fisherman noticed that cod had increased as a result of the closure: "Uh, the cod fish. [Increased?] Yeah, big cod fish. We're talking big [gestures with hands]" (DUT04).

Salmon Habitat and Primary Fishing Locations

Local Areas Important to Salmon

Respondents were asked to discuss locations that were important for salmon, as well as salmon run timing and primary locations used for subsistence fishing. One respondent spoke about the unique nature of salmon runs in the Aleutians due to the short salmon streams:

> I tease people when I used to do a little bird guiding and I'd drive out to Summer Bay and I'd say, "This is the world's shortest salmon stream." Because there's the bay, and then there's the lake, and there's the bridge (Plate 3-3). And that's it, there's really hardly even a stream and that seems very typical of Aleutian lakes and streams, is that there's often a lake like right behind the beach, you know, if you look at a map. Summer Bay, and Morris Cove, and, you know, even the bigger systems like Wislow and Volcano Bay and Kashega, these places, they have lakes fairly close to the beach. It might be a little bit of a stream, but because of that it seems like the runs are kind of vulnerable, to all kinds of things, you know. (DUT03)

Time of Year for Runs and Fishing

When asked about salmon run timing, respondents spoke about how sockeye salmon were typically the first to return, usually in June and July: "Uh, probably, like, the second week of June" (DUT04). One fisherman explained how subsistence fishing waned between the sockeye and coho salmon runs, allowing people to avoid catching pink salmon:

> Reds come in, like, July, and then mid- to late-August, early September is when the coho come in. And between the two is when the pinks come in. So everybody doesn't, everybody pulls their nets after reds, and, to avoid the pinks. (DUT05)

Another spoke of how he usually waited until August to start his subsistence fishing, because he could take advantage of the second run of sockeye salmon as the coho salmon were also starting to return: "Probably they'll start [fishing] early August with just reds. And then, uh, by mid-August you have, uh, same it would

3. Alaska Department of Fish and Game. 2016. "Alaska Board of Fisheries Meeting Information: Statewide Finfish and Supplemental Issues – March 8-11, 2016, Meeting Summary." Accessed September 2022. https://www.adfg.alaska.gov/static-f/regulations/regprocess/fisheriesboard/pdfs/2015-2016/statewide/statewide_soa_2016.pdf

Plate 3-3.–View of Summer Bay Creek, Unalaska.

be silver" (DUT02). For sockeye salmon specifically, a respondent who assisted with salmon monitoring projects spoke of how the run seemed to end first in McLees Lake, while the run to Unalaska Lake could go into October:

> Anecdotally, I feel like Unalaska Lake is the latest and McLees is the earliest. Unalaska Lake, last year, on October 3, between the church and the elementary school, you could walk along the causeway there with polarized glasses on a sunny day and see hundreds and hundreds of sockeye, right there, still spawning. And, uh, whereas McLees, we were there two weeks ago in mid-August, and there was already a bunch of dead ones in the creek. So, they certainly have some variability. (DUT08)

Finally, one respondent spoke about how he was able to harvest coho salmon well into October:

> After the rains of September and early October, because that brings in the coho. The cohos are running up the rivers, you know, as late as October. I've been fishing in the middle of October, the tenth or twelfth. (DUT06)

Primary Fishing Locations

Most respondents had access to a boat that was large enough for them to fish locations off the road system. Different respondents reported different areas that they primarily relied on for fish, including McLees Lake, Nateekin Bay, Broad Bay, and Volcano Bay. They also commented on the importance of road-accessible areas like Captains Bay and Humpy Cove. One respondent described several of the fishing locations that local residents relied on, and the species of salmon that returned to those systems:

> Morris Cove has reds and silvers and pinks, and then Humpy Cove just pinks. Summer Bay, another creek that's accessible by road, you know, so it gets hit

> pretty hard, reds, pinks, silvers. And then, uh, this creek [pointing to map], which also has, you know, some reds, pinks, silvers, some dog salmon get up in here. And then Captains Bay, a couple of creeks up there. And those are the creeks that are accessible by the road system. So, they get hit kind of hard, not just by subsistence but also by sport fishing. And a lot of our local people kind of, I guess you could say subsistence fish with poles. You know, kids especially love to fish, and a lot of the fish that we eat just get caught by, you know, it's kind of like subsistence fishing with a pole, I guess. People aren't really doing that for sport, you know. But then the bays to the west, on the west side of Unalaska Bay past Captains Bay, Nateekin and Broad Bay and Wide Bay, they also have salmon rivers, but you have to take a skiff over there. But neither Nateekin, Broad Bay, or Wide Bay have red salmon. (DUT03)

Road-Accessible Fishing Locations

Multiple respondents mentioned the importance of Captains Bay for fishing for coho salmon: "Captains Bay is really good for silvers. It's protected up there, you know, so there's not a lot of weather. You can go up there, people love to sport fish or subsistence fish silvers" (DUT03). However, one lifelong resident shared that 2021 was a poor fishing year there, and mentioned that people had to travel elsewhere:

> This year was the worst year I've ever seen at Captains Bay for salmon. Yeah, worst year. I think I only got 15 humpies, 4 dogs, maybe 5 silvers. This whole year. And, everybody's kind of had that same result as I've had, that I've talked to, that fishes up there most every year. Now we're having to go to places like Broad Bay and Eider Point, um, further out. (DUT01)

Humpy Cove was also mentioned in numerous interviews for being an important source of pink salmon: "Humpy Cove for example, there's no lake, so just pink salmon go up there. Silvers don't go up there and reds don't go up there" (DUT03). One respondent's family used the Humpy Cove area as a reliable source of pink salmon: "Pinks are so easy to get out here, we just sport fish them. You can go out to Humpy [Cove] and get, you know, me and my wife and daughter will go out, we'll get our limit of 15, five a person, in like 20 minutes" (DUT05).

McLees Lake

McLees Lake, also referred to as Wislow, was the primary location off the road system that respondents spoke of as being an important subsistence fishing location:

> Wislow is a pretty strong run, it's kind of got a really strong river, always fast flowing, a lot of water gets through there. I've never seen it dry up or berm off. And, also, just because it's out there, there's always escapement. People are not, can't be present there all the time, you know? It gets rough, and they go up at night. (DUT03)

Despite its importance for being a reliable source of salmon, most respondents spoke about the challenges with traveling out to McLees and fishing there: "Quite a ways. About 18 miles from town" (DUT01). As one stated:

> I go out on a nice day. I can't go out on a day like this when it's blowing northerly. 'Cause you get a big swell on the beach. I'll wait for a calm day to go over. The bigger boats have more advantage, they get to go to the pass and go fishing for the halibut and everything. I'm just here in the bay. (DUT04)

Similarly, another described how ideal conditions are needed for safe travel:

> But this, anything past these capes is really open water. Like really open water. And just even to get out to Wislow or over to my camp in a skiff is pretty dicey. You really have to have perfect conditions and know what you're doing. (DUT03)

One lifelong resident shared the specific challenges of fishing the McLees system:

> Yeah, with the boulders you get hung up and then you have to go lift the lead and you lose half your fish. Plus, you fall in, sometimes, that's not fun. But they have big rollers in there if you're not watching it right. West-northwest comes in there and you get, within an hour you'll get 5-foot rollers coming in on the beach. So, you've got to get out of there, or you'll lose your net and your boat. Which has happened to four or five guys, in the last two years that didn't understand what they were doing or what they're dealing with, weather, and they were caught on the beach, swamped their boat. (DUT01)

Finally, a respondent who is affiliated with the Qawalangin Tribe was interested in changing regulations to allow charter boats to transport fishermen to McLees Lake, and described how the current regulations prohibited people from fishing McLees because they lacked the large boats needed to travel there safely:

> McLees is a good example of why you need a charter boat sometimes to help move, uh, resources back and forth, people back and forth, to do subsistence. Um, the regulations don't allow for that. Does that make sense? But for me, just to move like my [tribal] staff over there, back and forth, we've got to pay a charter boat. Um, you know, if the tribe were to try to do a subsistence harvest for elders, uh, the way the beach is, and the kind of boat situation you need makes it really hard for, it's pretty dangerous, too. I mean a lot of boats have actually had trouble over there. Um, so what I was proposing was, can I get a charter boat to get me over there, and then we deploy the skiff, do the subsistence, then use the charter boat to get a ride back. And apparently that's not allowable under regulation. So, um, I'd like to see that looked at. [Does the tribe have a boat, or no?] We do, but it's not really set up for that. There's like four or five days a year when it's flat calm and you can go to McLees and, and have no trouble. But the rest of the time, you know, you need a, you need a bigger boat. If you want to be safe. (DUT09)

Other Fishing Locations

In addition to McLees, some respondents spoke of other locations off the road system that they regularly fished. Several mentioned Nateekin and Broad bays as locations they relied on for coho salmon: "As far as I know, Nateekin is still the same way [reliable for fishing]. Nothing that I know of has changed over there, other than the way the mouth of the river is, you know, due to storms and whatnot" (DUT06). One respondent spoke of how both locations were ideal for beach seining because of the lack of rocks and seaweed:

> Nateekin, or Broad Bay, where it's sandy bottom. Versus, and I tried at Captains Bay. I'll never do that again. I've seen this eel grass that I've never seen, I mean this terrible stuff. I mean, when you pull in the net, you're pulling in these boulders of it, big piles of kelp. (DUT01)

Another spoke fondly of catching bright coho salmon in Broad Bay through the middle of October: "On the tenth or twelfth of October, and we were still catching silv-, you know, chrome, chrome cohos," and elaborated: "Yeah, Broad Bay for, uh, silvers because they run up here, the coho run up here. You can troll out in front instead of going upriver if your boat's too big" (DUT06).

Another fisherman reported doing the majority of his fishing in recent years at Volcano Bay:

> What's really neat is, uh, Volcano Bay has a run of reds and you can catch red salmon and silver salmon at the same time around mid-August. And then, right about now, you'll get more silver but a few reds. And by, like, last year, my brother

> and I went down to there to fish, and we got 95 silvers and, and, uh, and five reds. Nice huge, big shiny reds. Makes me wonder if there's a second run in there, a third run in that, in one of those lakes. So, kinda interesting. (DUT02)

This respondent continued, describing the abundance of salmon in Volcano Bay:

> With Volcano Bay, I-, I've never seen, I mean, the silver salmon run last year was incredible. That bay had a lot of fish in it. And uh, and my brother and I, we set that net out and then they started hitting. And we started pulling them out just as quick as we could and, uh, within about an hour we said, I told, told my brother, I says, "We gotta get this net out of the water now, 'cause we're going to have too many salmon if we don't start put-, pulling it now." (DUT02)

Most of the respondents who fished off the road system talked about purposefully traveling farther to take pressure off the road-accessible fishing areas. As one explained: "A few years ago, they come up, Fish and Game came up with the regulation on, we can only get 10 salmon per day out at Front Beach. I'm fine with that, because I go to Wislow if I can" (DUT04). The respondent who primarily fished Volcano Bay explained his decision to direct his effort there:

> It's further away, um, and I do it for a reason. Because the, the, the lake here is already compromised. Silted in, and the run is really low, and the effort is too high. The same with Summer Bay. The effort is going, is going to kill these two, um, if something isn't done soon. And, and especially with restoration of habitat in both this and the other one. Um, it's, uh, it's got me worried. And then, I used to go primarily to Reese Bay. But, again, like I said, the effort is increased tenfold in the past few years. Probably within the past five … . And I try to encourage other guys that have larger vessels to, "Look, don't go out on Front Beach and fish this with your, you've got the ability to go out there. Do it." (DUT02)

Wild Resource Harvest and Use Patterns

Harvest Methods, Gear, and Processing

Respondents primarily spoke about methods for harvesting salmon and crab. Three interviews were conducted with families who were actively fishing subsistence gillnets on Front Beach in early September 2021 (Plate 3-4). While crab pots were the primary methods for harvesting crab, two respondents were active divers who also harvest subsistence crab while diving. In June 2022, the respondents who were active divers allowed researchers to accompany them on an exploratory diving trip near Eider Point.

Salmon Harvest

Respondents agreed that set gillnets are the primary method for harvesting subsistence salmon in Unalaska: "Mostly gillnets. There's only maybe one or two of us that actually have a beach seine we use" (DUT01) (Plate 3-5). One respondent described how it is ideal to have a smaller boat to check the net after setting it with a larger boat:

> Bigger boat so you could anchor it off, and then wait on shore. You know, if you had a dinghy or not, so some people had a dinghy, some people just walk into the water until it touches the top of your waders [laughs]. So, but, um, yeah sometimes you got swamped and you're wet. (DUT06)

In most responses there was a theme of resourcefulness when it came to assembling fishing gear. One fisherman explained how he chose his net based on what was locally available:

> I use the one net. And, uh, I'm gonna have to get another one because, uh, the one I have has got a mesh size that's too small. And that just happened to be the only one that LFS [local commercial fishing gear store] here had, so. I'm going to be forced to, uh, order another, a larger web size, and then rehang my net. (DUT02)

Plate 3-4.–A key respondent places a subsistence net from a skiff located offshore Front Beach.

Similarly, one of the respondents who was actively monitoring his fishing net during the interview explained how his fishing partner obtained a net, and pieced together the additional gear for tending a subsistence net:

> Yeah, she got it on Craigslist or, uh, Facebook, Dutch List I think it's called [Dutch Harbor Facebook sales group]. I think it's where she got her stuff. It's all her stuff, I just provide labor. So this is two nets. I'm thinking it's, I don't know the exact length. It's well under the maximum you can have. I think we could put almost double this, legally. [And then the boat is just a little inflatable with a battery-operated motor?] A little trolling motor on it, yep. Just to get us out there, get it set up. It works fine except you have to be careful with weather conditions. If the weather starts picking up, because any kind of a stiff, offshore wind you've got to be concerned about. Because you may not be able to get back in because it's got a bit of a, it catches the wind pretty easily. And those kind of conditions, if it starts coming up, we'll go out to the buoy and we'll haul it in this way. And you've got to be careful with that, because you don't want to get blown out to sea. There's that little bit of land and then the Bering Sea, there's nothing until you hit St. Paul. (DUT05)

Plate 3-5.–A family picks a subsistence net at Front Beach.

Salmon Processing

Respondents spoke of a wide variety of methods for processing and preserving salmon (Plate 3-6). Two explained how their methods changed over time due to the amount of fish they needed, and the ability to freeze fish. One longtime resident explained how her husband used to salt fish to have for the winter:

> He always had a wooden barrel like that, and he'd do layers of, and, um, to make pickled fish, pickled salmon, you have to salt it first. It gives it that texture. So, you salt it, and you've got to leave it at least 10 days or two weeks before you could freshen it out, and then cube it up and do pickled fish. But you know, it's an acquired taste, and I don't think a lot of people do much salt fish anymore except for pickling, mostly. But people, before refrigeration that was the only way to preserve for winter use. And you could, I mean we always kept a barrel of salt fish in the shed you know. And it was good all the way through, 'til the next summer's run. (DUT03)

When asked if she still preserved fish that way, she responded "I put them in the freezer, yeah, I just put them in the freezer" (DUT03). Similarly, an elder described how he used to rely on cottonwood to smoke fish, or salt fish if cottonwood was unavailable: "If you couldn't find cottonwood and had a good stock of it [salt], we didn't make very many smoked fish. We salted a lot, and we barreled a lot of dry fish" (DUT01). When asked if he still smoked and canned fish using those methods, he replied: "Uh, I used to. But now I just smoke 'em in strips, and uh, vacuum pack 'em in small bags and give 'em away" (DUT01). Finally, another active harvester described relying on family members for smoked salmon: "My uncle sends us smoked salmon, so we just depend on him to send it, and we just, uh, freeze it or salt our salmon in a bucket. For pickled fish" (DUT04).

Plate 3-6.–Processing salmon on Front Beach, 2021.

Some respondents had different processing methods depending on the salmon species. One suggested that chum and pink salmon were traditionally dried, while others were smoked:

> Any of them will dry, but, um, I know that dog salmon and pink salmon have less oil than the others, so traditionally they were often used [to dry]. But you know, red salmon and silvers make great smoked fish. Really good. You know, that's always been the preferred, and kings of course. But you know, red's kind of the primo fish. (DUT03)

Another agreed that sockeye and coho salmon were his favorites, but that incidental harvests of other species were saved for smoked sandwich meat: "The only ones I harvest are incidental to targeting the red and the silver. So, they make good sandwich meat. And it's also good smoked, so. Gotta have those nitrates" (DUT02). One fisherman shared how sockeye were his favorite to eat raw after they had been frozen: "Tons of salmon, my favorite way is just sushi. The, the reds … . After a couple months in the freezer just to kill any parasites. You can't beat a nice piece of it raw" (DUT05). He then went on to explain how his wife, who is originally from Thailand, uses a variety of methods to process and preserve pink salmon:

> She likes to ferment some. So she has some that have been fermenting for like two years. So it's a ferment of two years, and then, but she has, like, three batches going right now. And then she'll take some and dry them. And, uh, then she'll make some what she calls sweet fish, it's in a sweet kind of brine, and then dry them with sesame seeds on them. She loves drying the, she loves drying the pinks. So she'll dry the pinks really stiff, and then, uh, she'll take them out and she'll take them and then, put them in in her mortar and pestle and beat them up, until it's like really shredded. And then she'll make like some kind of dishes with that. (DUT05)

Crab Harvest

Respondents who harvested crab used both crab pots and scuba diving methods (Plate 3-7). Like salmon fishing gear, respondents described a level of resourcefulness for assembling crab pots for subsistence harvests. As one explained:

> Um, the smallest metal cage, um, I would say the bottom is probably 36 to 38 inches diameter, um, across. And then cones up, um, they, they're, a lot of 'em are old commercial pots that people have scavenged. Or they've modified, you know, they may have been 48 to 50 [inches], you know, across and they've cut down and rewelded the bottom ring to make 'em smaller, and less. … every pot that I've ever had has always been somebody left it over, or it was pulled up by someone else, where they're dragging an anchor and they pulled that up and it's like, "Oh, I don't want this." Or hand-me-downs here and there or have to rebuild. So, um, it isn't anything you can buy on the island. (DUT06)

The same respondent went on to describe the process for diving for subsistence crab, first explaining a crab ball:

> They cling together, yeah. They're, um, males are, well it was about this deep too, of crab. Um, so they, we call it a crab ball, people think of a ball but no, it's actually a mass of crab, they just move along. They're protecting the females, um, so we just go around the outside and pick the males out. You know, we see a female and we throw it back in. (DUT06)

He then described how divers harvest and transport crab from depth:

> What we do is we take a bag with us, a big nylon bag that has mesh on the bottom. And, um, there's always two people, so you grab one and one guy holds the bag, you shove it in the bag. If you get far enough away from the guy who has the bag, then you look for two [crab]. You get one, and you hold it by the back leg or the back of the body itself, um, and then you look and if you see a second one, then you put them belly to belly. And then you hold the back leg of the two of them, and they fight amongst themselves. Then you don't have to worry about it. I mean it is, as soon as you put them together they want to fight each other. And they don't care about you. (DUT06)

Crab Processing

When the Unalaska Dive Club had more active divers living on the island, a large group of people would gather to help process the crab:

> Scissors, vickies, Victorinox [paring knife], we had a big, um, we had this big stainless steel table that had, um, put a piece of plywood on it. And you'd cut a hole in the center, and that's where the trash can was. And the shells went into the center, and everybody's peeling. There's a bowl here, and a bowl here, you fill up the bowls with the meat and the legs, um, and then that was that. So, it was, it, it, those Sunday days are long gone. You know, the "church of scuba" was our theme [laughs]. (DUT06)

The diver then described how most harvesters processed meat:

> I vacuum seal. Yeah, I vacuum seal. Um, everybody I know usually has, you know, they section off meals, or, you know, a salad's worth, or something like that. Um, you know, and everybody, there's always body meat and there's always leg meat, um, so, where the knuckles, and in the legs, so there's always bits and pieces, and then longer pieces. (DUT06)

Plate 3-7.–Key respondents prepare to dive off skiff, June 2022.

He also shared an alternative for preserving crab meat without a vacuum sealer: "I knew to put it in a Ziplock bag, add a little water to it, lay it flat in the freezer, and it creates an ice shell around the meat" (DUT06).

Using and Sharing Salmon

Respondents attested to the ongoing importance of salmon to Unalaska residents, despite broad cultural and social changes in the community. As one longtime resident stated:

> But you know, just a lot of our comfort food and traditional food and potluck food is just fish, you know? Just, you know, whenever people get together for good times, and sad, you know, people always bring fish. It's just that way, you know? So, fish pie, you know, is just always a—or fish patties, you know—those are favorites. Or fish spread. (DUT03)

Sharing salmon was prevalent among most respondents: "I gave a lot of it away to, uh, people that don't have a boat, that have a smokehouse or a dry rack. Try to help them out" (DUT01). One fisherman described sharing salmon with elders as a sign of respect:

> Respect. So, yeah, uh. The seniors at the senior center, they don't have freezer space. So, it's kinda nice to, when I, when I package my salmon, I will take, instead of just a whole filet, I'll cut it up into, like, maybe three pieces, and freeze those, to be able to share with them. And, uh, because it's, you know, usually just a single person or, you know, they don't, obviously they don't have a lot of freezer space so they're grateful that they're able to get, you know, get some. (DUT02)

Some respondents spoke about sharing networks with friends and family living in other parts of Alaska: "Pribilof people don't get salmon and people trade for seal meat or whatever, or moose with people on the mainland" (DUT03). Residents also spoke of the role that the local Qawalangin Tribe played in gathering and sharing subsistence foods in the community. One respondent who was associated with the tribe explained: "We've got some of our CARES [Coronavirus Aid, Relief, and Economic Security Act (2020)] money that we use for, for fish and berries, and, uh, we're buying some more food boxes, uh, this fall for elders and the whole tribal community" (DUT09). A resident described how she hoped the tribe would obtain a bigger boat that could make the trip to McLees to harvest salmon for local elders:

> But also, the tribe has been doing some fishing, you know, the tribe has this small boat, we've been kind of elbowing them to get a little bigger boat so they can go to Wislow and bring back more fish. Because that would be really great, if the tribe could go out and make some subsistence hauls from that really good producing river. Or Volcano Bay for that matter, but Wislow is closer. Go out there and get three or four hundred fish and bring them back for all the elders. (DUT03)

Changes Affecting Subsistence Behaviors

Some respondents spoke about technological and other social changes that were affecting access to subsistence resources. As one mentioned, the increase in large boats and financial resources changed the nature of who is accessing subsistence fish:

> I'm not saying it's right or wrong, or trying to make judgements or anything, but, but it's something that at this point, you have a lot of people with big fancy boats. That was something we never saw 20 years ago. Like, all these people have money, can go subsistence fishing. (DUT03)

Another spoke about how increases in gas prices increased fishing pressure close to town because people did not want to travel as far to harvest fish:

> Um, and, you know, gas is expensive here, over four dollars a gallon for gasoline [in 2021]. And so, um, you know, years when it has spiked up even higher than that, um, you saw more fishing pressure inside the bay, near the channel, near the river, um, and so forth. Instead of people running, you know, 40 minutes out around the corner to go. (DUT07)

In addition to harvesting fish, one respondent spoke about changes in access to resources on land:

> Access now is easy 'cause they, some people have L-, uh, small LCMs [landing craft mechanized] that carry a 4-wheeler, so they can beach up, drive the 4-wheeler, go hunting, and get back on their boat. And these are areas where we traditionally never fished or hunted, they're going into. I'm concerned about that. Because they're leaving marks all over our property. When I say ours, OC [Ounalashka Corporation]. (DUT01)

Social and Cultural Practices Associated with Salmon Fishing

Descriptions of Life in Unalaska

Respondents' descriptions of social and cultural aspects of fishing depicted both traditional practices, as well as a local culture heavily influenced by the commercial fishing industry and associated social changes. One respondent described the unique foods that resulted from Unalaska becoming an increasingly multiethnic community:

> I just love the fact that it's a small town, so everybody's kind of sort of knows each other, and certainly helps each other and works together. And yet we're really multiethnic, really multicultural. And you know all the cultures have married into each other, so you have, you know, all these amazing potlucks. You know, before

> COVID, you know, you'd have some festival or potluck and it's like, oh my God there's food from all over the world in this little town. (DUT03)

Residents were quick to describe Unalaska as a working town where jobs were abundant, and the pay was significant. One resident who had grown up in Unalaska and spent a few years in Anchorage described the financial difference:

> You know, I could never make the money in Anchorage that I made here. Just, never could. And, it's just, it's too fast a pace for me. Here is fast paced, but it's a different pace. It's my pace. It's a pace that I get myself involved in. (DUT02)

Some respondents spoke about how the availability of work and other resources changed the reliance on subsistence resources: "Here, because we have stores, big stores, a couple big stores, and there's work for anybody that wants it, the need to subsistence fish is different, you know?" (DUT03). She elaborated:

> I think people maybe squabble less when everybody has what they need. I mean I could be wrong, but it seems like there's work here for everybody. Housing is tough, but there's work for everybody. People are friendly and helpful so there's kind of no need for us to be fighting. (DUT03)

Another resident described how the availability and demand of work often affected his ability to participate in subsistence harvest practices:

> So, the salmon's always been there, and the halibut's always been there, and it's just, every time somebody that I know that has boats going out fishing, I'm working. You know, whether they're going out at 3 o'clock in the afternoon or 7 o'clock at night, I'm still working. So. And that's what I did for, for, I would say for the last 10 years. A good six years of these last 10 was, I was nose in the grindstone for, you know, 10, 12, 14 hours a day. So, I haven't put a line in the water in two years. (DUT06)

He also spoke about how Unalaska was becoming more industrialized and revolved less around subsistence ways of life. Specifically, he shared an interaction he had with another local who described the changes in local culture:

> I was talking to somebody on Friday night who said, "We're not the Bush anymore, we're mainstream here." Even as secluded as we are, we're still becoming mainstream, you know. So, there's gonna be a lot more change and a lot more industrial push to make things bigger, better, stronger here. (DUT06)

An elder reminisced about how his family would spend summers fishing and processing fish together, which seemed to be less common:

> So, each family had their own little, depending on the size of family, had their own cabin. But we put up fish for everyone. The whole family. Everybody was part of the factory [laughing], what we call it. Kids would pack fish, clean fish. The elders would clean 'em, slice 'em. And, of course, we had the older ones and younger ones and we'd all be involved with, uh, the actual seining of salmon. (DUT01)

One of the longtime residents spoke specifically about how fish camps were less common, even though fishing was still important:

> I mean a lot of the fish camps aren't really being used much anymore. And I guess probably what's changed is that a lot of families, every family probably works, you know. So people are busy and working, and so I think what people do is they just go to Wislow a couple times and get their fish for the year. And so people are still eating their fish, but it's not a lifestyle anymore. You know, they each go out and get their fish, and it's huge, and it's important and it bolsters them, and it's important for people. But I don't think that people in this town anyway, given

> the modern nature of it, I don't think people are really living that way anymore. (DUT03)

She then elaborated on the ongoing subsistence way of life traditions that coexisted with other lifestyles that were becoming increasingly prevalent: "Somebody said something about the village under the pavement, you know. Because like I said, it's still here, but you, it's kind of subtle, you know?" (DUT03). That same respondent shared greater detail on the history of harvesting and sharing wild foods, and how jobs and industry changed the lifestyle but sharing values remained:

> After World War II, like in the mid-'40s, they, there was nothing going on here. No work. And so, the young men just fed the town, that's just all they did for many years. They would just go out and continually have people out, you know, like out at Eider Point hunting sea lions or, you know, hunting seals. And summertime just fishing, and then always ducks and geese, or, you know, going out and bringing back buckets of clams and sea urchins and stuff, you know. And that continues to some extent today, people still share, you know. It's just that it's, it's almost like those traditions are still going on, but they're so kind of, they're so buried under all this other stuff that goes on now. You know, there's this whole fishing industry, and jobs … it's still going on but it's harder to see. It just doesn't seem as prevalent, but, you know, people are still sharing and checking on each other to see if people have fish, you know, and berries. (DUT03)

As an example of ongoing traditions, one of the respondents who was an active crab harvester spoke about the prevalence of sharing and bartering local foods: "We're doing a little bartering system, you know? So, I'll barter for, 'I'll give you some crab if you give me some fresh eggs,' you know?" (DUT06).

