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by

Alaska Department of Fish and Game

2003

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

SPECIAL PUBLICATION NO. SP2003-001

BRIEFING MATERIALS PREPARED FOR THE ALASKA BOARD OF FISHERIES MEETING, SITKA, JAN. 20–29, 2003

by

Alaska Department of Fish and Game, Division of Subsistence, Juneau

Alaska Department of Fish and Game
Division of Subsistence
1255 West 8th Street, Juneau, AK 99802-5526

2003

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Briefing Materials
Prepared for the Alaska Board of Fisheries Meeting
Sitka, Jan. 20 -29, 2003

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CUSTOMARY AND TRADITIONAL USE WORKSHEET
Salmon, Dolly Varden Char, Trout and Steelhead Trout in Districts 7 & 8
Prepared by the Division of Subsistence
Alaska Department of Fish and Game

Alaska Board of Fisheries, Sitka Alaska
January 2003

PROPOSAL NUMBER: 112
FISHING DISTRICTS: 7 & 8
SPECIES/STOCK: Salmon (chinook (king), *Oncorhynchus tyshawytscha*; sockeye (red), *Oncorhynchus nerka*; coho (silver), *Oncorhynchus kisutch*; chum (dog), *Oncorhynchus keta*; and pink (humpback), *Oncorhynchus gorbuscha*; Trout (including steelhead (*Salmo gairdnerii*), cutthroat (*Salmo clarkii clarkii*), and Dolly Varden (*Salvelinus malma*).

MAIN COMMUNITIES USING THE SPECIES
Wrangell and Petersburg

Note: This worksheet contains background information on the uses of Salmon, chinook (king); sockeye (red); coho (silver); chum (dog); and pink (humpback); Trout (including steelhead, cutthroat, and Dolly Varden in District 7 and District 8. The Board of Fisheries requires this information in order to determine whether there are "customary and traditional" (subsistence) uses of salmon, Dolly Varden, trout and steelhead in this area. It is intended that the information in this worksheet be supplemented by any written and oral public testimony provided during the board meeting.

1. Length and consistency of use (a long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the users' control, such as unavailability of the fish caused by migratory patterns).

The community of Wrangell is located on the northern tip of Wrangell Island 89 miles northwest of Ketchikan. Bordered by Zimovia Straight, Wrangell is situated near the mouth of the Stikine River which reaches into the Canadian interior. Wrangell Island has been occupied by Tlingit Indians for centuries. In addition, Wrangell is one of the older non-Native communities in southeast Alaska. The town dates from the construction of the Russian-American trading post in 1836.

Wrangell was an important Tlingit site due to its proximity to the Stikine River, which was a trade route to the Interior. The Wrangell Indians are descended from the Stikine *kwaan*. The Stikine Tlingit were one of the most powerful and aggressive Tlingit groups, very numerous and possessing a large territory. They occupied the mainland coast from Cape Fanshaw southward to Cleveland Peninsula, the eastern half of Kupreanof Island,

all of Mitkof, Zarembo, and Etolin Islands, and the northeastern coast of Prince of Wales Island from Red Bay to Thorne Bay. The Stikine were also a riverine people. Their villages and camps extended more than 160 miles up the Stikine River to the interior Athabaskan groups, and their forceful defense and control of this valuable trade network enabled them to accumulate power and wealth (Betts et al 1994: Wrangell (Rev. 11/99): 1-2; Cohen 1989: 12-13).

By the turn of the 20th century, Wrangell had become a town with a mixed commercial and subsistence economy based on fishing and timber. Over the years, canneries closed or burned, and new ones replaced them (Betts et al 1994: Wrangell (Rev. 11/99): 1-2; Cohen 1989: 14).

The community of Petersburg is located on the north end of Mitkof Island where Wrangell Narrows meets Frederick Sound. The town of Petersburg, started by Peter Buschmann in 1900, grew up around the Icy Strait Packing Company, on the northwest shore of Mitkof Island on Wrangell Narrows. Along with the evolution of the commercial fishing industry, in which Petersburg has always been a leader in Southeast Alaska, a Tlingit community developed in the expanding town. This Indian community has been a permanent and stable component of the town throughout its development. Commercial fishing has been the economic foundation of the community since its inception at the turn of the century, and it continues to be primary in the present (Betts et al 1994: Petersburg (Rev. 11/99): 1-2; Smythe 1988: 21-28).

Prior to Petersburg's development by homesteaders and fishermen at the turn of the 20th century, Tlingit use of the area occurred at many small settlements. As fish camps or seasonal harvest and production sites, they were part of the traditional land use pattern of Tlingit society. Tlingit groups assembled together in larger villages with more permanent structures for the winter, and divided into small family groups during the spring, summer, and fall months to harvest resources at different locations within defined territories. Prior to contact in the 1800s, the Petersburg area was occupied by three different Tlingit *kwaans,* the Stikine, Kake, and Auk. By the turn of the 20th century, the Stikine Tlingit had moved to Wrangell while the Tlingit from Kake maintained a summer fishing camp they had established on the north end of Mitkof Island (Betts et al 1994: Petersburg (Rev. 11/99): 1-2; Smythe 1988: 17-21).

Historic sources report that Tlingit, Haida, and Tsimshian clans owned particular salmon streams. Sockeye in particular were highly valued for their oil content and because they could be harvested efficiently at stream weirs. Most clans in southeast at the time of historic contact owned at least one sockeye stream. King salmon were also highly valued. They were harvested by Wrangell and Petersburg residents in varying quantities with traditional trolling gear in marine waters. Coho salmon were also valued for their oil content; they were harvested later in the season than other species. Coho were also taken with trolling gear. Chum and pink salmon were used particularly for drying, as their low oil content allowed preservation without spoiling in warm weather.

Certain modifications to aboriginal methods of salmon fishing occurred after the late 1800s, in response to methods introduced by Russians and Euro-Americans. Fishing methods also changed to meet regulations set by federal and state agencies. In addition, new techniques of home preservation were incorporated, as freezing and canning became available.

Harvest and use of salmon for food has continued in the Wrangell and Petersburg area throughout the late 19th and 20th centuries, during which salteries, canneries, and the commercial salmon industry developed. The pattern of retaining salmon from cannery or other commercial catches for local consumption and winter use began during the early years of the commercial fishing industry (Moser 1899: 4; Smythe 1988: 30).

Non-commercial salmon harvests were not tabulated until statehood, at which time a subsistence permit system was implemented in the Southeast Alaska region. These data show consistent use of permitted salmon species from 1960 to the present. Net fishing for coho salmon was prohibited in 1967 except for areas near Yakutat, Klukwan, and Angoon. Net fishing for chinook was prohibited in 1969 except for areas near Yakutat and Klukwan. Non-commercial rod and reel harvests of salmon in portions of the region appear in sport harvest tabulations beginning in the early 1960s. Salmon harvests were estimated by the Division of Subsistence for all rural communities in the region with the 1988 TRUCS study which covered the 1987 harvest year. Since 1997 salmon harvests, along with all other wild resource harvests, have been estimated by the Division of Subsistence for a single 12-month period for twenty four rural communities using face-to-face interviews with randomly selected households. Wrangell and Petersburg were surveyed in 2001, with harvest data collected for the 2000 calendar year.

Subsistence and personal use harvests are also collected annually by the Commercial Fisheries Division using its subsistence/personal use harvest permit system.

In 2000, the percent of Wrangell households harvesting salmon were as follows: king - 38.8 percent, sockeye - 19.4 percent, coho - 20.4 percent, pink - 2.0 percent, chum - 4.1 percent (Table A-1, Figure A-1). The percent of Wrangell households harvesting trout and char: Dolly Varden char - 7.1 percent, cutthroat trout - 23.5 percent, rainbow trout - 8.2 percent, steelhead - 4.1 percent (Figure A-1). Number of salmon harvested per Wrangell household: king - 2.4 each, sockeye - 2.6 each, coho - 2.1 each, pink - 0.5 each, chum - 0.3 each. (Table A-1, Figure A-2). Numbers of trout and char harvested per Wrangell household: - Dolly Varden char 1.1 each, cutthroat trout - 4.7 each, rainbow trout - 1.1 each, steelhead - 0.1 each (Figure A-2).

In 2000, the percent of Petersburg households harvesting salmon were as follows: king - 42.4 percent, sockeye - 12.0 percent, coho - 27.2 percent, pink - 6.4 percent, chum - 6.4 percent (Table A-2, Figure A-3). The percent of Petersburg households harvesting trout and char: Dolly Varden char - 15.2 percent, cutthroat trout - 15.2 percent, steelhead - 1.6 percent (Figure A-3). Number of salmon harvested per Petersburg household: king - 7.6 each, sockeye - 3.2 each., coho - 5.0 each., pink - 4.0 each., chum - 1.3 each (Table A-2,

Figure A-4). Number of trout and char harvested per Petersburg household: Dolly Varden char - 2.1 each, cutthroat trout - 1.1 each., steelhead - 0.2 each. (Figure A-4).

2. Seasonality (a pattern of taking or use recurring in specific seasons of each year).

Historically, salmon were harvested according to seasonal availability and need. Permanent seasonal camps established on rivers and streams were inhabited at various months of the year according to the arrival of the various species. The size and nature of the camps was directly influenced by the quantity and movements of the salmon. The large rivers provided spawning beds for many kinds of salmon which came at different times of the year providing a supply of salmon almost year round. Accordingly, people tended to remain in these camps longer than in settlements which were located on smaller streams with fewer numbers and species of salmon and less harvest opportunity.

Today, salmon and trout are typically harvested according to seasonal availability and regulatory constraints. In general, king salmon are available in southeast waters throughout the year and may be harvested year-round. Sockeye salmon are harvested from May into August, while pink salmon are commonly harvested in July, August, and September. There are two distinctively seasonal runs of chum salmon in southeast Alaska. Summer chums are harvested in July and through the beginning of August. By approximately mid-August, fall chums appear in southeast waters and are harvested in September and October and occasionally into November. The harvest of coho salmon takes place from mid-June through November and occasionally into December in some parts of southeast Alaska.

Steelhead are harvested in spring and fall, although spring runs are generally larger than fall runs in southeast Alaska, and more fish may be harvested then.

3. Means and Methods of Harvest (A pattern of taking or use consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost).

The Stikine and Kake Tlingit, used three principal types of gear for harvesting salmon in the prehistoric time period: 1) trolling and setting with hook and line, 2) weirs and fish traps, and 3) gaffs, spears, and leisters (de Laguna 1960, 1972; Drucker 1955; Krause 1956:121; Langdon 1977: 180f; Moser 1899; Niblack 1890; Oswalt 1966:305; Rousselot et al. 1988:154; Spencer and Jennings 1965:176; Stewart 1977:28-67). Weirs and traps were set in rivers to catch spawning salmon, particularly sockeye, as they ascended the streams; trolling was undertaken from canoes in deeper marine waters; and gaffs, spears, and leisters were used to lift fish from weirs or troll gear. A fourth method, nets (including seine nets, set nets) was known to the region, but used primarily by the Haida and Tsimshian until the early cannery period (1880s), when nets became a primary method for subsistence harvest throughout Southeast Alaska (Langdon 1977).

Beach seine nets came into use in the 1880s. Beach seines catch schooled fish at stream mouths and were used in conjunction with weirs. All forms of stream barricades preventing escapement were outlawed in 1896 by federal law, due to over-harvest by canneries. However, beach seines continued to be used where fish schooled naturally. Purse seines were introduced by the mid-1890s, for harvesting fish in deeper water.

Technological modifications to trolling and hooking gear were introduced with the establishment of the commercial salmon industry in southeast Alaska beginning in the 1870s. For example, metal and lead replaced wood and stone hooks and sinkers; cotton and nylon line replaced natural fibers, rubber and plastic replaced wood and skin floats. Trolling gear evolved from the carved wooden rods and rectangular frame reels common in Tlingit communities in the late 1800s, to imported circular frame reels in the early 1900s, and manufactured rods and reels by the 1950s.

By the 1890s, it was common for Tlingit, Haida, Tsimshian, and non-Native residents to sell fish to canneries and salteries as independent fishers using beach seines, purse seines, and trolling gear (primarily for chinook, coho, and sockeye). The same seines and trolling gear used by independent fishers for commercial fishing were also used for non-commercial fishing. Fish were taken for sale and also for home use with the same type of gear.

Today, salmon are fished non-commercially under either sport or subsistence/personal use regulations. King and coho salmon are harvested under sport regulation by means of trolling with rod and reel, or less commonly using rod and reel from shore. Sockeye, pinks, and chum are harvested under subsistence regulation by means of drift gill net, beach seines, hand purse seines from skiffs, spear, gaff, and less commonly, dip net. Special permits are issued in some areas for fishing with power purse seine gear; coho salmon may be fished with beach seines or gaffs in Salt Lake and Mitchell Bay, just south of Angoon, on the west coast of Admiralty Island. King and coho salmon and steelhead caught incidental to other subsistence net fishing may be retained for home use. In addition, salmon are removed from commercial harvests for home use.

In Wrangell, we found that the most frequently used gear type allowed under subsistence regulations was the beach seine and the dip net. Most king salmon are caught trolling with rod and reel and most sockeye continue to be taken with nets.

In Petersburg, most salmon are caught trolling with rod and reel in marine waters. The most frequently used gear type allowed under subsistence regulations was the beach seine, most sockeye are taken with nets.

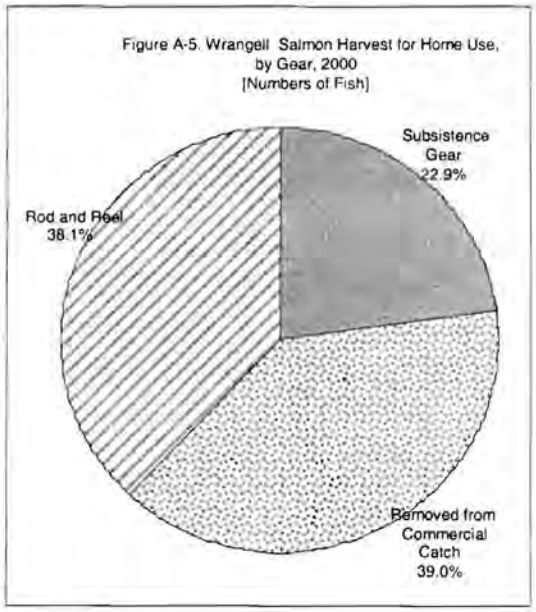
In both communities salmon are also caught for home use by commercial fishers, who retain part of their legal commercial catch for home use.

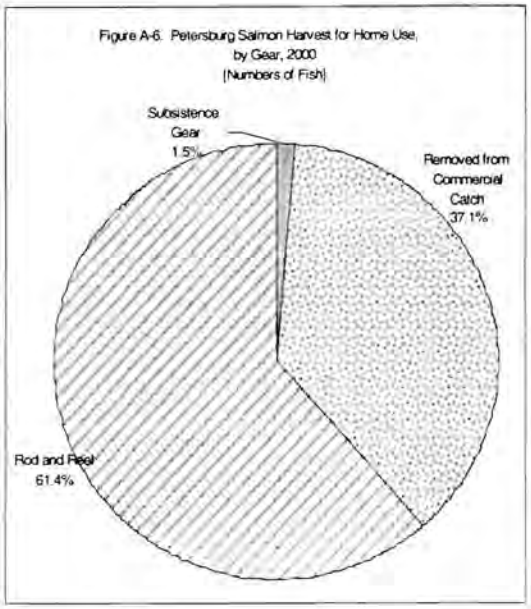
Historically, steelhead and trout were harvested by a variety of means in southeast Alaska. Gaffing, using "a large pointed hook secured to a stout pole," was observed at

rapids at spawning streams in the 1890s (Moser 1899:65). Steelhead were also caught in weirs along with salmon. More recently, steelhead are harvested by means of a baited hook (de Laguna 1972:391). In Petersburg in the 1920s and 1930s steelhead and Dolly Varden were harvested for commercial and subsistence uses by gill net, beach seining, and traps. The use of traps for catching Dolly Varden was prohibited after the late 1940s (Smythe 1988: 32, 33). Today in southeast Alaska, steelhead and other trout, and char are generally harvested with rod and reel gear, although incidental harvest of steelhead using gill nets takes place in some areas.

Data from Division of Subsistence household surveys covering 2000 in Wrangell, showed that 22.9 percent of salmon were harvested with nets, and 38.1 percent were harvested with rod and reel gear. In addition, 39.0 percent of the total salmon harvest for home use was removed from commercial catches (Figure A-5). Recent Wrangell data covering harvests taking place under personal use regulations, are attached (Table A-3 and Table A-4, Figure A-7).

Data from Division of Subsistence household surveys covering 2000 in Petersburg, showed that 1.5 percent of salmon were harvested with nets, and 61.4 percent were harvested with rod and reel gear. In addition, 37.1 percent of the total salmon harvest for home use was removed from commercial catches (Figure A-6). Recent Petersburg data covering harvests taking place under personal use regulations, are attached (Table A-5 and Table A-6, Figure A-8).





4. Geographic Area (The area in which the noncommercial, long-term, and consistent pattern of taking, use, and reliance upon the fish stock or game population has been established).

Historically, king and coho salmon were harvested primarily in marine waters and at river mouths, while coho, sockeye, pink, and chum salmon were generally harvested at weir locations near mouths of rivers. In addition, all salmon except king were harvested by various hand methods from shallow spawning grounds.

Locations used by Wrangell residents to harvest salmon under permit from 1997 to 2001 are listed in Table 5. Nets are used primarily at Salmon Bay Creek, Thoms Creek and Mill Creek where conditions are favorable. Trolling locations include the waters of upper Stikine Strait, Chichagof Pass, Zimovia Strait, Eastern Passage, and Blake Channel. In general, most salmon harvest takes place within 20-25 miles of Wrangell (Betts et al 1994: Wrangell (Rev. 11/99).

Locations used by Petersburg residents to harvest salmon under permit from 1997 to 2001 are listed in Table 6. Nets are used primarily at Salmon Bay Creek. Trolling locations include the waters of Wrangell Narrows, the near shore waters of Frederick Sound on the northern and northeastern shores of Mitkof and Kupreanof islands, and the North Arm of Farragut Bay. Greys Pass (between Mitkof and Greys islands) and the Stikine Flats are increasingly used for the harvest of King salmon (Betts et al 1994: Petersburg (Rev. 11/99).

5. Means of Handling, Preparing, Preserving and Storing (a means of handling, preparing, preserving and storing fish which has been traditionally used by past generations, but not excluding recent technological advances where appropriate).

Historically, salmon were hung in wooden smokehouses or left to air dry on racks and then stored in baskets and bentwood boxes. Late fall runs of salmon were left to freeze in log cabins or log caches (Stewart 1977).

Salmon were roasted, boiled, steamed, and baked. Wooden boxes, waterproof baskets, heated rocks, earth pits, rock ovens, hot ashes, and roasting tongs and sticks were the means used to prepare salmon. Fish, once dried, could be toasted over the fire until hot and crisp or soaked overnight and then boiled. Freshly caught fish were used for roasting. Salmon heads were buried for a week so the heads would not be exposed to the air and fermentation could occur.

Niblack (1890) and Krause (1956 [1885]) describe a method of converting salmon into oil. The fish were allowed to age and then boiled in wooden boxes into which hot stones were dropped. The grease or oil was skimmed from the surface and stored in boxes or in the hollow stalks of specially prepared giant kelp. Salmon oil as well as oil made from seal and other fish was used as a sauce for a variety of foods.

The roe of salmon was collected from harvested fish and eaten fresh or fermented, or dried and preserved for winter use. Salmon roe was buried in boxes below high tide and left to age and ferment. According to Niblack, dried eggs were prepared for eating in two ways. They were pounded between two stones, diluted with water and beaten with

wooden spoons into a creamy consistency or they were boiled with various dried berries and molded in wooden frames into cakes about 12 inches square and one inch thick.

Today, salmon are cut and scored for efficient drying much as they have been in the past. The fish are smoked in wooden smokehouses or metal smokers, air dried, canned, frozen, refrigerated, and cooked freshly caught. A combination of preservation methods is also used, such as half smoking (light smoking) and then canning. Salmon roe is still aged and fermented by some residents, sometimes by traditional methods of burying the eggs in barrels or jars on the beach below high tide. Freezing is the most common contemporary method of preserving fish.

6. Intergenerational Transmission (a pattern or taking or use which includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation).

In addition to generations of Tlingit residents, Wrangells' non-Native population derives historically from early Russian occupation in the early 1800s, followed by American influx with the commercial fishing, logging, and mining industries throughout the 20th century. Tlingit family fish camps were common salmon processing sites prior to the 1940s, where fish were cut and smoked. Learning of salmon harvest and preservation skills took place in fish camp. Non-Natives also passed down salmon harvest and preparation skills learned from their relatives.

The population of Petersburg is primarily of Euro-American cultural heritage in addition to Tlingit residents. Commercial fishing brought people to Petersburg from the continental United States, many of whom were recent immigrants from European countries, especially Norway. In the early years, immigrants also came to Petersburg directly from Norway. Many of these immigrants came from fishing villages in Norway (Betts et al 1994: Petersburg (Rev. 11/99): 1-2; Smythe 1988: 21). Salmon harvest and preparation skills learned from relatives is passed down to the younger generations.

7. Distribution and Exchange (a pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving).

Historically, salmon harvested by Tlingit, Haida, and Tsimshian were shared and consumed among large extended family groups who traced common ancestry as lineages and clans and who resided within large wooden clan houses. Large quantities of food also were prepared and given away by the headmen of the extended families in elaborate feasts and ceremonies to publicly demonstrate and validate rank, status, and prestige within the social group (Oswalt 1966:305).

The giving and receiving of salmon between families is still practiced in many communities of Southeast Alaska. In Wrangell active sharing of salmon is indicated by 2000 survey data, 37.8 percent of households gave salmon away. In Petersburg sharing of

salmon is indicated by 2000 survey data, 30.4 percent of households gave salmon away. Salmon, among other fish and game resources, are commonly given to those who do not harvest themselves. Salmon are essential foods and gifts at traditional Tlingit 40-day Parties and Payoff Parties as well. Sharing of subsistence resources continues to be common at the present time.

8. Diversity and Economic, Cultural, Social, and Nutritional Elements (a pattern that includes taking, use, and reliance for subsistence purposes upon a wide variety of the fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life).

Salmon were the mainstay of the economies of southeast communities at the time of historic contact. Salmon and trout were harvested along with other finfish, marine invertebrates, seal, deer, black bear, and a number of other animal and plant species. The historic fish harvests of Southeast Alaska were so large and reliable that they were the basis for the development of the complex non-agrarian Northwest Coast culture area, characterized by large populations, social stratification, and elaborate art and ceremonial systems (Spencer and Jennings 1965:168).

Salmon and trout and char continue to be part of a wide range of resources used in most communities, including other finfish, deer, and shellfish. In 2000, Wrangell households harvested an average of just over 10 different resources. Some Wrangell households used as many as 45 different animal or plant species. Salmon constituted 15.2 percent of total Wrangell harvests (Figure A-9). Of the ten most used species in Wrangell, chinook salmon ranked third with 67.3 percent of the households reported using, sockeye salmon ranked seventh with 38.8 percent of households reported using, and cutthroat trout was number ten with 29.6 percent reported using (Table A-7). About 17 percent of Wrangell households reported using steelhead.

Table A-7 Top Ten Species Used by the Most Wrangell Households, 2000

	Wrangell 2000	% HH
1	Halibut	68.4%
2	Shrimp	68.4%
3	Chinook Salmon	67.3%
4	Dungeness Crab	63.3%
5	Berries	56.1%
6	Deer	48.0%
7	Sockeye Salmon	38.8%
8	Clams & Cockles	34.7%
9	Moose	31.6%
10	Cutthroat Trout	29.6%

In 2000, Petersburg households harvested an average of 9 different resources. Some Petersburg households used as many as 31 different animal or plant species. Salmon constituted 37.3 percent of total Petersburg harvest in 2000 (Figure A-10). Of the ten most used species in Petersburg, chinook salmon ranked third with 64.8 percent of the households reported using, and coho salmon ranked fifth with 45.6 percent of the households reported using (Table A-8). In 2000 about 17 percent of Petersburg households reported using cutthroat trout, and 4 percent reported using steelhead.

Table A-8. Top Ten Species Used by the Most Petersburg Households, 2000

	Petersburg	% HH
1	Halibut	72.0%
2	Dungeness Crab	67.2%
3	Chinook Salmon	64.8%
4	Berries	55.2%
5	Coho Salmon	45.6%
6	Deer	40.0%
7	King Crab	36.0%
8	Shrimp	33.6%
9	Clams & Cockles	32.8%
10	Tanner Crab	28.8%

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Table A-1. Estimated Harvest and Use of Salmon, Char and Trout, Wrangell, 2000

	Percentage of Households					Pounds Harvested			Amount Harvested	
Resource Name	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH
All Resources	93.9	82.7	80.6	88.8	65.3	328,141.2	439.28	167.51	328,141 lbs	439.28
Fish	88.8	57.1	56.1	76.5	50.0	116,699.0	156.22	59.57	116,699 lbs	156.22
Salmon	80.6	49.0	45.9	54.1	37.8	50,022.4	66.96	25.54	6,990 ea.	9.36
Chum Salmon	4.1	4.1	4.1	0.0	1.0	1,746.0	2.34	0.89	252 ea.	0.34
Coho Salmon	29.6	20.4	20.4	11.2	15.3	9,185.2	12.30	4.69	1,753 ea.	2.35
Chinook Salmon	67.3	41.8	38.8	43.9	33.7	28,429.9	38.06	14.51	2,424 ea.	3.24
Pink Salmon	3.1	2.0	2.0	1.0	0.0	967.7	1.30	0.49	389 ea.	0.52
Sockeye Salmon	38.8	19.4	19.4	22.4	12.2	9,693.7	12.98	4.95	2,172 ea.	2.91
Unknown Salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0 ea.	0.00
Char	10.2	9.2	8.2	2.0	2.0	2,556.6	3.42	1.31	991 ea.	1.33
Brook Trout	1.0	1.0	1.0	0.0	0.0	128.1	0.17	0.07	91 ea.	0.12
Dolly Varden	9.2	8.2	7.1	2.0	2.0	2,428.5	3.25	1.24	899 ea.	1.20
Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0 ea.	0.00
Trout	42.9	27.6	25.5	23.5	16.3	8,666.7	11.60	4.42	4,977 ea.	6.66
Cutthroat Trout	29.6	25.5	23.5	9.2	9.2	5,945.5	7.96	3.04	3,964 ea.	5.31
Rainbow Trout	10.2	8.2	8.2	3.1	4.1	1,814.1	2.43	0.93	907 ea.	1.21
Steelhead	17.3	4.1	4.1	13.3	9.2	907.1	1.21	0.46	107 ea.	0.14

Source: ADFG Division of Subsistence, Household surveys 2001

Table A-2. Estimated Harvst and Use of Salmon, Char and Trout, Petersburg, 2000

	Percentage of Households					Pounds Harvested			Amount Harvested	
Resource Name	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH
All Resources	93.6	80.8	77.6	80.8	43.2	475,321	444.23	161.42	475,321 lbs	444.23
Fish	89.6	62.4	58.4	70.4	36.8	301,580	281.85	102.42	301,580 lbs	281.85
Salmon	78.4	52.0	47.2	51.2	30.4	177,210	165.62	60.18	25,192 ea.	23.54
Chum Salmon	11.2	6.4	6.4	6.4	3.2	10,873	10.16	3.69	1,566 ea.	1.46
Coho Salmon	45.6	31.2	27.2	23.2	10.4	31,214	29.17	10.60	5,958 ea.	5.57
Chinook Salmon	64.8	45.6	42.4	40.0	27.2	106,222	99.27	36.07	9,056 ea.	8.46
Pink Salmon	8.8	6.4	6.4	3.2	0.8	12,018	11.23	4.08	4,828 ea.	4.51
Sockeye Salmon	27.2	12.8	12.0	16.8	8.8	16,883	15.78	5.73	3,784 ea.	3.54
Unknown Salmon	2.4	0.0	0.0	2.4	0.0	0	0.00	0.00	0 ea.	0.00
Char	16.8	15.2	15.2	3.2	4.8	6,610	6.18	2.24	2,448 ea.	2.29
Dolly Varden	16.8	15.2	15.2	3.2	4.8	6,610	6.18	2.24	2,448 ea.	2.29
Trout	20.0	18.4	16.0	5.6	3.2	4,156	3.88	1.41	1,532 ea.	1.43
Cutthroat Trout	16.8	16.8	15.2	3.2	3.2	1,900	1.78	0.65	1,267 ea.	1.18
Steelhead	4.0	4.0	1.6	2.4	0.8	2,256	2.11	0.77	265 ea.	0.25

Source: ADFG Division of Subsistence, Household surveys 2001

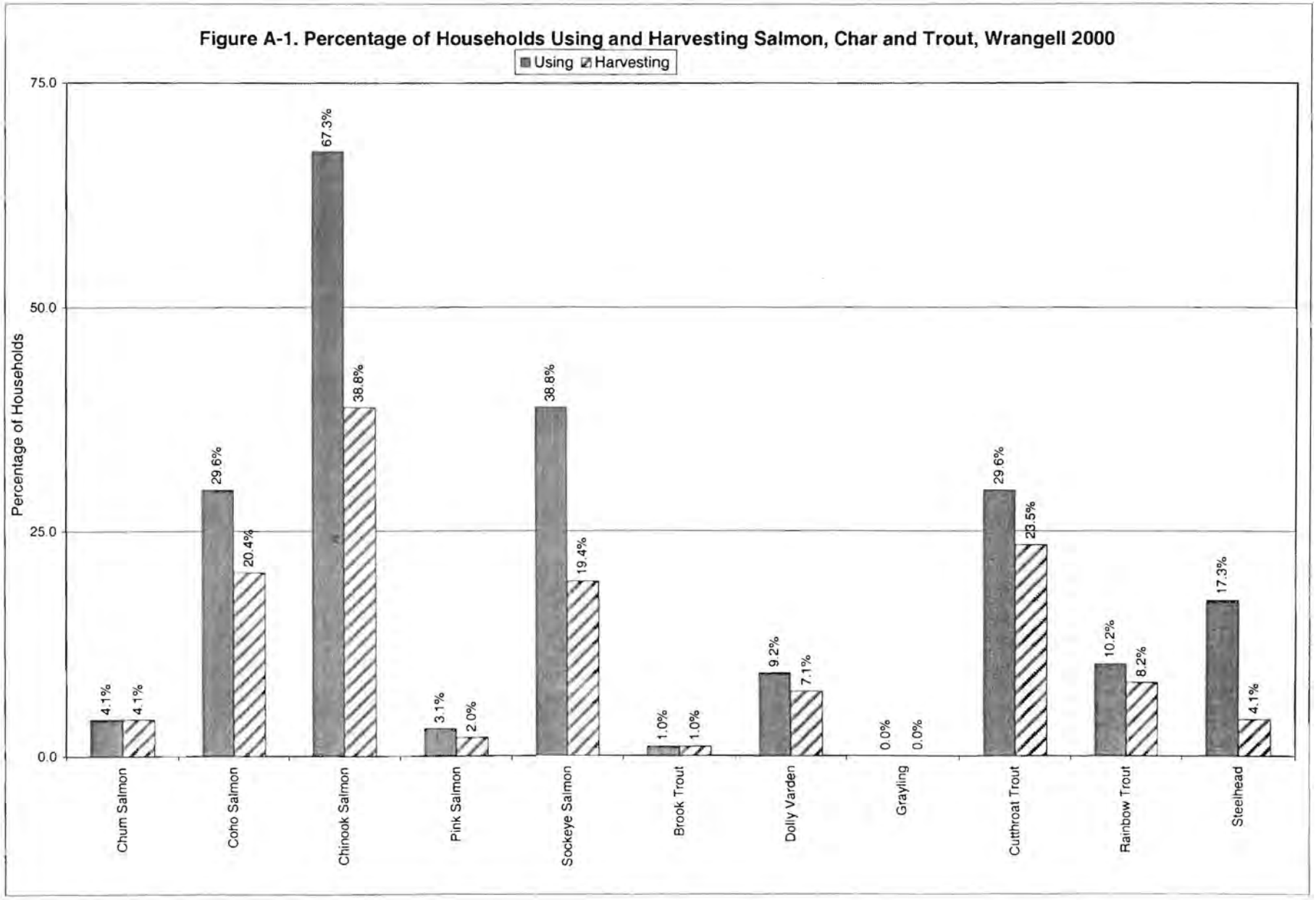
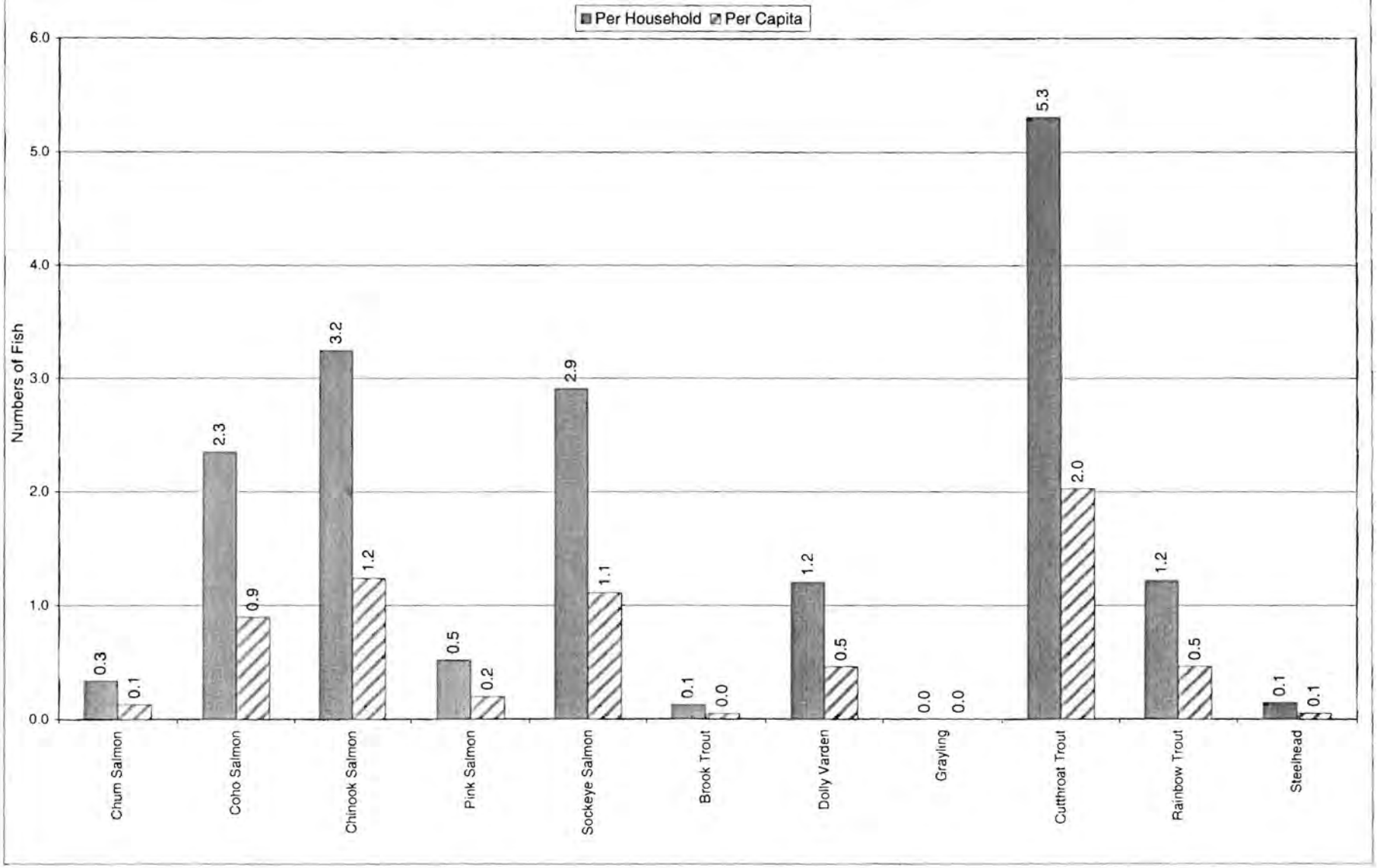


Figure A-1. Percentage of Households Using and Harvesting Salmon, Char and Trout, Wrangell 2000

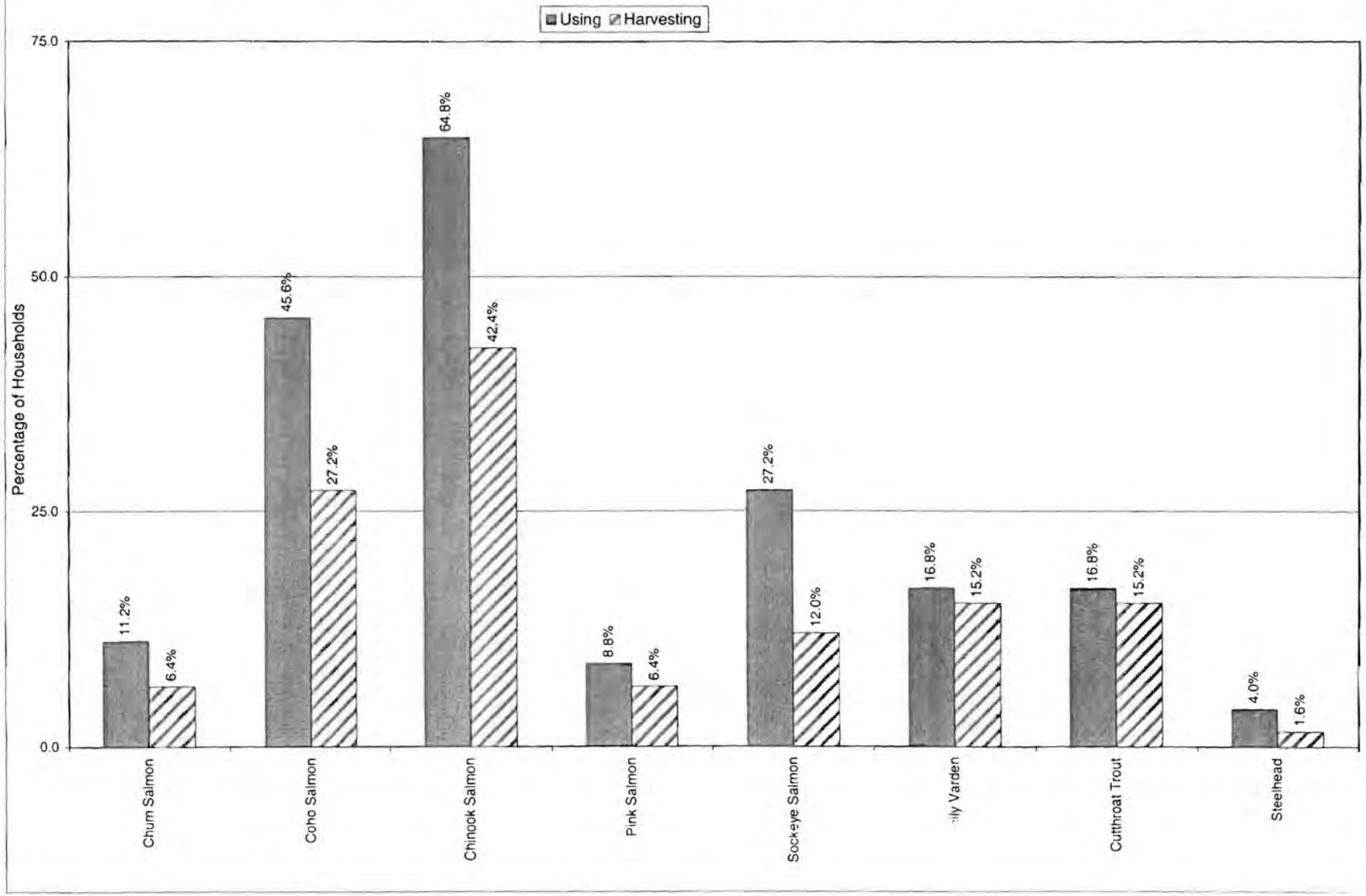
Source: ADFG Division of Subsistence Household Surveys

Figure A-2. Harvest of Salmon, Char and Trout for Home Use, Numbers Per Household and Per Capita, Wrangell 2000