Passing Subsistence Traditions to Younger Generations

Respondents were asked whether subsistence traditions were being passed to younger generations. Many spoke about the local culture camp, Camp Qungaayux. As one respondent explained, "Qungaayux is the word for pink, once they get the hump. So, they call it Camp Qungaayux." She elaborated, "All the kids, every kid goes. All the Filipino kids and Hispanic kids, you all get to be Unangan for a week" (DUT03). One of the elders explained the camp:

> We teach fishing, we teach dancing, we teach the Aleut language. Uh, and we do, uh, fish tanning, you know the skins? Yeah, we showed 'em how to do that this year. … And, uh, of course, respecting the, the sea life. Uh, we do a sea lion, or a seal hunt. We bring that in and we actually cut it up for them and show them what parts are edible, of course all of it, and what they're used for. Um, been doing this for, the longest running camp. Twenty-four years now. (DUT01)

Another resident who moved to Unalaska as an adult spoke about the value of the culture camps for his own daughters: "They've been participating in the, uh, like, the culture camps and stuff like that … . They learn a lot through those programs about plants and fish and everything" (DUT07).

Despite efforts to pass down subsistence traditions, some respondents also spoke about a decline in youth participation in fishing: "I think they're more into their iPhone or their phone than fishing. Um no, the younger generation, not so much" (DUT04). One resident suggested that the lack of affordable local housing prevented the younger generations from learning subsistence practices because they were pressured to move away from home:

> I've noticed a decline in that. Um, I just, and it, there's probably a whole number of different things that, uh, that, uh, play in that. You know, having to see our younger people have to move away from here because they don't have a place to stay, or housing, are the big things, so moving away, learning different things, different areas, and not learning to subsist. (DUT02)

Fisheries Management

Local Effects of the Commercial Fishing Industry

Many respondents expressed concerns about effects of the commercial fishing industry on Unalaska. Most concerns were related to the abundance of local fish, and the effects that processing facilities were having on local water quality.

Effects on Fish Populations

Multiple respondents spoke about notable changes in the size and abundance of Pacific halibut close to Unalaska, which they thought was related to commercial fishing. As one elder said:

> Well, I think the bigger halibut are out further away. But the halibut boats have increased in, in size and also in, uh, the amount of them. I mean, I've seen increase in halibut boats over the years to, from local halibut boats of four or five, to incoming boats of 15, 20. I mean at some point, they fish all the areas that we normally fish as subsistence 'cause they talk to people, find out where people are catching their subsistence and they lay their lines out and wipe out the subsistence before we can even get out there in June, July to go get 'em. They're out there in April and May. (DUT01)

Additionally, one lifelong resident shared his concerns with commercial bycatch:

> The very industry that keeps this community going is killing a number of other fisheries. And nobody seems to be doing anything about it. Um, so I've g-, I've, uh, hear from credible people that are on other vessels that they're shocked at the amount of black cod that is discarded, dead, P-cod that's discarded dead, and other, other species that are just dumped. And there's no small amounts. Some boats have up to, you know, 50 of these totes on deck with this dead fish. And going out and dumping it. It's disturbing. (DUT02)

Effects on Local Waters

Multiple residents expressed concerns about commercial fish industry effects on local water quality. One spoke specifically about changes in Captains Bay, where multiple processing plants are located:

> And Captains Bay, oh my God. You know, I still love to go up to the head of Captains Bay and bird up there, but you almost have to close your eyes all the way up because it's just one thing after another. And that's pretty recent. And many, many ships anchoring up, and we don't know what they pump out. There's just not a whole lot of regulating, or oversight, or monitoring, there's probably not funding for that, you know. (DUT03)

Another spoke about the water that processing plants were dumping back into the bay:

> I've got some big concerns of the permits that are issued for these processing companies that allow them to dump, uh, the water that they're dumping in the bay, in it. That has to stop. … It, I don't think they should be allowed to dump anything in the bay other than clean water. Um, it's, uh, yeah, it's, uh, it disturbs me to see the amount that is discoloring. And the smell that it emits all over this community. (DUT02)

Two fishermen spoke about "stickwater," or the solution discarded from fish processing facilities. One worried that it was not being transported far enough away from the community:

> Um, I kind of wonder if they're going out far enough with the high temperature of the stickwater that are going out with the canneries. … I think they have to go out three miles. I don't know if I'm right on that or not, but I don't know if that's something to be looked at. Because it's at a very high temperature when they're,

> uh, dumping it over. I feel like they would want to go out farther. You see those boats heading out and coming back in, and then by the time I'm done for the day they're going back out again with stickwater. [You said stickwater?] Yeah. It's the water from the canneries that they can't dump in the, um, the local, uh, treatment plant here. (DUT04)

Another explained how his brother was contracted to dispose of stickwater, and the effect it had on his boat due to the chemicals from the processing facilities:

> Um, they use a lot of things like hydrochloric acid, uh, some other things. And I know my brother's, uh, my brother has a vessel that he's got under contract to, uh, carry stickwater … . And uh, within, you know, maybe a dozen trips of, out, carrying that water out and dumping it and coming back, that epoxy paint was stripped right down to bare metal. (DUT02)

Salmon Management Issues

When asked about salmon management issues, many respondents expressed concern that local salmon populations were being overharvested both on and off the Unalaska road system. When speaking about road-accessible salmon runs, several residents thought that people were ignoring the bag limits meant to reduce pressure on locals runs. As one stated: "I think that if, I think people, if they're going to catch their fish, they're not going to worry about what the limit is. I don't think it's [a regulatory limit] done anything" (DUT04). One thought that a contributing factor to overfishing on the road system was people adding names to their subsistence permits in order to harvest more fish:

> It's, uh, fishing on the Front Beach. One point I saw 12 nets out there. We put in a change to allow only 10 [salmon] per permit holder. And what I've seen happen is, uh, families all of the sudden grew from two to 10, you know. Then you get a hundred [salmon]. (DUT01)

Similarly, another longtime resident attributed overharvesting to people abusing the proxy system:

> That whole proxy thing really gets out of hand. I think that's, that's, I think, in a nutshell, why there's overfishing. There's a part of me that says I hope that everybody has enough fish to eat all winter long, and in a little town in the Aleutians, that means a lot. So, I, I like that people share and that people make sure everybody has fish. But you can't do that at the expense of a run, in my mind. (DUT03)

Several respondents were concerned about overharvests on the road system and attributed overharvesting to people catching salmon under subsistence regulations to ship to friends and family in other places. State regulations do not stipulate how legally harvested subsistence salmon are gifted, only that fish harvested under subsistence regulations cannot be sold[4] (5 AAC 01.010(d)). Nevertheless, multiple respondents thought that subsistence fish were meant to be used and consumed locally:

- The other thing that concerns me greatly is, uh, is the amount of fish that is caught under a subsistence permit and then is boxed up and flown out of here. And not recorded. And people are not, they're not taking the specified amount on their permits. There's nobody checking that. (DUT02)
- There is still some issue of people sending out subsistence fish. They still do this all the time: they box them up, send them out to friends and family down south. And you're not supposed to do that, subsistence is for the people in a spot. (DUT03)

4. Tyler Lawson, Fishery Biologist 2, ADF&G Division of Commercial Fisheries, Cold Bay, November 1, 2022, personal communication.

- My other concern is people shipping off-island, to their families in the Philippines, or Hawaii, or wherever they're … Seattle. I've seen people packing out salmon, but I don't, nothing I can do about it. I know where they got them off the beach in subsistence. (DUT01)

Overharvest concerns also extended to salmon systems off the road system as ownership and use of bigger boats became more common. One respondent shared observations of increased fishing pressure at Volcano Bay: "Volcano Bay is the other hot spot and I'm concerned about Volcano Bay. Because I was over there in my skiff a month-and-half ago and there was eight nets over there" (DUT01). Another respondent shared similar concern about McLees Lake: "There's more people getting more boats, yes. And, uh, it's got me worried that, I mean, that is a, that's a big run over there, it's big lake. But, it's still, it's a lot of [fishing] effort" (DUT02).

In general, multiple respondents attributed overfishing issues to the limited presence of law enforcement. At the time when interviews were conducted, only one state trooper was stationed in Unalaska, and he was assigned to other communities during the summer months.[5] As one respondent lamented:

> I don't know what else to say about it, but other than it's being overfished. No enforcement out here, 'cause our trooper leaves. Fish and Game person leaves and goes to Bristol Bay. They don't have enforcement here, and people know that. (DUT01)

Another respondent elaborated on how it would be beneficial to have more law enforcement officers:

> Maybe dedicating a little bit more presence, you know. Like [Name], the trooper, he's just one guy. And he's busy all the time, but I don't think it'd hurt to have a few more people out and about. (DUT03)

Finally, another pointed out that when the trooper was in town, he could only cover a limited area:

> If they want to cover everything, they'll have to cover Margaret Bay [a bay on Amaknak Island within Iliuliuk Bay], they'll have to cover Summer Bay, they'll have to cover Captains Bay. Um, when I'm out there I don't see anybody looking over after anybody. (DUT04)

Participation in the Permit Program and Suggestions for Improvement

Subsistence salmon permit returns are slightly higher for permits issued to fishers declaring Unalaska and Dutch Harbor as their place of residence than the statewide average. An average of 76% of subsistence salmon permits were returned by residents of Unalaska and Dutch Harbor for 1999–2018 and the statewide average permit return rate was 67% (Alaska Salmon Fisheries Database, or ASFDB). However, due to the lack of in-season enforcement it is unclear what proportion of subsistence fishers are permit holders, and whether permit holders are adhering to the limits outlined on their permits. Some respondents offered suggestions for increasing participation in the subsistence salmon permit program. One suggested following the hunting license model of denying new permits to permit holders who had not returned their last permits:

> They've set a culture that like, it's pretty known, if you don't return your hunt tickets, or your reports? You get, you're hosed. And so that's an interesting one. You know, if they, if Fish and Game feels like it's a problem, then by all means put some kind of a rule on it. (DUT08)

Another suggested an online reporting option: "There's no online. And that would make it a whole lot easier if you had an online option to, to report" (DUT02). Finally, one respondent thought that there could be more educational information included on the permits:

> Maybe send out with the subsistence permit like I say, some basic stuff about the salmon streams and, and being respectful and, you know, not fishing over your

5. Tyler Lawson, Fishery Biologist 2, ADF&G Division of Commercial Fisheries, Cold Bay, September 21, 2022, personal communication.

> limit, and why we're asking you not to do that. And don't send, I mean there's nothing, unless you read that little booklet, you know, and really study it, I think it might take you a while to figure out that you're not supposed to do these things. (DUT03)

Observations of Environmental Patterns and Changes

Changes in Water, Weather and Climate

All of the respondents who grew up in Unalaska commented on increases in water temperatures. As one said:

> Probably the water temperature. [Getting warmer?] Yeah … . Um, I don't know how it affects [the salmon]. But I notice the runs seem to be smaller. So I don't know if once they get up to the lake, how it affects them from there. (DUT04)

Similarly, an elder explained water temperatures and a decrease in annual rainfall seemed to be affecting the timing of sockeye salmon runs:

> Um, reds, trouts. You know, they're the first ones usually out. When we start seeing trout moving out of the lake, uh, in the creeks, and then on the Front Beach, then you know the salmons are not too far behind. Usually, June twentieth to July first would be the first run of reds. But that's changed, uh, the last two or three years. And I think a lot of it has to do with the water temperature. They're not, we're not getting the amount of rain that we used to get either, uh, in the summer. I don't think we got, I would be surprised if we got 3 inches of rain since May. (DUT01)

Finally, one respondent spoke about water temperature changes statewide:

> Uh, you know, this warmer water, it's baffling to see how salmon in the, in the, like, Southeast, and, uh, and in the Gulf of Alaska just have been decimated, and yet we're getting okay runs here, but they're smaller, so. Bristol Bay is an anomaly. (DUT02)

Some respondents reflected on general changes in weather and wind patterns. One explained temperature changes through observed changes in the timing of plants blooming:

> But mostly what I notice, and I think in a lot of the areas of the state, is that in the summer it's just way warmer. You know and people, it's just way warmer in the summer. Like you know, 3, 4, 5, 6 degrees warmer, that, that they've got records of that. And so here certainly the summers are warmer. You can see it in plants, bloom earlier, you know, like wild iris is an example. I know that [Name] and I were married on the second of August in, in '87, and we were hard-pressed to find irises for the wedding. Now they start blooming the end of June. So that's just one example. But, a lot of the flowers are blooming earlier, berries are ripening sooner, salmonberries are kind of taking over areas, you know, much more aggressive than they were before. Just changes. Some of the little creeks are kind of drying up, you know, and that's not so good for salmon. But definitely warmer in the summers. (DUT03)

Two respondents spoke specifically about changes in wind patterns:

> I'd say warmer, and more wind. Like this winter, it seemed like it was more windier than anything, to me. [Did you all get a lot of snow last year?] Uh, we got a little bit. Not like it was back when I was a little kid in the, you know, in the '80s. (DUT04)

Similarly, another spoke about changing patterns:

> It used to be that we could count on, I mean, from a lot of the elders March was the time of winds, the month of winds. It's not quite the case anymore. Last year in August we had winds that were over 100 miles an hour. Um, 2005 we, uh, in December, we had winds near 200 miles an hour. That blew one of, this crane over, not this particular crane, but it blew it over. Um, so, we're seeing more severe winds, uh, more often, and different times of the year. Um, seeing less snow, um, seeing, uh, the kelp beds that used to be in areas that were, we always had 'em. But not so anymore. They may show up for a little while and then they disappear real-, rather quickly. I think that's due to, um, warmer water. (DUT02)

Contamination Concerns

Concerns about contamination in local waters were common among most respondents. As one respondent explained, contaminant levels are unusually high compared to most other communities:

> This, Unalaska, is probably one of the most contaminated, Formerly Used Defense sites in the nation. And the PCB [polychlorinated biphenyls[6]] levels in this bay, in particular, are off the charts. That would probably, um, in other, in any other populated area, uh, get a response, "We need to get it done and get it done now, and get it cleaned up." (DUT02)

He went on to explain how his concerns about contamination affected his personal harvest patterns:

> The pollution that's in this bay is specifically why I don't harvest in this bay. Other than crab. [Why is crab different?] Primarily because it comes out of a deeper portion of the water. And it's a scavenger. And I pay close attention to the guidelines of PSP [paralytic shellfish poisoning] in that shellfish, also. I don't cook 'em whole like we used to. Um, and, uh, you know, you discard, you end up discarding a good portion of that fish, that, or I mean of the crab, that generally you consumed prior. (DUT02)

Another lifelong resident explained how he no longer felt comfortable harvesting clams and other shellfish due to concerns about PSP:

> Well, we can't get clams here, or mussels anymore. Back in the '80s we used to pick bidarkis right by the corner going off towards, uh, Summer Bay. In the '80s, I used to pick mussels and bidarkis right there on the beach with my mom. [Are they not there anymore, or you just don't trust—] They're, uh, the level on 'em is too toxic, so you can't eat them. (DUT04)

The other respondent who had expressed concerns about contamination explained that the Qawalangin Tribe was conducting PSP testing, but that the delayed results were not helpful:

> I mean, we don't have a testing facility. By the time, you know, the tribe here samples them, but by the time you get the results back, it's a month later. It would be nice to be able to, uh, to get a testing facility where it's more real-time here. (DUT02)

One respondent who participated in an interview while subsistence fishing shared that local contamination did not concern him because of the types of resources he was harvesting:

> I'm not too concerned about it. It seems to be in specific areas. I mean, there's so much water flow and stuff around that, I mean, it's not much of an issue. Plus most

6. There are at least a couple dozen FUD sites in the Unalaska area and soil contamination persists and has been measured in subsistence resources (Adams et al. 2019). Public comments about intended cleanup efforts in Unalaska Valley were being accepted in June 2022: Theo Greenly. "Army corps makes plans to clean contaminated soil at WWII sites in Unalaska Valley," KUCB, June 8, 2022. Accessed September 2022. https://www.kucb.org/regional/2022-06-08/army-corps-makes-plans-to-clean-contaminated-soil-at-wwii-sites-in-unalaska-valley

> of the fish we target, like salmon, they're not local anyways. So, there wouldn't be any much contamination that they'd be exposed to for very long. (DUT05)

Key respondents shared a wide breadth of local knowledge on changes in fish populations, resilient subsistence ways of life in Unalaska, and concerns with the health of local salmon runs. Despite varying experiences and lengths of residency in Unalaska, most respondents shared a common concern over increasing pressures on road-accessible salmon runs. Proposed solutions included more educational information on subsistence salmon permits, encouraging residents with larger boats to concentrate fishing efforts away from the road system, and increasing law enforcement's presence to monitor fishing activity on the road system. Overall, respondents made it clear that a subsistence way of life, including harvesting salmon, continues to be both a crucial component of present life in Unalaska, and something they want to ensure that future generations will experience.

4. DISCUSSION AND CONCLUSIONS

The broad objectives of this project were to update 30-year-old subsistence harvest and use data for Unalaska, document local knowledge and patterns in salmon and nonsalmon fish harvests, and record observations of changes in salmon run timing, habitat, gear, and the social and cultural practices surrounding subsistence fishing. Through harvest surveys, key respondent interviews, and participant observation, this study documented the continued importance of subsistence activities to residents of a community with a history of changing demographics and economic bases. This updated baseline information is useful to a variety of users, including community members, researchers, and government agencies. Additionally, the updated data allow for assessment of changes in harvest patterns resulting from numerous factors, including environmental and regulatory changes, cultural factors, and economic considerations.

This chapter encompasses four sections:

1. "Comparing Harvests Over Time" highlights changes in harvest patterns by comparing data collected for the 2020 harvest year to data collected in previous years.
2. "Specialization and Sharing of Resources" summarizes patterns of resource harvesting and sharing in Unalaska and the role of high-harvesting households..
3. "Evaluation of COVID-19 Methods Modifications" describes the research adaptions that were made to conduct this study in the middle of a global COVID-19 pandemic, and methodological implications for future research.
4. "Conclusions" provides suggestions for future research.

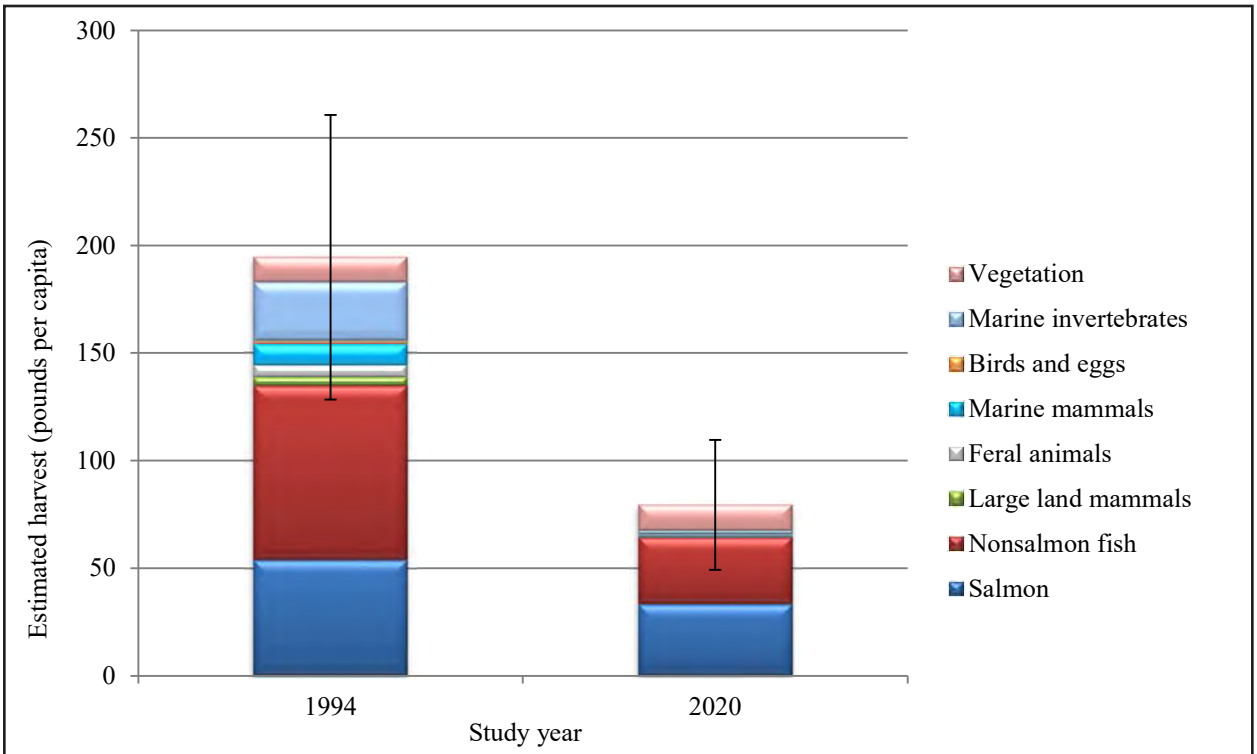
Comparing Harvests Over Time

Harvest Data

Changes in the harvest of resources by Unalaska residents can be discerned through comparisons with findings from earlier study years. The only other directly comparable comprehensive subsistence harvest survey was conducted in Unalaska for the study year 1994 (Scarbrough and Fall 1997). Reedy (2016) conducted a comprehensive harvest survey for the 2013 study year with funding from the Fisheries Resource Monitoring Program. However, quantitative results from that study cannot be systematically compared to the current research due to differing methods. Reedy used a snowball sampling method that only targeted known harvesters, which prohibited a community-wide estimate of subsistence harvests. In addition to comprehensive surveys, several studies have considered the harvest and use of specific resources or resource categories over time. Marine mammal harvest surveys were conducted in Unalaska for the study years 1992–1998 and 2000–2008 (Wolfe 2001; Wolfe et al. 2002; 2003; 2004; 2005; 2006; 2008; 2009a; 2009b; Wolfe and Hutchinson-Scarbrough 1999; Wolfe and Mishler 1996; 1997; 1998). Since 2003, there has been a federal subsistence Pacific halibut fishery and an annual or biennial survey of all federal subsistence halibut fishers, including those in Unalaska (Sill and Koster 2022). Under state regulations, subsistence salmon fishing in the Unalaska area has required a permit and harvest reporting since 1988.

Overall Changes in Harvest Composition and Amounts

Wild resource harvests were substantially different in 2020 than in 1994 (Figure 4-1). Most noticeably, the per capita harvest decreased by more than one-half, from 195 lb in 1994 to 80 lb in 2020 (Table 4-1). Per capita harvests of every resource category declined, except for vegetation, which increased slightly. Between the two study years, the proportion of the total harvest from each resource category changed as well. Interestingly, salmon was the largest contributing resource category in 2020, a change from nonsalmon fish being the largest category in 1994. In both study years, harvests of salmon and nonsalmon fish accounted for more than one-half of the total harvest, but in 1994 several other resource categories also contributed substantially to the overall harvest: marine invertebrates (14% of the harvest), vegetation (6%),



Note Error bars represent the upper and lower bounds of the 95% confidence interval. Also, there was no estimated small land mammal harvest weight for both study years; the category was removed from the figure.

Figure 4-1.–Composition of harvest in pounds per capita, by resource category, Unalaska, 1994 and 2020.

marine mammals (5%), feral animals (3%), and large land mammals (2%). In 2020, however, along with the harvest of salmon and nonsalmon fish, only the vegetation harvest composed more than 2% of the harvest weight (Figure 4-2). The 2020 subsistence harvest reflects a decrease in the diversity of resource categories that were harvested in substantial amounts. As one key respondent described it:

> Here, you know, we work, and we live a kind of modern life. We still get out, everybody goes berry picking and walking and hiking and fishing, but I don't think there's that depth of knowledge anymore that was here. (DUT03)

Understanding these changes requires an examination of the "total environment of change," which includes economic, cultural, and environmental factors (Moerlein and Carothers 2012). To explore these changes and to provide context for the 2020 study year, the following sections will discuss changes in harvests of specific resources over time, altered resource sharing patterns, and survey responses to self-assessment questions concerning resource health and access to resources. Changes in specific resources will be discussed first, augmented by qualitative data collected through interviews. It is important to note that the two study years providing comparable data are each only snapshots of a year. There may be discrete conditions affecting the results that are not indicative of overall trends. A broader view of the potential trends in harvest may be provided through examination of sources of annual harvest data and local perspectives of select knowledgeable residents who have seen changes throughout their lifetimes. Annually collected data will be presented in species-specific sections below. Data from in-depth interviews with key respondents were explored in greater detail in the previous chapter.

Table 4-1.–Comparison of estimated total and per capita harvests, by resource category, Unalaska, 1994 and 2020

	Estimated harvest in pounds usable weight							
	1994			95%	2020			95%
Resource category	Total	Per capita	Percentage of harvest	confidence interval (±) harvest	Total	Per capita	Percentage of harvest	confidence interval (±) harvest
All resources	**355,081.0**	**194.5**		**34.0%**	**166,273.0**	**79.5**		**38.1%**
Salmon	98,192.0	53.8	27.7%	35.0%	69,726.7	33.3	41.9%	33.5%
Nonsalmon fish	147,684.0	80.9	41.6%	34.0%	64,915.8	31.0	39.0%	75.5%
Large land mammals	7,412.0	4.1	2.1%	107.0%	0.0	0.0	0.0%	0.0%
Small land mammals	0.0	0.0	0.0%	62.0%	0.0	0.0	0.0%	0.0%
Feral animals	10,056.0	5.5	2.8%	132.0%	0.0	0.0	0.0%	0.0%
Marine mammals	17,536.0	9.6	4.9%	47.0%	1,961.0	0.9	1.2%	186.5%
Birds and eggs	2,758.0	1.5	0.8%	77.0%	753.5	0.4	0.5%	85.7%
Marine invertebrates	50,138.0	27.5	14.1%	84.0%	3,616.7	1.7	2.2%	62.0%
Vegetation	21,304.0	11.7	6.0%	50.0%	25,299.3	12.1	15.2%	25.7%

Sources For 2020, ADF&G Division of Subsistence household surveys, 2021; for 1994, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2021.