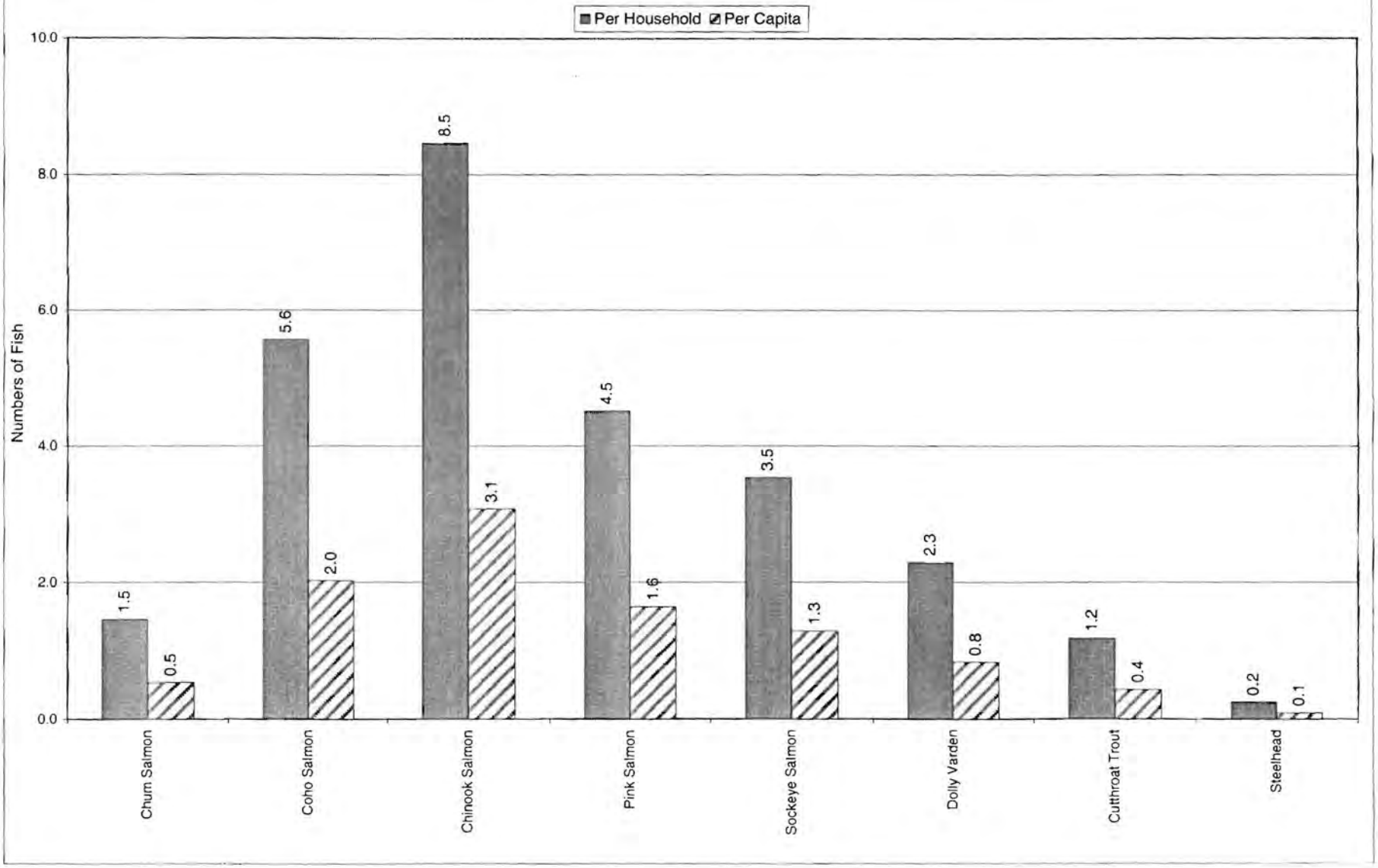
Source: ADFG Division of Subsistence
Household Surveys 2001

Figure A-3. Percentage of Households Using and Harvesting Salmon, Char and Trout, Petersburg 2000



Source: ADFG Division of Subsistence Household Surveys

Figure A-4. Harvest of Salmon, Char and Trout for Home Use, Numbers Per Household and Per Capita, Petersburg 2000

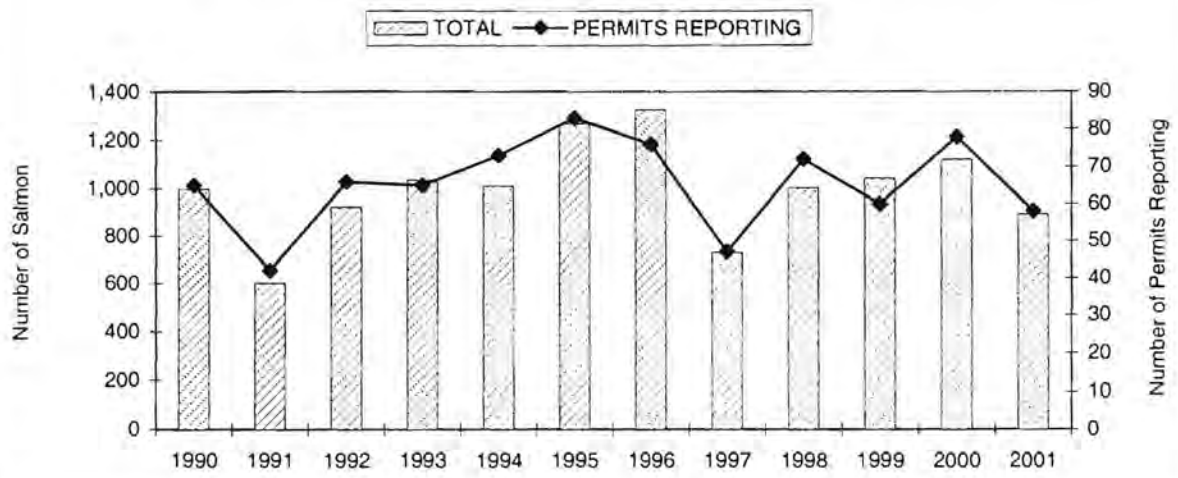


Source: ADFG Division of Subsistence
Household Surveys 2001

Table A-3. Wrangell Salmon Permit Harvest Data, 1990-2001

YEAR	CITY	PERMITS REPORTING	CHINOOK	SOCKEYE	COHO	PINK	CHUM	TOTAL
1990	Wrangell	65	57	658	130	91	59	995
1991	Wrangell	42	57	434	3	69	38	601
1992	Wrangell	66	3	768	10	112	29	922
1993	Wrangell	65	7	978	9	36	4	1,034
1994	Wrangell	73	8	914	0	15	71	1,008
1995	Wrangell	83	37	1,040	42	12	136	1,267
1996	Wrangell	76	26	923	15	10	350	1,324
1997	Wrangell	47	15	525	22	62	103	727
1998	Wrangell	72	21	758	4	49	168	1,000
1999	Wrangell	60	34	867	1	62	77	1,041
2000	Wrangell	78	44	1,003	9	26	37	1,119
2001	Wrangell	58	81	687	3	36	81	888

Figure A-7. Wrangell Community Salmon Permit Harvest Reported, 1990-2001



Source: ADFG Commercial Fish Division, Alexander Database

Table A-4. Wrangell Salmon Harvests Reported by Stream, 1997-2001

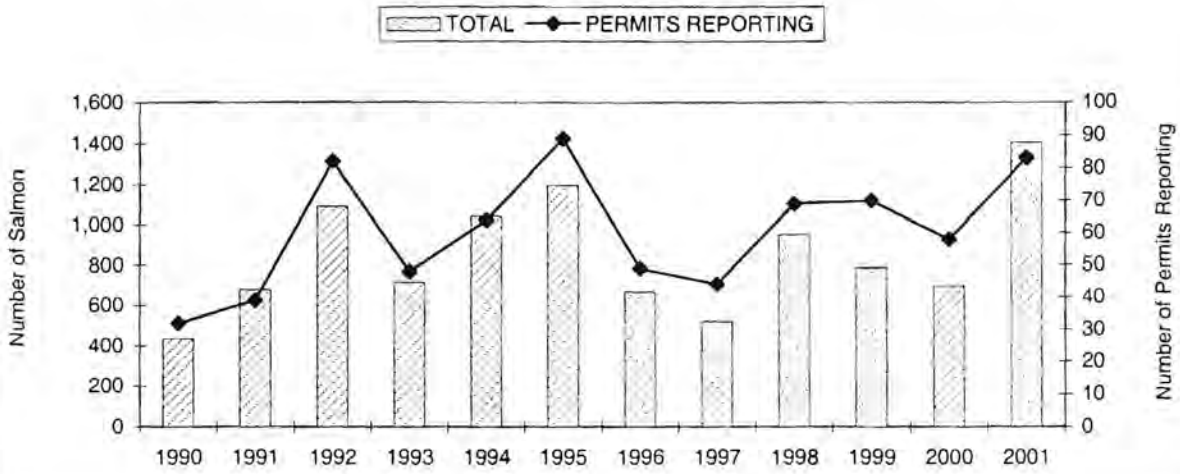
YEAR	STREAM	PERMITS REPORTING	CHINOOK	SOCKEYE	COHO	PINK	CHUM
1997	Dog Salmon Creek	1	0	0	0	0	0
1997	Sarkar	1	0	0	0	0	0
1997	Shipley Bay Lk Ck	1	0	10	0	0	0
1997	Salmon Bay Creek	11	0	149	0	3	0
1997	Thoms Creek	13	0	137	0	3	3
1997	Snake Ck Olive Cove	2	0	0	0	35	0
1997	Harding River	1	0	0	0	0	15
1997	Mill Ck	25	5	229	2	21	85
1997	Unknown	2	10	0	20	0	0
1998	Dog Salmon Creek	1	0	5	0	0	0
1998	Virginia Creek	1	0	0	0	0	0
1998	Klawock River	1	0	25	0	0	0
1998	Hatchery Ck Sweethrt	1	0	5	0	0	0
1998	Salmon Bay Creek	17	0	246	0	0	1
1998	Thoms Creek	32	0	336	0	5	11
1998	Snake Ck Olive Cove	2	1	0	0	44	17
1998	Mill Ck	23	3	136	2	0	101
1998	Unknown	7	17	0	2	0	38
1998	Sweetheart Creek	1	0	5	0	0	0
1999	Salmon Bay Creek	13	0	127	0	0	0
1999	Thoms Creek	26	0	479	0	4	5
1999	Snake Ck Olive Cove	2	0	0	0	55	6
1999	Mill Ck	30	20	261	1	3	63
1999	Unknown	2	14	0	0	0	3
2000	Point Baker	1	0	6	0	0	3
2000	Salmon Bay Creek	17	0	218	0	0	0
2000	Crystal Creek	2	0	0	8	0	0
2000	Thoms Creek	37	0	450	0	1	6
2000	Snake Ck Olive Cove	2	0	2	0	25	6
2000	Mill Ck	31	7	264	1	0	22
2000	Unknown	5	37	3	0	0	0
2000	Alecks Creek	1	0	50	0	0	0
2000	Taku River	1	0	10	0	0	0
2001	Salmon Bay Creek	8	0	141	0	6	0
2001	Red Lake Creek	1	0	15	0	0	0
2001	Thoms Creek	20	0	163	0	20	5
2001	Harding River	2	1	0	0	0	5
2001	Earl West Cove	5	44	0	0	0	1
2001	Mill Ck	30	36	346	3	10	70
2001	Stikine River	2	0	22	0	0	0

Source: ADFG Commercial Fish Division, Alexander Database

Table A-5. Petersburg Salmon Permit Harvest Data, 1990-2001

YEAR	CITY	PERMITS REPORTING	CHINOOK	SOCKEYE	COHO	PINK	CHUM	TOTAL
1990	Petersburg	32	0	248	188	0	0	436
1991	Petersburg	39	0	462	199	0	17	678
1992	Petersburg	82	0	496	550	6	40	1,092
1993	Petersburg	48	0	289	421	6	0	716
1994	Petersburg	64	0	414	605	13	10	1,042
1995	Petersburg	89	0	422	756	14	5	1,197
1996	Petersburg	49	0	381	208	6	72	667
1997	Petersburg	44	0	318	179	24	0	521
1998	Petersburg	69	0	740	177	31	5	953
1999	Petersburg	70	0	570	178	10	29	787
2000	Petersburg	58	0	462	141	20	74	697
2001	Petersburg	83	6	830	419	116	34	1,405

Figure A-8. Petersburg Community Salmon Permit Harvest Reported, 1990-2001



Source: ADFG Commercial Fish Division, Alexander Database

Table A- 6. Petersburg Salmon Harvests Reported by Stream, 1997-2001

YEAR	STREAM	PERMITS REPORTING	CHINOOK	SOCKEYE	COHO	PINK	CHUM
1997	Salmon Bay Creek	24	0	251	0	22	0
1997	Crystal Creek	14	0	0	177	0	0
1997	Mill Ck	2	0	2	0	0	0
1997	Blind Slough Sumner	1	0	0	2	0	0
1997	Falls Ck Baranof Is	3	0	30	0	0	0
1997	Kutlaku Creek	1	0	25	0	0	0
1997	Taku River	1	0	10	0	2	0
1998	Hatchery Ck Sweethrt	1	0	5	0	0	0
1998	Point Baker	1	0	2	2	3	0
1998	Salmon Bay Creek	44	0	402	1	2	1
1998	Red Lake Creek	3	0	17	3	0	1
1998	Crystal Creek	15	0	0	170	1	0
1998	Gut Bay Head	1	0	15	0	0	0
1998	Falls Ck Baranof Is	2	0	30	0	0	0
1998	Kutlaku Creek	2	0	165	0	1	1
1998	Taku River	1	0	10	1	2	0
1998	Sweetheart Creek	1	0	9	0	0	0
1998	Necker Bay Lake	1	0	85	0	22	2
1999	Point Baker	2	0	9	2	0	19
1999	Salmon Bay Creek	46	0	453	1	2	3
1999	Red Lake Creek	2	0	20	0	0	0
1999	Crystal Creek	21	0	0	175	8	2
1999	Mill Ck	1	0	8	0	0	5
1999	Falls Ck Baranof Is	3	0	40	0	0	0
1999	Kutlaku Creek	2	0	40	0	0	0
2000	Salmon Bay Creek	39	0	348	2	8	3
2000	Red Lake Creek	1	0	25	0	0	0
2000	Crystal Creek	14	0	0	139	1	3
2000	Gut Bay Head	1	0	30	0	0	0
2000	Falls Ck Baranof Is	4	0	39	0	8	18
2000	Salt Chuck-Security	1	0	0	0	0	50
2000	Kutlaku Creek	1	0	10	0	0	0
2000	Taku River	1	0	10	0	3	0
2001	Point Baker	2	3	27	16	17	18
2001	Salmon Bay Creek	42	0	723	2	50	3
2001	Red Lake Creek	1	0	3	0	0	0
2001	Crystal Creek	36	1	17	401	42	12
2001	Stikine River	1	0	6	0	0	0
2001	Falls Ck Baranof Is	1	2	20	0	4	0
2001	Taku River	1	0	10	0	3	1
2001	Sweetheart Creek	1	0	24	0	0	0

Source: ADFG Commercial Fish Division, Alexander Database

Figure A-9. Wrangell Wild Resource Harvests, 2000

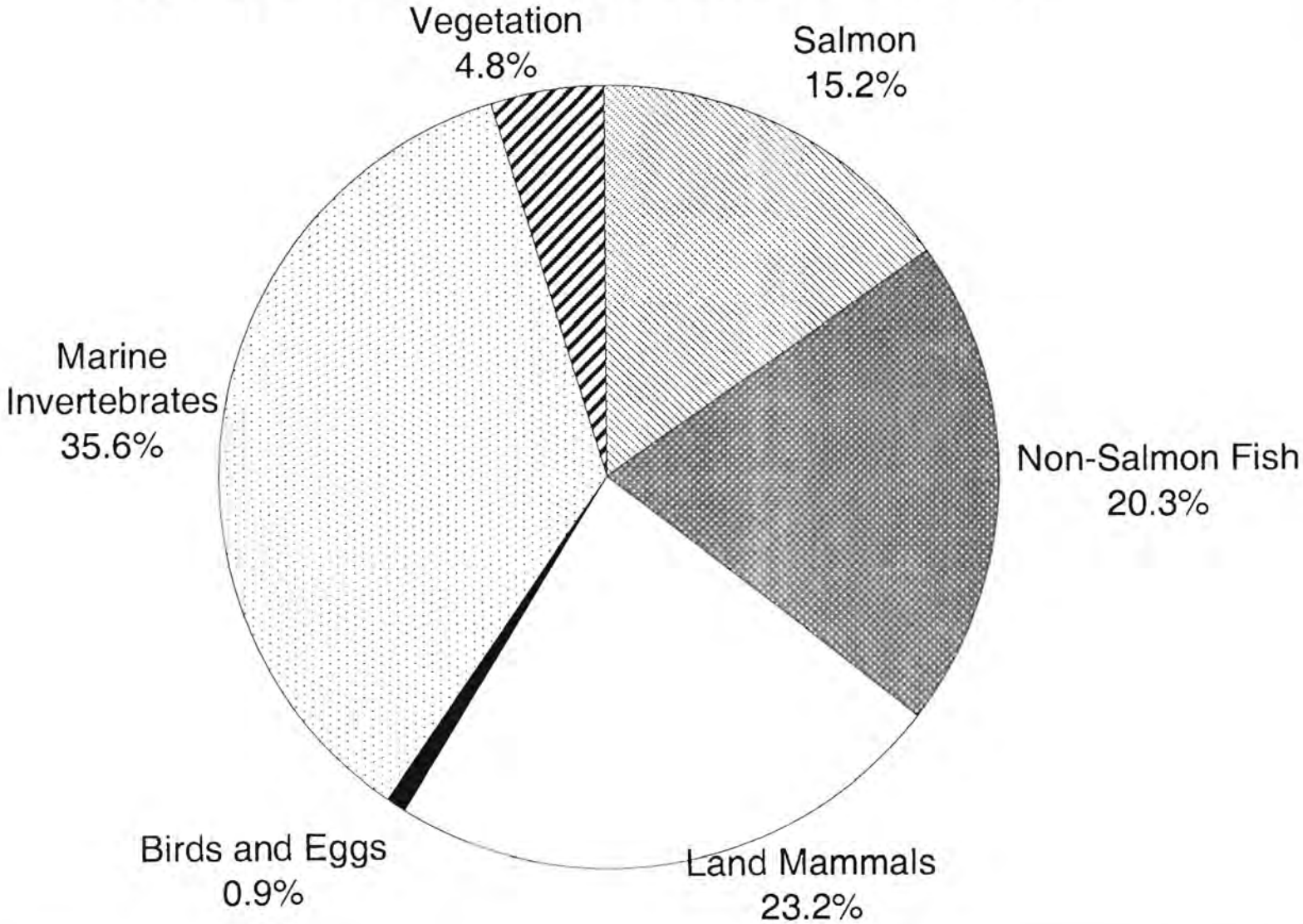
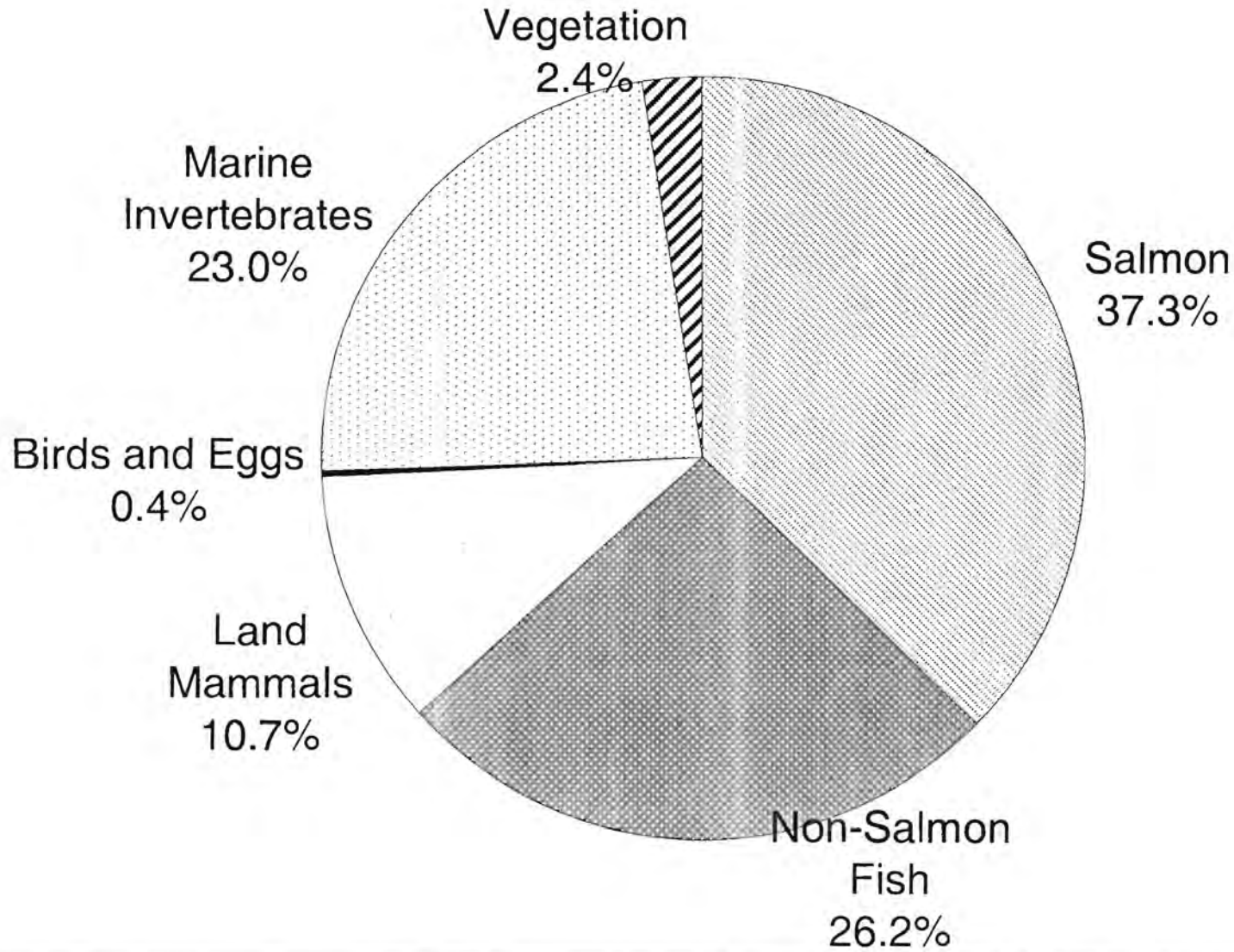


Figure A-10. Petersburg Wild Resource Harvests, 2000



Source: ADFG Division of Subsistence
Household surveys 2001

CUSTOMARY AND TRADITIONAL USE WORKSHEET
Halibut, Bottomfish, Herring and Herring Roe in Districts 7 & 8
Prepared by the Division of Subsistence
Alaska Department of Fish and Game

Alaska Board of Fisheries, Sitka Alaska
January 2003

PROPOSAL NUMBER: 111
FISHING DISTRICTS: 7 & 8
SPECIES/STOCK: Bottomfish, including halibut, *Hippoglossus stenolopis*; cod (Pacific grey cod, *Gadus macocephalus*; black cod or sablefish, *Anoplopoma finbria)*; rockfish (red snapper, *Sebastodes ruberrimus*; black rockfish *Sebastodes melanops*); flatfish (eg., flounder, *Platichthys stellatus*), greenling, *Hexagrammos sp.*(including lingcod, *Ophiodon elongatus*); sculpin, *Scorpaena* , and herring, *Clupea pallasii*, and herring Roe.