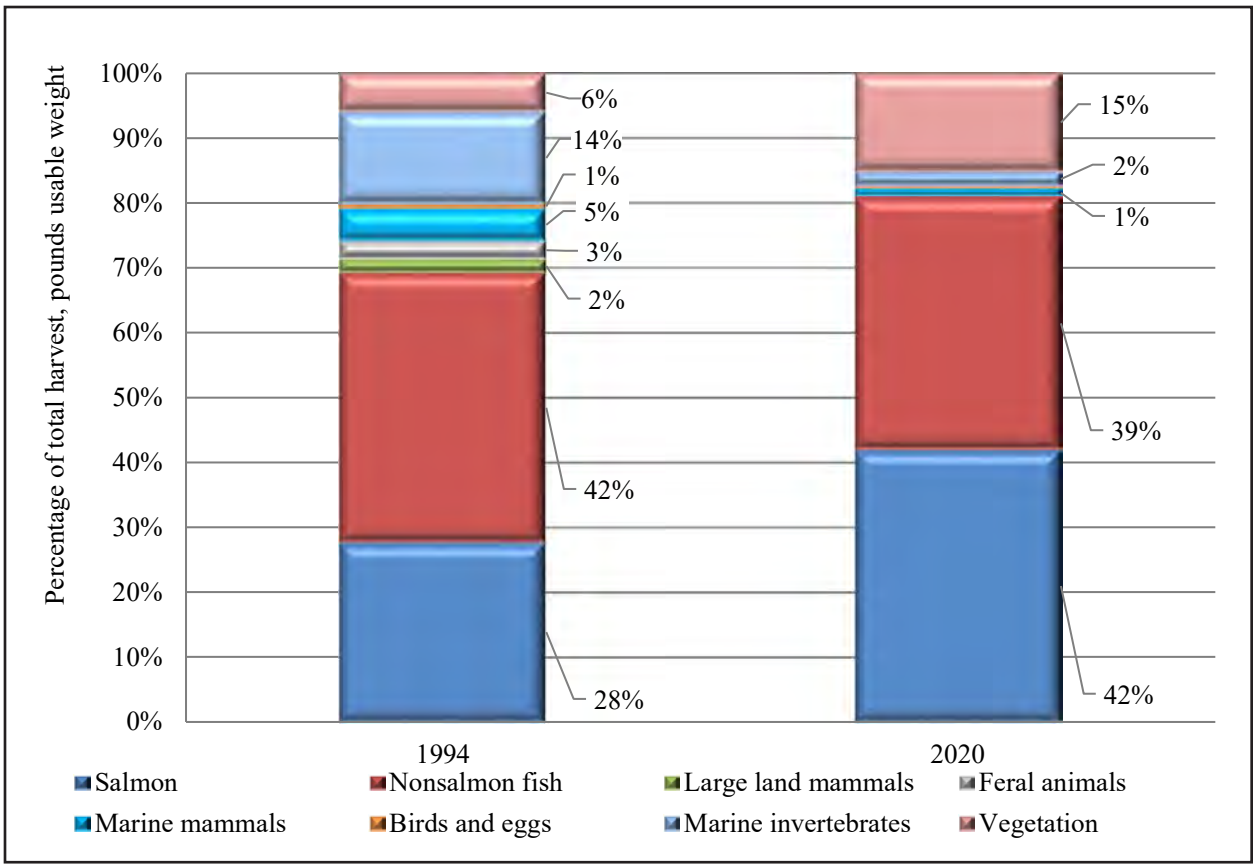


Figure 4-2.–Comparison of total harvest composition in pounds, by resource category, Unalaska, 1994 and 2020.

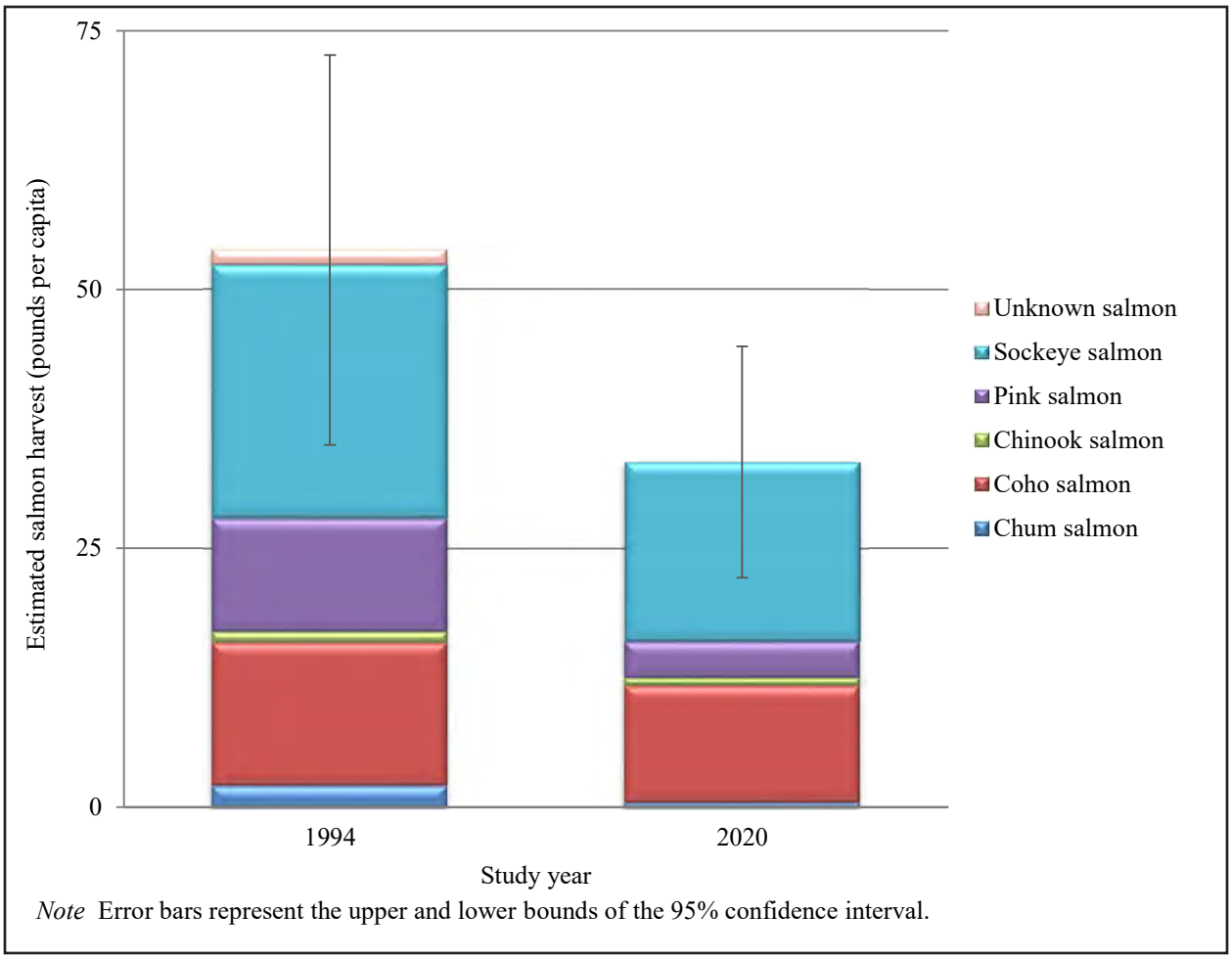
Salmon

Despite the fact that salmon made up a greater percentage of the total harvest weight in 2020 than in 1994, the salmon harvest weight decreased in 2020 in a similar change to that of the overall subsistence harvest (Figure 4-3). Between the two study years, per capita harvests of each salmon species decreased and the two main species (sockeye and coho salmon) composed a greater percentage of the salmon harvest in 2020 as compared to 1994 (Table 4-2). However, due to the relatively wide confidence intervals surrounding both these estimates, they may not be statistically different from each other. Corresponding with a decline in the per capita harvest of salmon is a decline in the percentage of households harvesting salmon (Table 4-3). In 1994, nearly 70% of households harvested salmon whereas in 2020 only 41% of households harvested. Interestingly, in 2020, the percentage of households harvesting salmon (41%) was similar to the percentage of households fishing (44%), indicating general levels of success; by comparison, in 1994, 92% of households fished but only 69% of households harvested, indicating less harvest success in that study year. Even though a smaller percentage of households fished for salmon in 2020, a greater percentage of households used salmon than in 1994. It is possible that this finding is unique to 2020 and changes in fishing behavior are due to COVID-19. Although many survey respondents said that the pandemic did not affect their subsistence harvesting, of those who provided an assessment, 36% of respondents were affected and some of those noted that they could not get out to harvest (Table 2-21). The need for salmon would have remained during the year, perhaps putting more responsibility on those fishers who could get out and fish to provide fish for more families than they might otherwise. If the finding is indicative of a trend and not just the circumstances of 2020, one potential explanation may be changes in perceived availability of salmon or competition among users. There are road-accessible salmon fishing locations, such as Unalaska Lake, Summer Bay, Front Beach, and Captains Bay, and then there are the systems that require boats to access. Fishing effort has increased in the road-accessible areas and there have been perceived changes in the health of some of those salmon populations, as evidenced by a regulation proposed by the local Fish and Game Advisory Committee and adopted by the BOF to limit the sockeye salmon harvest from Front Beach. One local resident talked at length about fishing areas in town:

> I haven't fished this Front Beach for years because I don't think it can sustain too much fishing. You know, it's gotten to be a really small run and there's issues, I mean people fish all down this beach and the other beach, and the creek, there's hardly any greenbelt left, and the valley's all filled in, the lake's silting up, and it's just lots going on, you know. … Morris Cove has reds and silvers and pinks, and then Humpy Cove just pinks. Summer Bay, another creek that's accessible by road, you know, so it gets hit pretty hard, reds, pinks, silvers. And then, uh, this creek, which also has, you know, some reds, pinks, silvers, some dog salmon get up in here. And then Captains Bay, a couple of creeks up there. And those are the creeks that are accessible by the road system. So, they get hit kind of hard, not just by subsistence but also by sport fishing. … But then the bays to the west, on the west side of Unalaska Bay past Captains Bay, Nateekin and Broad Bay and Wide Bay, they also have salmon rivers, but you have to take a skiff over there. But neither Nateekin, Broad Bay, or Wide Bay have red salmon. (DUT03)

Another resident also spoke about his perspective on Front Beach:

> On the Front Beach. 'Cause what I've seen in the last three years is decline in red salmon, uh, in the lake up here, Unalaska Lake. Um, I mean, these guys got two-hundred-thousand-dollar boats and they're fishing off the Front Beach. I was, "What are you doing here?" [This is for] people in town, you know, who need, don't have a boat. They pull their nets out on a line, on an anchor. And, uh, I say, "You guys got a big enough boat, go to Makushin." (DUT01)



Note Error bars represent the upper and lower bounds of the 95% confidence interval.

Figure 4-3.–Composition of per capita harvests of salmon by species, Unalaska, 1994 and 2020.

Table 4-2.–Comparison of estimated total and per capita harvests of salmon, Unalaska, 1994 and 2020

	Estimated harvest in pounds usable weight							
	1994			95% confidence	2020			95% confidence
Resource	Total	Per capita	Percentage of harvest	interval (±) harvest	Total	Per capita	Percentage of harvest	interval (±) harvest
Salmon	**98,192.0**	**53.8**		**35.0%**	**69,726.7**	**33.3**		**33.5%**
Chum salmon	3,825.0	2.1	3.9%	58.0%	958.7	0.5	1.4%	80.3%
Coho salmon	25,162.0	13.8	25.6%	45.0%	23,658.3	11.3	33.9%	44.4%
Chinook salmon	1,926.0	1.1	2.0%	86.0%	1,551.5	0.7	2.2%	73.5%
Pink salmon	19,970.0	10.9	20.3%	26.0%	7,320.1	3.5	10.5%	55.1%
Sockeye salmon	44,550.0	24.4	45.4%	49.0%	36,238.1	17.3	52.0%	37.5%
Unknown salmon	2,759.0	1.5	2.8%	187.0%	0.0	0.0	0.0%	0.0%

Sources For 2020, ADF&G Division of Subsistence household surveys, 2021; for 1994, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2021.

Table 4-3.–Comparison of estimated uses and harvests of salmon, Unalaska, 1994 and 2020

	Percentage of households					Estimated harvest in pounds usable weight	
Year	Using	Attempting harvest	Harvesting	Receiving	Giving	Total (lb)	Per capita (lb)
1994	67.1%	91.9%	68.9%	71.4%	52.5%	98,192.0	53.8
2020	78.1%	43.9%	41.2%	48.2%	12.3%	69,726.7	33.3

Sources For 2020, ADF&G Division of Subsistence household surveys, 2021; for 1994, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2021.

If easily accessible stocks are perceived to be in trouble, or people are meeting with less success when fishing those stocks, there may be some shifting to relying on other residents with boats who can access bays and salmon systems located farther away from town. At the same time, gas prices are always changing, generally increasing, making trips more expensive and perhaps changing the calculus of where people choose to fish: "… gas is expensive here, over four dollars a gallon for gasoline. And so, um, you know, years when it has spiked up even higher than that, um, you saw more fishing pressure inside the bay, near the channel, near the river, um, and so forth. Instead of people running, you know, 40 minutes out around the corner to go" (DUT07).

Through the state subsistence salmon permit system, a longer time series of harvest estimates is available for reference. Comparing the estimated subsistence salmon harvests resulting from the two methods—permits and household surveys—it is clear that, in 2020, the permit system estimated a much smaller subsistence salmon harvest than the household surveys: 10,663 fish estimated through household harvest surveys compared to 2,858 salmon estimated through permit returns (Table 4-4 and Table 2-13). This is not a unique finding among other subsistence-based communities with subsistence salmon permit requirements and is likely not limited to the 2020 harvest year (Halas and Cunningham 2019; Sill et al. 2021; 2022; Walker 2009). The reasons for this underestimation are likely complex, including lack of trust in the management agencies, lack of knowledge about the rules, confusion about how to fill out a permit, or fear of enforcement actions (Fall and Shanks 2000). Although the magnitude of the harvest may be different, the annual permit estimates can provide information on trends in subsistence salmon harvests. Subsistence salmon harvests have fluctuated considerably since 1988, driven particularly by the size of the sockeye salmon harvest, but there has been no strong increasing or decreasing trend in harvests over time. Similar to what was seen in the household harvest surveys, there has been a trend toward sockeye salmon accounting for a larger percentage of the total harvest over time. This trend was not discussed during the qualitative data collection, but would be worth exploring. There are a variety of potential changes occurring in Unalaska that could inform the growing reliance on sockeye salmon, including environmental, economic, and cultural shifts. Environmental factors could be contributing to the trend through changing resource abundance or access to those resources. Economic factors, including wage employment and the cost of owning and maintaining the necessary equipment, could prevent or diminish participation in subsistence activities. Or perhaps cultural factors are shifting and changing the community's desired foods. In communities affected by the *Exxon Valdez* oil spill, for example, researchers found that barriers to the transfer of knowledge from older to younger generations, economic changes in the community, and a change from community production of subsistence harvests to individual ownership all contributed to an increased specialization of community harvesters and a narrowing breadth of resource use to more reliable resources such as salmon (Keating et al. 2020).

Table 4-4.–Historical subsistence salmon harvests, Unalaska, 1988–2020

Study year	Permits			Chum salmon		Coho salmon		Chinook salmon		Pink salmon		Sockeye salmon		All salmon	
	Issued	Returned	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Average per permit
1988	74	43	58.1%	83.0	2.0%	390.0	9.6%	1.0	0.0%	2,626.0	64.6%	962.0	23.7%	4,062.0	54.9
1989	70	41	58.6%	36.0	1.3%	470.0	16.4%	2.0	0.1%	1,292.0	45.1%	1,064.0	37.2%	2,864.0	40.9
1990	94	36	38.3%	100.0	2.2%	681.0	14.9%	4.0	0.1%	1,428.0	31.2%	2,357.0	51.6%	4,570.0	48.6
1991	89	48	53.9%	45.0	1.5%	666.0	21.6%	0.0	0.0%	1,075.0	34.9%	1,294.0	42.0%	3,080.0	34.6
1992	144	102	70.8%	11.0	0.2%	587.0	11.6%	7.0	0.1%	1,723.0	34.0%	2,739.0	54.1%	5,067.0	35.2
1993	137	102	74.5%	136.0	3.2%	697.0	16.3%	17.0	0.4%	587.0	13.8%	2,831.0	66.3%	4,268.0	31.2
1994	150	120	80.0%	48.0	1.0%	774.0	16.7%	1.0	0.0%	1,053.0	22.7%	2,759.0	59.5%	4,635.0	30.9
1995	159	129	81.1%	23.0	0.4%	480.0	8.3%	23.0	0.4%	784.0	13.6%	4,446.0	77.2%	5,756.0	36.2
1996	189	123	65.1%	49.0	1.8%	1,033.0	38.5%	5.0	0.2%	492.0	18.3%	1,107.0	41.2%	2,686.0	14.2
1997	218	161	73.9%	110.0	2.0%	864.0	15.4%	8.0	0.1%	440.0	7.8%	4,192.0	74.7%	5,614.0	25.8
1998	206	161	78.2%	26.0	0.5%	731.0	15.2%	4.0	0.1%	729.0	15.2%	3,317.0	69.0%	4,807.0	23.3
1999	204	151	74.0%	15.8	0.3%	1,234.2	25.8%	0.0	0.0%	1,044.0	21.8%	2,484.6	52.0%	4,778.5	23.4
2000	205	161	78.5%	25.6	0.5%	602.0	11.7%	6.4	0.1%	569.5	11.1%	3,935.4	76.6%	5,138.9	25.1
2001	201	164	81.6%	76.7	1.3%	724.2	12.5%	6.3	0.1%	783.9	13.5%	4,201.7	72.5%	5,792.8	28.8
2002	225	176	78.2%	65.3	1.0%	706.7	10.5%	2.6	0.0%	385.0	5.7%	5,597.5	82.8%	6,757.0	30.0
2003	219	171	78.1%	40.2	0.7%	572.2	9.4%	24.7	0.4%	378.3	6.2%	5,093.7	83.4%	6,108.9	27.9
2004	204	167	81.9%	25.7	0.4%	954.8	15.6%	7.3	0.1%	437.3	7.2%	4,684.5	76.7%	6,109.6	29.9
2005	206	144	69.9%	13.8	0.3%	423.6	8.5%	6.1	0.1%	526.8	10.5%	4,042.6	80.6%	5,012.9	24.3
2006	193	156	80.8%	74.1	2.3%	421.6	13.2%	14.9	0.5%	675.4	21.2%	2,006.7	62.9%	3,192.7	16.5
2007	170	120	70.6%	42.4	1.2%	254.4	7.1%	14.2	0.4%	683.2	19.1%	2,574.8	72.1%	3,569.0	21.0
2008	195	155	79.5%	90.4	2.8%	828.3	25.4%	2.5	0.1%	660.2	20.3%	1,675.6	51.4%	3,256.9	16.7
2009	199	125	62.8%	182.0	4.1%	596.4	13.6%	4.8	0.1%	442.7	10.1%	3,169.7	72.1%	4,395.5	22.1
2010	210	164	78.1%	70.8	1.5%	319.5	7.0%	1.3	0.0%	335.5	7.3%	3,858.6	84.1%	4,585.6	21.8
2011	216	148	68.5%	64.9	1.1%	302.7	4.9%	7.3	0.1%	342.8	5.6%	5,443.1	88.3%	6,160.9	28.5
2012	205	163	79.5%	43.4	0.8%	418.1	7.2%	19.7	0.3%	338.4	5.9%	4,953.6	85.8%	5,773.1	28.2
2013	230	177	77.0%	67.3	1.4%	182.8	3.9%	2.6	0.1%	288.0	6.1%	4,144.9	88.5%	4,685.5	20.4

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Table 4-4.–Page 2 of 2.

Study year	Permits			Chum salmon		Coho salmon		Chinook salmon		Pink salmon		Sockeye salmon		All salmon	
	Issued	Returned	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Average per permit
2014	234	162	69.2%	14.5	0.3%	486.5	11.5%	2.9	0.1%	360.6	8.5%	3,369.9	79.6%	4,234.3	18.1
2015	210	165	78.6%	26.4	0.6%	441.8	10.4%	3.8	0.1%	460.4	10.9%	3,308.2	78.0%	4,240.6	20.2
2016	237	163	68.8%	35.1	0.6%	320.4	5.2%	39.5	0.6%	297.6	4.8%	5,488.3	88.8%	6,180.9	26.1
2017	178	138	77.5%	46.5	1.6%	281.8	9.5%	0.0	0.0%	372.8	12.6%	2,255.2	76.3%	2,956.3	16.6
2018	169	144	85.2%	73.8	3.0%	459.8	18.9%	27.0	1.1%	140.5	5.8%	1,730.7	71.2%	2,431.9	14.4
2019	166	109	65.7%	68.3	2.3%	438.1	14.5%	1.4	0.0%	202.3	6.7%	2,308.7	76.5%	3,018.8	18.2
2020	196	129	65.8%	39.4	1.4%	508.4	17.8%	6.1	0.2%	263.8	9.2%	2,039.9	71.4%	2,857.6	14.6
5-year avg (2015–2019)	192	144	74.9%	50.0	1.3%	388.4	10.3%	14.3	0.4%	294.7	7.8%	3,018.2	80.2%	3,765.7	19.6
10-year avg (2010–2019)	206	153	74.6%	51.1	1.2%	365.1	8.2%	10.5	0.2%	313.9	7.1%	3,686.1	83.3%	4,426.8	21.5
Historical avg (1985–2019)	181	134	73.9%	57.2	1.3%	573.2	12.6%	8.3	0.2%	686.1	15.1%	3,231.1	70.9%	4,555.9	25.1

*Source AD*F&G Division of Subsistence Annual Salmon Fisheries Database (ASFDB).

Note Data are for the Unalaska and Dutch Harbor communities combined.

Pacific Halibut

> People say it's harder to get halibut, but you know there are still halibut out there. Guys with the bigger boats are getting out a little bit further, but you know, again, it's, it's a limited resource, you know. It used to be you could pretty much drop a line and get fish (DUT03)

The per capita harvest of nonsalmon fish in 2020 was less than one-half the estimated harvest in 1994, although nonsalmon fish made up a similar percentage (approximately 40%) of the overall harvest weight in each year. In both study years, Pacific halibut composed the majority of the nonsalmon fish harvest. One notable difference between the study years was the lack of commercial retention of halibut in the 2020 harvest (Table 2-15). In 1994, about 6% of households retained halibut from their commercial catch for personal use resulting in a per capita harvest of about 6 lb of halibut (CSIS). This may be the result of changing participation in commercial fisheries. In 1994, 47 residents of Unalaska and Dutch Harbor held a commercial fishing permit for a halibut fishery and 35 of them actively fished, whereas in 2020, only 11 residents held a permit and all of them fished.[1] Another consideration for halibut harvests comes from the development of a new fishery during the time between the two study years. Since 2003, there has been a federal subsistence Pacific halibut fishery. All residents of Unalaska are eligible to participate, either as a tribal citizen or as a rural resident. Federal subsistence fishers can use setline or hand-held gear (such as longlines, handlines, or rod and reel) and need to possess a subsistence halibut registration certificate (SHARC). There is no mandatory harvest reporting for this fishery, but from 2003–2012, ADF&G conducted an annual voluntary harvest survey of all SHARC holders, and from 2014–2022 ADF&G has conducted this survey biennially. Direct comparisons cannot be made with the household harvest data because the household survey does not ask fishers who harvest Pacific halibut with rod and reel gear whether that harvest was conducted under federal subsistence regulations or state sport regulations. Nevertheless, the 15 years of harvest data can provide insight into trends within the fishery. Since 2003, the number of Unalaska residents who fish their SHARC and the total pounds of Pacific halibut they have harvested have decreased (Figure 4-4). From 2003 through 2010, an average of 94 Unalaska SHARC holders actively fished for halibut. There was a slight spike in participation after 2011, before declining to the low of 53 fishers in 2020. Pacific halibut harvests, in pounds, also generally declined from a high in 2005 to a low in 2020, except for a spike in 2009. The harvest estimates from returned SHARCs during these years are substantially lower than the harvest estimate of halibut caught using subsistence gear and by rod and reel from the 1994 household surveys (97,601 lb; CSIS), as well as the 2020 surveys (46,276 lb; Table 2-15); this is perhaps an indication that Unalaskans prefer to harvest halibut with rod and reel only under state sportfishing regulations or do not obtain a SHARC. However, the SHARC surveys of a consistent population of fishers do document declining trends in harvests and participation in Pacific halibut fishing, supporting the finding of a decline in halibut fishing and harvests documented through the household harvest surveys in 1994 and 2020, as well as through key respondent interviewing.

1. *Fishery Statistics – Participation & Earnings*, s.v. "Permit & Fishing Activity by Year, State, Census Area or Alaska City; 1994 or 2020; Totals by Alaska Community; U – Z; Unalaska" (by Alaska Commercial Fisheries Entry Commission), accessed December 1, 2022. https://www.cfec.state.ak.us/fishery_statistics/earnings.htm *Fishery Statistics – Participation & Earnings*, s.v. "Permit & Fishing Activity by Year, State, Census Area or Alaska City; 1994 or 2020; Totals by Alaska Community; D – F; Dutch Harbor" (by Alaska Commercial Fisheries Entry Commission), accessed December 1, 2022. https://www.cfec.state.ak.us/fishery_statistics/earnings.htm

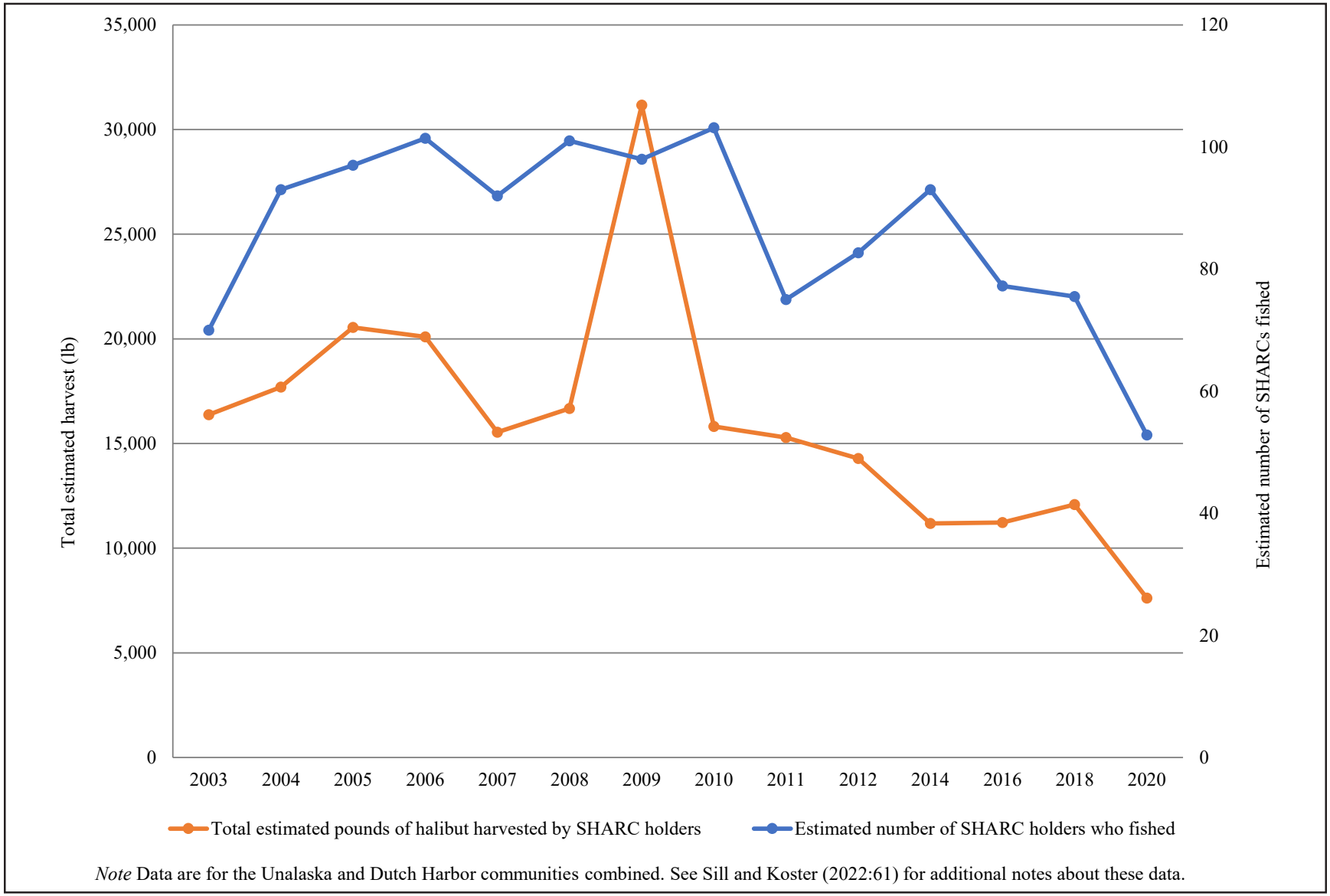

Figure 4-4.–Total estimated pounds of halibut harvested by SHARC holders residing in Unalaska and estimated number of Unalaska SHARC holders who fished, 2003–2020.