MAIN COMMUNITY USING THE SPECIES
Wrangell and Petersburg

Note: This worksheet contains background information on the uses of halibut, cod (Pacific grey cod), black cod or sablefish, rockfish (red snapper), black rockfish, flatfish (flounder), greenling (lingcod), sculpin, herring and herring roe in District 7 and District 8. The Board of Fisheries requires this information in order to determine whether there are "customary and traditional" (subsistence) uses of these species in this area. It is intended that the information in this worksheet be supplemented by any written and oral public testimony provided during the board meeting.

1. Length and consistency of use (a long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the users' control, such as unavailability of the fish caused by migratory patterns).

Bottomfish have been important food fish utilized by the Tlingit, Haida, and Tsimshian in Southeast Alaska since before historic contact. This indigenous use has continued to the present (Stewart 1977). Archeological excavations have found the bones of halibut, rockfish, cod of various species, and sculpin in prehistoric village sites (de Laguna 1960:92). Along with salmon, halibut, cod, and rockfish were principal fish mentioned as harvested and used by the area's residents according to early historic reports (Grinnell 1899:138-139; Krause 1956 [1885]:60, 120-24; Boas 1966 [1895]: 3; de Laguna 1960:116; 1972:401-2; Rousselot et al. 1988: 152-3). Specialized gear and harvest methods were developed by the Tlingit, Haida, and Tsimshian for harvesting bottomfish, examples of which are retained in museum collections (see below) (Stewart 1977).

Wrangell was an important Tlingit site due to its proximity to the Stikine River, which was a trade route to the Interior. The Wrangell Indians are descended from the Stikine *kwaan*. The Stikine Tlingit were one of the most powerful and aggressive Tlingit groups, very numerous and possessing a large territory. They occupied the mainland coast from Cape Fanshaw southward to Cleveland Peninsula, the eastern half of Kupreanof Island, all of Mitkof, Zarembo, and Etolin Islands, and the northeastern coast of Prince of Wales Island from Red Bay to Thorne Bay. The Stikine were also a riverine people. Their villages and camps extended more than 160 miles up the Stikine River to the interior Athabaskan groups, and their forceful defense and control of this valuable trade network enabled them to accumulate power and wealth (Betts et al 1994: Wrangell (Rev. 11/99): 1-2; Cohen 1989: 12-13). Historically, bottomfish, herring and herring roe were harvested by Wrangell residents (Betts et al 1994: Wrangell (Rev. 11/99): Cohen 1989: 62-67).

The town of Petersburg, started by Peter Buschmann in 1900, grew up around the Icy Strait Packing Company, on the northwest shore of Mitkof Island on Wrangell Narrows. Along with the evolution of the commercial fishing industry, in which Petersburg has always been a leader in Southeast Alaska, a Tlingit community developed in the expanding town. This Indian community has been a permanent and stable component of the town throughout its development. Commercial fishing has been the economic foundation of the community since its inception at the turn of the century, and it continues to be primary in the present. Halibut was central to the developing economy of Petersburg because it provided regular employment through the winter months. Halibut and cod were frequently removed from commercial catch for home use. Cod is popular in households for making traditional Norwegian foods such as lutefisk and smoked black cod. (Betts et al 1994: Petersburg (Rev. 11/99): 1-2; Smythe 1988: 21-30).

The use of bottomfish for food has continued in Southeast Alaska communities during the historic period, along with certain modifications of fishing techniques introduced by Euro-American settlers. This non-commercial use of bottomfish for food has continued alongside the development of commercial bottomfish fisheries. Of the bottomfish, halibut are particularly targeted. Rockfish are also targeted, red snapper, and lingcod in particular. Flounder, sole, greenling (other than lingcod), and sculpin are less commonly harvested (Cohen 1989: 62-67, 75; Smythe 1988: 21, 27 - 29).

Herring and herring eggs have been used in Southeast Alaska since before historic contact. This use continues to the present. Herring was fished for salteries in the Petersburg area since the late 1800s. A variety of commercial seine fisheries contributed to the historical development of Petersburg. Herring were fished as a baitfish, kept alive in pounds and used in the lucrative king salmon fisheries of the 1920s. With the development of cold storage, canneries could supply the winter halibut fleet with frozen herring bait (Smythe 1988: 33, 34).

Herring has been used continuously by Petersburg and Wrangell households since the establishment of these communities. Herring is smoked, pickled, fried fresh, and frozen for home use. Harvest of herring roe on hemlock branches is a traditional use by Tlingit

residents of both communities, but is practiced less frequently in recent years (Betts et al 1994: Wrangell (Rev. 11/99): Smythe 1988: 34).

In 2000, the percent of households harvesting bottomfish in Wrangell were the following: halibut - 2.7 percent, rockfish - 17.3 percent, sablefish (black cod) - 2.0 percent, lingcod - 7.1 percent, and herring - 1.0 percent (Table B-1. Figure B-1). The mean household harvest in 2000 was the following: halibut - 45.23 lbs., rockfish - 20.57 lbs., sablefish (black cod) - 2.57 lbs., lingcod - 1.61 lbs and herring - 0.5 lbs. (Figure B-2).

In 2000, the percent of households harvesting bottomfish in Petersburg were the following: halibut - 33.6 percent, rockfish - 15.2 percent, sablefish (black cod) - 4.0 percent, lingcod - 4.8 percent, sole - 1.6 percent, and herring - 18.4 (Table B-2. Figure B-3). The mean household harvest in 2000 was the following: halibut - 52.3 lbs., red rockfish - 5.5 lbs., black rockfish - 1.3 lbs., sablefish (black cod) - 2.4 lbs., lingcod - 4.1 lbs., sole - 4.3 lbs, and herring - 27.4 lbs (Figure B-4).

2. Seasonality (a pattern of taking or use recurring in specific seasons of each year).

Many of the bottomfish species are available in the waters of southeast throughout the entire year. Consequently, historically they were harvested in open water at various times during the year, scheduled around the more seasonally restricted harvests of migrating species (especially salmon). The most intensive time for fishing bottomfish was in late winter and early spring and during fall when salmon species were not as abundant in local waters (de Laguna 1972:401; Oswalt 1966:305; Smythe 1988:30).

Harvest of herring took place historically as herring were needed and available. In recent years, herring may be caught year round, with spring being the months of intensive harvest. Herring eggs are taken exclusively in March and April, during the annual spawning runs.

3. Means and Methods of Harvest (A pattern of taking or use consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost).

Historically, hooks and lines of various types were the primary methods for harvesting bottomfish used by the Tlingit, Haida, and Tsimshian. Lures and spears were used for certain shallow-water bottomfish (de Laguna 1960, 1972; Drucker 1955: plate 3; Krause 1956:121; Niblack 1890:289, plates 30-31; Oswalt 1966:305; Rousselot et al 1988:154; Spencer and Jennings 1965:176; Stewart 1977: 28-67).

Four major types of hooks were used for harvesting bottomfish in Southeast Alaska: (1) Steam-bent U-shaped hooks of various sizes were used for harvesting cod, rockfish, halibut, and other bottomfish, especially in the southern portions of southeast by the Haida and Tsimshian. The U-shaped hooks were made of wood tipped with slender bone (and later iron) barbs, sometimes with bone or stone shanks. (2) Carved, V-shaped hooks were used for harvesting halibut, rockfish, cod, and other bottomfish, especially in the northern portions of southeast by the Tlingit. The V-shaped hooks were made of two

wood arms, fitted and lashed, and tipped with a bone or iron barb. (3) Jig or trolling hooks were used in Southeast Alaska for hooking cod and rockfish in deep water, and were constructed of wood shanks with a bone or iron barb. (4) Bi-pointed throat gorges were used for harvesting bottom feeders such as halibut and flounder. All four types of hooks were commonly set as single hooks, in pairs with rig spreaders, or as multiple hooks along long lines (skates). Sets were made to place the hook on or above the bottom. The hooks were typically baited with octopus or whole small fish. Set hooks were attached to wood or bladder floats, and were weighted with sinker stones. Sets were checked from open boats. Before linen, cotton, hemp, and, much later, synthetic line became available locally, line was made of a variety of materials, including spruce root and sinew in the northern part of the region, and bull kelp, nettle fiber, and cedar bark fiber in the southern part of the region. In addition, jigs and trolling hooks and throat gorges were jigged and trolled from canoes, with long leader made from doeskin, cedar bark twine, porcupine quill, or human hair; hooks were sunk deep for various cod species and rockfish with heavy sinker stones (Wolfe 1989).

Lures, spears, and leisters also were used for taking bottomfish, although this was less common than fishing with hooks. Wooden carved cod lures were pushed to the bottom with a pole and released. Cod following the rising lure were speared near the surface. Small fish such as tomcod, herring, and lingcod were cut, filled with pebbles, and used as lures on a line to attract cod to the surface, where they were speared. Spears and leisters were used for harvesting flounder by fishers wading in shallow mud flats and sand bars, and for taking flounder through the ice at river mouths. Small hand-held bag nets were also used in shallow water for capturing bottomfish. Also, flounder were sometimes taken in shallow water with beach seine nets (Wolfe 1989).

With the settlement of Southeast Alaska by fishers from the continental U.S., these techniques underwent modifications by the early 20th century. Initially, hooks were made incorporating iron, copying traditional designs. Eventually, manufactured metal hooks replaced wood and bone hooks, and linen replaced local fiber for line. The traditional hooking techniques for bottomfish continued, including set hooks, set long lines, jigging, and trolling. The attachment of hand-held lines to poles and rods, with and without reels, became a common method during the early part of the 20th century. When commercial bottomfish fisheries were developed, fishers involved in commercial fishing commonly retained for home use some bottomfish taken during commercial fishing, or used commercial gear outside the commercial season for home use, practices which continue today (Wolfe 1989).

Currently as in the past, most non-commercial rockfish and cod are taken with baited hooks on weighted lines. Lines are set with floats, held by hand, or attached to a pole with a reel. Halibut are taken with baited hooks on weighted lines. Most fishing for these species uses rod and reel gear. Although set lines (skates) are not allowed in regulation for the non-commercial harvest of halibut, the gear has been used by some fishers.

Historically, herring were caught with a fish rake, which was an oar shaped implement approximately 7 to 15 feet long with 40 or more teeth made from copper, wood or bone

embedded in the blade end. The teeth were made from nails in later times. The rake was drawn through the water in a paddle like motion when the herring were thick and the fish were impaled upon the teeth (Stewart 1977: 76, 77). Herring were also dipped out of the water with nets or baskets or caught with drag nets (seines).

Herring eggs were harvested by laying branches in quiet water in bays and coves, and then retrieving the branches with the spawn attached. Spawn-covered seaweed that was growing naturally was also collected (Stewart 1977: 124 - 127).

In recent years, herring are most often caught non-commercially for food and bait using a set gill net. To a lesser degree, herring are caught by jigging, using a hand line or rod and reel, and a line of shiny hooks. Herring eggs are still harvested using historic methods. The harvest of herring spawn on kelp is regulated by ADF&G, which issues subsistence permits with a specified harvest limit of 32 pounds for an individual or 158 pounds for a household of two or more persons.

4. Geographic Area (The area in which the noncommercial, long-term, and consistent pattern of taking, use, and reliance upon the fish stock or game population has been established).

Historically, most bottomfish were harvested in relatively deep, open marine waters of the bays and passages, and in ocean waters near the main winter settlement. Seasonal moves to camps nearer to halibut and cod fishing areas did occur (de Laguna 1972). Fishing areas were accessed by open boats, canoes in the prehistoric and early historic period; skiffs and larger watercraft during the late historic period. Some bottomfish were taken in shallow waters of bays and river mouths.

For some households involved in commercial fishing, some bottomfish retained for home use may be harvested in commercial fishing areas more distant from the home community.

Herring are found in marine waters throughout the region, and are often harvested in waters immediately adjacent to communities. Certain herring stocks used historically were depleted during the 19th and early 20th centuries by commercial fishing pressure, and are no longer available for harvest.

Currently, herring spawn is found in a few localized areas that may shift slightly from year to year but are generally persistent. Herring spawn areas-exist in the vicinity of Craig, Sitka, Hoonah, Angoon, Yakutat and Ketchikan. Among these, the particularly rich spawning grounds near Sitka and Craig are important areas that are used by residents of communities throughout the region, traveling to these sites just to obtain fresh spawn.

Residents of both Wrangell and Petersburg harvest halibut, bottomfish, and herring in Districts 7 and 8. Popular trolling locations include the waters of Wrangell Narrows, the mouth of the Stikine River, the near shore waters of Frederick Sound and of Mitkof and

Kupreanof islands, and the North Arm of Farragut Bay (Betts et al 1994: Wrangell and Petersburg (Rev. 11/99).

5. Means of Handling, Preparing, Preserving and Storing (a means of handling, preparing, preserving and storing fish which has been traditionally used by past generations, but not excluding recent technological advances where appropriate).

In the early historic period, most of the catch of bottomfish by Tlinigt, Haida, and Tsimshian was eaten fresh. Halibut, cod, and rockfish were also thinly cut, dried, and smoked over racks for later use, especially in northern southeast (de Laguna 1972:402; Stewart 1977:145). Most fish was boiled for eating in wooden or woven containers into which hot stones were dropped. Fish also were roasted and steamed and eaten with seal and hooligan oil (Stewart 1977:129).

As in the past, currently most bottomfish continue to be used fresh or fresh frozen in southeast communities. Sablefish and cod are still smoked, and some residents dry and smoke halibut. Cod is popular for making traditional Norwegian foods such as lutefisk and smoked black cod.

Historically, large quantities of herring were dried or roasted and eaten or pressed into oil. To make oil, the fish were usually allowed to age and then were boiled in wooden boxes full of water into which hot stones had been dropped. The grease or oil was then skimmed from the surface. Leftover fish were squeezed in mats and the grease that was obtained was stored in boxes or sometimes in the hollow stalks of giant kelp. The kelp stalks were soaked in fresh water to extract the salt, dried in the sun or the smoke of a dwelling, and then toughened and made pliable by rubbing with oil. Spawn-covered branches were hung in the sun on racks or lines, or spread out on mats and turned frequently to ensure all around drying. Sometimes the eggs were wiped off the branches and scattered on mats to finish drying. The dried egg masses were stored in lidded boxes for winter use.

More recently, whole herring are prepared like trout and pan-fried. They may be pickled, canned, smoked or frozen for future use, herring eggs are rinsed and either eaten fresh or frozen. When eaten, they are dipped in hot water until they turn opaque, then dipped in condiments or seal oil. Eggs may also be baked in the oven.

6. Intergenerational Transmission (a pattern or taking or use which includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation).

Halibut, flounder, and cod were among the fish mentioned as being released into the world by Raven from a floating bentwood box, according to a Tlingit origin story known widely in Southeast Alaska (Swanton 1909, Stewart 1977: 13). Catching large bottomfish from canoes was an activity infused with traditional lore and techniques. Fishers enlisted spirit helpers by talking to halibut lines and hooks, sang songs while hauling up fish. Floats and hooks were fashioned into the shapes of various powerful

animal spirits (Swanton 1908:452, 458; Stewart 1977:46, 161-177). Knowledge of productive halibut harvest locations are passed down from generation to generation. Along with salmon, halibut, cod, and rockfish were principal fish mentioned as harvested and used by the area's residents according to early historic records (Grinnell 1899:138-139; Krause 1956 [1885]:60, 120-24; Boas 1966 [1895]: 3; de Laguna 1960:116; 1972:401-2; Rousselot et al. 1988: 152-3).

Herring has been used continuously by Petersburg and Wrangell households since the establishment of these communities. Herring fishing locations used today are similar or identical to those used traditionally. Fishing methods for whole herring have changed over time. Herring spawn harvests utilize methods that have been passed through generations of users.

7. Distribution and Exchange (a pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving).

Historically, the fish produced by the Tlingit, Haida, and Tsimshian were shared and consumed among large extended family groups who traced common ancestry through lineages and clans, and who resided within large wooden clan houses. Large quantities of food also was prepared and given away by the headmen of the extended families in elaborate feasts and ceremonies to publicly demonstrate and validate rank, status, and prestige within the social group. The Tlingit, Haida, and Tsimshian were also avid traders, and fish and fish oil were primary trade items (Oswalt 1966:305). The giving and receiving of fish between families is still practiced in many communities of southeast.

In 2000 almost forty nine percent of Wrangell households reported receiving halibut and twenty three percent reported giving halibut away. Eleven percent of Wrangell households reported receiving rockfish and six percent reported giving rockfish away (Table B-1. Figure B-5). In 2000 almost fifty percent of Petersburg households reported receiving halibut and almost eighteen percent reported giving halibut away. Almost thirteen percent of Petersburg households reported receiving rockfish and two percent reported giving rockfish away (Table B-2. Figure B-6). Eighteen percent of Petersburg households reported harvesting herring, almost five percent of the households received herring and five percent gave herring away (Table B-2).

Particularly in the case of herring roe, this finding is consistent with the fact that while herring may be found throughout the region, they are abundant only in certain areas and their spawning sites are even more localized. Herring eggs are a highly valued food by Natives and some non-Natives, so the available spawn is widely shared among and within communities. In 2000 ten percent of Wrangell households reported using herring roe even though no households reported harvesting. Six percent of Wrangell households reported giving away some of the herring roe they received (Table B-2).

8. Diversity and Economic, Cultural, Social, and Nutritional Elements (a pattern that includes taking, use, and reliance for subsistence purposes upon a wide variety of the fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life).

Marine fish were the mainstay of the economies of Southeast Alaska communities at historic contact. They were harvested along with other fish (salmon, herring, and eulachon), marine invertebrates, seal, deer, black bear, and a number of other species. The historic fish harvests of Southeast Alaska were so large and reliable, that they were the basis for the development of the complex non-agrarian Northwest Coast culture characterized by large populations, social stratification, and elaborate art and ceremonial systems (Spencer and Jennings 1965:168).

In 2000, Wrangell households harvested an average of just over 10 different resources and some households used as many as 45 different animal or plant species. Halibut was top ranked among the most used species by Wrangell households, 68 percent of the households surveyed reported using halibut in 2000 (Table B-3).

Table B-3. Top Ten Species Used by the Most Wrangell Households, 2000

	Wrangell 2000	% HH
1	Halibut	68.4%
2	Shrimp	68.4%
3	Chinook Salmon	67.3%
4	Dungeness Crab	63.3%
5	Berries	56.1%
6	Deer	48.0%
7	Sockeye Salmon	38.8%
8	Clams & Cockles	34.7%
9	Moose	31.6%
10	Cutthroat Trout	29.6%

Petersburg households harvested an average of 9 different resources and some households used as many as 31 different animal or plant species. Halibut was the species used by the most Petersburg households with almost 72 percent of the households surveyed reported using halibut in 2000 (Table B-4).