One objective of this study was to explore perceived effects resulting from the closure of Unalaska Bay to commercial trawling. The closure has only been in effect since 2016 and it is likely too soon to see any widespread changes to resource populations or subsistence activities potentially resulting from the closure, but some key respondents did discuss the positive effect they had seen on halibut populations and halibut fishing since the closure began:

> … it's anecdotal as you could say, but yeah, there seems to be [changes after trawling was closed in the bay]. And it just makes it easier because the draggers aren't dragging through everybody's, you know, we used to set little longlines and the draggers would just drag right through that stuff. So yeah, you know, now the halibut that are in the bay and the salmon that are in the bay are available, and not being scooped up. So that's helped. (DUT03)

> Yes. Very, a noticeable change. Almost immediately. So, uh, we were able to get out and get halibut, instead of having to go, you know, 50 or 60 miles to try to catch one. (DUT02)

Whether these changes in halibut populations prove to be long term changes, and whether subsistence halibut fishermen change their behavior in response remains to be seen, but should be followed up on in the future.

Marine Invertebrates

Per capita harvests of marine invertebrates decreased from 28 lb in 1994 to 2 lb in 2020. There are no harvest data for all marine invertebrates for the years between the study years, but other data sources provide some insight into the nature of the decline. For example, Reedy (2016) found that residents reject shellfish almost unilaterally because of concerns for the health and safety of those wild foods. As discussed in the previous chapter, local respondents attributed the decline in harvests of marine invertebrates to a combination of declines in resource availability, largely due to sea otters, and loss of harvest effort due to concerns for contamination or PSP (DUT01, DUT02, DUT03, DUT04, DUT06, DUT08).

> Well, nobody eats shellfish anymore anywhere, you know. … PCBs and red tide and oil, and just, you know, all kinds of stuff. … No, we had people, people died from PSP. Just a couple years ago we had a death in the community. But also, we're the tenth highest site in the nation for PCBs. Nobody talks about that, we're off the chart! … Nobody talks about that probably because we're the number one fishing port. Nobody wants to say we're also the number one PCB site. (DUT03)

State subsistence permits are required for the harvest of king and Tanner crab from Unalaska waters. Reported harvests from returned permits from 1999–2020 are presented in Nichols et al. (2022:96). Subsistence harvests of king crab have trended smaller since 2008 and reported harvests in 2020 were the lowest on record. Subsistence harvests of Tanner crab have fluctuated between periods of higher and lower harvests. The most recent period of high harvests spanned 2013 through 2017 (with an average harvest of 1,706 crab) and lower harvests have been recorded from 2018 on (average harvest from 2018–2020 of 403 crab). Reported harvests in 2020 (119 Tanner crab) were also the lowest on record. Additional supporting evidence of a substantial decrease in the harvest of crab is, in particular, demonstrated by a comparison to 1994 harvest survey results. In 1994, the harvest of crabs composed 80% of the entire marine invertebrate harvest and Tanner, king, and Dungeness crab were the top three marine invertebrate species harvested (CSIS). In 2020, while crabs were still among the most harvested marine invertebrates, the harvest of octopus outweighed any crab species, and, together, crabs accounted for approximately 50% of the marine invertebrate harvest. Similarly, in 1994, crabs were among the most used resources by Unalaska households. All three crab species were among the top 10 species used by the most households in 1994: king crab ranked fourth (67%), Tanner crab ranked seventh (51%), and Dungeness crab was ninth (47%) (CSIS). In 2020, only king crab was on the list of top used resources, ranked seventh, with 28% of households using the species (Table 2-12).

Marine Mammals

Per capita harvests of marine mammals decreased from 10 lb in 1994 to 1 lb in 2020 (Table 4-1). There have been 16 years of harvest monitoring studies of harbor seals and sea lions spanning from 1992 through 2008 (see Wolfe et al. [2009b]), and the USFWS mandates tagging of harvested sea otters. The last marine mammal harvest study in Unalaska was conducted nearly 15 years ago for study year 2008 (Wolfe et al. 2009b). Prior to 2006, harvests in Unalaska had fluctuated between 13 and 47 harbor seals. Beginning in 2006, harvests decreased to nine animals before no harvest was documented in 2008.

Sea lion harvests were documented in every year of the marine mammal studies starting in 1992, with up to 50 animals being harvested in the earlier years of the program. Similar to harbor seals, 2006 through 2008 were the lowest harvest years documented and just three sea lions were harvested in 2008. Declines in harvests and hunter effort have been seen in many other study areas over this time period. The other marine mammal hunted in Unalaska is the sea otter. Based on USFWS tagging records, in most years since 1989 zero sea otters were tagged.[2] In years with a harvest, Unalaska residents have harvested between one and five sea otters. The reasons for these declines in marine mammal harvests were beyond the scope of this study and few local residents discussed changes in marine mammal populations or harvesting on the surveys or during interviews. A more focused study of marine mammal subsistence use would likely produce more refined results.

Specialization and Sharing of Resources

Unalaska is a geographically remote community, but due to its relatively large size, economic base, and diverse population, it shares some characteristics of subsistence harvesting patterns with larger communities, such as increased concentration of resource harvesting households and a lower per capita harvest amount.

In a recent statewide update of subsistence harvests, Southwest Alaska households were estimated to harvest 210 lb of wild resources per capita (Fall 2018). The Southwest estimate in turn is lower than the statewide rural estimate of 276 lb per capita, perhaps because of the general lack of wild large game animals on the Aleutian Islands/Alaska Peninsula. The 2020 household survey per capita harvest estimate for Unalaska of 80 lb is substantially lower than the rest of Southwest Alaska. Changes in access and resource abundance, discussed above, are likely contributing factors to the lower-than-regional average per capita harvest amount. Other factors that may also be associated, either as a driving force or as an indicator of some other factor, include a high average income, sharing characteristics, and the generally low number of resources harvested and used. Although more productive subsistence harvesting households have been correlated with higher household incomes relative to other households within the community (Wolfe et al. 2009c), some respondents discussed how the presence of the cash economy can change subsistence ways of life. For example, one respondent noted, “Here, because we have stores, big stores, a couple big stores, and there’s work for anybody that wants it, the need to subsistence fish is different, you know?” (DUT03). In contrast to the correlations of household incomes and subsistence harvests among households within a community, at the broader community scale, higher average cash incomes are associated with lower per capita harvests, suggesting that some types of economic development can create conditions that diminish subsistence productivity (Wolfe and Walker 1987). Other respondents noted the challenges to getting out to participate in subsistence activities because of work and associated time constraints. Although the presence of the cash economy provides for the purchase of fuel and equipment for subsistence activities, the increasing costs of pursuing these activities and of living in rural Alaska may act as a damper on participation for some households.

Sharing of resources is a hallmark of subsistence communities. Displaying patterns of generalized reciprocity, households share resources, whether they are high producing “super-households” or whether they receive the majority of their subsistence foods. Sharing provides many benefits to individuals, households, and communities, including increased well-being, food security, food diversity, and heritage and cultural identity (Langdon 2021). While there are many reasons households maintain sharing practices, there are

2. Brad Benter, Wildlife Biologist, USFWS, Anchorage, personal communication.

also stressors to the system, such as availability of resources, decreasing number of subsistence producers compared to consumers, the cost of transportation, and changing values (Langdon 2021). In Unalaska, the estimated percentages of households sharing and receiving resources in 2020 were much lower than those estimated in 1994. Considering only the salmon resource category, in 1994, 53% of households gave away salmon and 71% of households received it. In 2020, these percentages were 12% giving away and 48% receiving salmon (Table 4-3). Similar declines occurred for other resource categories as well (CSIS; Table 2-11).

However, with nearly one-quarter of households giving away some resource and 65% of households receiving resources, the tradition of sharing maintains its importance in Unalaska. But some of the stressors that Langdon (2021) identified are likely important in Unalaska. Interview respondents spoke of changing values through the generations as fish camps are used less, and about knowledge being passed down less, or differently; knowledge transmission has changed because there is an expanding use of digital technology or younger people have to move out of town for economic reasons (Hutchinson-Scarbrough et al. 2020; Keating et al. 2020). On the other hand, the annual culture camp was highlighted by multiple respondents as contributing to the continuation of knowledge transfer and cultural practices. These changes can cause a change in consumption and preferences for subsistence foods, as can fears of PSP in shellfish; reduced abundance of resources, like crabs; or access challenges, such as reaching larger sockeye salmon systems. Transportation challenges also contribute to changing harvest and use patterns: fuel is increasingly expensive and people may need to travel further to access adequate salmon or marine invertebrate populations (Reedy 2016). COIVD-19 may also have influenced the sharing patterns observed in 2020 due to overall fewer interactions among community residents as people intentionally became more isolated for health concerns.

One notable difference in household use of wild resources between the two study years becomes apparent in a comparison of the percentage of households using the most-used species in each year. In 1994, the top 10 most used species were used by 39% or more of households, with 91% using Pacific halibut, the most used species (CSIS). In 2020, the list of species used by the most households was similar, but the highest use of a species was by only 69% of households (berries), and the lowest percentage of households using a "most-used" species was much lower than in 1994 at only 19% of households (Table 2-12). These use percentages may be pointing at an overall reduction in diet breadth of Unalaska residents. This possibility is bolstered by the decrease in the average number of resources used and harvested by Unalaska residents between the 1994 and 2020 study years. In 1994, households used an average of 12 resources and harvested seven (Scarbrough and Fall 1997). In 2020, these numbers changed to an average of six resources used and four harvested (Table 2-10).

However, averages such as the mean number of resources used can obscure substantial disparities within a population. Although Unalaska households used an average of six resources and harvested an average of four, the maximum number of resources used by a household was 28, with a maximum of 23 resources harvested (Table 2-10). The disparity between the average number of resources used by all community households and the maximum used by a household indicates the presence of Unalaska households that are high-producing households. The difference among households that are high-producing and heavy users and other community households is evident in both the overall harvest pattern as well as in the characteristics of resource use. The 50% of households that harvested the least amount of harvest weight used an average of four resources, whereas an average of 10 resources were used by the top 25% of producing households (Table 1-7). A similar disparity existed in harvest amounts: the 50% of households that harvested the least amount of resources harvested just 3% of the total community harvest weight, with an average of 5 lb per capita, compared to the top 25% of harvesting households that accounted for 81% of the harvest weight. The study did not investigate characteristics of highly productive households. However, earlier research (Magdanz et al. 2009; Wolfe 1987; Wolfe et al. 2009c; Wolfe and Walker 1987) has shown that highly productive households ("super-households") tended to be mature, with multiple middle-aged adults (particularly male adults), and higher cash incomes, especially when tied to commercial fishing activity.

Wolfe (1987) argued that subsistence-based communities in Alaska appeared to follow a "30–70 rule"[3] based on an initial study of five rural communities. Since 1987, this rule has been shown to apply broadly across the state in many other communities where subsistence patterns prevail. However, recently, it appears this ratio is potentially shifting to become more specialized; that is a smaller percentage of households are responsible for producing more of the community's food. In Unalaska, 16% of households accounted for 70% of harvests (Figure 2-10). For resources like salmon, Unalaska households that can afford a boat, engine, and gas, and potentially take time off work, can travel further from Unalaska to some of the sockeye salmon streams with either more abundant runs or higher limits than at Front Beach near town. Households that are more constrained in their time and equipment may rely on the smaller runs more easily accessible to them, or may depend on others to provide them with salmon. As salmon become more difficult to harvest for multiple reasons, more households may be pushed out of production. Both the salmon use statistics and interview data bear this out, as well. Substantially more households used salmon than harvested them, and nearly one-half of all households received salmon, while only one-tenth of households gave them away. Multiple interviewees spoke of the distribution of salmon through Unalaska, commenting on both 1) the changes from a more traditional subsistence way of life characterized by fish camps and extended families being involved in the harvest and processing of fish, and 2) the more modern-day approach of individuals with bigger boats harvesting salmon from larger systems that are further away, and sharing the salmon back in town (DUT01, DUT02, DUT03, DUT09).

One set of findings from the survey that would benefit from more investigation concerns Unalaskans' perception of changes to local resource populations and changes in their access to those resources (discussed in Chapter 2 under "Additional Assessments"). These survey questions asked respondents to assess whether, in the last 10 years, they had noted changed harvesting behaviors, resource health and availability, seasonality, environmental conditions, and harvest locations. With the exception of the question concerning changes in resource health and availability, the majority of respondents indicated that they had not noticed any changes. On the surface, this may indicate that changes in access or timing of resource harvests, or the presence of COVID-19 during the study year, are not reasons underlying the changes seen in subsistence harvests and uses between 1994 and 2020. There are two caveats to such a conclusion, however. One is that the question specified a time frame of 10 years. It is possible that there were significant changes observed prior to that time frame, but that the last 10 years have been relatively stable. Also, as was just discussed, Unalaska households are not uniform in their interaction with subsistence resources. It is reasonable to think that a high-harvesting household that has been fishing for salmon for generations could have a different answer on whether harvesters had to travel further to harvest resources than a low-level harvester who has always procured fish from Front Beach. Without analyzing the answers to these additional questions in tandem with other household characteristics, it is difficult to extract definitive answers from the dataset.

Evaluation of COVID-19 Methods Modifications

This section summarizes and evaluates the modified survey research methods that were employed to conduct this project among the travel restrictions and public safety concerns associated with the COVID-19 pandemic. To operate in this environment, the Division of Subsistence tested a pilot, self-administered comprehensive survey, a significant deviation from standard research methods. Following a summary of standard methods, the modifications are discussed in terms of the survey form, and survey distribution and response rates.

Overview of Standard Survey Methods

The Division of Subsistence has been collecting household-level subsistence harvest and use data in person since the early 1980s (Fall 1990; Stratton and Chisum 1986). For three decades, the surveys generally employed a standard block of questions asking about attempted harvest, harvest, use, giving away, and receiving of resources, and harvest by gear type. However, there was variability in survey layout, resource names and codes, and the inclusion of core questions across projects, especially between the division's

3. The rule being that 30% of the households in a community often produce 70% of the community's harvest, in terms of usable pounds of wild foods.

northern and southern regions. At a division-wide researchers' meeting in 2007, a "Data Collection Instrument" working group was formed to address these discrepancies. Informed by survey forms for recent baseline harvest assessments in Kiana (Magdanz et al. 2011), Bristol Bay (Krieg et al. 2009), and Prince William Sound (Fall 2006), the group provided suggestions for a standardized survey tool with a direct translation to the CSIS database. Following extensive testing and staff training, working group suggestions resulted in a core comprehensive survey form[4] with standardized formatting, spacing, and filter questions, along with standardized data collection methods and data processing (Brown et al. 2012). While the form and methods are evaluated regularly, the standardized core format enables the division to maintain the most comprehensive repository of community-level harvest information in Alaska, and to scientifically evaluate changes in harvest and use levels over time (Keating et al. 2020). By 2021, more than 140 comprehensive survey projects had been conducted using this standard form (CSIS).

The breadth and complicated nature of the standard comprehensive survey form necessitates in-person administration by trained staff and hired local assistants. Staff guide survey participants through the entire survey form and document responses in pencil. It is common for a single comprehensive survey to take longer than an hour for households that are active harvesters. Following administration, staff use a standardized coding guide to code responses in red pen in preparation for data entry. In total, the in-person data collection process is labor- and travel-intensive, which explains the cost of collecting comprehensive subsistence harvest data in person. However, these data are essential to the sustainable management of Alaska's wild resources under the statutory mandates of a subsistence priority. The 2020/2021 COVID-related travel bans in Unalaska and local safety concerns with in-person contact among local residents necessitated the pilot self-administered survey (described in detail in Chapter 1), and survey deliveries that minimized person-to-person contact. This was an opportunity to test a potentially more cost-effective method for administering comprehensive surveys. The benefits and challenges of self-administered surveys and remote administration are discussed in the following two sections.

Self-Administered Survey Form

The process for designing and testing the self-administered survey is described in Chapter 1, and the final survey form can be found in Appendix D. The changes employed for the self-administered survey did not affect the ability to adequately capture community harvest and use levels, and the results are fully compatible with historical data maintained in the CSIS. The modified survey did not capture the more nuanced details of harvests, such as individual participation in subsistence activities, the timing of game and marine mammal harvests, or sex of harvested marine mammals. The survey also collected a more generalized assessment of use compared to the recent past. The effect of not collecting this information will be discussed in greater detail below, but, overall, the survey performed well. The cumulative percentage of pounds of wild resources harvested was plotted by cumulative percentage of households, ordered by highest harvesters first. The resulting curve showed that 70% of resources were harvested by roughly 16% of households (Figure 2-10). Similarly large rural communities, such as Sitka, exhibit a comparable pattern (Sill and Koster 2017). Importantly, this pattern illustrates an approximately exponentially distributed harvest among households. Since household subsistence harvests have been repeatedly shown to fit this distribution, it can be assumed the sample is likely representative and largely free from bias. Further, missing information was sporadic and generally random in nature, indicating the form was, overall, well understood by those filling it in. The largest quantity of missing data was present among jobs and income questions. This pattern is consistent with the standard staff-administered survey tool, as well as surveys in general where respondents are typically more hesitant to answer personal questions like those related to income (Dillman et al. 2014). Among this set of questions, however, the question asking respondents for the number of months worked in each position in the household was not understood as months worked in 2020 in each position, and elicited responses of total months worked in the position. In these instances, responses divisible by 12 were assumed full-time, year-round jobs. Other instances were estimated on a case-by-case basis using jobs of similar types.

4. Appendix D shows the self-administered form used for this project; to compare the self-administered form against an early version of the core comprehensive survey form, see Appendix A in Brown et al. (2012:375–406)

While the modified survey instrument did not ask all of the same questions of the standard survey, omitted details had little effect on the ability to estimate community harvests. For example, detailed questions regarding harvest timing for large game, small game, and marine mammals were not included, but estimation methods do not rely on seasonality, thus allowing for an unchanged approach to community harvest estimates. The food security module did not substantively change from past surveys, remaining fully compatible with USDA methods, but the modified questions did eliminate the distinction between store-bought and subsistence foods. This did not prevent the computation of overall food security scores but did affect the understanding of which types of foods might be more subject to causing insecurity.

Of note, two key topics were removed from the self-administered survey. The first was questions regarding participation in harvesting and processing activities by person. Individual participation adds only modest explanatory information to harvest patterns but is essential in evaluating generational changes over time. The second, and more critical omission, involved questions regarding less, same, or more use of resource categories, whether the amount of food obtained was enough, and the impacts of not getting enough by resource category. These assessment questions offer valuable context to harvests by category and food security by indicating whether results are typical, or a substantial deviation from past practices and how those differences may influence local food security. While questions were removed to simplify the self-administered survey and to reduce perceived burden for respondents, future efforts should include these questions to assure a more complete understanding of community patterns.

Survey Distribution and Response Rates

Survey Distribution

As discussed in Chapter 1, survey distribution relied solely on LRAs delivering survey packages to every occupied household in Unalaska, with the goal of receiving 200 surveys in return. The first challenge that arose from this approach was that housing for permanent cannery workers remained on lockdown throughout the duration of the study, and LRAs were never permitted to deliver surveys for distribution. Therefore, hard copies of the survey were not delivered to approximately 22% (223 households) of total permanent households (Table 1-4), although a small percentage of permanent cannery residents were potentially later captured in phone surveys. Second, local mandates prohibited social gatherings, so LRAs left survey packages on doors without interacting with residents or having the opportunity to explain the survey effort and were asked to leave a set of housing units in the Aerie section before all surveys were distributed. Additionally, an unknown number of surveys blew away or were otherwise damaged by Unalaska's harsh weather conditions. Third, there were difficulties with the execution of the survey pickup method. The information letter included with each survey packet listed four designated pickup days where respondents could hang their completed survey packet outside and have an LRA pick it up; in addition, respondents could mail the survey with pre-paid postage or bring it to the local ADF&G office. Due to limited LRA capacity and weather that delayed initial survey dropoff days (thus interfering with designated pickup days), the pickup system was largely unsuccessful. Multiple respondents expressed frustration on their survey forms over leaving their surveys outside multiple times without anyone retrieving them.

It was difficult to know how many households were completing the self-administered survey due to the lag time with mail submissions. Nevertheless, when survey returns remained far below the desired threshold of 200 surveys after the first week of March 2021, phone surveys were activated to increase responses. The original sample of 50 phone numbers resulted in 12 surveys completed over the phone, and the second sample of 50 resulted in two more surveys. The phone surveys possibly failed to produce a volume of participants due to several factors: the time delay between when project outreach efforts were made and when phone surveys began; the raffle deadline advertised during project outreach announcements had passed before phone surveys began (although the original raffle deadline had been extended); and phone surveys began five weeks after the first survey packets were delivered to residences. Additionally, Division of Subsistence staff were making survey calls to Unalaskans on top of other pressing tasks for various division projects. Having a team of staff who were solely assigned to conducting phone surveys for the entire duration of the Unalaska data collection period would likely have been more effective. As an example, in response to the pandemic in 2020, the Division of Subsistence deployed phone surveys for the Kuskokwim River post-

season salmon harvest survey that yielded response rates of 27%–85%, depending on the village, by using fish and wildlife technicians whose primary task was conducting surveys (McDevitt et al. 2021).

In the future, if surveys had to be administered remotely in other communities, several revisions could improve the survey distribution effort. First, a remote survey effort could be more successful by distributing the survey through all local post office (PO) boxes, rather than household deliveries where the survey could blow away or be damaged by weather. While this approach was impractical in Unalaska due to multiple households sharing a single PO box, or multiple individuals in one household having separate PO boxes, smaller communities may be a better fit for this method. Second, successful dropoff/pickup methods for survey research require a significant team effort on the ground to make multiple contact attempts and retrieve surveys in a timely manner (Steele et al. 2001). Therefore, the survey retrieval methods could be improved by having more local research assistants to aid with survey pickups, scheduling more buffer time between dropoff and pickup days, or removing the pickup option altogether to simplify survey returns. Finally, finding ways to interact personally with each household should be pursued. This effort addressed the issue of being unable to interact personally with each household through outreach efforts, including multiple radio interviews, newspaper articles, and flyers around town that promoted the survey effort. While there is no method for quantifying what motivated people to complete the survey on their own, there is anecdotal evidence from LRAs that some survey participants completed the survey specifically because they heard a radio program or read a newspaper article. This attests to the importance of outreach efforts, especially when research staff cannot be physically present in a community.

Survey Response Rates

The results of this survey effort demonstrate that the subsistence survey response rate drops dramatically when surveys cannot be administered in person. On average, comprehensive subsistence surveys have about a 15% refusal rate.[5] While it is impossible to calculate an exact survey response rate for the 2020 study due to the unknown number of surveys that made it into households after being delivered, a maximum of 758 surveys were distributed, and only 100 self-administered surveys were returned. Therefore, the failure rate for the self-administered surveys was approximately 87%, with 13% of households electing to return the survey. In stark contrast, when the division last conducted Unalaska comprehensive surveys in 1994, 86% of contacted households completed a survey and 14% refused to participate (Scarbrough and Fall 1997). It is common for survey response rates to be higher when administered in person (Dillman et al. 2014). Therefore, the inability for staff and LRAs to have in-person conversations with potential survey respondents likely contributed to lower response rates, despite extensive outreach efforts and opportunities to win cash rewards. While the combination of dropoff and phone surveys produced enough surveys to have a representative sample, there is no substitute for having a consistent staff presence to promote and administer subsistence surveys.

Conclusions

Household harvest surveys and key respondent interviews demonstrate the continued importance of wild resources to Unalaska residents. Despite a decline in the total per capita harvest for all wild resources, salmon are arguably increasingly important to Unalaskans. This is likely because other resources, such as marine invertebrates and large game, make up a smaller percentage of the total harvest due to changes in abundance, or access issues associated with rising fuel costs, concerns about contamination (Reedy 2016), or skills to harvest. Like other larger communities across the state, updated harvest data in Unalaska show a shift toward increasingly concentrated harvest patterns, where the majority of the harvest comes from a smaller percentage of the total households. While this may be partially attributed to COVID-19 preventing families from harvesting or sharing resources like nets and boats with other households, it is important to consider the regulatory implications of the community becoming increasingly reliant on a small number of harvesters. Most key respondents spoke of the importance of large boats with the ability to travel to reliable and abundant salmon harvesting locations like McLees Lake. At the time that this study was conducted, regulations were unclear as to whether or not charter boats were allowed to transport subsistence fishermen

5. David Koster, Research Analyst 4, ADF&G Division of Subsistence, Anchorage, personal communication.

to fishing grounds, so households with small boats that could not withstand the harsh boating conditions were limited to accessing the stressed runs returning to waterways on the road system.[6] Because many residents have expressed strong support[7] for maintaining closures on the road system in order to protect vulnerable salmon runs, many households have likely become increasingly reliant on people with access to the McLees Lake system or Volcano Bay, as harvests shift from a community effort to a concentrated one. Limitations to accessing productive fishing areas may also have implications on younger generations learning to fish.

Numerous respondents expressed concerns about a lack of local law enforcement and abuse of the subsistence salmon permit system. The average annual permit participation in Unalaska is relatively high compared to statewide permit returns. However, numerous residents shared observations of individuals adding false family members to their permit to increase their limits, skirting residency requirements to obtain a permit, or disregarding harvest limits altogether. While key respondents offered suggestions for permit improvements like online reporting options and more educational information on the printed permits, there was unanimous agreement that a regular enforcement presence was needed in order to monitor fishing on the stressed road system salmon runs.

The COVID-19 pandemic presented the opportunity to experiment with a modified comprehensive survey that can be conducted without extensive staff travel and time administering the survey in the field. Given the suboptimal circumstances of an ongoing pandemic and total reliance on only two local research assistants, the survey effort was successful and sufficient for obtaining reliable results. However, when it comes to response rates and outreach efforts, there is no substitute for having trained subsistence staff in communities to administer in-person surveys. While self-administered comprehensive surveys will never be the first choice in subsistence research methods, there were useful aspects of this pilot study method that could contribute to successful alternate methods in the future if there are circumstances that prohibit standard methods. These aspects include the development of an extensively tested self-administered survey, comprehensive outreach materials, and lessons learned in survey distribution (including the importance of reliable survey pickup days). As with any survey conducted for a single harvest year, the 2020 harvest data reflect a snapshot of a single year that comes with its own unique environmental and social circumstances affecting harvest participation. However, 2020 is especially anomalous as the entire world adapted to a global pandemic through social distancing and precautions related to grave health concerns. While this survey effort provides an accurate estimate of harvests in 2020, more household-level harvest research is needed to fully understand quantitative patterns and trends in Unalaska. Nevertheless, the quantitative and qualitative data collected in this study reflect a community filled with people who care about the place they live, and who clearly feel enriched by the wild resources it provides. Through changing environmental, cultural, and economic conditions, Unalaskans continue to value and fight for subsistence ways of life.

6. In October 2021, the area management biologist spoke with the wildlife trooper at Dutch Harbor and made a management decision to interpret the vagueness in the regulations to allow for charters to transport people specifically for the purpose of subsistence salmon fishing (Tyler Lawson, Fishery Biologist 2, ADF&G Division of Commercial Fisheries, Cold Bay, November 2, 2022, personal communication)
7. Researcher notes of public testimony that occurred at the Kodiak/Aleutians Subsistence Regional Advisory Council (RAC) meeting in Cold Bay, Alaska, on September 21–22, 2022.

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APPENDIX A—PROJECT SUPPORT LETTERS

Aleut CORPORATION

February 9, 2017

Office of Subsistence Management
U.S. Fish and Wildlife Service
1011 E. Tudor Road, Mail Stop 121
Anchorage, Alaska 99503

Re: *FRMP Proposal:* ***Changing Regulations, Changing Environment, Changing Subsistence Practices: A Study of Salmon Harvest Practices in Unalaska***

Dear Federal Subsistence Board and Staff:

The Aleut Corporation offers its full support for the proposed Unalaska/Dutch Harbor Comprehensive Subsistence Harvest Survey by the Alaska Department of Fish and Game. Within our region, Unalaska is the largest community and approximately 132 Aleut Corporation shareholders reside there. Today, subsistence continues to be a vital part of the Aleut culture and for those who live in Unalaska.