Table B-4. Top Ten Species Used by the Most Petersburg Households, 2000

	Petersburg	% HH
1	Halibut	72.0%
2	Dungeness Crab	67.2%
3	Chinook Salmon	64.8%
4	Berries	55.2%
5	Coho Salmon	45.6%
6	Deer	40.0%
7	King Crab	36.0%
8	Shrimp	33.6%
9	Clams & Cockles	32.8%
10	Tanner Crab	28.8%

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Table B-1. Harvest of Halibut, Bottomfish and Herring for Home Use, Wrangell, 2000

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total Number		Mean HH
Herring	1.0	1.0	1.0	0.0	0.0	381.1	0.5	0.2	381.1	lbs	0.5
Herring Roe	10.2	0.0	0.0	10.2	6.1	0.0	0.0	0.0	0.0	lbs	0.0
Herring Roe/Unspecified	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lbs	0.0
Herring Spawn on Kelp	3.1	0.0	0.0	3.1	1.0	0.0	0.0	0.0	0.0	lbs	0.0
Herring Roe on Hair Seaweed	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	lbs	0.0
Herring Roe on Hemlock Branches	10.2	0.0	0.0	10.2	6.1	0.0	0.0	0.0	0.0	lbs	0.0
Cod	2.0	0.0	0.0	2.0	1.0	0	0.00	0.00	0	ea.	0.00
Pacific Cod (gray)	0.0	0.0	0.0	0.0	0.0	0	0.00	0.00	0	ea.	0.00
Pacific Tom Cod	1.0	0.0	0.0	1.0	1.0	0	0.00	0.00	0	ea.	0.00
Walleye Pollock (whiting)	1.0	0.0	0.0	1.0	0.0	0	0.00	0.00	0	ea.	0.00
Unknown Cod	1.0	0.0	0.0	1.0	0.0	0	0.00	0.00	0	ea.	0.00
Flounder	1.0	0.0	0.0	1.0	0.0	0	0.00	0.00	0	ea.	0.00
Unknown Flounder	1.0	0.0	0.0	1.0	0.0	0	0.00	0.00	0	ea.	0.00
Greenling	12.2	7.1	7.1	6.1	3.1	1,201	1.61	0.61	191	ea.	0.26
Lingcod	12.2	7.1	7.1	6.1	3.1	1,201	1.61	0.61	191	ea.	0.26
Rock Greenling	0.0	0.0	0.0	0.0	0.0	0	0.00	0.00	0	ea.	0.00
Halibut	68.4	35.7	32.7	49.0	23.5	33,790	45.23	17.25	33,790	lbs	45.23
Rockfish	27.6	18.4	17.3	11.2	6.1	15,367	20.57	7.84	3,842	ea.	5.14
Black Rockfish	6.1	5.1	5.1	2.0	2.0	1,951	2.61	1.00	488	ea.	0.65
Red Rockfish	26.5	17.3	16.3	11.2	5.1	12,501	16.73	6.38	3,125	ea.	4.18
Unknown Rockfish	1.0	1.0	1.0	0.0	0.0	915	1.22	0.47	229	ea.	0.31
Sablefish (black cod)	15.3	2.0	2.0	14.3	3.1	1,921	2.57	0.98	480	ea.	0.64
Shark	1.0	1.0	1.0	0.0	0.0	412	0.55	0.21	46	ea.	0.06
Dogfish	1.0	1.0	1.0	0.0	0.0	412	0.55	0.21	46	ea.	0.06
Sole	1.0	0.0	0.0	1.0	0.0	0	0.00	0.00	0	ea.	0.00
Unknown Sole	1.0	0.0	0.0	1.0	0.0	0	0.00	0.00	0	ea.	0.00

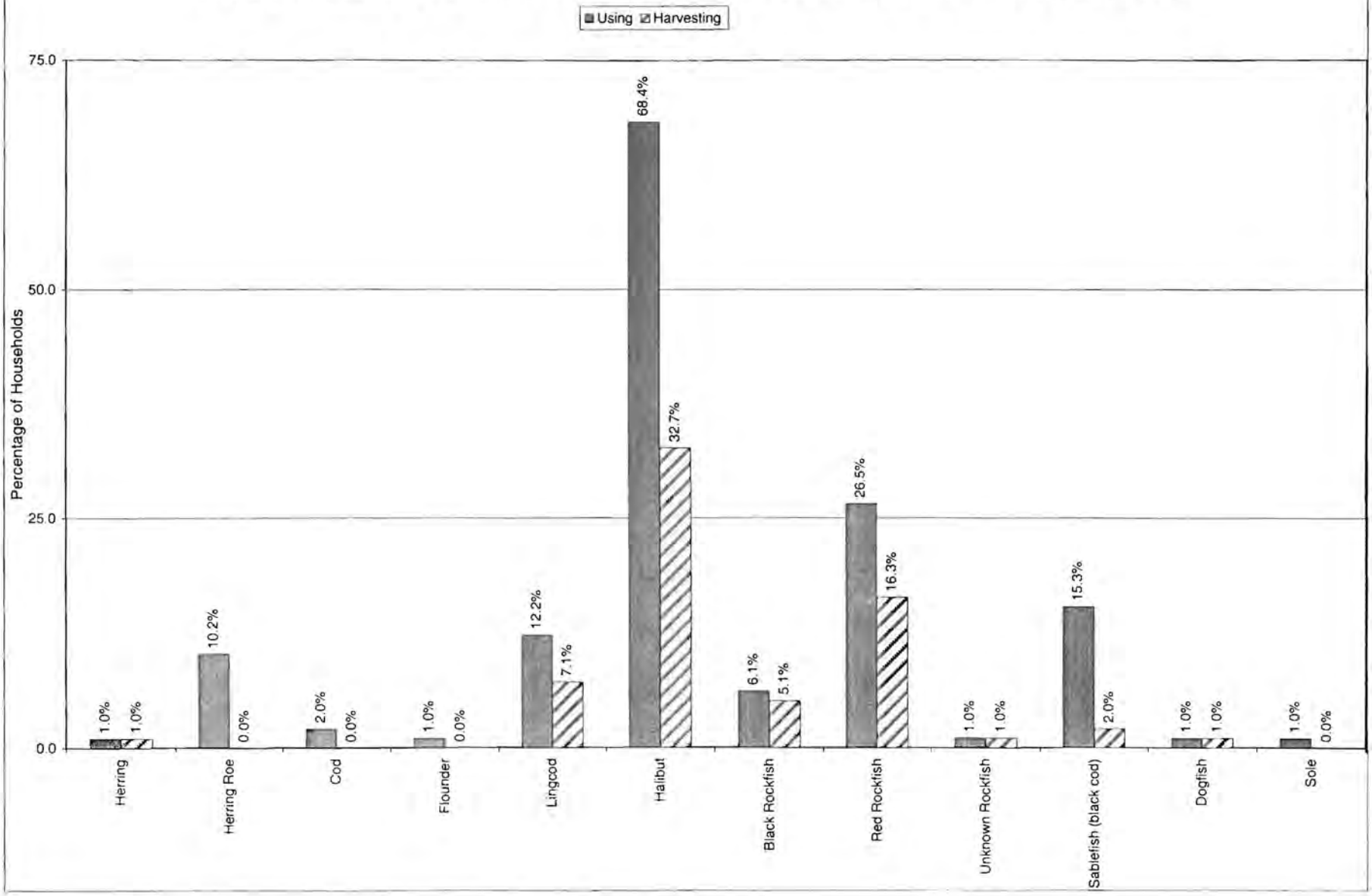
Source: ADFG Division of Subsistence, Household surveys 2001

Table B-2. Harvest of Halibut, Bottomfish and Herring for Home Use, Petersburg, 2000

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	tal Number		Mean HH
Herring	19.2	18.4	18.4	4.8	4.8	29,352.2	27.4	10.0	29,352.2	lbs	27.4
Herring Roe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lbs	0.0
Herring Roe/Unspecified	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lbs	0.0
Herring Spawn on Kelp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lbs	0.0
Herring Roe on Hair Seaweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lbs	0.0
Herring Roe on Hemlock Branches	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lbs	0.0
Cod	14.4	7.2	7.2	8.0	1.6	5,204.5	4.86	1.77	1,626.4	ea.	1.52
Pacific Cod (gray)	12.8	7.2	7.2	6.4	1.6	5,204.5	4.86	1.77	1,626.4	ea.	1.52
Unknown Cod	1.6	0.0	0.0	1.6	0.0	0.0	0.00	0.00	0.0	ea.	0.00
Greenling	6.4	4.8	4.8	1.6	1.6	4,422.1	4.13	1.50	701.9	ea.	0.66
Lingcod	6.4	4.8	4.8	1.6	1.6	4,422.1	4.13	1.50	701.9	ea.	0.66
Halibut	72.0	39.2	33.6	49.6	17.6	55,973.8	52.31	19.01	55,973.8	lbs	52.31
Perch	0.8	0.0	0.0	0.8	0.8	0.0	0.00	0.00	0.0	ea.	0.00
Rockfish	26.4	16.0	15.2	12.8	2.4	8,423.0	7.87	2.86	2,105.8	ea.	1.97
Black Rockfish	3.2	3.2	3.2	0.0	0.0	1,369.6	1.28	0.47	342.4	ea.	0.32
Red Rockfish	23.2	12.8	12.0	12.0	2.4	5,855.0	5.47	1.99	1,463.8	ea.	1.37
Unknown Rockfish	2.4	1.6	1.6	0.8	0.0	1,198.4	1.12	0.41	299.6	ea.	0.28
Sablefish (black cod)	17.6	4.0	4.0	13.6	4.0	2,533.8	2.37	0.86	633.4	ea.	0.59
Sculpin	0.8	0.8	0.8	0.0	0.0	256.8	0.24	0.09	256.8	ea.	0.24
Skates	0.8	0.8	0.8	0.8	0.0	2,653.6	2.48	0.90	530.7	ea.	0.50
Sole	2.4	1.6	1.6	0.8	0.0	4,622.4	4.32	1.57	4,622.4	ea.	4.32
Unknown Sole	2.4	1.6	1.6	0.8	0.0	4,622.4	4.32	1.57	4,622.4	ea.	4.32

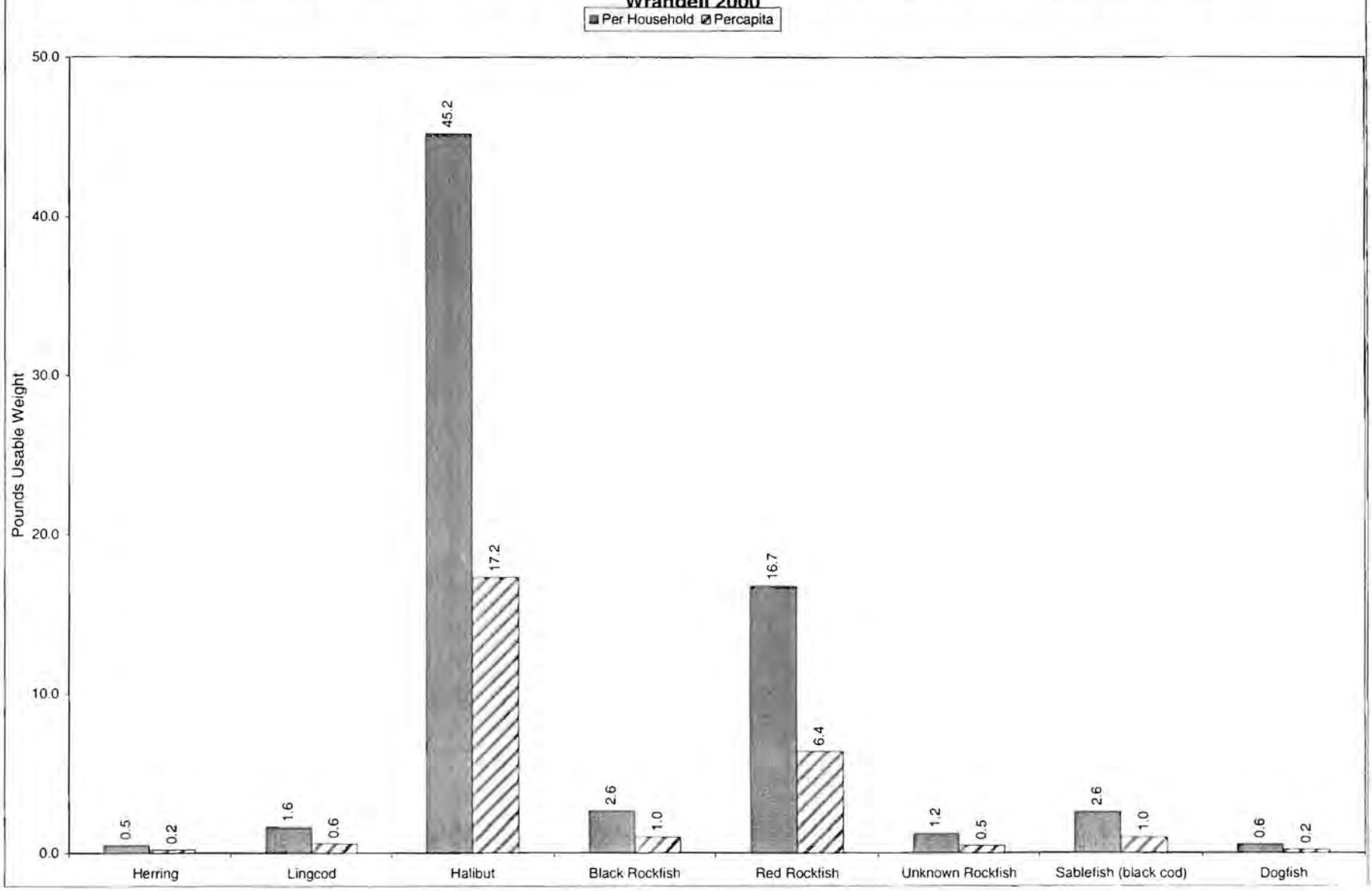
Source: ADFG Division of Subsistence, Household surveys 2001

Figure B-1. Percentage of Households Using and Harvesting Halibut, Bottomfish & Herring, Wrangell 2000



Source: ADFG Division of Subsistence
Household Surveys

Figure B- 2. Harvest of Bottomfish, Halibut & Herring for Home Use, Pounds Per Household and Per Capita, Wrangell 2000



Source: ADFG Division of Subsistence Household Surveys

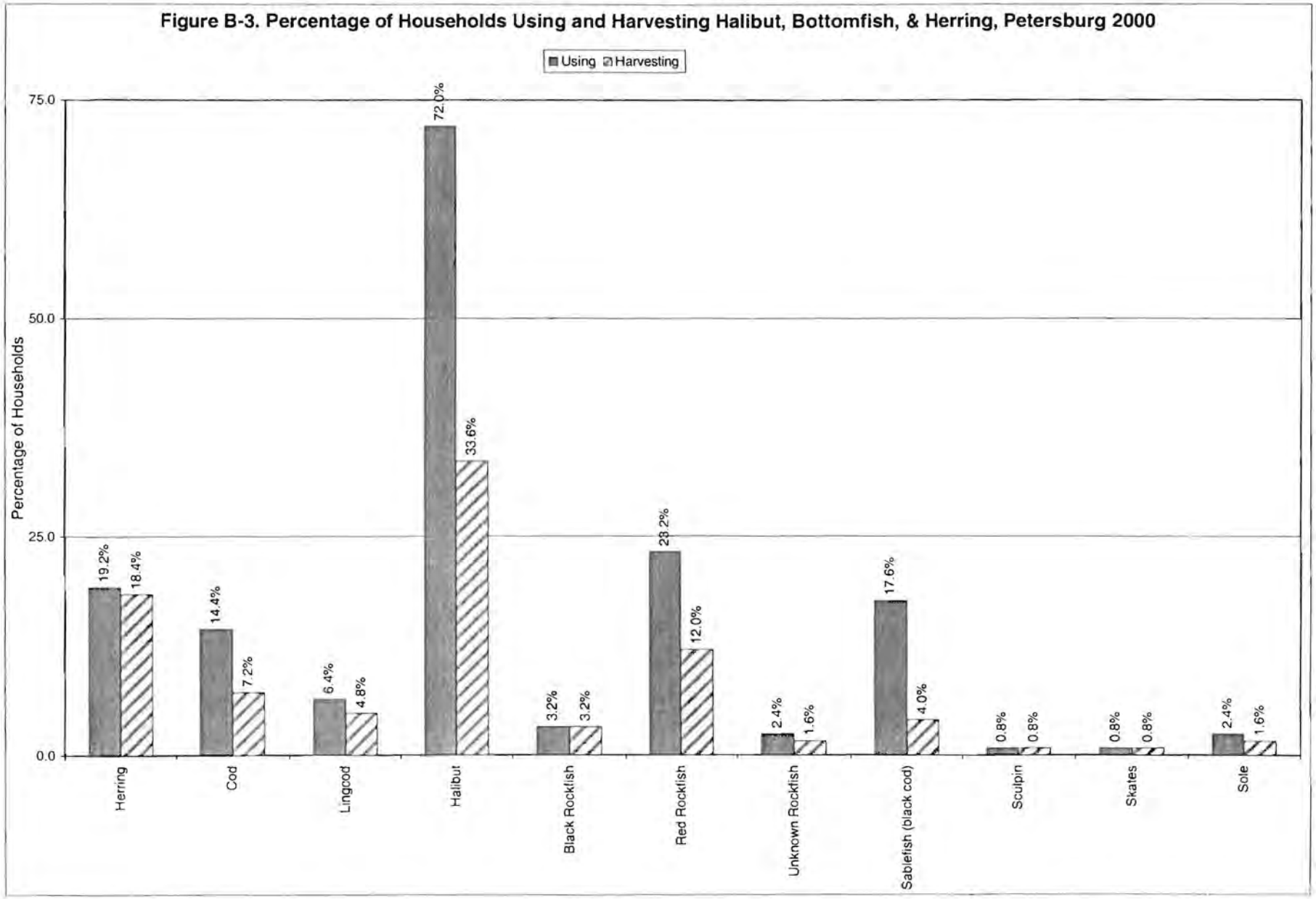
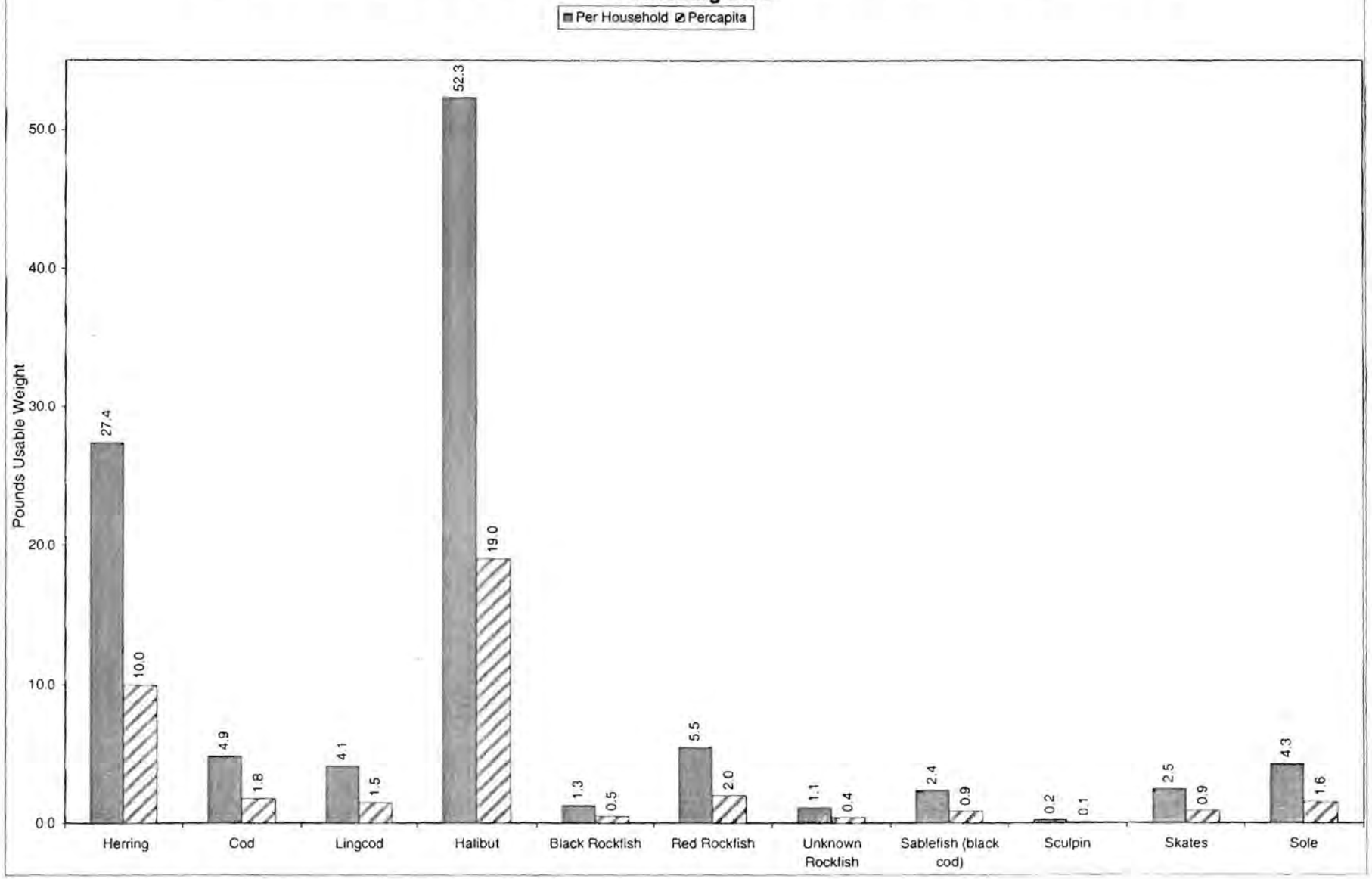


Figure B-3. Percentage of Households Using and Harvesting Halibut, Bottomfish, & Herring, Petersburg 2000

Source: ADFG Division of Subsistence Household Surveys

Figue B-4. Harvest of Halibut, Bottomfish & Herring for Home Use, Pounds Per Household and Per Capita, Petersburg 2000



Source: ADFG Division of Subsistence Household Surveys

CUSTOMARY AND TRADITIONAL USE WORKSHEET
Shellfish in Districts 7 & 8
Prepared by the Division of Subsistence
Alaska Department of Fish and Game

Alaska Board of Fisheries, Sitka Alaska
January 2003

PROPOSAL NUMBER: 114
FISHING DISTRICTS: 7 & 8
SPECIES/STOCK: Shellfish, all species
MAIN COMMUNITIES USING THE SPECIES
Wrangell and Petersburg

Note: This worksheet contains background information on the uses of shellfish in Fishing Districts 7 and 8. The Board of Fisheries requires this information in order to determine whether there are "customary and traditional" (subsistence) uses of shellfish in this area. It is intended that the information in this worksheet be supplemented by any written and oral public testimony provided during the board meeting.

1. Length and consistency of use (a long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the users' control, such as unavailability of the fish caused by migratory patterns).

Archeological evidence points to continuous use of shellfish by inhabitants of Southeast Alaska for at least 9000 years, which is the entire known period of human occupancy. Reports by numerous anthropologists and travelers in the past century have remarked on uses of shellfish including dungeness and king crab, clams and cockles, whelks, limpets, abalone, sea urchins, chitons, sea cucumber and octopus. Harvest of these species continues throughout the region in all communities, to varying degrees depending on species availability.

Wrangell was an important Tlingit site due to its proximity to the Stikine River, which was a trade route to the Interior. The Wrangell Indians are descended from the Stikine *kwaan*. They occupied the mainland coast from Cape Fanshaw southward to Cleveland Peninsula, the eastern half of Kupreanof Island, all of Mitkof, Zarembo, and Etolin Islands, and the northeastern coast of Prince of Wales Island from Red Bay to Thorne Bay. (Betts et al 1994: Wrangell (Rev. 11/99): 1-2; Cohen 1989: 12-13).

The community of Petersburg is located on the north end of Mitkof Island where Wrangell Narrows meets Frederick Sound. Prior to Petersburg's development by homesteaders and fishermen at the turn of the 20th century, Tlingit use of the area occurred at many small settlements. The population of Petersburg is primarily of Euro-

American cultural heritage. Petersburg was developed by people from the continental United States, many were recent immigrants from European countries, especially Norway. In the early years, immigrants also came to Petersburg directly from Norway (Betts et al 1994: Petersburg (Rev. 11/99): 1-2; Smythe 1988: 21).

By 1916 canneries in Wrangell and Petersburg were processing shrimp for commercial sale. Wrangell and Petersburg residents have harvested dungeness crab for home use since at least the early 1900s. King and tanner crab have been commercially harvested since the late 1940s. Clams and cockles were harvested prior to European contact and heavily utilized throughout the history of these two communities (Betts et al 1994: Wrangell (Rev. 11/99); Smythe 1988: 35, 36).

In 2000, 45.9 percent of Wrangell households reported harvesting marine invertebrates. The following species were reported harvested by Wrangell households: 1.0 percent of households reported harvesting chitons, 29.6 percent reported harvesting clams, 17.3 percent reported harvesting cockles, 31.6 percent reported harvesting crabs, 1.0 percent reported harvesting mussels, 2.0 percent reported harvesting octopus, 2.0 percent reported harvesting scallops, 4.1 percent reported harvesting sea cucumber, and 19.4 percent reported harvesting shrimp (Table C-1, Figure C-1).

The mean household harvest of all marine invertebrates for Wrangell in 2000 was 156.20 lbs. The mean household harvest for the following species: clams 16.45 lbs., cockles 6.01 lbs., crabs 57.86 lbs., scallops 0.50 lbs., sea cucumber 2.16 lbs., and shrimp 72.86 lbs. (Table C-1, Figure C-2).

In 2000, 44.8 percent of Petersburg households reported harvesting marine invertebrates. The following species were reported harvested by Petersburg households: 3.2 percent of households reported harvesting chitons, 25.6 percent reported harvesting clams, 7.2 percent reported harvesting cockles, 33.6 percent reported harvesting crabs, 7.2 percent reported harvesting octopus, and 13.6 percent reported harvesting shrimp (Table C-2, Figure C-3).

The mean household harvest of all marine invertebrates for Petersburg in 2000 was 102.14 lbs. The mean household harvest for the following species: clams 14.75 lbs., cockles 1.08 lbs., crabs 45.50 lbs., and shrimp 38.14 lbs. (Table C-2, Figure C-4).

2. Seasonality (a pattern of taking or use recurring in specific seasons of each year).

Historically, most shellfish were consumed in the fall and winter months. This time of harvest coincides with the low tides of the year, which is important for harvest of inter-tidal species. Additional historic sources say that female crabs were harvested in the spring when they entered shallow water to lay eggs.

Contemporary use of shellfish takes place throughout the year. Crab pots make crab harvests possible in the spring and summer, which is the period of most crab harvest.

Likewise, shrimp pots make harvest of shrimp possible at any time, but the weather often precludes much winter non-commercial shrimping. Exceptions can be found in situations where shrimp or crab are taken in the course of a winter hunting trip. Inter-tidal species are taken during low tides throughout the year, but the lowest tides in the region occur in the winter. This also is the time of minimal concern for paralytic shellfish poisoning. Octopus may be found year round in shallow inter-tidal rocky areas.

3. Means and Methods of Harvest (A pattern of taking or use consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost).

Historically, Dungeness crab were speared or kicked out of the mud at low tide. In some cases, special digging sticks were used for crab and other shellfish. King and tanner crab were often caught in deeper water while harvesting other species, as when they would become entangled in a net or fishing line or would grab a baited hook and be taken to the surface. Many other species were simply gathered at low tide.

More recent harvest of crab and shrimp has utilized pots or webbed rings. Rakes or shovels may also be used in shallow inter-tidal areas. King crab are taken with pots, webbed rings or baited hand lines. Additionally, crab and shrimp are frequently removed from commercial catches for home use.

Many intertidal invertebrates still are simply gathered or dug at low tide. This would pertain to clams, cockles, gumboot chitons, sea urchins and sea cucumber. Octopus are found inter-tidally in small caves or rock overhangs from which they can be extricated using a long-handled hook. Abalone are generally picked off rocks at low tide. In some areas diving gear has become a method of harvest. The cost of this gear and the skills required to use it limits its use considerably.

4. Geographic Area (The area in which the noncommercial, long-term, and consistent pattern of taking, use, and reliance upon the fish stock or game population has been established).

Shellfish harvest areas are generally coastal flats, rocky headlands and sheltered bays, in close proximity to a community. Wrangell is located near rich shellfish grounds and noncommercial crabbing is common because good grounds are convenient. Wrangell households harvest three species of crab: king, tanner and dungeness. Shrimp are more difficult to harvest, nonetheless, five species of shrimp are harvested; northern pink, sidestripe, coonstripe, spot, and occasionally, humpy. Crab is harvested off the west shore of Wrangell Island between Thoms Place and Point Highfield. Crab and shrimp are also harvested in the waters of Eastern Passage or "Back Channel" as far south as Channel Island. Marine invertebrates gathered in inter-tidal and sub-tidal areas include sea urchins, abalone, scallops, gumboots, sea cucumbers, clams and cockles. Other less common species include limpets, blue mussels, moon snails and oysters (Cohen 1989: 79-85).

Shellfish is recognized as an important resource by Petersburg households and are harvested over a large area extending from Sandy Beach north of town down along the Narrows and through Beecher Pass to much of Duncan Canal. Historically, dungeness crab were harvested non-commercially by Petersburg residents, who speared them from rowboats near the mouth of Petersburg Creek, and otherwise gathered them from the flats north of Petersburg and in Wrangell Narrows. Clams and cockles were also dug from beaches at the north end of Mitkof Island, and the flats of Petersburg Creek. Chitons are gathered primarily by Tlingit families living in Petersburg (Smythe 1988: 35, 36, 90-94).

Commercial shrimp fishing in Thomas Bay and Duncan Canal and commercial crabbing has involved many Petersburg families. Shrimp continues to be retained from commercial catches for home use. The majority of clam, crab, and shrimp harvest took place in areas close to Petersburg (Betts et al 1994: Petersburg (Rev. 11/99).

5. Means of Handling, Preparing, Preserving and Storing (a means of handling, preparing, preserving and storing fish which has been traditionally used by past generations, but not excluding recent technological advances where appropriate).

Shellfish are eaten fresh, either raw or cooked in a variety of ways. Means of preservation include freezing and, traditionally, drying (clams and cockles). Clams are occasionally canned. Octopus is pickled, boiled, or fried for human consumption and also used as halibut bait.

6. Intergenerational Transmission (a pattern or taking or use which includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation).

In addition to generations of Tlingit residents, Wrangell's non-Native population derives historically from early Russian occupation in the early 1800s, followed by American influx with the commercial fishing, logging, and mining industries throughout the 20th century. The population of Petersburg is primarily of Euro-American cultural heritage in addition to Tlingit residents. Commercial fishing brought people to Petersburg from the continental United States, many of whom were recent immigrants from European countries, especially Norway. In the early years, immigrants also came to Petersburg directly from Norway. Many of these immigrants came from fishing villages in Norway.

Methods of harvest and harvest areas for shellfish have endured throughout the region. Because shellfish are a highly valued food, residents of the region are aware of seasonal harvest opportunities and efficient harvest methods.

Survey data indicate that ethnicity influences the use of certain species of shellfish over others in Southeast Alaska. For example, more Alaska Native households used cockles and gumboots than did non-Native households, while both groups traditionally and currently use clams. Values associated with food choices are generally passed between generations. In addition, attitudes towards harvesting reflect traditional methods and

values of long standing. For example, respondents who grew up using wild resources in their households attached a high value to "cultural background" (that is, knowledge and skills learned from elders) in their personal motivation for continuing to use wild resources.

7. Distribution and Exchange (a pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving).

Shellfish are highly valued foods in the region, but not found everywhere, so they are frequently shared among households and communities. Researchers have found that in many communities a few harvesting individuals may be responsible for supplying shellfish to many households. This is especially true with shrimp and crab, which utilize special equipment for harvest. Abalone which are found in remote areas and are no longer abundant in the inter-tidal zone, are similarly shared. Clams are shared also, although because of their ease of harvest they are not shared as widely as some other species.

Survey data for 2000 indicate that 42.9 percent of Wrangell households harvesting inter-tidal resources, including shellfish, shared their harvests with other households. Survey data for 2000 indicate that 32 percent of Petersburg households harvesting inter-tidal resources, including shellfish, shared their harvests with other households. Data also indicate that residents who do not harvest shellfish often receive it from those who harvested, suggesting a dependence of some households on others for wild foods, as well as social obligations of harvesting households towards other. In addition, shellfish were used in community dinners and traditional feasts, as well as for gifts to relatives and friends in other communities.

8. Diversity and Economic, Cultural, Social, and Nutritional Elements (a pattern that includes taking, use, and reliance for subsistence purposes upon a wide variety of the fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life).

In 2000, Wrangell households harvested an average of just over 10 different resources and some households used as many as 45 different animal or plant species. Three shellfish species were listed in the top ten species used by the most households in Wrangell. Shrimp was the second most used resource, 68.4 percent of the households reported using. Dungeness crab was the fourth most used resource, 63.3 percent of the households reported using. Clams were the eighth most used resource, 34.7 percent of the households reported using (Table C-5).

Table C-5. Top Ten Species Used by the Most Wrangell Households, 2000

	Wrangell 2000	% HH
1	Halibut	68.4%
2	Shrimp	68.4%
3	Chinook Salmon	67.3%
4	Dungeness Crab	63.3%
5	Berries	56.1%
6	Deer	48.0%
7	Sockeye Salmon	38.8%
8	Clams	34.7%
9	Moose	31.6%
10	Cutthroat Trout	29.6%

In 2000, Petersburg households harvested an average of 9 different resources and some households used as many as 31 different animal or plant species. Five shellfish species were listed in the top ten species used by the most households in Petersburg. Dungeness crab was the second most used resource, 67.2 percent of the households reported using. King crab was the seventh most used resource, 36.0 percent of the households reported using. Shrimp, 33.6 percent of the households reported using; Clams and cockles, 32.8 percent of the households reported using,, and tanner crab, 28.8 percent of the households reported using. These species were the eighth, ninth, and tenth most used resources in Petersburg (Table C-6).

Table C-6. Top Ten Species Used by the Most Petersburg Households, 2000

	Petersburg	% HH
1	Halibut	72.0%
2	Dungeness Crab	67.2%
3	Chinook Salmon	64.8%
4	Berries	55.2%
5	Coho Salmon	45.6%
6	Deer	40.0%
7	King Crab	36.0%
8	Shrimp	33.6%
9	Clams	32.8%
10	Tanner Crab	28.8%

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Table C-1. Estimated Harvest and Use of Shellfish Resources, Wrangell, 2000

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested	
	Use	Att	Harv	Receive	Give	Total	Mean HH	Percapita	Total	Mean HH
All Resources	**93.9**	**82.7**	**80.6**	**88.8**	**65.3**	**328,141.2**	**439.28**	**167.51**	**328,141.2 lbs**	**439.28**
Marine Invertebrates	82.7	46.9	45.9	72.4	42.9	116,684.5	156.20	59.56	116,684.5 lbs	156.20
Abalone	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Chitons (bidarkis, gumboots)	**2.0**	**1.0**	**1.0**	**1.0**	**0.0**	**114.3**	**0.15**	**0.06**	**38.1 gal**	**0.05**
Red (large) Chitons	1.0	1.0	1.0	0.0	0.0	114.3	0.15	0.06	38.1 gal	0.05
Black (small) Chitons	1.0	0.0	0.0	1.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Unknown Chitons	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Clams	**34.7**	**29.6**	**29.6**	**14.3**	**16.3**	**12,288.8**	**16.45**	**6.27**	**3,372.9 gal**	**4.52**
Butter Clams	14.3	12.2	12.2	5.1	10.2	4,358.7	5.83	2.23	979.5 gal	1.31
Horse Clams (Gaper)	6.1	6.1	6.1	1.0	3.1	1,543.4	2.07	0.79	346.8 gal	0.46
Pacific Littleneck Clams (Steamers)	30.6	25.5	25.5	11.2	13.3	6,293.9	8.43	3.21	2,023.8 gal	2.71
Pinkneck Clams	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Razor Clams	2.0	1.0	1.0	1.0	0.0	28.2	0.04	0.01	7.6 gal	0.01
Unknown Clams	1.0	1.0	1.0	0.0	0.0	64.6	0.09	0.03	15.2 gal	0.02
Cockles	**22.4**	**17.3**	**17.3**	**8.2**	**10.2**	**4,486.3**	**6.01**	**2.29**	**1,442.5 gal**	**1.93**
Heart Cockles	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.00
Crabs	**64.3**	**33.7**	**31.6**	**52.0**	**23.5**	**43,220.5**	**57.86**	**22.06**	**27,982.0 ea.**	**37.46**
Box Crab	1.0	1.0	1.0	0.0	0.0	0.0	0.00	0.00	38.1 ea.	0.05
Dungeness Crab	**63.3**	**31.6**	**29.6**	**43.9**	**22.4**	**30,426.4**	**40.73**	**15.53**	**23,050.3 ea.**	**30.86**
King Crab	**15.3**	**5.1**	**5.1**	**12.2**	**5.1**	**6,807.5**	**9.11**	**3.48**	**1,265.3 ea.**	**1.69**
Blue King Crab	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Brown King Crab	5.1	1.0	1.0	4.1	3.1	1,230.3	1.65	0.63	228.7 ea.	0.31
Red King Crab	13.3	4.1	4.1	10.2	4.1	5,577.2	7.47	2.85	1,036.7 ea.	1.39
Unknown King Crab	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Tanner Crab	**23.5**	**9.2**	**9.2**	**15.3**	**7.1**	**5,986.7**	**8.01**	**3.06**	**3,628.3 ea.**	**4.86**
Tanner Crab, Bairdi	23.5	9.2	9.2	15.3	7.1	5,986.7	8.01	3.06	3,628.3 ea.	4.86
Unknown Crab	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Geoducks	3.1	0.0	0.0	3.1	1.0	0.0	0.00	0.00	0.0 gal	0.00
Limpets	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Mussels	**1.0**	**1.0**	**1.0**	**0.0**	**1.0**	**11.4**	**0.02**	**0.01**	**7.6 gal**	**0.01**
Unknown Mussels	1.0	1.0	1.0	0.0	1.0	11.4	0.02	0.01	7.6 gal	0.01
Octopus	**3.1**	**2.0**	**2.0**	**1.0**	**1.0**	**146.4**	**0.20**	**0.07**	**22.9 ea.**	**0.03**
Oyster	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Scallops	**5.1**	**2.0**	**2.0**	**3.1**	**0.0**	**376.5**	**0.50**	**0.19**	**228.7 gal**	**0.31**
Weathervane Scallops	3.1	2.0	2.0	1.0	0.0	314.4	0.42	0.16	190.6 gal	0.26
Rock Scallops	2.0	1.0	1.0	1.0	0.0	62.1	0.08	0.03	38.1 gal	0.05
Unknown Scallops	1.0	0.0	0.0	1.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Sea Cucumber	**6.1**	**4.1**	**4.1**	**3.1**	**4.1**	**1,616.0**	**2.16**	**0.82**	**202.0 gal**	**0.27**
Yein Sea Cucumber	6.1	4.1	4.1	3.1	4.1	1,616.0	2.16	0.82	202.0 gal	0.27
Unknown Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Green Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Red Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Purple Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Unknown Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Shrimp	**68.4**	**19.4**	**19.4**	**57.1**	**24.5**	**54,424.3**	**72.86**	**27.78**	**6,803.0 gal**	**9.11**
Squid	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00

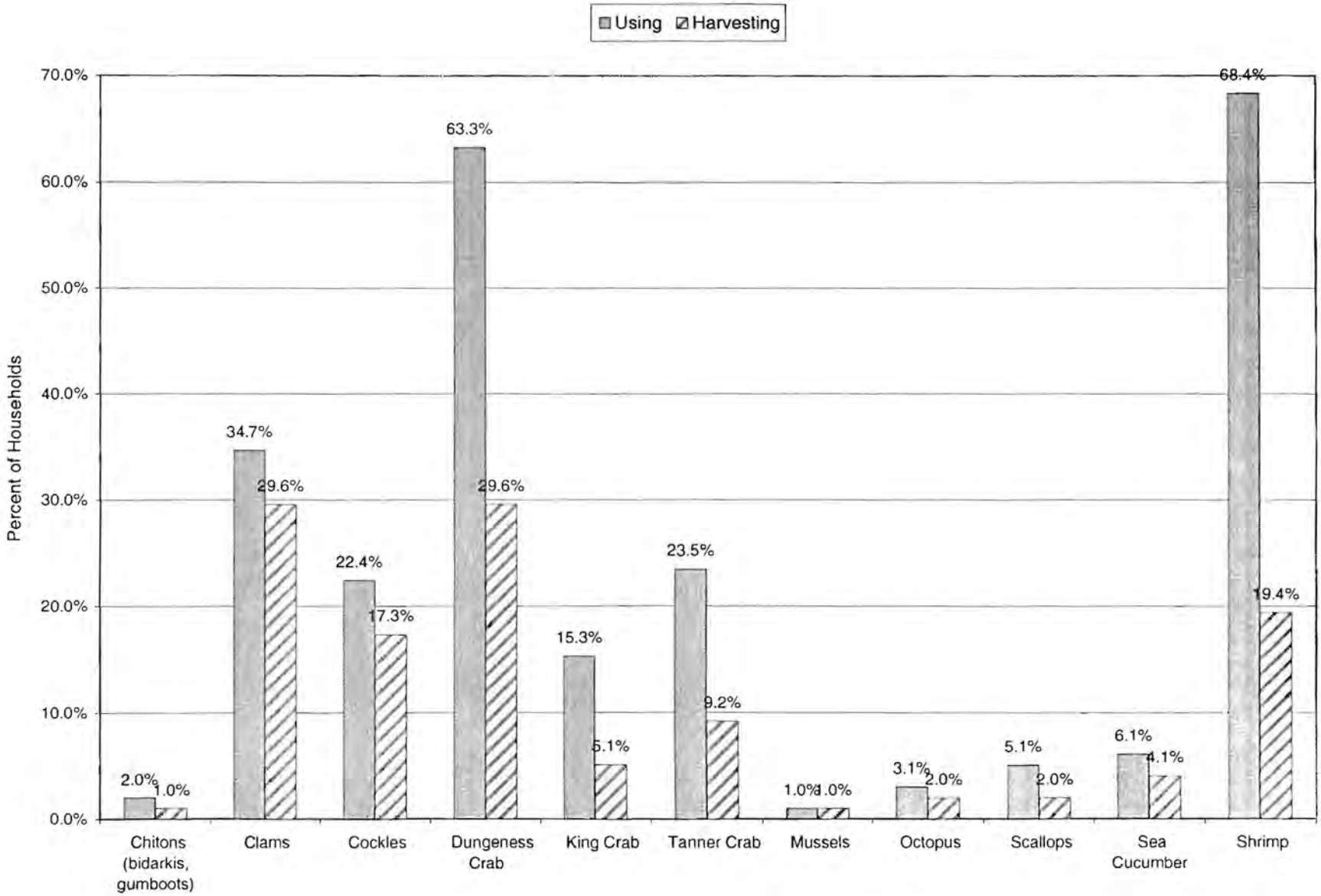
Source: ADFG Division of Subsistence, Household surveys 2001