This proposal meets the priority information for the Southwest Alaska Region, 2018 Notice of Funding Opportunity, "*Reliable estimates of the harvest and use of salmon and other, nonsalmon fish species for subsistence. Of specific interest are harvest trends at Unalaska Bay.*" Funding of this proposal would increase managements knowledge on salmon harvests and needs of Unalaska residents. This data could also be compared to the 1994 harvest survey to examine possible changes in subsistence harvest patterns. In addition, this project would help to identify important salmon spawning streams if the need for population monitoring arises.

The residents of Unalaska, under Federal regulations, the rural residents of Unalaska have a positive customary and traditional use determination for all fish species. Under State regulations, have a customary and traditional use determination for salmon, halibut, finfish, king crab, Tanner crab, Dungeness crab, and miscellaneous shellfish. Within the last decade abundance of these subsistence resources, including salmon, has been reported by subsistence users. Many subsistence users have reported that they have had to leave their traditional fishing grounds to attempt to meet their subsistence needs. The new fishing grounds are father away from their homes and out of the Bays safe waters, which has put an increased economic burden on those individuals to purchase more fuel and larger-safer boats.

Many residents noticed a decline of subsistence resources shortly after the inception of the pollock trawl fishery in 2002. For the past few Board of Fisheries cycles the Unalaska Native Fisherman's Association (UNFA) requested action by the Board to protect these resources and their subsistence lifestyle through the closure of trawl fishing within Unalaska Bay. During the 2015/2016 Board meeting while UNFA's proposal was being heard and deliberated on, Board Member Huntington, requested subsistence harvest and abundance data that supported UNFA's and the Qawalangin Tribe of Unalaska's testimony that their local stocks had been depleted and that their subsistence needs were not being met. However, this data does not exist.

The most recent comprehensive harvest survey for Unalaska/Dutch Harbor was completed in 1994. This survey is no longer a reflection of current harvest levels and cannot be used by the Board of Fisheries

when making determinations on regulations within the area. Because of a lack of data, the Alaska Department of Fish and Game, UNFA, the Aleut Corporation, and the Qawalangin Tribe of Unalaska were not able to provide the Board with the information they requested. Yet, after public testimony and the Committee of the Whole, the Board deliberated and voted 6 to 1 in support of closing Unalaska Bay to trawl fishing.

With the closing of Unalaska Bay to trawling we are hopeful that the local fish stocks will rebuild and that the residents of Unalaska will be able to meet their subsistence needs. However, we are aware that this can take decades depending on the species and their current abundance levels. The survey will provide managers with a variety of information that will be used by management and those that subsist on the resources. This survey will document the local subsistence salmon fishery, the amount of fish harvested, where the fish are harvested, and local knowledge on changes of the resources.

In closing, the Aleut Corporation offers its full support for the proposed Unalaska/Dutch Harbor Comprehensive Subsistence Harvest Survey due to its importance to the subsistence users of Unalaska. Further, the Aleut Corporation's Fisheries Resource Specialist will be working with the Alaska Department of Fish and Game throughout the completion of the project. Due to its importance to our region, the subsistence users, and the fisheries resources we urge the Alaska Sustainable Salmon Fund to select this proposal for funding.

Respectfully,

Thomas Mack

Thomas Mack
President
The Aleut Corporation

CITY OF UNALASKA
P.O. BOX 610
UNALASKA, ALASKA 99685-0610
(907) 581-1251 FAX (907) 581-1417

February 15, 2017

Office of Subsistence Management
U.S. Fish and Wildlife Service
1011 E. Tudor Road, Mail Stop 121
Anchorage, Alaska 99503

Dear Federal Subsistence Board and Staff:

This letter expresses support for the proposal being submitted by Brian Davis entitled *Changing Regulations, Changing Environment, Changing Subsistence Practices: A Study of Salmon Harvest Practices in Unalaska*. The Alaska Department of Fish & Game (ADF&G) Division of Subsistence will investigate the environmental and cultural context that shapes subsistence salmon fishing in Unalaska. The research will identify current patterns and issues affecting fishing in our community and will document changes to this fishery overtime.
We understand that the research will address the following objectives:

1) Document the current harvest and use of salmon, as well as other resources, by Unalaska residents for home use, including harvest locations, and compare current harvest data with past data to identify trends over time,
2) Identify environmental, climatic, regulatory, and cultural factors that shape community access to salmon, and how the impact of these factors has changed over time,
3) Compare survey results to permit harvest return data to more accurately estimate household use of salmon and the community's Amount Necessary for Subsistence,
4) Record observations of pressures on locally used anadromous waterways which are unmonitored by ADF&G.

We understand that the participation of our community members in the project is voluntary, and that local residents serving as local research assistants will be compensated by the Division for their efforts. 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 harvests.

Information on the anadromous waters in and around Unalaska is sorely lacking or out of date, and we strongly recommend you help address this research deficit by funding this project.

Sincerely,

Frank Kelty,

Mayor

UNALASKA/DUTCH HARBOR FISH AND GAME ADVISORY COMMITTEE

P.O. BOX 162 UNALASKA, AK 99685

February 16, 2017

Office of Subsistence Management
U.S. Fish and Wildlife Service
1011 E. Tudor Road, Mail Stop 121
Anchorage, Alaska 99503

Dear Federal Subsistence Board and Staff:

This letter expresses the Unalaska/Dutch Harbor ADFG Advisory Committee's support for the proposal being submitted by Brian Davis entitled *Changing Regulations, Changing Environment, and Changing Subsistence Practices: A Study of Salmon Harvest Practices in Unalaska*. We believe that this project will be very beneficial on gathering data on the subsistence use salmon by local residents; but may also bring forward additional information on the local watersheds salmon run strengths, and escapement levels based on local knowledge. The salmon information for this area is sorely lacking, and the Unalaska AC for years has asked the Board of Fisheries for lower bag limits, area closers, and other regulations to protect the local salmon resources. This project will assist in getting a better understanding of the local salmon resource and how it is used.

Alaska Department of Fish & Game (ADF&G) Division of Subsistence will investigate the environmental and cultural context that shapes subsistence salmon fishing in Unalaska. We understand that the research will address the following objectives:

1) Document the current harvest and use of salmon, as well as other resources, by Unalaska residents for home use, including harvest locations, and compare current harvest data with past data to identify trends over time,
2) Identify environmental, climatic, regulatory, and cultural factors that shape community access to salmon, and how the impact of these factors has changed over time,
3) Compare survey results to permit harvest return data to more accurately estimate household use of salmon and the community's Amount Necessary for Subsistence,
4) Record observations of pressures on locally used anatropous waterways which are unmonitored by ADF&G.

We understand that the participation of our community members in the project is voluntary, and that local residents serving as local research assistants will be compensated by the Division for their efforts. We would ask that you give serious consideration for funding this much needed project that would be of great benefit to get a better understand of the salmon resources in the Unalaska Island area.

Sincerely

Frank Kelty

Unalaska/Dutch Harbor AC Chairman

Attn: Bronwyn Jones

January 26, 2017

Office of Subsistence Management
U.S. Fish and Wildlife Service
1011 E. Tudor Road, Mail Stop 121
Anchorage, Alaska 99503

Dear Federal Subsistence Board and Staff:

This letter is to support the proposal submitted by Brian Davis entitled *Changing Regulations, Changing Environment, Changing Subsistence Practices: A Study of Salmon Harvest Practices in Unalaska*. The Alaska Department of Fish & Game (ADF&G) Division of Subsistence will investigate the environmental and cultural context that shapes the subsistence salmon fishery in Unalaska. The research will identify current patterns and issues affecting salmon fishing in our community and will document changes to this fishery overtime.

We understand that the research will address the following objectives:

1) Document the current harvest and use of salmon by Unalaska residents for home use, including harvest locations, and compare current harvest data with past data to identify trends over time,
2) Identify environmental, climatic, regulatory, and cultural factors that shape community access to salmon, and how the impact of these factors has changed over time,
3) Compare survey results to permit harvest return data to more accurately estimate household use and the community's Amount Necessary for Subsistence,
4) Record observations of pressures on locally used anadromous waterways which are unmonitored by ADF&G.

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. 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.
Information on the anadromous waters in and around Unalaska is sorely lacking or out of date, and we strongly recommend you help address this research deficit by funding this project.

Sincerely,

Walter Tellman
Unalaska Native Fisherman's Association

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Fish and Game

DIVISION OF COMMERCIAL FISHERIES
Westward Region Office

351 Research Court
Kodiak, Alaska 99615-6327
Main: 907.486.1825
Fax: 907.486.1841

February 17, 2017

Office of Subsistence Management
U.S. Fish and Wildlife Service
1011 E. Tudor Road, Mail Stop 121
Anchorage, Alaska 99503

Dear Office of Subsistence Management Proposal Review Team:

This letter is in support of the proposal submitted by Lisa Hutchinson-Scarbrough and Brian Davis entitled Changing Regulations, Changing Environment, Changing Subsistence Practices: A Study of Salmon Harvest Practices in Unalaska. The Alaska Department of Fish & Game (ADF&G) Division of Subsistence will investigate the environmental and cultural context that shapes the subsistence salmon fishery in Unalaska. The research will identify current patterns and issues affecting salmon fishing in the Unalaska salmon district by the community of Unalaska and will document changes to this fishery over time.

We understand that the research will address the following objectives:

1. Document current harvest and use of salmon by Unalaska residents for home use, including harvest locations, and compare current harvest data with past data to identify trends over time,
2. Identify environmental, climatic, regulatory, and cultural factors that shape community access to salmon, and how the impact of these factors has changed over time,
3. Compare survey results to permit harvest return data to more accurately estimate household use and the community's Amount Necessary for Subsistence,
4. Record observations of pressures on locally used anadromous waterways which are unmonitored by ADF&G.

The Board of Fisheries made a positive customary and traditional use finding for salmon in the Unalaska District and determined the amount necessary for subsistence (ANS). By state and federal law, subsistence resource availability in areas with these positive findings must be managed as a priority over other resource harvests and ADF&G Division of Sport Fish and Commercial Fisheries must manage salmon escapements and resource harvests to insure that a reasonable opportunity for subsistence uses is being provided. Commercial, sport and subsistence salmon fisheries in the Aleutian Islands are managed cooperatively by staff in Cold Bay and Sand Point, with assistance from the Dutch Harbor Office.

Though the commercial salmon harvests in this area are fully documented, the only current assessment tool that ADF&G managers have for assessing harvests of subsistence salmon in the Unalaska District is the reported harvests provided from returned annual subsistence permits. The Department issues over 200 permits annually for the Unalaska District, and harvests are estimated from the returned permits;

return rates vary from year to year. Unreliable data make it a challenge for mangers to determine if desired harvest levels are being achieved. In addition, estimates for in-stream sport-caught salmon in the Unalaska District are only achieved through the statewide mail-out random surveys that capture a small portion of local rod and reel users. The amount of data obtained through this method is insufficient for directly monitoring salmon in stocks.

The community of Unalaska has been home to the Unangan people for several millennia, is the largest city in the Aleutian Islands, and is situated around the port of Dutch Harbor, the largest fisheries port in the United States. Salmon that return to the rivers accessible by road from Unalaska, including Iliuliuk River, Unalaska Lake, and Summer Bay, are important to community harvest efforts. Although the inland water ways are closed to subsistence fishing, many people participate in the sports fishery as a way to access salmon for home use. This is especially important to residents who do not have boats, which are needed to access the local subsistence fisheries. Currently, these anadromous waterways are experiencing an increase harvest pressure but are unmonitored by ADF&G because of budget and staff limitations. Since accurate escapement data are currently not available for many of the local streams, resource managers must rely on subsistence, commercial, and sport harvest information in combination with weir data to determine salmon run strength and abundance.

Implementing a harvest survey would improve estimates of sockeye, Chinook, and coho salmon harvested for home use in the subsistence fishery, rod and reel harvests, and fish brought home for personal use from commercial harvests. This information would be greatly beneficial to the ADF&G biologists when managing the salmon stocks and various fisheries in the Unalaska District to ensure that the local subsistence fishery continues to be sustainable and that harvest levels consistent with the ANS range are being achieved.

The Division of Subsistence's applied social science research program includes systematic household surveys, mapping of harvest areas, harvest monitoring and assessment, key respondent interviewing, and participant observation. The types of information collected range from harvest estimates, harvest locations, demographic data, and sources of cash income, to oral histories, traditional knowledge, and social networks. Their research program provides the best methods for obtaining comprehensive and reliable subsistence harvest and use estimates in communities such as Unalaska. ADF&G Commercial Fisheries Division resource managers value and utilize their data, when available, in order to better understand local subsistence economies, resource needs, and resource harvest levels, and to manage for sustainable fisheries.

Sincerely,

Elisabeth Fox
South Alaska Peninsula and Aleutian Islands Salmon and Herring Area Management Biologist
Alaska Department of Fish and Game, Division of Commercial Fisheries
351 Research Court
Kodiak, AK 99615-6399

APPENDIX B—UNALASKA SURVEY OUTREACH PLAN

FRMP 18-450 Changing Regulations, Changing Environment, Changing Practices: A Study of Fish Harvest Practices in Unalaska

PIs: Jackie Keating and Lauren Sill

Summary: Due to travel and safety issues related to the COVID-19 pandemic, the Division of Subsistence will create a comprehensive mail survey that will be delivered to all households (approximately 900) in Unalaska, with the goal of receiving 200 completed surveys. Methods will include a rigorous community outreach plan, personally delivered surveys using local research assistants, potential options for completing the survey over the phone, a raffle for community members, follow-up calls conducted by research staff, and options for conducting key informant interviews using communications technology supplied by ADF&G. Participant observation is tentatively scheduled for late summer of 2021 (FY22).

Project Timeline (Working Draft)

Month	Tasks
September 2020	Draft survey development Formal survey review by agency staff and acquaintances Survey method literature reviews Preliminary outreach planning
October 2020	Survey revisions and expand agency testing Survey data entry system management Unalaska Q Tribe and City Council consultation meetings/presentations Determine rules and logistics of raffles and other incentives Launch photo contest for local subsistence photos for promotions and survey
November 2020	Survey testing with select Unalaska residents Solidify survey timeline, collection schedule, and follow-up methods Advertise LRA positions Launch promotional materials (flyers, radio shows, newspaper article) Order survey incentives (pens, stickers, etc.)
December 2020	Print survey announcements and surveys, prep mailing materials Continue outreach efforts ***Celebrate the end of 2020*** (#survivors!)
January 2021	Initial announcement mailed to PO boxes (early January) Logistic preparations: LRA training and working with City Council Ongoing outreach (flyers, radio shows, newspaper article) **Door-to-door survey efforts launch!**

Month	Tasks
February 2021	Ongoing outreach, radio campaigns, and staff phone calls First round of public fuel card drawings
	Receive surveys, data management and coding Launch reminder (methods TBD)
March 2021	Ongoing outreach, radio campaigns, and staff phone calls Second round of public fuel card drawings
	Continue receiving surveys and data management
April 2021	Wrap up survey collection by end of month, assess damage. Create preliminary response reports to share with community

Outreach Effort Action Items

1. Community Subsistence Photo Contest

Photos will be used for promo flyers (subsistence is important to be me because _____), and the winner will be on the cover of the mail survey.

- Learn ADF&G protocols for photo contests
- Advertise contest and determine prizes

2. Radio Communications

KUCB (https://www.kucb.org/#stream/0). Radio communications will include an interview about the project (possibly facilitating conversations with subsistence users about why harvest data are important), and a regular advertisement.

- Contact radio station to see if this is possible to do remotely
- Outreach team will brainstorm messaging
- Contact KUCB to learn costs and possible venues
- Use to advertise fuel card drawings, could announce winners on the air
- Does ADF&G have protocols we need to follow?

3. Newspaper Communications

Research local newspaper

- Determine costs and advertising possibilities

4. Community Flyers

Will be posted in public places (with the help of Q Tribe and/or LRAs) and Unalaska Facebook pages

- Will incorporate community photos
- Outreach team meetings to determine messaging

5. Survey PO Box Announcements

Will precede door-to-door delivery

- Read Dillman text and other literature on most effective announcements and timing

6. Survey Incentives

Tokens to encourage survey participation

- Read Dillman text and other literature on incentives
- Determine what is allowed (i.e. raffle protocol)
- Pens to accompany survey, stickers, fishhooks, other ideas?
- Fruit or snacks at survey drop box locations

7. Involvement in Local Schools

Is there something we can provide for teachers and students that provides info on what we do?

- Robin was developing school outreach materials
- Reach out to Brenda Duty to see if she had any education planned that we could tack on to
- Have students do subsistence drawing contest
- Work with teachers on encouraging survey participation

8. Thinking Outside the Box

What else can we do?!

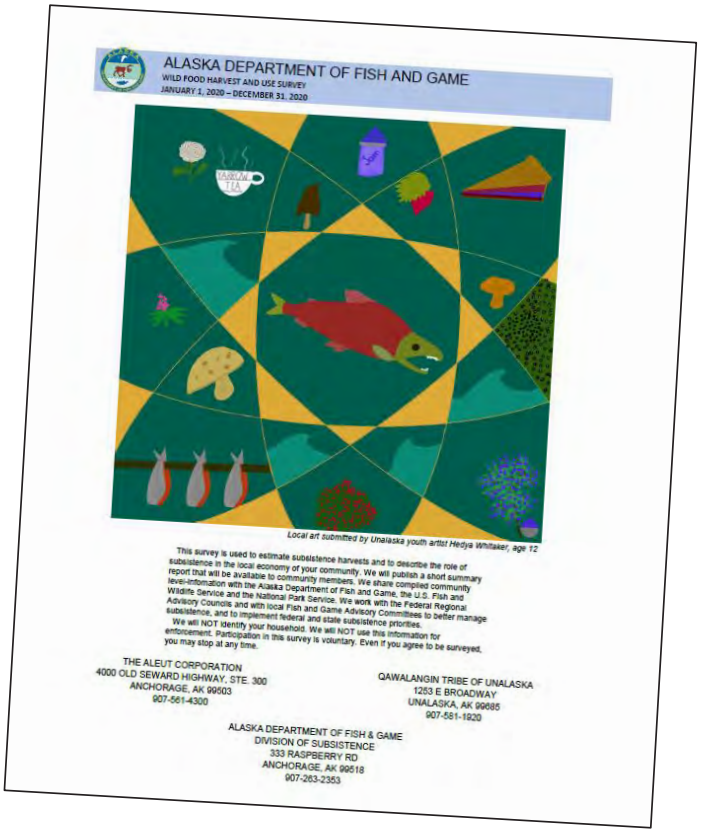
- Potential outreach video explaining survey and value of data (would need to explore venues for sharing, like the Q Tribe's Facebook)
- Potential online presentation on materials prepared for Museum of the Aleutians presentation (could we have someone else host some kind of kickoff celebration and provide snacks and a virtual presentation?)
- Other thoughts?

9. Other Action Items

- Contact Aleut Corp to see if they can still fund a local intern to assist with ground operations
- Set up meeting with Q Tribe to discuss outreach, and to understand who we should be involving locally. See if we can setup regular monthly update meetings
- Send survey drafts to local ADF&G staff, and set up meeting to review outreach plan

APPENDIX C—SURVEY AND RAFFLE PROMOTION FLYER

Finish your wild food harvest and use survey TODAY!


ALASKA DEPARTMENT OF FISH AND GAME
WILD FOOD HARVEST AND USE SURVEY
JANUARY 1, 2020 – DECEMBER 31, 2020

Local art submitted by Unalaska youth artist Hedya Whitaker, age 12

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 compiled community level-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.

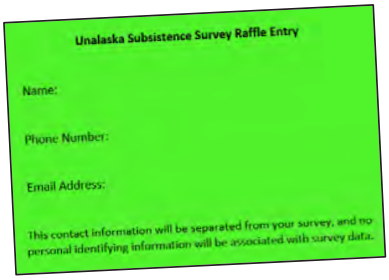
THE ALEUT CORPORATION
4000 OLD SEWARD HIGHWAY, STE. 300
ANCHORAGE, AK 99503
907-561-4300

QAWALANGIN TRIBE OF UNALASKA
1253 E BROADWAY
UNALASKA, AK 99685
907-581-1920

ALASKA DEPARTMENT OF FISH & GAME
DIVISION OF SUBSISTENCE
333 RASPBERRY RD
ANCHORAGE, AK 99518
907-263-2353

Surveys document the importance of wild foods in Unalaska and collect knowledge and concerns about local subsistence resources.

Even if you do not harvest or use wild foods, your feedback is important!


Unalaska Subsistence Survey Raffle Entry

Name:

Phone Number:

Email Address:

This contact information will be separated from your survey, and no personal identifying information will be associated with survey data.

All households that submit a completed survey will be eligible to enter a raffle drawing for **five $200 prizes** and **one $1,000 grand prize**.

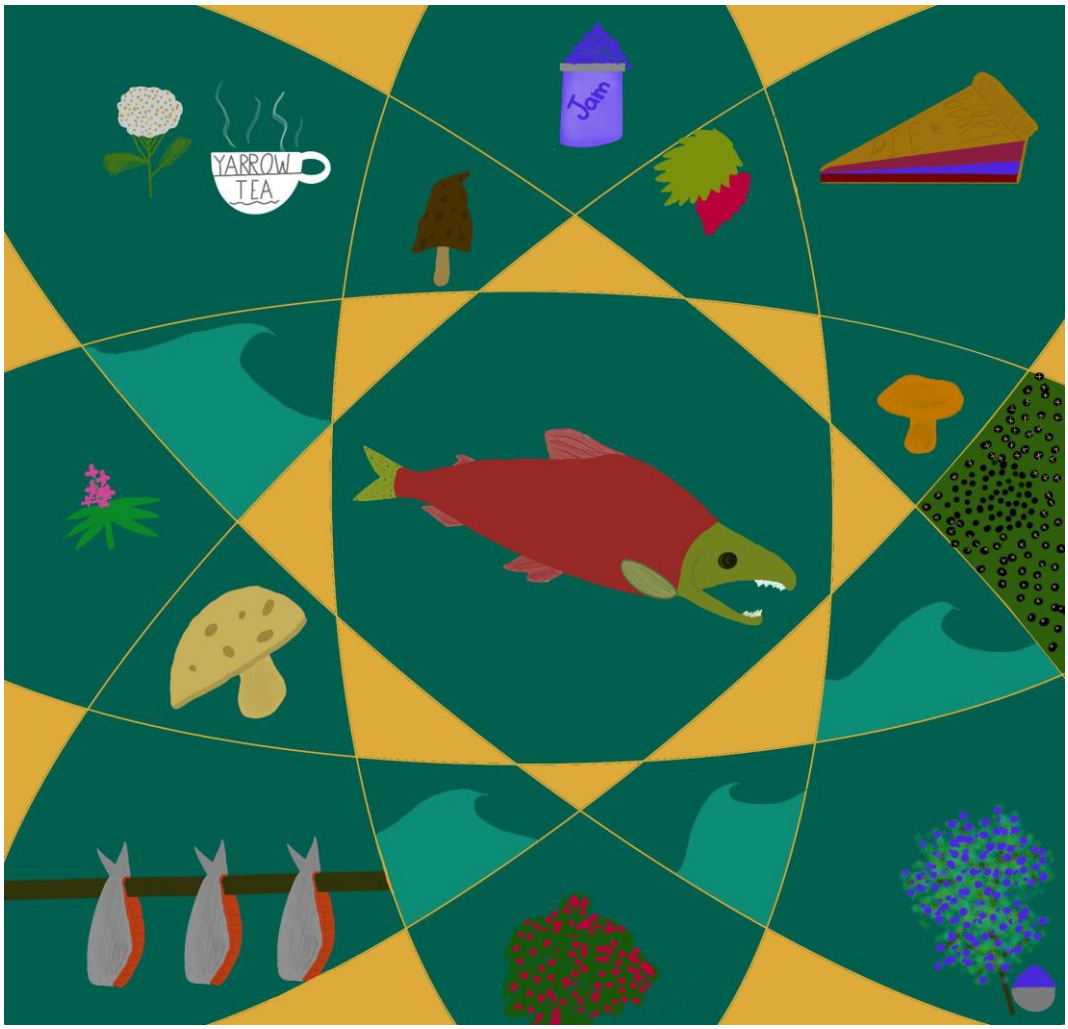
Leave your survey and raffle entry outside on a designated pickup day or return it via mail by February 22 to be entered into the drawing. Winners will be announced in the first week of March.

Survey participation is voluntary and confidential.
If you did not receive a survey, call (907) 267-2368 to arrange a delivery.

Thank you for participating!

QAWALANGIN Tribe of Unalaska

APPENDIX D—SURVEY FORM



Local art submitted by Unalaska youth artist Hedya Whitaker, age 12

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 compiled community level-infomation 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.

THE ALEUT CORPORATION
4000 OLD SEWARD HIGHWAY, STE. 300
ANCHORAGE, AK 99503
907-561-4300

QAWALANGIN TRIBE OF UNALASKA
1253 E BROADWAY
UNALASKA, AK 99685
907-581-1920

ALASKA DEPARTMENT OF FISH & GAME
DIVISION OF SUBSISTENCE
333 RASPBERRY RD
ANCHORAGE, AK 99518
907-263-2353

UNALASKA SUBSISTENCE SURVEY 2020

** INSTRUCTIONS **

Thank you for taking the time to complete this survey, produced by the Division of Subsistence in collaboration with the Qawalangin Tribe of Unalaska. This is a confidential survey intended to help us learn about and share information on the subsistence economy in Unalaska. Below you will find a set of general instructions to help you fill out this form — *Examples are provided on the following page.*

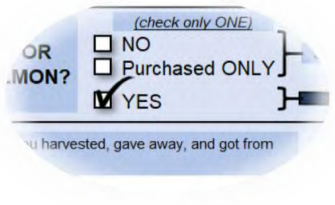
NOTE: This survey can take between 10 and 45 minutes, if you need assistance, please call 907-267-2368.

EVERY HOUSEHOLD IS IMPORTANT TO US! Please fill out and return this form even if members of your household do not usually or never harvest, receive or use wild resources.

Each page asks about similar kinds of wild foods. If no one in your household was given that kind of food and no one in your household tried to harvest those kinds of foods, check 'NO' at the top of the page. If you bought that kind of wild food directly from a fishermen or from the grocery store, mark 'PURCHASE ONLY' and go on to the next page.

If you or anyone in your household WAS GIVEN or TRIED TO HARVEST that kind of wild food, answer yes, and fill-in the rest of the page to the best of your ability.

EXAMPLE:



Every kind of wild food we ask about has 3 statements:

Someone gave to us

- ☑ Check this box if someone in another household gave you this kind of food.
- ☑ Check this box even if you didn't EAT the food, but gave it to someone else.
- ☑ Check this box even if you only bartered for another kind of food.
- ⊘ DO NOT check this box if you only shared a meal at someone else's house.

We gave to someone else

- ☑ Check this box if you gave someone in another household this kind of food.
- ☑ Check this box even if you only bartered another kind of food to get it.
- ⊘ DO NOT check this box if you only shared meals at your own home.

We tried ….

- ☑ Check this box if anyone in your household tried to harvest this kind of food.
- ☑ Check this box even if someone tried, but was unsuccessful.
- ☑ Check this box if you incidentally caught and kept a type of fish.
- ⊘ DO NOT check this box if you only fished to catch and release.

Recording your HARVESTS

Write the amount of each kind of wild food you harvested in the spaces provided.

Include harvests by all people living in your household.

If a person only lived in your household for part of the year, only include what they harvested while they lived in your household.

If the question asks for 'individual' numbers of a wild food, but you only know how many gallons or buckets you harvested, write the number and write in the type of measurement next to it, such as 'gallon'.

If you tried to harvest a kind of wild food, but did not, check the box next to "We didn't harvest any." and go on to the next kind of wild food.

Include all of the wild foods people in your household harvested anywhere in Alaska.

If you harvested some, but can't remember how much, write a question mark ? In the space provided to write in the amount.

**** You do NOT need to tell us how much wild food <u>you gave to others</u> or that <u>others gave to you.</u> ****

For COMMERCIAL FISHING households

Tell us how much fish or shellfish you took home for home use, including the amount you gave to other households.