Table C-2. Estimated Harvest and Use of Shellfish Resources, Petersburg, 2000

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested	
	Use	Att	Harv	Receive	Give	Total	Mean HH	Percapita	Total	Mean HH
All Resources	**93.6**	**80.8**	**77.6**	**80.8**	**43.2**	**475,321.4**	**444.23**	**161.42**	**475,321.4 lbs**	**444.23**
Marine Invertebrates	81.6	44.8	44.8	69.6	32.0	109,286.5	102.14	37.11	109,286.5 lbs	102.14
Abalone	0.8	0.0	0.0	0.8	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Chitons (bidarkis, gumboots)	**5.6**	**3.2**	**3.2**	**2.4**	**0.8**	**597.2**	**0.56**	**0.20**	**81.3 gal**	**0.08**
Red (large) Chitons	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Black (small) Chitons	4.0	2.4	2.4	1.6	0.8	513.6	0.48	0.17	68.5 gal	0.06
Unknown Chitons	1.6	0.8	0.8	0.8	0.0	83.6	0.08	0.03	12.8 gal	0.01
Clams	**32.8**	**26.4**	**25.6**	**12.0**	**11.2**	**15,780.9**	**14.75**	**5.36**	**4,404.1 gal**	**4.12**
Butter Clams	19.2	14.4	14.4	7.2	5.6	5,732.8	5.36	1.95	1,288.3 gal	1.20
Horse Clams (Gaper)	1.6	1.6	1.6	1.6	0.8	380.9	0.36	0.13	85.6 gal	0.08
Pacific Littleneck Clams (Steamers)	14.4	12.8	12.8	2.4	4.8	7,294.3	6.82	2.48	2,345.4 gal	2.19
Pinkneck Clams	3.2	3.2	3.2	0.0	1.6	1,284.0	1.20	0.44	428.0 gal	0.40
Razor Clams	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Unknown Clams	4.0	3.2	2.4	2.4	1.6	1,088.8	1.02	0.37	256.8 gal	0.24
Cockles	**7.2**	**7.2**	**7.2**	**0.8**	**1.6**	**1,151.4**	**1.08**	**0.39**	**370.2 gal**	**0.35**
Heart Cockles	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.00
Crabs	76.0	33.6	33.6	61.6	21.6	48,690.0	45.50	16.54	24,139.2 ea.	22.56
Box Crab	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Dungeness Crab	**67.2**	**29.6**	**29.6**	**50.4**	**18.4**	**18,688.9**	**17.47**	**6.35**	**14,158.2 ea.**	**13.23**
King Crab	**36.0**	**9.6**	**8.8**	**30.4**	**8.8**	**19,521.1**	**18.24**	**6.63**	**3,629.4 ea.**	**3.39**
Blue King Crab	0.8	0.8	0.8	0.0	0.0	86.8	0.08	0.03	17.1 ea.	0.02
Brown King Crab	10.4	4.0	4.0	6.4	1.6	5,848.7	5.47	1.99	1,087.1 ea.	1.02
Red King Crab	28.8	8.0	6.4	25.6	7.2	13,585.6	12.70	4.61	2,525.2 ea.	2.36
Unknown King Crab	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Tanner Crab	**28.8**	**13.6**	**12.0**	**20.0**	**8.8**	**10,480.0**	**9.79**	**3.56**	**6,351.5 ea.**	**5.94**
Tanner Crab, Bairdi	28.8	13.6	12.0	20.0	8.8	10,480.0	9.79	3.56	6,351.5 ea.	5.94
Unknown Crab	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Geoducks	0.8	0.0	0.0	0.8	0.0	0.0	0.00	0.00	0.0 gal	0.00
Limpets	0.8	0.8	0.8	0.0	0.0	6.4	0.01	0.00	4.3 gal	0.00
Mussels	**0.8**	**0.8**	**0.8**	**0.0**	**0.8**	**12.8**	**0.01**	**0.00**	**8.6 gal**	**0.01**
Unknown Mussels	0.8	0.8	0.8	0.0	0.8	12.8	0.01	0.00	8.6 gal	0.01
Octopus	**9.6**	**7.2**	**7.2**	**5.6**	**4.0**	**2,191.4**	**2.05**	**0.74**	**342.4 ea.**	**0.32**
Oyster	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Scallops	**2.4**	**0.8**	**0.8**	**1.6**	**1.6**	**42.4**	**0.04**	**0.01**	**25.7 gal**	**0.02**
Weathervane Scallops	2.4	0.8	0.8	1.6	1.6	42.4	0.04	0.01	25.7 gal	0.02
Rock Scallops	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Unknown Scallops	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Yein Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Unknown Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 gal	0.00
Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Green Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Red Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Purple Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Unknown Sea Urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00
Shrimp	**33.6**	**13.6**	**13.6**	**23.2**	**15.2**	**40,814.1**	**38.14**	**13.86**	**5,101.8 gal**	**4.77**
Squid	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0 ea.	0.00

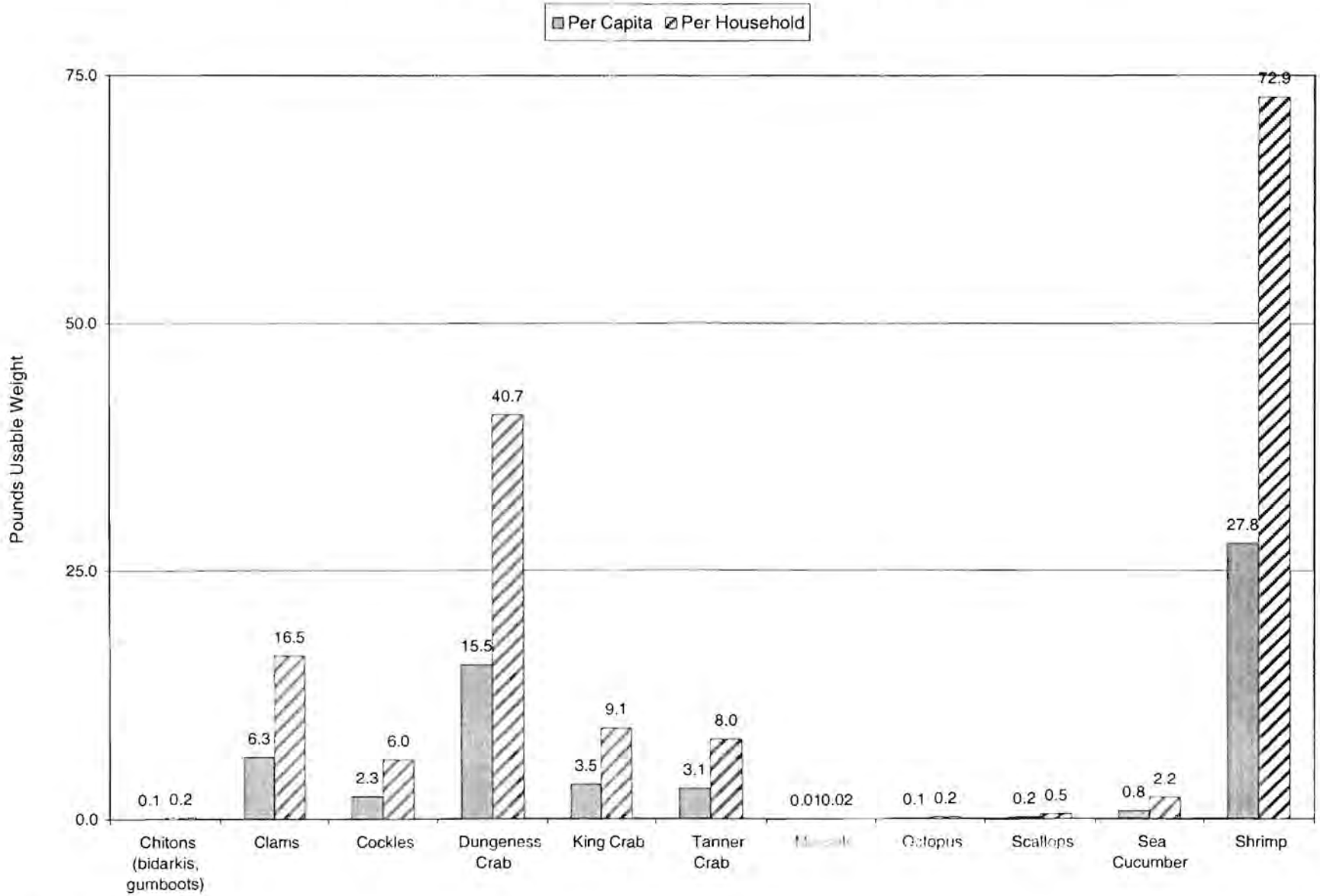
Source: ADFG Division of Subsistence, Household Surveys 2001

Figure C-1. Percent of Households Using and Harvesting Shellfish for Home Use, Wrangell 2000



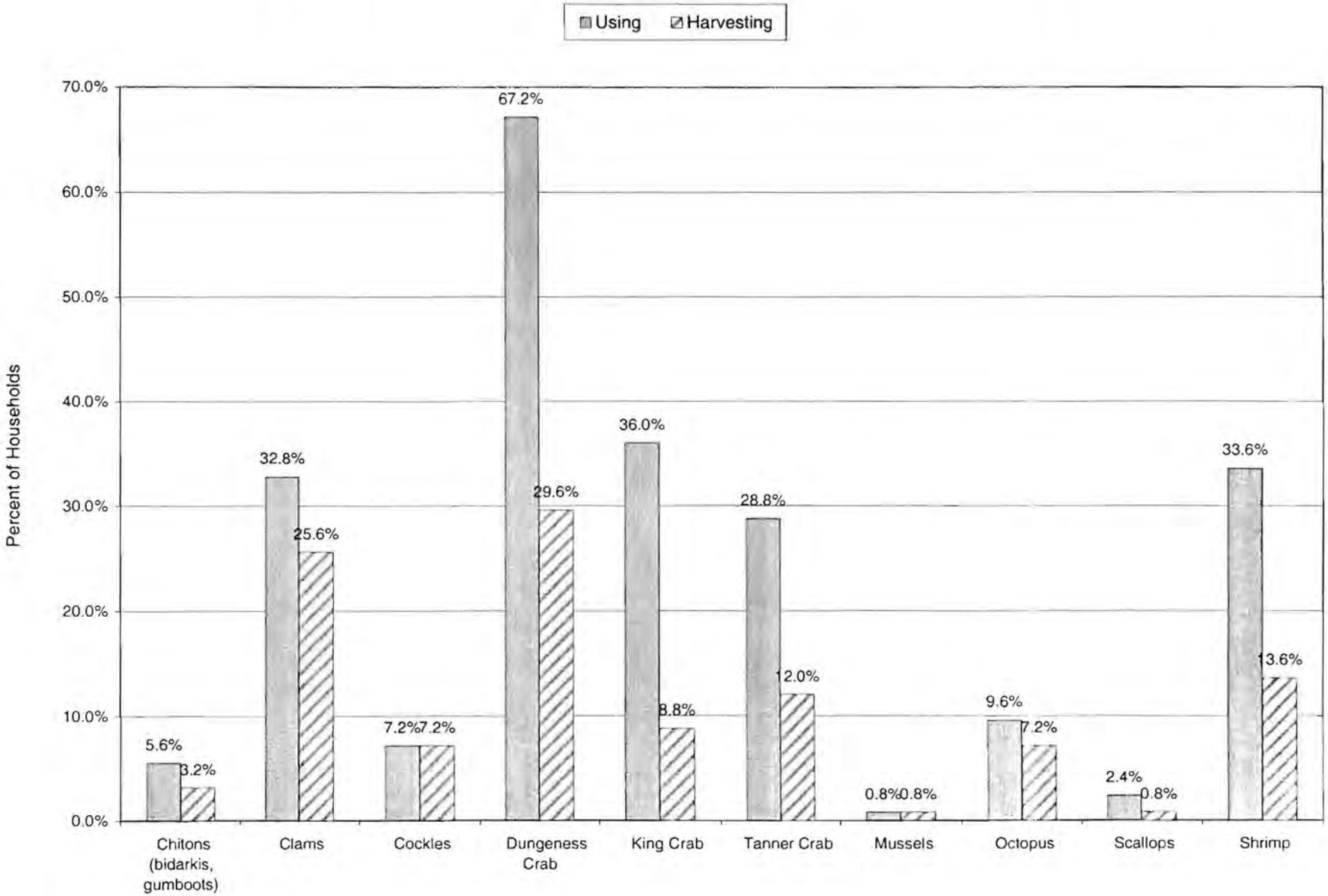
Source: ADFG Division of Subsistence Household surveys 2001

Figure C-2. Harvest of Shellfish for Home Use, Pounds per Household and Pounds per Capita, Wrangell 2000



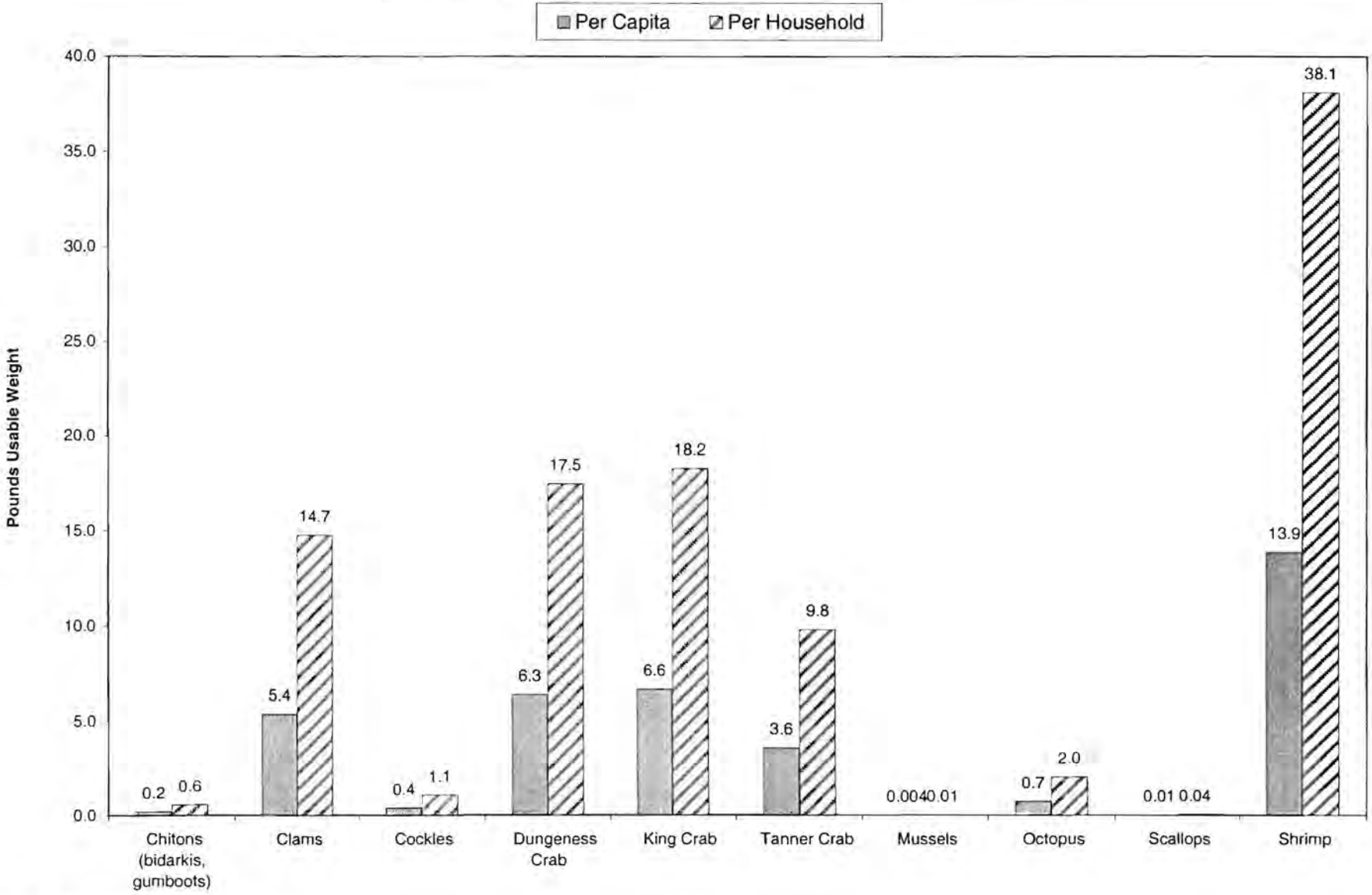
Source: ADFG Division of Subsistence Household surveys 2001

Figure C-3. Percent of Households Using and Harvesting Marine Invertebrates for Home Use, Petersburg 2000



Source: ADFG Division of Subsistence Household Surveys 2001

Figure C-4. Harvest of Shellfish for Home Use, Pounds per Household and Pounds per Capita, Petersburg 2000



Source: ADFG Division of Subsistence Household Surveys 2001

SALMON, CHAR AND TROUT OVERVIEW, WRANGELL

Wrangell is located on the north end of Wrangell Island on Zimovia Strait, and near the mouth of the Stikine River, which reaches into the Canadian interior. The following brief discussion is taken from Betts et al 1994 : Wrangell (Rev. 11/99):1-2.

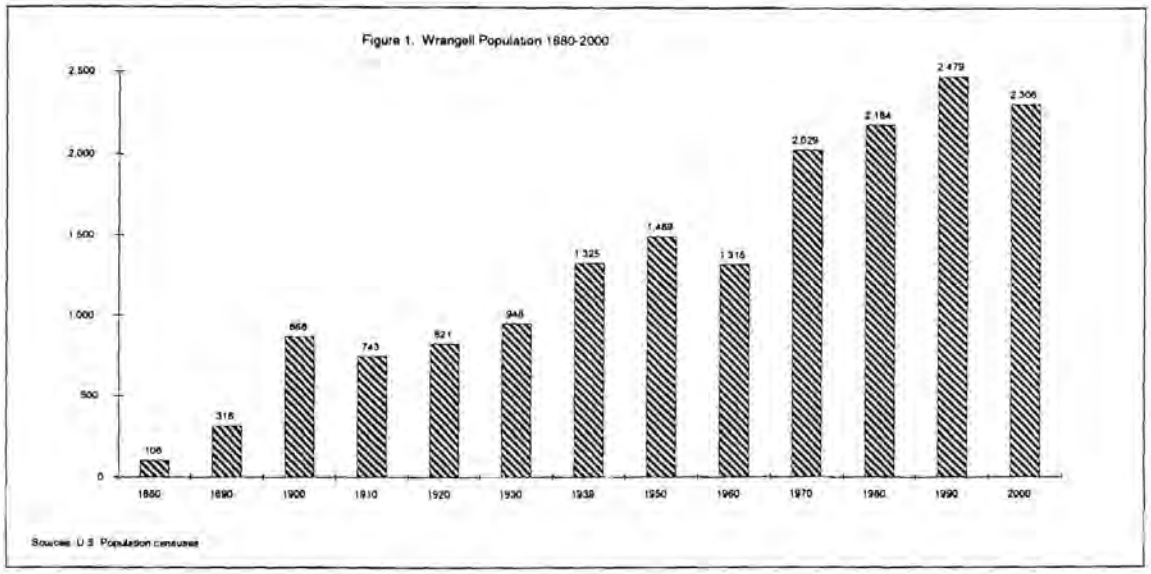
> " Wrangell Island has been occupied by Tlingit Indians for centuries. In addition, Wrangell is one of the older non-Native communities in southeast Alaska. The town dates from the construction of the Russian-American trading post in 1836.
>
> Wrangell was an important Tlingit site due to its proximity to the Stikine River, which was a trade route to the Interior. The Wrangell Indians are descended from the Stikine *kwaan*. The Stikine Tlingit were one of the most powerful and aggressive Tlingit groups, very numerous and possessing a large territory. They occupied the mainland coast from Cape Fanshaw southward to Cleveland Peninsula, the eastern half of Kupreanof Island, all of Mitkof, Zarembo, and Etolin Islands, and the northeastern coast of Prince of Wales Island from Red Bay to Thorne Bay. The Stikine were also a riverine people. Their villages and camps extended more than 160 miles up the Stikine River to the interior Athabaskan groups, and their forceful defense and control of this valuable trade network enabled them to accumulate power and wealth."
>
> "As with their Indian counterparts who controlled trade up the Taku and Chilkat rivers, the Stikine profited from their advantageous position as middlemen between the traders on the coast and the fur gatherers in the interior, doubling and tripling their profits in the exchange."
>
> " .....The American army erected and manned a fort on the Stikine River north of the ruins of Fort Stikine. The fort was named Fort Wrangell after the former manager of the Russian American Company. Another major impact on the Stikine occurred after the establishment of the Presbyterian mission in Wrangell in 1876, the first of several Presbyterian missions to be developed in Southeast Alaska."
>
> "Since the end of the Cassiar gold rush in the 1860s, Wrangell had been left to permanent residents who began to establish fishing and lumber as more stable components of the community's economic base. .....Over the years, canneries closed or burned, and new ones replaced them. Timber, however, grew to surpass fishing in economic importance to the community. Its large Alaska Lumber and Pulp Company mill processes forest resources from the area and exports timber products mainly to Japan. [Betts et al 1994: Wrangell (Rev. 11/99):1-2.]