If you are a skipper, DO NOT tell us how much your crew members kept, only include the amount you kept to eat or to give to other households.

For households who fish

If you incidentally caught a type of fish or shellfish, and kept it, remember to record the amount you kept.

If you fish with people in other households, only tell us about YOUR SHARE of the harvest.

Do not tell us how many fish you caught and released.

For households who hunt

Only record a harvest if a person in your household shot the animal.

Do not record the harvest if you were part of a successful hunting group and someone from a different household shot the animal. Do check the box for 'We hunted…' and for 'Someone gave to us'.

Still have questions? Call 907-267-2368 or check the examples on the following page.

UNALASKA SUBSISTENCE SURVEY 2020

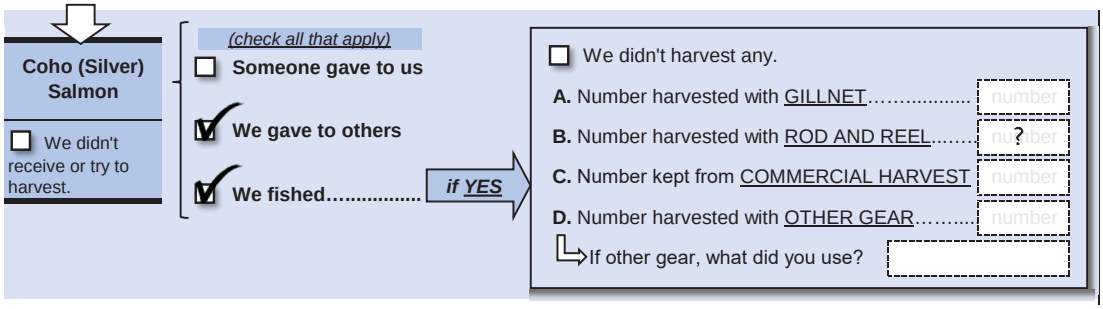
** EXAMPLES **

Below are some examples showing how to fill this form out. They include some common scenarios you might encounter. This isn't a comprehensive list of situations.

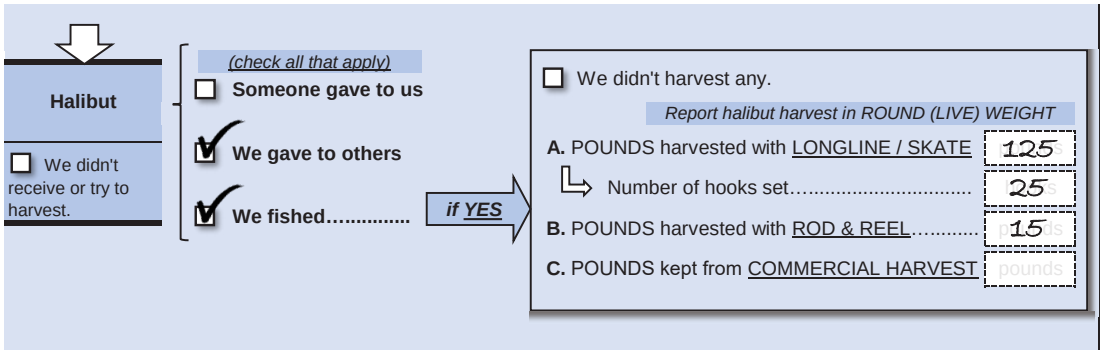
If you have any questions, please contact the Alaska Department of Fish and Game at: **907-267-2368.**

EVERY RESPONSE IS IMPORTANT TO US! Please fill out and return this form even if members of your household do not usually or never harvest, receive or use wild resources.

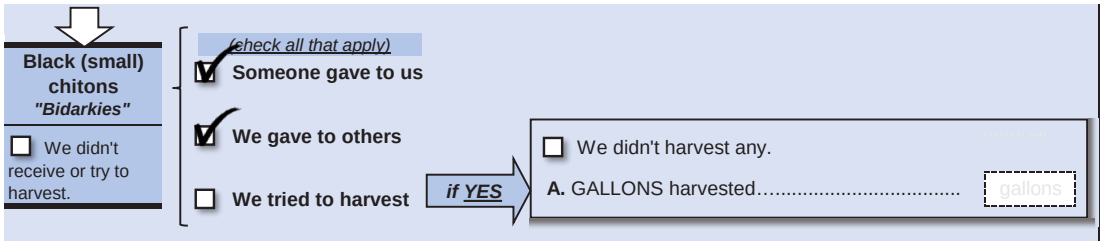
In the example to the right, the 14-year-old son went rod and reel fishing and harvested coho salmon. He only kept 2 and gave the remainder to his uncle, who lives in a different household. He doesn't remember the total number harvested.



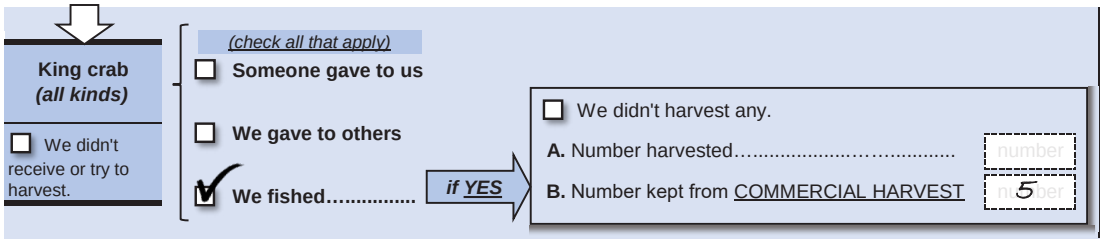
In the example to the right, the household head went fishing with another household. They used a 25 hook long-line and harvested 250 pounds of halibut. They split the harvest 50/50. Later, the household head went out and caught 1 more halibut that weighed 15 pounds. The household head also gave away 50 pounds of halibut to his sister.



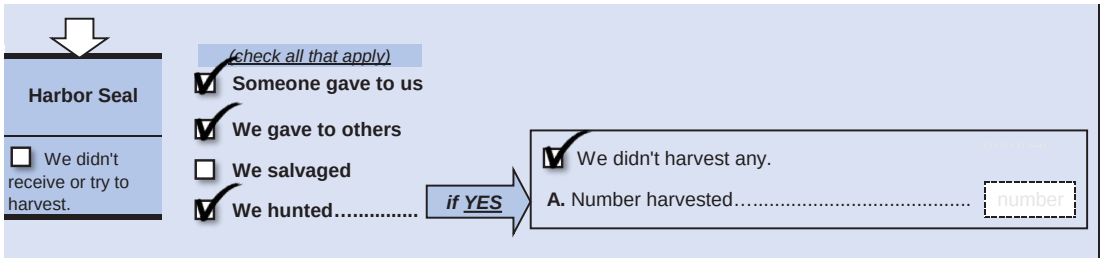
In this example, the head of household was given 1 gallon of bidarkies, but her family doesn't like them, so she gave them to her mother who lives in a different household.



In this example, an adult son in the household was a crew-member on a crabbing boat and the skipper let him take 5 king crab home from the catch.



In this example, the head of household went seal hunting with a neighbor. They harvested 3 seals. The neighbor shot all 3. This household mailed 3 jars of seal oil to his sister in Anchorage.



PAGE 1 – HOUSEHOLD MEMBERS

This page asks questions about people living in your household during 2020. Please include everyone living in your household for more than 3 months between January 1, 2020 – December 31, 2020.

Example

	How is this person related to household head 1? (relationship)	In what year was this person born? (year)	Is this person Male or Female? (check ONE)	Total years has this person lived in Unalaska? (total years)	Is this person an Alaska Native? (check if YES)	Is this person a member of the Qawalangin tribe? (check if YES)
EXAMPLE PERSON	SON	2005	☑ Male ☐ Female	15	☑ Yes	☐ Yes

To start, could you tell us a little about the heads of household? If there is no spouse or partner, leave the SECOND household head BLANK.

Household Head 2
This person should be a spouse or partner. If there is no second head, leave this blank.

What if we had a baby in 2020?
Enter your baby's information on any one of the lines provided. Write < 1 for total years lived in Unalaska.

What if someone lived in two different households in 2020?
IF that person lives in your house NOW, include them here. If not, leave them off of your survey.

	How is this person related to household head 1? (relationship)	In what year was this person born? (year)	Is this person Male or Female? (check ONE)	Total years has this person lived in Unalaska? (total years)	Is this person an Alaska Native? (check if YES)	Is this person a member of the Qawalangin tribe? (check if YES)
Household Head 1	**SELF**	YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
Household Head 2		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes

Now, could you tell us a little about the OTHER members of your household? Please include ALL people living in your household for more than 3 months during 2020.

	How is this person related to household head 1? (relationship)	In what year was this person born? (year)	Is this person Male or Female? (check ONE)	Total years has this person lived in Unalaska? (total years)	Is this person an Alaskan Native? (check if YES)	Is this person a member of the Qawalangin tribe? (check if YES)
PERSON 3		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 4		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 5		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 6		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 7		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 8		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 9		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 10		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 12		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 13		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 14		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 15		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes
PERSON 16		YEAR	☐ Male ☐ Female	Total Years	☐ Yes	☐ Yes

CONTINUE TO PAGE 2, SALMON

PAGE 2 – SALMON

This page asks questions about your household's use of SALMON during 2020. This includes all SALMON your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE, FISH FOR, OR COMMERCIAL FISH for ANY species of SALMON?

(check only ONE)

- ☐ NO
- ☐ Purchased ONLY

→ SKIP TO PAGE 3 (saltwater fish)

- ☐ YES

In the questions below, we would like to know about the SALMON you harvested, gave away, and got from others. **If you did not fish, only answer questions about giving.**

Examples of OTHER GEAR
- *Dip net*
- *Seine*
- *Spear*
- *Longline*

How do I record Trolling?
Record this with other Rod and Reel harvests.

What is included in: Number kept from COMMERCIAL HARVEST?
Include only those fish you kept and brought home for personal use, INCLUDING incidental harvests and fish you gave to others. If you are a skipper, DO NOT include fish given to CREW. If you are a crew-member record what you took home.

Coho (silver) salmon

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We fished…… *if YES*

- ☐ We didn't harvest any.
- A. Number harvested with GILLNET…… number
- B. Number harvested with ROD AND REEL…… number
- C. Number kept from COMMERCIAL HARVEST number
- D. Number harvested with OTHER GEAR…… number
- If other gear, what did you use?

Sockeye (red) Salmon

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We fished…… *if YES*

- ☐ We didn't harvest any.
- A. Number harvested with GILLNET…… number
- B. Number harvested with ROD AND REEL…… number
- C. Number kept from COMMERCIAL HARVEST number
- D. Number harvested with OTHER GEAR…… number
- If other gear, what did you use?

Pink (humpies) salmon

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We fished…… *if YES*

- ☐ We didn't harvest any.
- A. Number harvested with GILLNET…… number
- B. Number harvested with ROD AND REEL…… number
- C. Number kept from COMMERCIAL HARVEST number
- D. Number harvested with OTHER GEAR…… number
- If other gear, what did you use?

Chum (dog) salmon

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We fished…… *if YES*

- ☐ We didn't harvest any.
- A. Number harvested with GILLNET…… number
- B. Number harvested with ROD AND REEL…… number
- C. Number kept from COMMERCIAL HARVEST number
- D. Number harvested with OTHER GEAR…… number
- If other gear, what did you use?

Chinook (king) Salmon

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We fished…… *if YES*

- ☐ We didn't harvest any.
- A. Number harvested with GILLNET…… number
- B. Number harvested with ROD AND REEL…… number
- C. Number kept from COMMERCIAL HARVEST number
- D. Number harvested with OTHER GEAR…… number
- If other gear, what did you use?

CONTINUE TO PAGE 3, SALTWATER FISH

PAGE 3 – SALTWATER FISH

This page asks questions about your household's use of SALTWATER FISH during 2020. This includes all SALTWATER FISH (other than salmon) your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE, FISH FOR, OR COMMERCIAL FISH for ANY species of SALTWATER FISH? *(not including salmon)*

(check only ONE)

- ☐ NO
- ☐ Purchased ONLY

→ SKIP TO PAGE 5 (freshwater fish)

- ☐ YES

In the questions below, we would like to know about the SALTWATER FISH (other than salmon) you harvested, gave away, and got from others. **If you did not fish, only answer questions about giving.**

Examples of OTHER GEAR
- *Dip net*
- *Seine*
- *Spear*
- *Longline*
- *Handline*

How do I record Trolling?
Record this with other Rod and Reel harvests.

What is included in: Number kept from COMMERCIAL HARVEST?
Include only those fish you kept and brought home for personal use, INCLUDING incidental harvests and fish you gave to others. If you are a skipper, DO NOT include fish given to CREW. If you are a crew-member record what you took home.

Halibut

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished**..... *if YES*

- ☐ We didn't harvest any.

Report halibut harvest in ROUND (LIVE) WEIGHT

- **A.** POUNDS harvested with LONGLINE / SKATE ____ pounds
  - Number of hooks set..... ____ hooks
- **B.** POUNDS harvested with ROD & REEL..... ____ pounds
- **C.** POUNDS kept from COMMERCIAL HARVEST ____ pounds

Pacific (gray) cod

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished**..... *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested with LONGLINE / SKATE.... ____ number
- **B.** Number harvested with ROD AND REEL..... ____ number
- **C.** Number kept from COMMERCIAL HARVEST ____ number
- **D.** Number harvested with OTHER GEAR..... ____ number
  - If other gear, what did you use? ____

Black rockfish

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished**..... *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested with GILLNET..... ____ number
- **B.** Number harvested with ROD AND REEL..... ____ number
- **C.** Number kept from COMMERCIAL HARVEST ____ number
- **D.** Number harvested with OTHER GEAR..... ____ number
  - If other gear, what did you use? ____

Pacific herring

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished**..... *if YES*

- ☐ We didn't harvest any.
- **A.** GALLONS harvested with GILLNET..... ____ gallons
- **B.** GALLONS harvested with ROD AND REEL..... ____ gallons
- **C.** GALLONS kept from COMMERCIAL HARVEST ____ gallons
- **D.** GALLONS harvested with OTHER GEAR..... ____ gallons
  - If other gear, what did you use? ____

Greenling "*pogies*"

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished**..... *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested with GILLNET..... ____ number
- **B.** Number harvested with ROD AND REEL..... ____ number
- **C.** Number kept from COMMERCIAL HARVEST ____ number
- **D.** Number harvested with OTHER GEAR..... ____ number
  - If other gear, what did you use? ____

CONTINUE TO PAGE 4, SALTWATER FISH CONTINUED

PAGE 4 – SALTWATER FISH *(continued)*

This is a continuation of PAGE 3 — SALTWATER FISH. Spaces are provided below to add any fish we have not included for you.

Did you answer NO or PURCHASED ONLY on the PREVIOUS PAGE? If so, proceed to page 5. → SKIP TO PAGE 5 (freshwater fish)

IF you responded YES on the previous page, please fill this out…...

Don't forget to add species that were given to you, even if you did not eat those and gave them away.

Examples of OTHER GEAR
- *Dip net*
- *Seine*
- *Spear*
- *Longline*
- *Handline*

How do I record Trolling?
Record this with other Rod and Reel harvests.

Examples of OTHER SPECIES
- *Red rockfish*
- *Sablefish (black cod)*
- *Herring roe*
- *Flounder*
- *Mackerel*
- *Sole*
- *Sculpin*
- *Swordfish*
- *Steelhead*
- *Lingcod*
- *Shark*
- *Dolly Varden (sea-run dollies)*

Someone gave us Saltwater fish, but we don't know what kind.
Write "unknown" in one of the other species boxes provided, and mark the check-box for "someone gave you."

What if we harvested HERRING ROE?
Write HERRING ROE in a blank space provided, and report the amount in GALLONS.

Walleye pollock "*whiting*"

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We fished…..

if YES

- ☐ We didn't harvest any.
- **A.** Number harvested with LONGLINE / SKATE…. number
- **B.** Number harvested with ROD AND REEL…… number
- **C.** Number kept from COMMERCIAL HARVEST number
- **D.** Number harvested with OTHER GEAR……. number
- If other gear, what did you use? ____

Other Species? ____ *(specify species)*

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We fished…..

if YES

- ☐ We didn't harvest any.
- **A.** Number harvested with LONGLINE / SKATE…. number
- **B.** Number harvested with ROD AND REEL…… number
- **C.** Number kept from COMMERCIAL HARVEST number
- **D.** Number harvested with OTHER GEAR……. number
- If other gear, what did you use? ____

Other Species? ____ *(specify species)*

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We fished…..

if YES

- ☐ We didn't harvest any.
- **A.** Number harvested with GILLNET…… number
- **B.** Number harvested with ROD AND REEL…… number
- **C.** Number kept from COMMERCIAL HARVEST number
- **D.** Number harvested with OTHER GEAR……. number
- If other gear, what did you use? ____

Other Species? ____ *(specify species)*

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We fished…..

if YES

- ☐ We didn't harvest any.
- **A.** Number harvested with GILLNET…… number
- **B.** Number harvested with ROD AND REEL…… number
- **C.** Number kept from COMMERCIAL HARVEST number
- **D.** Number harvested with OTHER GEAR……. number
- If other gear, what did you use? ____

Other Species? ____ *(specify species)*

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest

if YES

- ☐ We didn't harvest any.
- **A.** Number harvested with LONGLINE / SKATE…. number
- **B.** Number harvested with ROD AND REEL…… number
- **C.** Number kept from COMMERCIAL HARVEST number
- **D.** Number harvested with OTHER GEAR……. number
- If other gear, what did you use? ____

CONTINUE TO PAGE 5, FRESHWATER FISH

PAGE 5 — FRESHWATER FISH

? This page asks questions about your household's use of FRESHWATER FISH during 2020. This includes all FRESHWATER FISH your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE OR FISH FOR ANY species of FRESHWATER FISH?
(including incidental harvests retained from commercial fishing)

(check only ONE)
- ☐ NO
- ☐ Purchased ONLY } SKIP TO PAGE 6 (crabs)
- ☐ YES

In the questions below, we would like to know about the FRESHWATER FISH you harvested, gave away, and got from others. **If you did not fish, only answer questions about giving.**

? Examples of OTHER GEAR
- Spear/Gaff
- Longline
- Dip net
- Seine
- Ice fishing
- Net under ice
- Fishtrap

? What is included in: Number kept from COMMERCIAL HARVEST?
Include only those fish you kept and brought home for personal use, INCLUDING incidental harvests and fish you gave to others. If you are a skipper, DO NOT include fish given to CREW. If you are a crew-member record what you took home.

? Examples of OTHER SPECIES
- Grayling
- Arctic char
- Northern pike
- Whitefish

? Someone gave us fresh water fish, but we don't know what kind.
Write "unknown" in one of the other species boxes provided, and mark the check-box for "someone gave you."

Dolly Varden (freshwater)
☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished...............** if YES →

☐ We didn't harvest any.
- **A.** Number harvested with GILLNET.................. [number]
- **B.** Number harvested with ROD AND REEL........ [number]
- **D.** Number kept from COMMERCIAL HARVEST [number]
- **E.** Number harvested with OTHER GEAR.......... [number]
- If other gear, what did you use? [ ]

Rainbow trout
☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished..............** if YES →

☐ We didn't harvest any.
- **A.** Number harvested with GILLNET.................. [number]
- **B.** Number harvested with ROD AND REEL........ [number]
- **D.** Number kept from COMMERCIAL HARVEST [number]
- **E.** Number harvested with OTHER GEAR.......... [number]
- If other gear, what did you use? [ ]

Other Species?
[ ] *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished..............** if YES →

☐ We didn't harvest any.
- **A.** Number harvested with GILLNET.................. [number]
- **B.** Number harvested with ROD AND REEL........ [number]
- **D.** Number kept from COMMERCIAL HARVEST [number]
- **E.** Number harvested with OTHER GEAR.......... [number]
- If other gear, what did you use? [ ]

Other Species?
[ ] *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished..............** if YES →

☐ We didn't harvest any.
- **A.** Number harvested with GILLNET.................. [number]
- **B.** Number harvested with ROD AND REEL........ [number]
- **D.** Number kept from COMMERCIAL HARVEST [number]
- **E.** Number harvested with OTHER GEAR.......... [number]
- If other gear, what did you use? [ ]

Other Species?
[ ] *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished..............** if YES →

☐ We didn't harvest any.
- **A.** Number harvested with GILLNET.................. [number]
- **B.** Number harvested with ROD AND REEL........ [number]
- **D.** Number kept from COMMERCIAL HARVEST [number]
- **E.** Number harvested with OTHER GEAR.......... [number]
- If other gear, what did you use? [ ]

CONTINUE TO PAGE 6, CRABS →

PAGE 6 — CRABS

This page asks questions about your household's use of CRABS during 2020. This includes all CRABS your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE, FISH FOR, OR COMMERCIAL FISH FOR ANY species of CRAB?

(check only ONE)
- ☐ NO
- ☐ Purchased ONLY } SKIP TO PAGE 7 (clams & mussels)
- ☐ YES

In the questions below, we would like to know about the CRABS you harvested, gave away, and got from others. **If you did not fish, only answer questions about giving.**

What is included in: Number kept from COMMERCIAL HARVEST?

Include only those fish you kept and brought home for personal use, INCLUDING incidental harvests and fish you gave to others. If you are a skipper, DO NOT include fish given to CREW. If you are a crew-member record what you took home.

Someone gave us crab, but we don't know what kind.

Write "unknown" in one of the other species boxes provided, and mark the check-box for "someone gave you."

Examples of OTHER SPECIES

- *Hair crab*
- *Korean horse-hair crab*

King crab (all kinds)

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished...............** ***if YES*** →

☐ We didn't harvest any.
A. NUMBER harvested.. number
B. Number kept from COMMERCIAL HARVEST number

Tanner crab

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished...............** ***if YES*** →

☐ We didn't harvest any.
A. NUMBER harvested.. number
B. Number kept from COMMERCIAL HARVEST number

Dungeness crab

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished...............** ***if YES*** →

☐ We didn't harvest any.
A. NUMBER harvested.. number
B. Number kept from COMMERCIAL HARVEST number

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished...............** ***if YES*** →

☐ We didn't harvest any.
A. NUMBER harvested.. number
B. Number kept from COMMERCIAL HARVEST number

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished...............** ***if YES*** →

☐ We didn't harvest any.
A. NUMBER harvested.. number
B. Number kept from COMMERCIAL HARVEST number

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We fished...............** ***if YES*** →

☐ We didn't harvest any.
A. NUMBER harvested.. number
B. Number kept from COMMERCIAL HARVEST number

CONTINUE TO PAGE 7, CLAMS AND MUSSELS

PAGE 7 – CLAMS AND MUSSELS

This page asks questions about your household's use of CLAMS OR MUSSELS during 2020. This includes all CLAMS OR MUSSELS your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE OR FISH FOR ANY species of CLAM OR MUSSEL?

(check only ONE)
- ☐ NO
- ☐ Purchased ONLY

SKIP TO PAGE 8 (other shellfish)

- ☐ YES

In the questions below, we would like to know about the CLAMS AND MUSSELS you harvested, gave away, and got from others. **If you did not try to harvest, only answer questions about giving.**

Someone gave us clams or mussels, but we don't know what kind.
Write "unknown" in one of the other species boxes provided, and mark the check-box for "someone gave you."

Examples of OTHER SPECIES
- Pacific littleneck clams (steamers)
- Horse clams (gapers)
- Brown mussels
- Pinkneck clams
- Cockles
- Freshwater clams

Blue mussels
☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → *if YES*

☐ We didn't harvest any.
Report mussels with shells on.
A. GALLONS harvested.................................... ______ gallons

Butter clams
☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → *if YES*

☐ We didn't harvest any.
Report clams with shells on.
A. GALLONS harvested.................................... ______ gallons

Razor clams
☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → *if YES*

☐ We didn't harvest any.
Report clams with shells on.
A. GALLONS harvested.................................... ______ gallons

Other Species?
______ *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → *if YES*

☐ We didn't harvest any.
Report clam and mussel harvest with shells on
A. GALLONS harvested.................................... ______ gallons

Other Species?
______ *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → *if YES*

☐ We didn't harvest any.
Report clam and mussel harvest with shells on
A. GALLONS harvested.................................... ______ gallons

Other Species?
______ *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → *if YES*

☐ We didn't harvest any.
Report clam and mussel harvest with shells on
A. GALLONS harvested.................................... ______ gallons

CONTINUE TO PAGE 8, OTHER SHELLFISH

PAGE 8 – OTHER SHELLFISH

This page asks questions about your household's use of other SHELLFISH during 2020. This includes all types of soft-bodied and hard-shelled animals from the ocean that your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE OR FISH FOR ANY species of SHELLFISH?
(Unsure? See the examples provided below)

(check only ONE)
- ☐ NO
- ☐ Purchased ONLY

→ SKIP TO PAGE 9 (marine mammals)

- ☐ YES

In the questions below, we would like to know about the SHELLFISH you harvested, gave away, and got from others. **If you did not try to harvest, only answer questions about giving.**

Examples of OTHER SHELLFISH
- *Sea cucumbers*
- *Sea urchins*
- *Jingles*
- *Limpet*
- *Anemone*
- *Scallops*
- *Snails*
- *Squid*

Someone gave us clams or mussels, but we don't know what kind.
Write "unknown" in one of the other species boxes provided, and mark the check-box for "someone gave you."

Shrimp
- ☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest

if YES
- ☐ We didn't harvest any.

Report shrimp harvest with heads and shells on
A. POUNDS harvested…..... pounds

Black (small) chitons *"Bidarkies"*
- ☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest

if YES
- ☐ We didn't harvest any.

A. GALLONS harvested…..... gallons

Red (large) chitons
- ☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest

if YES
- ☐ We didn't harvest any.

A. GALLONS harvested…..... gallons

Octopus
- ☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest

if YES
- ☐ We didn't harvest any.

A. NUMBER harvested…..... number

Other Species?
(specify species)

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest

if YES
- ☐ We didn't harvest any.

A. GALLONS harvested…..... gallons

Other Species?
(specify species)

(check all that apply)
- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest

if YES
- ☐ We didn't harvest any.

A. GALLONS harvested…..... gallons

CONTINUE TO PAGE 9, MARINE MAMMALS →

PAGE 9 — MARINE MAMMALS

This page asks about your household's use of MARINE MAMMALS during 2020. This includes all types of MARINE MAMMALS your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE, HUNT FOR, OR SALVAGE ANY species of MARINE MAMMAL

(check only ONE)

- ☐ NO.................... } SKIP TO PAGE 10 (large land mammals)
- ☐ YES.................. }

In the questions below, we would like to know about the MARINE MAMMALS you harvested, gave away, and got from others. **If you did not try to harvest, only answer questions about giving.**

Examples of OTHER SPECIES

- Bearded seal
- Ribbon seal
- Beluga whale
- Sea otter
- Walrus

DON'T FORGET!

We also would like to know about any MUKTUK or SEAL OIL that you were GIVEN, even if you are unsure what kind it was.

Write 'Muktuk' or 'Seal Oil' in the OTHER species box.

Harbor seal

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We salvaged**
- ☐ **We hunted..............** ***if YES***

☐ We didn't harvest any.

A. NUMBER harvested.. number

Sea lion

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We salvaged**
- ☐ **We hunted..............** ***if YES***

☐ We didn't harvest any.

A. NUMBER harvested.. number

Fur seal

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We salvaged**
- ☐ **We hunted..............** ***if YES***

☐ We didn't harvest any.

A. NUMBER harvested.. number

Other Species?

(specify species)

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We salvaged**
- ☐ **We hunted..............** ***if YES***

☐ We didn't harvest any.

A. NUMBER harvested.. number

Other Species?

(specify species)

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We salvaged**
- ☐ **We hunted..............** ***if YES***

☐ We didn't harvest any.

A. NUMBER harvested.. number

Other Species?

(specify species)

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We salvaged**
- ☐ **We hunted..............** ***if YES***

☐ We didn't harvest any.

A. NUMBER harvested.. number

CONTINUE TO PAGE 10, LARGE LAND MAMMALS

PAGE 10 — LARGE LAND MAMMALS

This page asks questions about your household's use of LARGE LAND MAMMALS during 2020. This includes all types of LARGE LAND MAMMALS that your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE OR HUNT FOR ANY species of LARGE LAND MAMMALS?

- ☐ NO..................... } SKIP TO PAGE 11 (small land mammals)
- ☐ YES.................... }

(check only ONE)

In the questions below, we would like to know about the LARGE LAND MAMMALS you harvested, gave away, and got from others. **If you did not try to harvest, only answer questions about giving.**

Examples of OTHER SPECIES
- Black bear
- Dall sheep
- Muskox
- Wild cow (feral cattle)
- Elk
- Deer
- Wood bison
- Feral reindeer

What if we went hunting with other households?
Only report the number of animals harvested that were SHOT by members of your household.

Moose
☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted..............** *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.. [number]

Caribou
☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted..............** *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.. [number]

Brown bear
☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted..............** *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.. [number]

Other Species?
(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted..............** *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.. [number]

Other Species?
(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted..............** *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.. [number]

Other Species?
(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted..............** *if YES*
  - ☐ We didn't harvest any.
  - **A.** Number harvested.. [number]

CONTINUE TO PAGE 11, SMALL LAND MAMMALS

PAGE 11 — SMALL LAND MAMMALS

This page asks questions about your household's use of SMALL LAND MAMMALS during 2020. This includes all SMALL LAND MAMMALS your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE, HUNT OR TRAP FOR ANY species of SMALL LAND MAMMALS?

(check only ONE)

- ☐ NO……………………} SKIP TO PAGE 12 (geese and swans)
- ☐ YES………………… }

In the questions below, we would like to know about the SMALL LAND MAMMALS you harvested, gave away, and got from others. **If you did not hunt or trap, only answer questions about giving.**

Examples of OTHER SPECIES
- Squirrel
- Wolverine
- Marten
- River otter
- Mink
- Ermine
- Weasel
- Lynx
- Wolf

Alaska hare

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** — *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested………………………………… number
  - How many of these were ONLY used for fur? number

Red fox

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** — *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested………………………………… number
  - How many of these were ONLY used for fur? number

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** — *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested………………………………… number
  - How many of these were ONLY used for fur? number

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** — *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested………………………………… number
  - How many of these were ONLY used for fur? number

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** — *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested………………………………… number
  - How many of these were ONLY used for fur? number

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** — *if YES*
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested………………………………… number
  - How many of these were ONLY used for fur? number

CONTINUE TO PAGE 12, GEESE AND SWANS

PAGE 12 – GEESE and SWANS

This page asks questions about your household's use of GEESE and SWANS during 2020. This includes all GEESE and SWANS your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE OR HUNT FOR ANY species of GOOSE or SWAN?

(check only ONE)

- ☐ NO..... → SKIP TO PAGE 13 (ducks)
- ☐ YES.....

In the questions below, we would like to know about the GEESE or SWANS you harvested, gave away, and got from others. **If you did not hunt for GEESE or SWANS, only answer questions about giving.**

SEASON DATES

SPRING: April, May & June.

SUMMER: July & August.

FALL: September & October

WINTER: January, February March, 2020 and November, December, 2020.

Examples of OTHER SPECIES

- White-fronted geese
- Snow-geese

Brant "*black geese*"

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We hunted..... *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

Canada geese "*cacklers*"

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We hunted..... *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

Emperor geese "*beach geese*"

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We hunted..... *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

Snow geese

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We hunted..... *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

Swan

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We hunted..... *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

CONTINUE TO PAGE 13, DUCKS

PAGE 13 – DUCKS

This page asks questions about your household's use of DUCKS during 2020. This includes all DUCKS your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE OR HUNT FOR ANY species of DUCK?

(check only ONE)

- ☐ NO..... → SKIP TO PAGE 15 (other birds)
- ☐ YES.....

In the questions below, we would like to know about the DUCKS you harvested, gave away, and got from others. **If you did not hunt for DUCKS, only answer questions about giving.**

SEASON DATES

SPRING: *April, May & June.*

SUMMER: *July & August.*

FALL: *September & October*

WINTER: *January, February March, 2020 and November, December, 2020.*

Mallard

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted.....** *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

Teal

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted.....** *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

Canvasback

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted.....** *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

Scaup

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted.....** *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

Goldeneye

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted.....** *if YES*

- ☐ We didn't harvest any.
- **A.** Number harvested in SPRING..... number
- **B.** Number harvested in SUMMER..... number
- **C.** Number harvested in FALL..... number
- **D.** Number harvested in WINTER..... number
- **E.** Number harvested *(unknown season)* ..... number

CONTINUE TO PAGE 14, DUCKS CONTINUED

PAGE 14 — DUCKS *(continued)*

This is a continuation of page 13 DUCKS, you can skip this page if you didn't try to harvest ducks and nobody gave you any.

Did you answer NO on the PREVIOUS PAGE? If so, proceed to page 14. SKIP TO PAGE 15 (other birds)

IF you responded YES on the previous page, please fill this out……

Don't forget to add species that were given to you, even if you did not eat those and gave them away.

SEASON DATES

SPRING: April, May & June.

SUMMER: July & August.

FALL: September & October

WINTER: January, February March, 2020 and November, December, 2020.

Examples of OTHER SPECIES

- Wigeon
- Long-tailed duck
- Harlequin duck
- Bufflehead
- Merganser
- Common eider
- King eider
- Steller's eider
- Black scoter
- Surf scoter
- White-winged scoter

Someone gave us ducks, but we don't know what kind.

Write "unknown" in one of the other species boxes provided, and mark the check-box for "someone gave you."

Other Species? ____ *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER…………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER…………………… number
- **E.** Number harvested *(unknown season)* …………… number

Other Species? ____ *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER…………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER…………………… number
- **E.** Number harvested *(unknown season)* …………… number

Other Species? ____ *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER…………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER…………………… number
- **E.** Number harvested *(unknown season)* …………… number

Other Species? ____ *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER…………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER…………………… number
- **E.** Number harvested *(unknown season)* …………… number

Other Species? ____ *(specify species)*

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER…………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER…………………… number
- **E.** Number harvested *(unknown season)* …………… number

CONTINUE TO PAGE 15, OTHER BIRDS

PAGE 15 — OTHER BIRDS

This page asks questions about your household's use of birds other than DUCKS, GEESE or SWANS during 2020. This includes all other types of birds your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE OR HUNT FOR ANY species of BIRD other than ducks, geese, or swans?

(check only ONE)

- ☐ NO…………………… } SKIP TO PAGE 16 (wild bird eggs)
- ☐ YES……………….. }

In the questions below, we would like to know about the other birds you harvested, gave away, and got from others. **If you did not hunt for other birds, only answer questions about giving.**

SEASON DATES

SPRING: April, May & June.

SUMMER: July & August.

FALL: September & October

WINTER: January, February March, 2020 and November, December, 2020.

Examples of OTHER SPECIES

- -Auklet
- -Puffin
- -Cormorant
- -Murre
- -Loon
- -Large gull
- -Black-legged kittiwake
- -Black oystercatcher

Ptarmigan

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER………………… number
- **E.** Number harvested *(unknown season)* …………… number

Other Species?

(specify species)

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER………………… number
- **E.** Number harvested *(unknown season)* …………… number

Other Species?

(specify species)

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER………………… number
- **E.** Number harvested *(unknown season)* …………… number

Other Species?

(specify species)

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER………………… number
- **E.** Number harvested *(unknown season)* …………… number

Other Species?

(specify species)

(check all that apply)

- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We hunted……………** *if YES*

☐ We didn't harvest any.

- **A.** Number harvested in SPRING…………………… number
- **B.** Number harvested in SUMMER………………… number
- **C.** Number harvested in FALL…………………… number
- **D.** Number harvested in WINTER………………… number
- **E.** Number harvested *(unknown season)* …………… number

CONTINUE TO PAGE 16, EGGS

PAGE 16 — WILD BIRD EGGS

This page asks questions about your household's use of WILD BIRD EGGS during 2020. This includes all types of WILD BIRD EGGS that your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE OR TRY TO HARVEST ANY type of WILD BIRD EGG?

(check only ONE)

☐ NO.................... } SKIP TO PAGE 17 (wild plants)

☐ YES.................. }

In the questions below, we would like to know about the WILD BIRD EGGS you harvested, gave away, and got from others. **If you did not try to harvest, only answer questions about giving.**

Examples of OTHER SPECIES
- -Black-legged kittiwake eggs
- -Tern eggs
- -Murre eggs
- -Duck eggs
- -Goose eggs
- -Unknown eggs

Large gull eggs

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → ***if YES***
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.................................. [number]

Oystercatcher eggs

☐ We didn't receive or try to harvest.

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → ***if YES***
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.................................. [number]

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → ***if YES***
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.................................. [number]

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → ***if YES***
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.................................. [number]

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → ***if YES***
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.................................. [gallons]

Other Species?

(specify species)

(check all that apply)
- ☐ **Someone gave to us**
- ☐ **We gave to others**
- ☐ **We tried to harvest** → ***if YES***
  - ☐ We didn't harvest any.
  - **A.** NUMBER harvested.................................. [gallons]

CONTINUE TO PAGE 17, WILD PLANTS

PAGE 17 – WILD PLANTS

This page asks questions about your household's use of WILD plants during 2020. This includes all types of WILD plants that your household harvested, gave away, or was given to you from January 1, 2020 - December 31, 2020.

During 2020, did you RECEIVE OR TRY TO HARVEST ANY type of WILD PLANT, BERRY, MUSHROOM or SEAWEED?

(check only ONE)

- ☐ NO..... → SKIP TO PAGE 18 (summary of harvests)
- ☐ YES.....

In the questions below, we would like to know about the WILD PLANTS you harvested, gave away, and got from others. **If you did not try to harvest, only answer questions about giving.**

Examples of wild plants to include

- Blueberries
- Cranberries
- Currants
- Salmonberries
- Mossberries
- Wild celery (pushki)
- Wild parsley (petrushky)
- Morel
- Beach greens
- Yarrow
- Fiddlehead ferns
- Fireweed

Berries (all kinds)

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest → *if YES*
  - ☐ We didn't harvest any.
  - **A.** Total GALLONS of berries harvested..... gallons

Wild plants (all kinds)

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest → *if YES*
  - ☐ We didn't harvest any.
  - **A.** Total GALLONS of wild plants harvested..... gallons

Mushrooms (all kinds)

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest → *if YES*
  - ☐ We didn't harvest any.
  - **A.** Total GALLONS of mushrooms harvested..... gallons

Seaweed

☐ We didn't receive or try to harvest.

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest → *if YES*
  - ☐ We didn't harvest any.
  - *(report seaweed in wet gallons)*
  - **A.** Total GALLONS of seaweed harvested..... gallons
  - **B.** Thinking about your total seaweed harvest, how many GALLONS of that total was used for fertilizer? gallons

Other Species?

(specify species)

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest → *if YES*
  - ☐ We didn't harvest any.
  - **A.** GALLONS harvested..... gallons

Other Species?

(specify species)

(check all that apply)

- ☐ Someone gave to us
- ☐ We gave to others
- ☐ We tried to harvest → *if YES*
  - ☐ We didn't harvest any.
  - **A.** GALLONS harvested..... gallons

CONTINUE TO PAGE 18, WILD FOOD ASSESSMENT

PAGE 18 – SUMMARY of WILD FOOD HARVESTS

Below are questions about your general use of wild foods from January 1, 2020 through December 31, 2020. This ends the portion of our survey about wild food harvests.

Please answer these questions to the best of your ability.

What if our household doesn't USUALLY use wild foods?

Mark "Don't use" in the first question, and proceed to the next page.

What is "use" of wild food?

Using is anything to do with a wild food. This includes eating the food, sharing with others, or making crafts with hide, pelt, bone or other parts of wild animals.

Was your use of WILD FOOD in 2020 less, about the same or more than in the past 5-years?

- ☐ LESS
- ☐ MORE
- ☐ SAME
- ☐ Don't use

If you said LESS or MORE, could you please explain?

In the past 10 years, have you noticed changes in availability or health of wild animals used for subsistence.

- ☐ YES
- ☐ NO
- ☐ Don't know

If you said yes, could you explain?

In the past 10 years, have you had to travel further to harvest wild foods?

- ☐ YES
- ☐ NO
- ☐ Don't know

If you said yes, could you tell us for which wild foods?

1.	2.	3.
4.	5.	6.
7.	8.	9.

In the past 10 years, have you noticed any changes in the times of year wild foods are available to harvest?

- ☐ YES
- ☐ NO
- ☐ Don't know

If you said yes, could you tell us for which wild foods?

1.	2.	3.
4.	5.	6.
7.	8.	9.

CONTINUE TO PAGE 19, EMPLOYMENT

PAGE 19 – EMPLOYMENT

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.

This information is essential to understanding all parts of the community economy. Many people use wages from jobs to support subsistence activities. Please tell us about the employment status of EACH PERSON in your household who was 16 or OLDER between January 1, 2020 and December 31, 2020.

You don't have to answer any of these questions. If you do answer them, all of your answers **will be confidential**.

What is "Work Schedule"?

FT – is Full Time employment of 30 or more hours per week.

PT – is Part Time employment of 1-29 hours per week.

OTH – includes shift schedules and irregular or on-call jobs.

NOTE: Gross Earnings

Gross earnings are your earnings before you paid taxes.

DON'T FORGET!

these jobs are important!

COMMERCIAL FISHING

ARTS & CRAFTS

TRAPPING

What if I am a home-maker?

Mark "Not Employed" and write "HOME MAKER" in the space for Job Type.

What if I am self-employed?

Write 'Self' for employer, and describe the type of work you do.

Household Head 1

- ☐ Employed
- ☐ Retired
- ☐ Student
- ☐ Not Employed

	Employer (who employes you?)	Job Type (what do you do?)	Number of Months Worked (# months)	Work Schedule (see instructions to the left) (circle one)	Gross Earnings ($ earned)
Job #1				FT PT OTH	$
Job #2				FT PT OTH	$
Job #3				FT PT OTH	$
Job #4				FT PT OTH	$

Household Head 2

- ☐ Employed
- ☐ Retired
- ☐ Student
- ☐ Not Employed

	Employer (who employes you?)	Job Type (what do you do?)	Months Worked (# months)	Work Schedule (circle one)	Gross Earnings ($ earned)
Job #1				FT PT OTH	$
Job #2				FT PT OTH	$
Job #3				FT PT OTH	$
Job #4				FT PT OTH	$

Person 3 *(from page 1)*

- ☐ Employed
- ☐ Retired
- ☐ Student
- ☐ Not Employed

	Employer (who employes you?)	Job Type (what do you do?)	Months Worked (# months)	Work Schedule (circle one)	Gross Earnings ($ earned)
Job #1				FT PT OTH	$
Job #2				FT PT OTH	$
Job #3				FT PT OTH	$
Job #4				FT PT OTH	$

Person 4 *(from page 1)*

- ☐ Employed
- ☐ Retired
- ☐ Student
- ☐ Not Employed

	Employer (who employes you?)	Job Type (what do you do?)	Months Worked (# months)	Work Schedule (circle one)	Gross Earnings ($ earned)
Job #1				FT PT OTH	$
Job #2				FT PT OTH	$
Job #3				FT PT OTH	$
Job #4				FT PT OTH	$

Person 5 *(from page 1)*

- ☐ Employed
- ☐ Retired
- ☐ Student
- ☐ Not Employed

	Employer (who employes you?)	Job Type (what do you do?)	Months Worked (# months)	Work Schedule (circle one)	Gross Earnings ($ earned)
Job #1				FT PT OTH	$
Job #2				FT PT OTH	$
Job #3				FT PT OTH	$
Job #4				FT PT OTH	$

Person 6 *(from page 1)*

- ☐ Employed
- ☐ Retired
- ☐ Student
- ☐ Not Employed

	Employer (who employes you?)	Job Type (what do you do?)	Months Worked (# months)	Work Schedule (circle one)	Gross Earnings ($ earned)
Job #1				FT PT OTH	$
Job #2				FT PT OTH	$
Job #3				FT PT OTH	$
Job #4				FT PT OTH	$

CONTINUE TO PAGE 20, OTHER SOURCES OF INCOME

PAGE 20 – OTHER SOURCES OF INCOME

The next few pages ask about sources of income other than employment. We ask about these things because we are trying to understand all parts of the community economy. Many people use this income to support subsistence activities.

During 2020, please tell us about the total amounts of OTHER TYPES of income all members of the household received. This information is essential to understanding all parts of the community economy. Many people use income from all sources to support subsistence activities.

You don't have to answer any of these questions. If you do answer them, all of your answers **will be confidential**.

DON'T FORGET!
The 2020 PFD Amount was:
$992 / Person issued in JULY

		Did anyone in your household receive this type of income in 2020? (check yes if anyone received)		Total amount your household received from this source in 2020. (Total household income)
Dividends	Alaska Permanent Fund dividends	☐ Yes	*... If YES, then ...*	$
	Native corporation dividends	☐ Yes	*... If YES, then ...*	$
Employment related	Unemployment	☐ Yes	*... If YES, then ...*	$
	Worker's Comp	☐ Yes	*... If YES, then ...*	$
	Social Security	☐ Yes	*... If YES, then ...*	$
	Pension & Retirement	☐ Yes	*... If YES, then ...*	$
	Disability	☐ Yes	*... If YES, then ...*	$
	Veteran's Assistance	☐ Yes	*... If YES, then ...*	$
Entitlements	SNAP Benefits	☐ Yes	*... If YES, then ...*	$
	Adult Public Assistance	☐ Yes	*... If YES, then ...*	$
	Supplimental Security Income (SSI)	☐ Yes	*... If YES, then ...*	$
State Benefits	Heating Assistance	☐ Yes	*... If YES, then ...*	$
	Alaska Senior Benefits (Longevity)	☐ Yes	*... If YES, then ...*	$
Family & Child	TANF (Temporary assistance for needy families)	☐ Yes	*... If YES, then ...*	$
	Child Support	☐ Yes	*... If YES, then ...*	$
	Foster Care	☐ Yes	*... If YES, then ...*	$
OTHER	Fuel vouchers	☐ Yes	*... If YES, then ...*	$
	Meeting Honoraria	☐ Yes	*... If YES, then ...*	$
	OTHER _____	☐ Yes	*... If YES, then ...*	$
	OTHER _____	☐ Yes	*... If YES, then ...*	$

Examples of OTHER SOURCES of income.
- Rental properties
- Dividends from stocks
- Fishing permit revenues
- Property sales
- Per diem
- Stimulus check

CONTINUE TO PAGE 21, FOOD SECURITY

PAGE 21 – FOOD SECURITY

The questions on this page have been asked all over the United States to find out if people have enough to eat. We would like to know if people in your community have enough to eat. This page includes both wild food and store-bought food.

You don't have to answer any of these questions. If you do answer them, all of your answers **will be confidential**.

Which of these 3 statements best describes the food eaten in your household between January 1, 2020 and December 31, 2020?

(check only ONE)

Statement 1 —We had enough of the kinds of food we wanted to eat…..... ☐ SKIP TO PAGE 23 (summary & final questions)

Statement 2 —We had enough food, but not always the KIND of food we wanted to eat…... ☐

Statement 3 —Sometimes, or often, we did NOT HAVE ENOUGH food to eat…..... ☐ Continue to statement 4

For each of the following statements, please indicate whether these were TRUE for your household during 2020.

STATEMENT 4. We WORRIED that our household would run out of food before we could get more…..... ☐ **TRUE**

If TRUE, did this happen because your household could not get enough WILD FOOD, STORE-BOUGHT food or BOTH KINDS of food?..... ☐ Wild food ☐ Store-bought food ☐ Both

If you said TRUE to the statement 4 above, please tell us which months this happened by checking the boxes below.
(check all months that apply)

January	February	March	April	May	June	July	August	September	October	November	December
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

What do we mean by 'resources'

Resources are things like, money, nets, ammunition, gas, boats, or even other people to help.

STATEMENT 5. We could not get the kinds of food we wanted to eat because of a LACK OF RESOURCES…..... ☐ **TRUE**

If TRUE, did this happen because your household could not get enough WILD FOOD, STORE-BOUGHT food or BOTH KINDS of food?..... ☐ Wild food ☐ Store-bought food ☐ Both

If you said TRUE to the statement 5 above, please tell us which months this happened by checking the boxes below.
(check all months that apply)

January	February	March	April	May	June	July	August	September	October	November	December
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

STATEMENT 6. The food we had JUST DID NOT LAST, and we could not get more…..... ☐ **TRUE**

If TRUE, did this happen because your household could not get enough WILD FOOD, STORE-BOUGHT food or BOTH KINDS of food?..... ☐ Wild food ☐ Store-bought food ☐ Both

If you said TRUE to the statement 5 above, please tell us which months this happened by checking the boxes below.
(check all months that apply)

January	February	March	April	May	June	July	August	September	October	November	December
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

CONTINUE TO PAGE 22, FOOD SECURITY CONTINUED

PAGE 22 – FOOD SECURITY (*continued*)

Continued from page 21.

You don't have to answer any of these questions. If you do answer them, all of your answers will be confidential.

Did you respond TRUE to Statements 4, 5, OR 6 on the last page?

- ☐ NO — SKIP to page PAGE 23
- ☐ YES — *continue to questions below*

In the last 12 months, did you or other adults in your household ever CUT THE SIZE OF YOUR MEALS OR SKIP MEALS because the household could not get the food that was needed?.....

- ☐ NO
- ☐ YES

If you said YES to the question above, please tell us which months this happened by checking the boxes below.
(check all months that apply)

January	February	March	April	May	June	July	August	September	October	November	December
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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

- ☐ NO
- ☐ YES

In the past 12 months, were you or other adults in your household ever HUNGRY BUT DID NOT EAT because there was not enough food?.....

- ☐ NO
- ☐ YES

In the last 12 months, did adults in the household LOSE WEIGHT because there was not enough food?.....

- ☐ NO
- ☐ YES

In the past 12 months, did you or other adults in your household ever NOT EAT FOR A WHOLE DAY because there was not enough food?.....

- ☐ NO
- ☐ YES

If you said YES to the question above, please tell us which months this happened by checking the boxes below.
(check all months that apply)

January	February	March	April	May	June	July	August	September	October	November	December
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

CONTINUE TO PAGE 23, SUMMARY & FINAL QUESTIONS

PAGE 23 – SUMMARY & FINAL QUESTIONS

Please answer these questions to the best of your ability.

Please answer the summary questions to the best of your ability. If you don't know, leave them blank.

Are you aware that commercial pelagic trawling has been closed in all of Unalaska Bay?

- ☐ YES
- ☐ NO

Has the closure of commercial trawling affected your access to salmon and halibut?

- ☐ YES
- ☐ NO

Describe how your access to SALMON and HALIBUT has been affected.

Have you noticed any environmental changes in the last ten years that have impacted your access to salmon?

- ☐ YES
- ☐ NO

What KIND of changes did you see?

Do you believe current Fish and Game regulations provide adequate opportunity to get the wild resources you need for home use?

- ☐ YES
- ☐ NO

If you said NO, could you please explain?

Did the COVID-19 pandemic impact your SUBSISTENCE activities during 2020?

- ☐ YES
- ☐ NO

If you said YES, could you please explain?

Do you have any final comments or remarks about subsistence that you would lke to share with the Alaska Department of Fish and Game?

Are you willing to answer follow-up question about your responses?

- ☐ YES
- ☐ NO

Please provide a NAME and TELEPHONE number

THIS COMPLETES OUR SURVEY - THANK YOU!!

APPENDIX E—LETTER PROVIDED IN SURVEY PACKETS DELIVERED TO HOUSEHOLDS IN UNALASKA

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Fish and Game
Division of Subsistence

333 Raspberry Rd
Anchorage, AK 99518
Main: 907.267.2353
Fax: 907.267.2450

January 25, 2021

Dear Unalaska Resident,

You are receiving this survey as part of an effort to update community subsistence harvest and use information for Unalaska. The project directly addresses concerns expressed by Unalaska residents regarding the lack of up-to-date household harvest data.

Reliable and current harvest assessments are essential to ensure that management policies are providing adequate and reasonable opportunity for subsistence. The most recent comprehensive harvest surveys for Unalaska were conducted 27 years ago. This study will compare and contrast harvests today with those of the past and document local concerns regarding the current and future availability of wild foods. **Even if you do not harvest or use wild resources, your response is important!** The survey takes 5-10 minutes if you do not use many wild resources, and longer if you are an active harvester. Please enjoy the enclosed coffee while completing the survey! All data collected throughout the study are confidential, and participation in the survey is voluntary.

Thanks to a generous donation, we are happy to offer a raffle drawing with five $200 cash prizes and one $1,000 grand prize. Any household that returns a completed survey will be eligible to enter the drawing. Please complete the green entry form and return it in the enclosed envelope with your survey (your entry ticket will be separated from your survey, and no individual identifying information will be associated with survey data).

Once your survey is complete, please seal it in the enclosed envelope and place the envelope back in the waterproof bag to leave outside on a designated pickup day. You can also return your survey via mail using the prepaid postage on the enclosed envelope. These methods are being used to avoid unnecessary contact during the COVID-19 pandemic. **Surveys must be returned by February 22 to be eligible for raffle drawings.**

This project is funded by the U.S. Fish and Wildlife Service's Fisheries Research Monitoring Program and conducted in collaboration with the Qawalangin Tribe of Unalaska. If you have questions about this work, contact Jackie Keating at jacqueline.keating@alaska.gov or (907) 267-2368.

We sincerely thank you for your time and participation!

Survey Pickup Days

Local research assistants will be picking up surveys outside on the following days from 10am – 5pm:

Wednesday February 3rd
Friday February 5th
Monday February 8th
Wednesday February 17th

For additional return options, call (907) 267-2368.

Division of Subsistence Staff
Alaska Department of Fish and Game

APPENDIX F—PHONE SURVEY ADMINISTRATION INSTRUCTIONS

Guidelines for Unalaska Phone Surveys

Hi, this is _____ from the Alaska Department of Fish and Game, how are you?

I'm calling about the subsistence harvest surveys that were delivered last month. We are making phone calls to give people one more chance to enter the raffle drawing for five $200 prizes and the $1,000 grand prize. Did anyone is your household complete a survey yet?

Do you have a few minutes to do yours over the phone now? If your household does not harvest a lot, it should only take about 5 minutes.

If the person doesn't have time then they ask when to call back, and make sure to do so. If they say that they have time to do the survey, then the surveyors asks "Are you the best person to talk to about the fishing for this household?" If the person answers yes then the survey moves forward. If no, they ask to talk to the other person or when to call back.

Stress that they survey is voluntary and anonymous. Raffle information will be kept separate from the survey, so there is no personal identifying information associated with the survey data. We are not law enforcement, and are more concerned with getting a true idea of the amounts people need to harvest to meet their needs.

*After completing survey, make sure to

(1) ask for contact info for the raffle entry, and

(2) write the HHID number on the front page of the survey.

Common Q&As

How will the raffle be announced?

At the end of March, the six winning tickets will be drawn live on KUCB. Winners will then be contacted individually to arrange their prizes.

Why is this information needed?

Data collected from these surveys inform federal and state regulations, document local concerns about resources and regulations, and ensure there continue to be reasonable opportunities for subsistence.

Why do you need household and income information?

The surveys include more than just harvest numbers, they document resource sharing, the role income plays in ability to harvest, and household food security. The goal of the research is to create a holistic understanding of subsistence activities in Unalaska.

When will results be available?

Preliminary findings will be presented at a community data review meeting next winter. The final report and a project summary will be distributed about the data are approved.

APPENDIX G—KEY RESPONDENT PROTOCOL

UNALASKA SUBSISTENCE SALMON
KEY RESPONDENT INTERVIEW PROTOCOL

Interviewer – This is a general list of questions. The interview can be as open-ended as you wish. Some of the questions will likely be answered in the context of asking other questions. The critical task is to document perceived changes in subsistence salmon participation, use, and abundance. The rest depend on how the interview is going. Feel free to reword the questions. These interviews can be taped or you can just take notes, depending on how comfortable you and the interviewee feel with each method.

First I will ask a few questions about your personal background. Then we are going to discuss your observations of salmon and subsistence salmon fishing. **Your answers to these questions are anonymous. If we use any quotes citing your name we will ask your permission**

DEMOGRAPHICS

*Date

*Researcher

*Name

*Age

*Parents Residence when Born

*Years in Community

SUBSISTENCE FISHING LIFE HISTORY AND EXPERIENCE

*How old were you when you first started salmon fishing for subsistence?

*Who taught you how to fish for salmon?

SUBSISTENCE FISHING SEASONS, LOCATIONS, ACCESS, AND EFFORT

*Which resources do you primarily harvest throughout the year? What are the seasons? (Seasonal round)

*What type of salmon do you normally get for subsistence? What is their local name?

*Do you also subsistence fish for other types of salmon? What do you call them?

*What time of the year do the different salmon species run?

*What times of the year do you fish for salmon?

*What are the names of the rivers the salmon run in? What species, by river?

*At what locations do you subsistence fish for salmon?

*Are the fishing locations different depending on the species?

*Have your salmon fishing locations changed over time? Why?

*How do you fish for salmon? What gear do you use?

*Do you use different gear to catch specific types of salmon?

*Have your salmon fishing techniques changed over time? How?

ABUNDANCE AND MANGEMENT

*Do you think salmon populations have changed? How? Are they more abundant or less abundant?

*Which salmon populations have changed?

*What about other species of salmon: have they changed?

*Are the changes you have observed isolated to specific rivers? Or is it more general?

*Have you observed any effects to salmon resulting from the closure of the commercial trawl fishery in Unalaska Bay in 2016?

*If yes, please explain what you have observed in detail:

*Have you ever participated in the Alaska fisheries regulatory process? What is your experience? Is it helpful?

*Do you participate in the subsistence salmon permit program?

*Do you normally turn-in your permit at the end of the season?

*Can you suggest any reasons why subsistence salmon permit returns from Unalaska are often low?

*Can you offer any suggestions to managers about improving the permit program and/or salmon fishery?

USING AND SHARING SALMON

*Do you share the subsistence salmon you catch with other households?

*Do other households share their subsistence salmon with you?

*Are there sharing networks between Unalaska households and households in other communities?

*How is salmon and other subsistence food shared between communities?

*How much does the required shipping or transportation cost?

*What type of social relationships surround the sharing of subsistence foods?

*Does sharing subsistence foods help you build and maintain relationships?

MARINE HABITAT, ECOLOGY, ABUNDANCE, AND HEALTH

*Where is the best salmon habitat located currently?

*Has salmon habitat change occurred? When? Where?

*Has the rate of change been slow or rapid? How many years/decades have you witnessed the changes taking place?

*Have certain habitat changes increased or decreased salmon abundance? Where? When?

*What are your observations concerning the health of salmon and salmon flesh?

*What have you observed regarding the health of other marine resource populations and their habitats?

*Have you noticed changes in the abundance of other resources?

*Has the size of some marine mammals, fish, or shellfish changed?

*What are your observations concerning the health of marine resources such as seals, sea lions, halibut, flounder, clams, & bidarkis?

*Do you have any observations to share about the environmental health of the water in Unalaska Bay?

*Do you have any concerns about contamination? If so, does this affect where you harvest resources?

*How does environmental change relate to fisherman's behavior?

*Can you discuss any impacts you have observed from the commercial fishing industry, including processing & by-catch?

WEATHER AND CLIMATE

*Have you observed any changes in the weather or climate over the years? What, when and where?

*Have you observed any changes in marine water or freshwater temperatures?

OTHER WILDLIFE

*Do you have any other observations to share concerning subsistence resources generally, including birds and land mammals?

RESILIENCE AND ADAPTATION

*How have any of the changes you've described influenced your behavior as a subsistence fisher? How have you adapted?

*Have you redirected your efforts towards pursuing different resources because of any of these changes?

*Are younger generations continuing to participate in harvesting and processing subsistence foods?

*Is there anything else you would like to tell us about subsistence strategies, traditional practices and customs, or your fishing experiences?

THANK YOU FOR YOUR TIME!

APPENDIX H—PARTICIPANT OBSERVATION GUIDE

UNALASKA SUBSISTENCE SALMON PARTICIPANT OBSERVATION GUIDE

Participant observer – This is a guide for what to record while in the field with your respondents. Participant observation should be conducted with families of similar backgrounds and experience to those selected for Key Respondent Interviews. The goal is to participate in subsistence salmon fishing with residents and obtain the information needs listed below. Take notes and photographs when pertinent. It is also possible to obtain high quality Key Respondent Interview information while conducting participant observation. For this reason, it is a good idea to also have a voice recording device on hand and be prepared to ask permission to record conversations with respondents while in the field.

If not obtained previously via completion of a Key Respondent Interview, first obtain demographic information for the respondents involved in your participant observation.

DEMOGRAPHICS

*Date

*Researcher

*Name

*Age

*Parents Residence when Born

*Years in Community

TOPICS AND ACTIVITIES OF FOCUS DURING PARTICIPANT OBSERVATION

* Transport type used and distances traveled

* Fishing locations utilized

* Gear used

* Species targeted and caught

* Observations on run-timing for salmon species

* Preservation and processing following harvest

* Note respondent ideas, values, and opinions as they occur during fishing

* Identify and note any social and cultural practices associated with salmon fishing

* Make in-field assessment of possible changes associated with the recent exclusion of commercial trawl fishers from Unalaska Bay

* Note any other expressed or observed concerns related to local commercial fishing industry impacts

* Note any expressed or observed environmental concerns, especially any identified in the field by participants, including:

water quality
water temperatures
weather
health of harvested salmon
health of other subsistence resources observed and/or harvested

APPENDIX I—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 gallons of Pacific herring, the quantity would be multiplied by the appropriate conversion factor (in this case 6.0) to show a harvest of 18 lb of Pacific herring.

Resource name	Reported units	Conversion factor
Chum salmon	Individual	5.215
Chum salmon [CF retention]	Individual	5.215
Coho salmon	Individual	5.017
Coho salmon [CF retention]	Individual	5.017
Chinook salmon	Individual	6.111
Chinook salmon [CF retention]	Individual	6.111
Pink salmon	Individual	2.389
Pink salmon [CF retention]	Individual	2.389
Sockeye salmon	Individual	3.865
Sockeye salmon [CF retention]	Individual	3.865
Pacific herring	Individual	0.180
Pacific herring	Gallons	6.000
Pacific herring [CF retention]	Gallons	6.000
Pacific (gray) cod	Individual	3.200
Pacific (gray) cod [CF retention]	Individual	3.200
Walleye pollock (whiting)	Individual	1.400
Walleye pollock (whiting) [CF retention]	Individual	1.400
Arrowtooth flounder (turbot)	Individual	3.000
Greenlings	Individual	1.000
Greenlings [CF retention]	Individual	1.000
Pacific halibut	Individual	18.500
Pacific halibut [CF retention]	Pounds	1.000
Pacific halibut	Pounds	1.000
Black rockfish	Individual	1.500
Black rockfish [CF retention]	Individual	1.500
Unspecified rockfishes	Individual	1.500
Sablefish (black cod)	Individual	3.100
Salmon shark	Individual	9.000
Rock sole	Individual	1.000
Dolly Varden	Individual	1.400
Dolly Varden	Individual	1.400
Rainbow trout	Individual	0.700
Brown bear	Individual	141.000
Caribou	Individual	130.000
Moose	Individual	450.000

-continued-

Resource name	Reported units	Conversion factor
Red fox	Individual	0.000
Alaska hare	Individual	5.600
Arctic ground (parka) squirrel	Individual	0.500
Northern fur seal	Individual	19.700
Harbor seal	Individual	56.000
Sea otter	Individual	0.000
Steller sea lion	Individual	200.000
Canvasback	Individual	1.740
Gadwall	Individual	1.230
Goldeneyes	Individual	1.270
Mallard	Individual	1.610
Common merganser	Individual	2.110
Red-breasted merganser	Individual	1.360
Scaups	Individual	1.350
Unspecified scoters	Individual	1.460
Northern shoveler	Individual	0.860
Teals	Individual	0.470
Brant	Individual	1.890
Canada/cackling geese	Individual	2.830
Emperor goose	Individual	3.080
Snow goose	Individual	2.800
Swans	Individual	10.980
Wilson’s snipe	Individual	0.140
Ptarmigan	Individual	0.770
Black oystercatcher eggs	Individual	0.101
Large gull eggs	Individual	0.214
Red (large) chiton	Gallons	3.000
Black (small) chiton	Gallons	4.000
Butter clam	Individual	0.230
Butter clam	Gallons	3.000
Pacific littleneck clam (steamers)	Gallons	3.000
Razor clam	Individual	0.230
Razor clam	Gallons	3.000
Dungeness crab	Individual	0.700
Dungeness crab [CF retention]	Individual	0.700
King crab	Individual	2.300
King crab [CF retention]	Individual	2.300
King crab	Pounds	1.000
Tanner crab	Individual	0.400
Tanner crab [CF retention]	Individual	0.400

-continued-

Resource name	Reported units	Conversion factor
Limpet	Gallons	0.153
Blue mussel	Gallons	1.500
Octopus	Individual	4.000
Sea urchins	Gallons	0.500
Shrimps	Pounds	1.000
Berries	Gallons	4.000
Plants and greens	Gallons	1.000
Mushrooms	Gallons	1.000
Seaweed	Gallons	4.000

APPENDIX J—KEY RESPONDENT INTERVIEW CODEBOOK

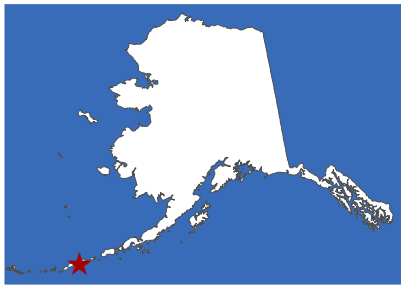
Unalaska Comprehensives – Code Book

Nodes

Name	Description
Abundance and Management	Discussions related to observed changes in the abundance of subsistence resources and related management issues
Changes in fish abundance	Comments related to observed changes in abundance of salmon and nonsalmon fish
Changes related to specific rivers or areas	Comments related to observed changes in abundance of fish in specific river systems
Effects of 2016 trawl fishery closure	Comments related to observed effects of the 2016 trawl fishery closure on abundance of local fish
Have salmon populations changed	Comments related to general observations of changes in salmon populations
Have you participated in the regulatory process	Comments related to respondents' participation in state or federal regulatory processes
Participation in permit program	Comments related to the state subsistence salmon permit program
Reasons for low permit returns	Suggestions for causes of low permit returns in Unalaska
Suggestions for improving permit returns	Suggestions for solutions to low permit returns in Unalaska
Comments on other wildlife	Comments related to general observations of changes in other local wildlife populations
Marine Habitat, Ecology, and Health	Discussions related to local habitat and environmental health
Changes in health of other marine resources and habitat	Comments related to observed changes in the health of other marine resources and local habitat
Changes in salmon habitat	Comments related to observed changes in local salmon habitat
Changes in marine mammals, fish, and shellfish	Comments related to observed changes in the size and quality of marine mammals, fish, and shellfish
Concerns about contamination	Comments related to general concerns about contamination related to subsistence resource harvests
Environmental health of waters in Unalaska Bay	Comments related to specific concerns about the waters of Unalaska Bay
Health of other marine resources	Comments related to general changes in the health of other marine resources
Impacts of commercial fishing industry	Comments related to observed impacts of the commercial fishing industry on local waters and marine resources
Impacts of environmental changes on fishing behavior	Comments related to reported changes in fishing behavior due to environmental changes
Locations of best salmon habitat	Comments related to descriptions of best local salmon habitat

Name	Description
Observations on the health of salmon	Comments related to observed changes in the general health of local salmon populations
Rate of change in habitat	Comments related to the rate of change in local salmon habitat
Resilience and Adaptations	Discussions related to resilience of subsistence ways of life, and adaptations to changing physical and social environments
Have changes impacted subsistence fishing behavior	Comments related to environmental and resource abundance changes, and the impact of subsistence fishing practices
Redirecting efforts to other resources due to changes	Comments related to redirecting fishing efforts due to environmental and abundance changes
Subsistence and younger generations	Comments related to younger generations' participation in subsistence practices
Subsistence Fishing Life History and Experience	Discussions related to subsistence fishing life history and experience
Age started fishing	Comments related to the age that respondents started fishing
Who taught you how to fish	Comments related to how respondents learned to fish
Subsistence Fishing Seasons, Locations, Access, and Effort	Discussions on subsistence fishing seasons, primary locations, methods of access, and effort
Fishing methods and gear	Comments related to methods of harvesting salmon and other resources
Have your salmon fishing locations changed over time	Comments related to how salmon fishing locations have changed over time
Local Names for Salmon	Comments related to local names for salmon species
Local rivers and species by rivers	Comments related to local river systems and salmon species
Primary fishing locations	Comments related to primary subsistence salmon fishing locations
Seasonal Round	Comments related to seasonal round
Time of year for runs and fishing	Comments related to time of year for salmon returns and fishing
Using and Sharing Salmon	Discussions related to the use and sharing of salmon
Are there sharing networks between Unalaska households and other communities	Comments related to sharing networks between Unalaska households and other communities
Do you share with other households	Comments related to sharing salmon with other local households
Types of social relationships surrounding subsistence foods	Comments related to the types of social relationships surrounding the use and sharing of subsistence foods
Weather and Climate	Discussions related to observations of local weather and climate
Changes in water temperatures	Comments related to observed changes in water temperatures
Changes in weather and climate	Comments related to observed changes in weather and climate

APPENDIX K—PROJECT RESULTS SUMMARY HANDOUT



COMMUNITY SUMMARY - Technical Paper No. 491

Unalaska

The Harvest and Use of Wild Resources, Unalaska, Alaska, 2020. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 491. Published 2022. By Jacqueline M. Keating, Lauren A. Sill, and David Koster.

Study Overview

Household surveys were conducted in spring 2021 to record harvests and uses of wild resources by households in Unalaska in the 2020 calendar year. Due to the COVID-19 pandemic, Division of Subsistence researchers employed novel survey methods to administer surveys remotely. Eleven percent of households (114) returned a survey during the survey period. Researchers engaged in participant observation with Unalaska fishers during the salmon harvest season in 2022 and conducted in-depth interviews with residents who are knowledgeable about subsistence practices in fall 2021. Project results will help ensure the sustainable management of local resources and continued provision of reasonable opportunity to harvest those resources. The research was funded by the U.S. Fish and Wildlife Service, Office of Subsistence Management.

> *"I just love the fact that it's a small town, so everybody's kind of sort of knows each other, and certainly helps each other and works together. And yet we're really multiethnic, really multicultural. And you know all the cultures have married into each other, so you have, you know, all these amazing potlucks. You know, before COVID, you know, you'd have some festival or potluck and it's like, oh my God there's food from all over the world in this little town."*

Where to find the report?

The full report is available online:
www.adfg.alaska.gov/techpap/TP491.pdf

Paper copies available at
Qawalangin Tribe of Unalaska
and City of Unalaska

Survey Findings Highlights

During the study year, most households relied on wild resources—obtained through sharing, hunting, fishing, or wild food gathering—for nutrition and to support their way of life.

- Unalaskans harvested more than 160,000 lb of wild resources over the course of the study year.
- An estimated 80 lb per capita of wild resources were harvested.
- Households harvested more fish than any other resource.
- Eighty-five percent of households used any wild resource and nearly three-quarters of households successfully harvested a wild resource.
- Salmon, nonsalmon fish, marine invertebrates, and plants and berries were used, harvested, and shared by the most households (Figure 1). Households also used and shared large and small game, birds and eggs, and marine mammals (not shown on the figure).

Harvest Composition

- Almost all of the harvest weight was composed of resources harvested from the marine environment, reflecting the lack of large game on Unalaska and Amaknak islands (Figure 2).
- Salmon composed 42% of the harvest weight: sockeye salmon and coho salmon were the main salmon species harvested, followed by pink, Chinook, and chum salmon (Figure 3).
- In numbers of fish, on average, households harvested about five coho salmon a year, nine sockeye salmon, three pink salmon, and smaller amounts of chum and Chinook salmon.
- Nonsalmon fish composed 39% of the harvest weight: mostly Pacific halibut were harvested.
- Other top nonsalmon fish harvested included Pacific cod, black rockfish, and Dolly Varden.

> *"But you know, just a lot of our comfort food and traditional food and potluck food is just fish, you know? Just, you know, whenever people get together for good times, and sad, you know, people always bring fish. It's just that way, you know? So, fish pie, you know, is just always a—or fish patties, you know—those are favorites. Or fish spread."*

Photo by Lauren A. Sill, ADF&G

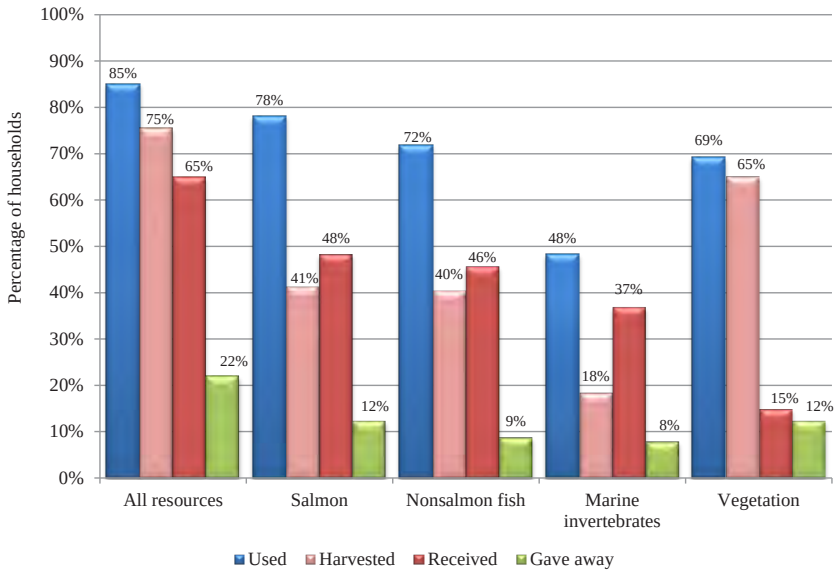
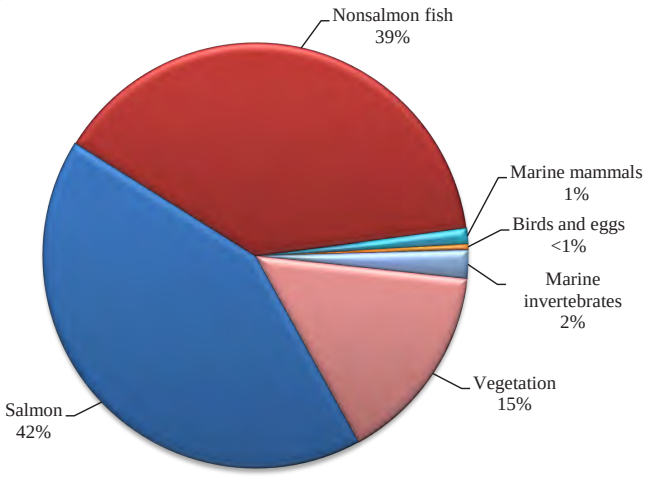


Figure 1.–Harvest and use of select resource categories, Unalaska, 2020.



Note Categories having 0 lb of usable weight are not included.

Figure 2.–Composition of harvest in pounds usable weight, by resource category, Unalaska, 2020.

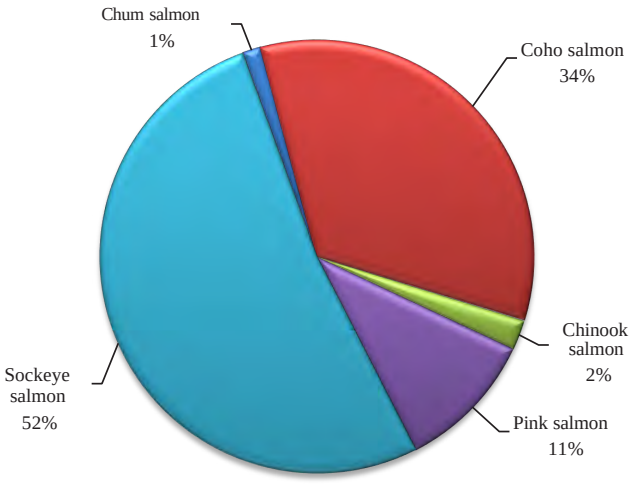
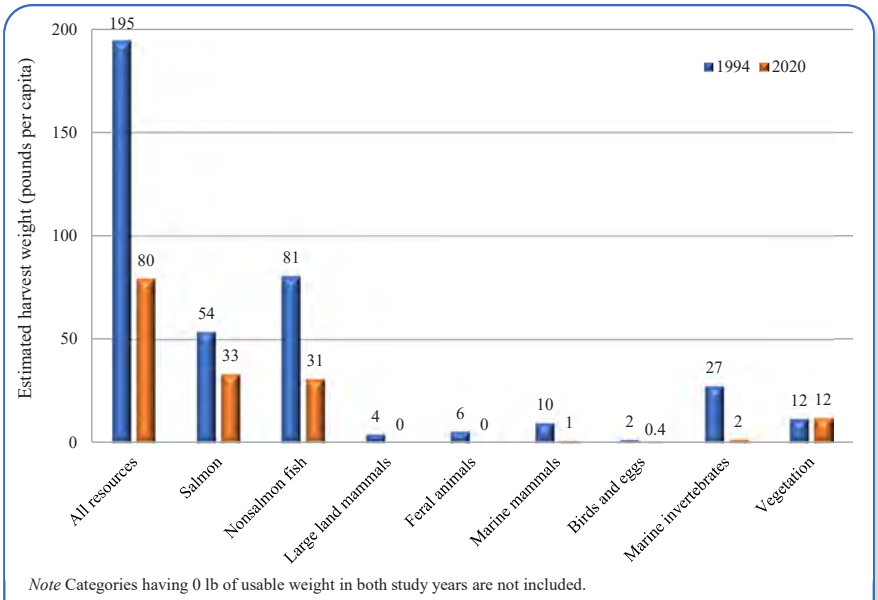


Figure 3.–Composition of salmon harvest in pounds usable weight, Unalaska, 2020.



Note Categories having 0 lb of usable weight in both study years are not included.

Figure 4.–Harvest and use of select resource categories, Unalaska, 1994 and 2020.

> ***"You could say those things have kind of dropped off. I would say the last 30 or, 20, 30 years. From where they were. I mean, yeah, the abundance is not there that I recall when I first showed up here. Like, um, the king crab, subsistence king crab fishing was a big deal when I first got here. And now I hardly hear about anybody getting king crab."***

Harvest Changes

ADF&G researchers conducted a similar study estimating subsistence harvests in Unalaska in 1994. The per capita subsistence harvest in 1994 was more than double the estimated harvest in 2020 (Figure 4). The biggest decrease was in the harvest of nonsalmon fish, especially Pacific halibut and cod. During interviews, respondents discussed challenges with accessing Pacific halibut in local waters. Marine invertebrate harvests also dramatically decreased, from nearly 30 lb per person in 1994 to not quite 2 lb per person in 2020. The majority of the shellfish harvest in 1994 comprised Dungeness, king, and Tanner crabs. By 2020, harvests of these species were nearly nonexistent. During interviews, researchers heard about declines in the population of crabs and how much more abundant crabs had been in the past.

Acknowledgments

This research was possible due to the efforts and guidance of the Qawalangin Tribe of Unalaska. Staff especially thank Chandra Poe, Chris Price, and Kate Arduser, who were instrumental in designing the pilot self-administered survey instrument. Dozens of community and agency partners took the time to provide meaningful feedback on the draft survey tool, which was critical to advancing our research methods. Survey deliveries simply would not have happened without local research assistants Victor Fisher and Robin Stepetin. Local ADF&G biologists Miranda Westphal and Rachel Alinsunurin provided guidance and support throughout project planning and fieldwork. Finally, we acknowledge and thank all the residents of Unalaska who completed a survey, participated in an interview, or allowed staff to participate in their subsistence harvesting activities. We learned a great deal from all of you, and hope this report reflects the depth of community and rich subsistence ways of life that the research team experienced in Unalaska.

Photo by Jacqueline M. Keating, ADF&G

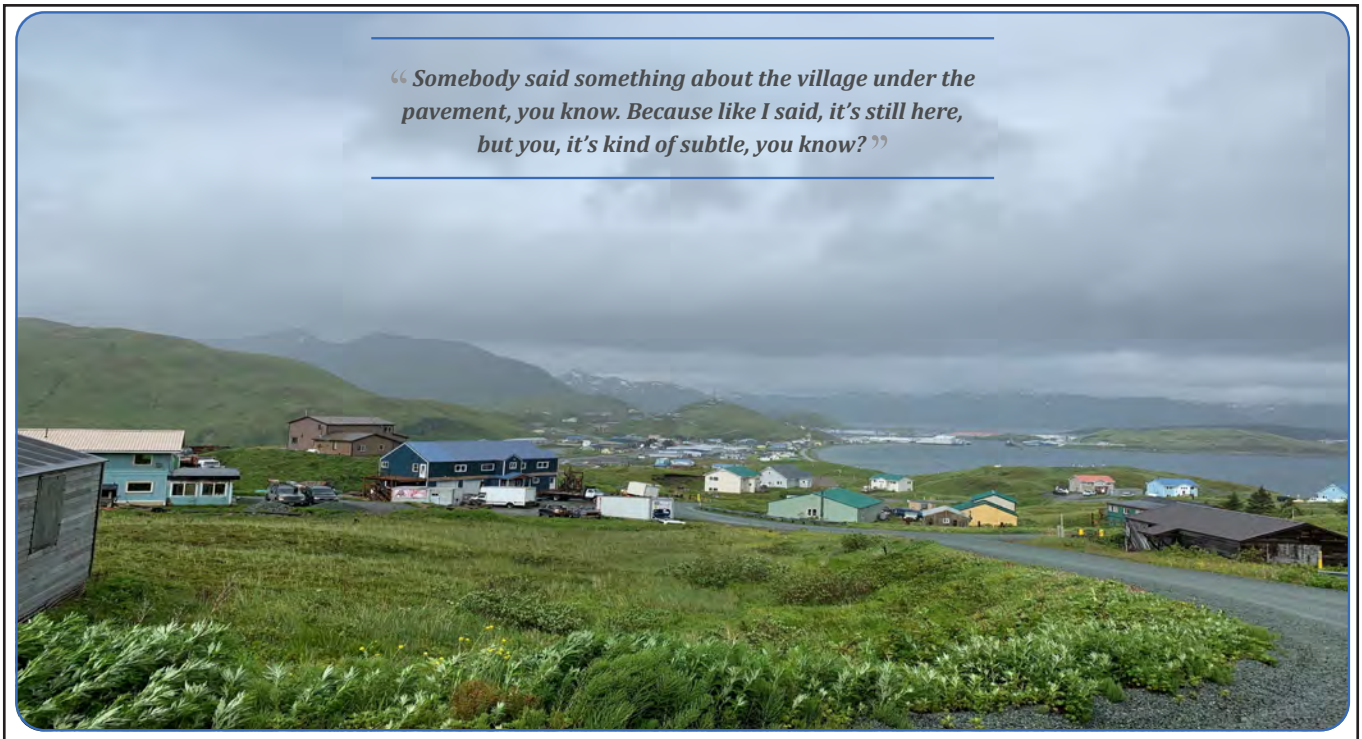


Photo by Lauren A. Sill, ADF&G

Photo by Jacqueline M. Keating, ADF&G

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