During the last half of the 1990s Wrangell has experienced economic slowdown with the decline of both the logging and fishing sectors of the economy of the region as a whole.

POPULATION AND DEMOGRAPHICS

Wrangell first appears in the 1880 U.S. Census of Population, with a population of 106. It grew unevenly in the following decades with the influx and departure of Russian and European traders, following by American military, gold seekers to the Cassiar goldfield, salmon cannery workers and loggers to work in the fishing and timber industries, and their subsequent decline. By 1950 the population reached 1,489, following by a drop to 1,315 in 1960. Growth resumed in the

1960s and continued through the mid 1990s, reaching 2,754 in 1994. Since 1994 Wrangell has lost population. By 2000 the town was down to 2,308 in 907 households. (Figure 1). In 2000 the average Wrangell household size was 2.52, and the median age of the population was 39.1 years. Alaska Natives represented 23.8 percent of the population of Wrangell in 2000.



PARTICIPATION IN HARVESTING OR USING WILD RESOURCES

Hunting, fishing and gathering are an important part of the life of Wrangell. In 2000 nearly all (93.9 percent) households in Wrangell used at least one wild resource species. Almost as many attempted to harvest, harvested, or received at least one wild species. Almost eighty-one percent of Wrangell households used at least one salmon and 79.6 percent used at least one non-salmon fish species.

Somewhat fewer households were actively involved in harvesting resources. Eighty-one percent of households reported harvesting at least one wild resource. Forty-six percent harvested salmon and 47 percent harvested non-salmon fish species.

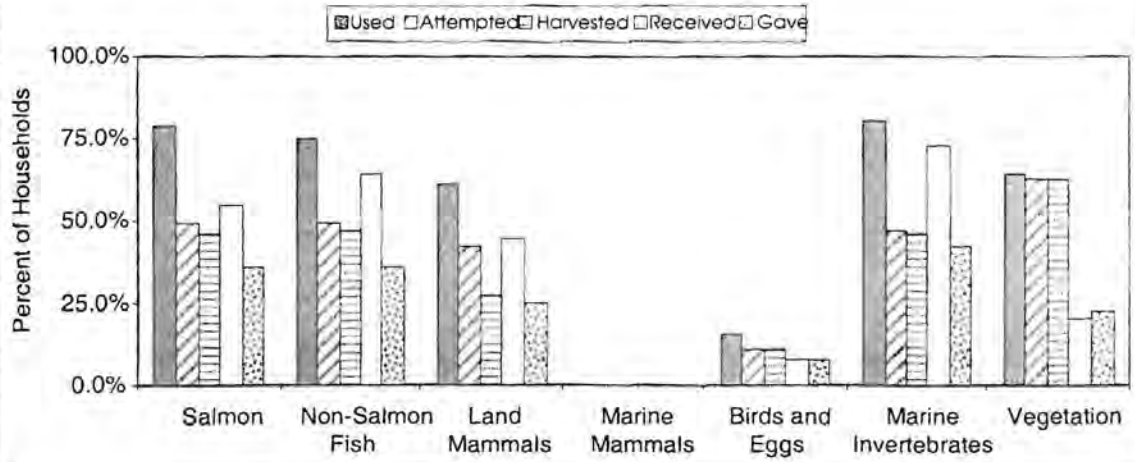
Table 1. Percentages of Households Using, Attempting to Harvest, Harvesting, Receiving and Giving Wild Resources, Wrangell 2000

Resource Category	Used	Attempted	Harvested	Received	Gave
All Resources	93.9%	82.7%	80.6%	88.8%	65.3%
Fish	88.8%	57.1%	56.1%	76.5%	50.0%
Salmon	80.6%	49.0%	45.9%	54.1%	37.8%
Non-Salmon Fish	79.6%	49.0%	46.9%	63.3%	38.8%
Land Mammals	60.2%	41.8%	26.5%	43.9%	24.5%
Marine Mammals	5.1%	2.0%	2.0%	3.1%	1.0%
Birds and Eggs	15.3%	11.2%	10.2%	7.1%	7.1%
Marine Invertebrates	82.7%	46.9%	45.9%	72.4%	42.9%
Vegetation	66.3%	64.3%	64.3%	20.4%	22.4%

Sharing of wild resource is common too. Sixty-five percent of Wrangell households reported giving at least one resource to other households, and almost 89 percent of surveyed

households received at least one resource from their neighbors. The Figure 2 displays the percentage of Wrangell households that used, attempted to harvest, harvested, received or gave by resource category.

Figure 2. Percent of Wrangell Households that Used, Attempted to Harvest, Harvested, Received and Gave Any Wild Resource, January 2000 - February 2000



DIVERSITY AND QUANTITY OF RESOURCES USED

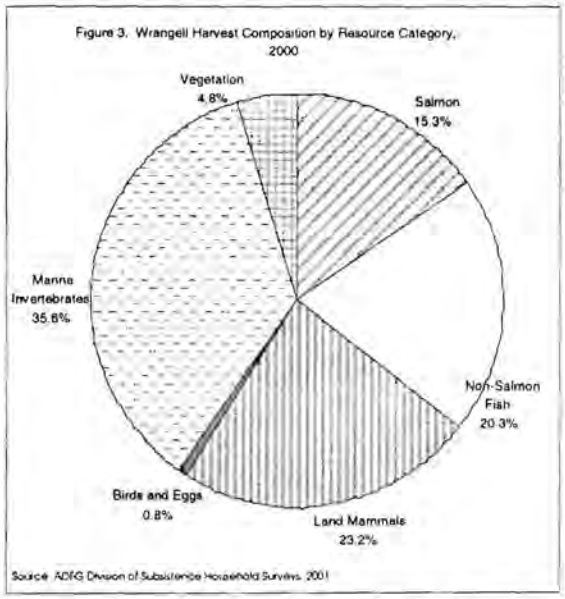
In 2000 some Wrangell households used as many as 45 different animal or plant species, while other households used none. The average (mean) number of different wild resources used by Wrangell households was just over 10, out of a possible 195 species listed on the survey. The average number of resources harvested by Wrangell households was just over 6 ranging from 0 to 39.

Based on the sample in 2000, it is estimated that about 328,225 pounds of wild resources were harvested by Wrangell households from January through December 2000 (measured in pounds of useable weight). The harvest came from six main resource categories - fish, land mammals, marine mammals, birds and eggs, marine invertebrates, and plants. Overall the average Wrangell household used 439 pounds of wild resources in the survey year. This amounts to 167.5 pounds per person in the community.

Table 2. Estimated Community Harvest by Resource Category, Wrangell 2000

Resource Category	Total Pounds Harvested	Mean Pounds Per Household	Pounds Per Person
All Resources	328,225.00	439.39	167.55
Fish	116,699.05	156.22	59.57
Salmon	50,022.44	66.96	25.54
Non-Salmon Fish	66,676.61	89.26	34.04
Land Mammals	76,209.24	102.02	38.90
Marine Mammals	0.00	0.00	0.00
Birds and Eggs	2,813.60	3.77	1.44
Marine Invertebrates	116,768.39	156.32	59.61
Vegetation	15,734.72	21.06	8.03

As for other Southeast communities, fish contributed the large portion of the useable weight harvested (35.6 percent), but marine invertebrates were equally important, contributing 35.6 percent of the wild resources harvested for home use. Land mammals, (principally deer) contributed almost 23 percent of the harvest. Table 2 shows the estimated total pounds of usable weight for the community, average (mean) pounds per household and average pounds per person by resource category. Figure 3 shows the composition of the harvest and the percentage each resource category comprises of the total, as measured in pounds.



The top ten species used by most Wrangell households is shown in Table 3. Five species were used by more than 50 percent of Wrangell households. They included one salmon species - chinook - as well as shrimp, dungeness crab, halibut, and berries. Other species in the top ten for Wrangell households in 2000 included deer, sockeye salmon, clams and cockles, moose, and cutthroat trout.

Table 3. Top Ten Species Used by the Most Wrangell Households, 2000

	Wrangell 2000	% HH
1	Halibut	68.4%
2	Shrimp	68.4%
3	Chinook Salmon	67.3%
4	Dungeness Crab	63.3%
5	Berries	56.1%
6	Deer	48.0%
7	Sockeye Salmon	38.8%
8	Clams & Cockles	34.7%
9	Moose	31.6%
10	Cutthroat Trout	29.6%

SALMON

Harvest Size and Composition

Salmon made up 15.3 percent of the wild resource harvest for home use in Wrangell in 2000, as measured in pounds of useable weight, contributing 50,022 pounds for the community,

or about 66.9 pounds per household. Chinook salmon comprised the largest portion of the Wrangell salmon harvest in terms of numbers of fish (34.7 percent), and in terms of pounds of useable weight (56.8 percent), providing 2,424 fish and 28,430 pounds for the community, and 3.2 fish per household. Sockeye salmon were next in importance, both in numbers of fish and pounds - Wrangell households reported an estimated 2,172 sockeye salmon in 2000 that contributed 9,694 pounds for the community, and almost 2.9 fish per household. Coho salmon contributed 1,753 fish (25.1 percent of numbers of salmon) and 9,185 pounds (18.4 percent of pounds of salmon) for the community, and 2.3 fish per household. Pink and chum each contributed smaller portions of the salmon harvest (Table 4).

Table 4. Wrangell Salmon Harvest for Home Use, by Species, 2000

Species	Estimated Total Number	Estimated Total Pounds	Per Household Number	Per Capita Number	Per Household Pounds	Per Capita Pounds
Salmon	6,990	50,022	9.4	3.6	66.96	25.54
Chum Salmon	252	1,746	0.3	0.1	2.34	0.89
Coho Salmon	1,753	9,185	2.3	0.9	12.30	4.69
Chinook Salmon	2,424	28,430	3.2	1.2	38.06	14.51
Pink Salmon	389	968	0.5	0.2	1.30	0.49
Sockeye Salmon	2,172	9,694	2.9	1.1	12.98	4.95

The composition of the salmon harvest in any particular year may vary considerably, depending on a number of factors, such as species abundance, timing of the runs, inter-face with commercial salmon fishing activity by Wrangell fishers and by others, and with the growing charter vessel sport fishing business in the waters of central southeast Alaska. Figure 4 shows the composition of the Wrangell salmon harvest by numbers of fish, and Figure 5 shows the composition by pounds. The varying size and weight of the several species accounts for the different values when calculated by weight.

Fig. 4. Percentage of Wrangell Salmon Harvest for Home Use by Species, 2000 [Numbers of Fish]

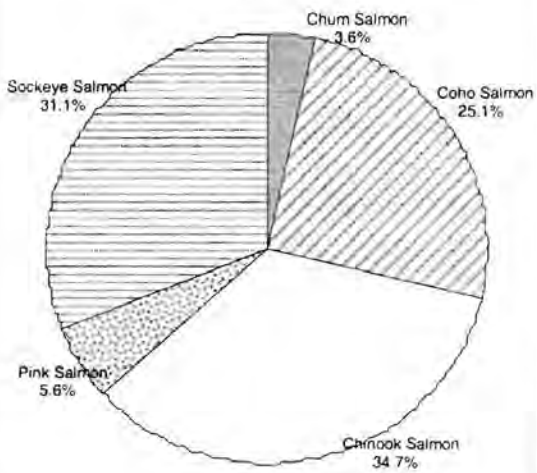
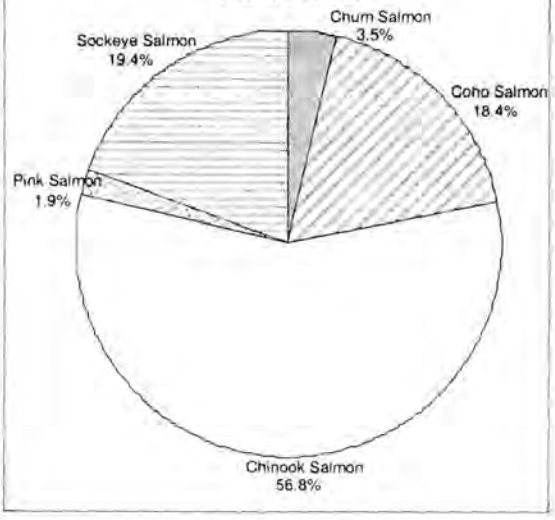


Figure 5. Percentage of Wrangell Salmon Harvest for Home Use by Species, 2000 [Pounds of Salmon]

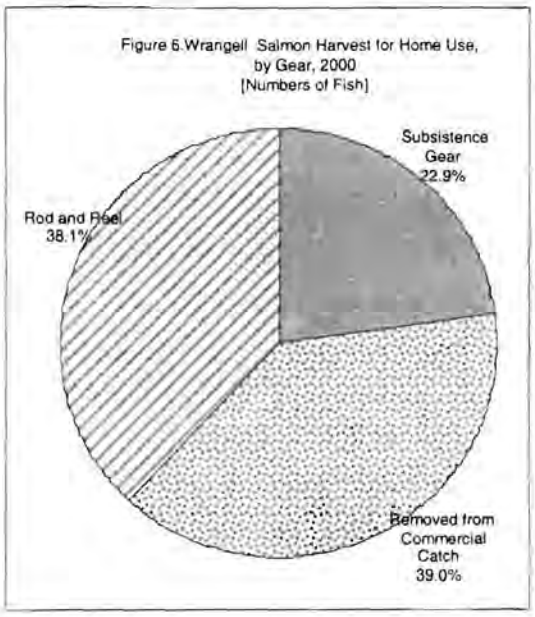


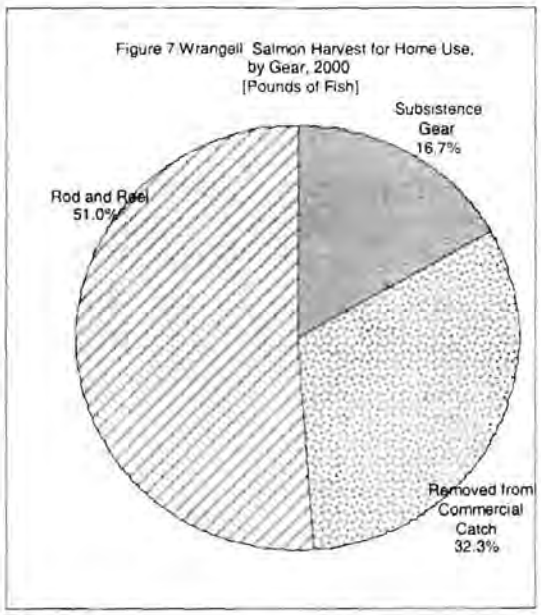
Salmon Harvest Methods

Wrangell fishers' salmon for home use was harvested about equally with rod and reel and retained from their commercial catches, measured in numbers - close to 40 percent from each source. But rod and reel brought home more pounds of salmon - 51 percent of the pounds of

salmon harvested for home use were caught with rod and reel. Salmon removed from commercial catches by households involved in commercial salmon fisheries as permit holders and crew members represented 39 percent of the numbers of salmon harvested. Only a small amount of Wrangell's salmon was caught with recognized subsistence gear - 23 percent of the numbers of salmon, and about 17 percent of the pounds. Figures 6 and 7 show the composition of the Wrangell salmon harvest in 2000 by gear type used, in numbers of fish and pounds of fish.

Rod and reel was the preferred method used to catch chinook and coho salmon. Sixty-eight percent of salmon caught with rod and reel were chinook salmon, about 26 percent were coho salmon. A small number of sockeyes and pinks were also caught with rod and reel. Wrangell fishers preferred to remove their pink and chum salmon from their commercial catches - 98 percent of Wrangell's pink salmon, and 91 percent of it's chum harvest in 2000 were removed from commercial catches. Coho salmon comprised the largest share of the salmon removed from commercial catches (39.4 percent), followed by sockeye (21.5 percent), chinook (16.8 percent), and pink (14 percent) (Tables 5 and 6).





Forty-six percent of Wrangell households reported harvesting salmon for home use in 2000. Forty percent harvested salmon using rod and reel, 8 percent used subsistence methods, and about 12 percent removed salmon from commercial catches (Table 7).

Location, Use Patterns and Factors Affecting Wrangell Salmon Fishing

The information on "areas used for fishing during the past 5 years" collected as part of the Division's household harvest survey for 2000 is not available at this time. Wrangell households identified areas used for salmon fishing on maps as part of the Division's 1987 household harvest survey project. The following discussion about salmon fishing locations, patterns of use and factors affecting salmon fishing is taken from a review of maps for that project in Betts et al 1994: Wrangell (Rev.11/99).

Locations of Salmon Harvest. Salmon harvest Map #2 for Wrangell residents indicated that salmon were fished in the following general locations:

-Revillagigedo Channel from Foggy Bay to Boca de Quadra
-Revillagigedo Island: George Inlet and Clover Pass
-Prince of Wales Island: selected nearshore waters on the southeastern, western and northern coasts
-Kosciusko and Warren islands.

-Noyes Island area
-Ernest Sound: the Meyers Chuck area and the nearshore waters of southern Etolin Island.
-Clarence Strait: the nearshore waters in the northern Strait.
-Stikine Strait and Chichagof Pass
-Zimovia Strait
-Eastern Passage, Blake Channel and Bradfield Canal
-Wrangell Narrows
-Stikine River, especially the lower tributaries
-Sumner Strait: the nearshore waters and selected bays of Prince of Wales, Kosciusko, Kuiu, Kupreanof, Mitkof, and Zarembo islands
-Kuiu Island: Affleck Canal, Port Beauclerc, and the nearshore waters of the western coast to Rowan Bay; Security and Saginaw bays.
-Admiralty Island: Pybus Bay and the waters near Angoon
- Frederick Sound
-Chatham Strait: including Sitkoh, Freshwater, and False bays.
-Peril Strait
-Salisbury Sound
-Icy Strait and parts of Glacier Bay
-Stephens Passage near Auke Bay

Additional Harvest Areas not Shown on Wrangell Map #2. During review sessions with local residents held on December 9, 1991, Wrangell respondents reported using areas in addition to those shown on Map #2. These additional areas included the southern portion of Wrangell Narrows and lower Duncan Canal.

Intensity of Use by Area. The waters of upper Stikine Strait, Chichagof Pass, Zimovia Strait, Eastern Passage, Blake Channel close to Wrangell, were shown on the salmon harvest maps to have been fished by the greatest number of households. Waters more distant than 20-25 miles generally were used by fewer than 10 percent of Wrangell households.

Review Comments on Wrangell Map #2. The levels of salmon harvest intensity generally were shown correctly on Wrangell Map #2. The waters in close proximity to Wrangell are the most utilized for salmon harvest. The areas around Olive Cove and Thoms Place in Zimovia Strait probably are used more intensively than indicated on the map since the population of these areas has increased in recent years.

Some residents believe that over-harvesting in areas close to Wrangell, such as Zimovia Strait, has caused a decline in sockeye, chinook, and other fish stocks.

Respondents noted that more distant harvest areas were associated with commercial fishing grounds. It was noted that the intensity of use of Noyes Island was probably higher than indicated on Map #2; this is a popular commercial fishing area for king salmon, some of which are retained for home use.

Pattern of Use of Salmon Harvest Areas. The extent of the mapped area indicates a shifting of fishing patterns over the years. Historically, many households in Wrangell have been involved in commercial fishing in distant areas, such as Noyes Island, Salisbury Sound, and Icy Strait. Households involved in commercial fisheries commonly retained portions of their catches of all salmon species for home use.

Wrangell residents harvested salmon using beach seines and dip nets under the Wrangell Area Personal Use Salmon Fishing Guidelines. Households also used rod and reel to harvest coho, chinook, and pink salmon for subsistence purposes.

In general, households not involved in commercial fishing conducted subsistence fishing using non-commercial nets or rod and reel from skiffs in the waters around Wrangell.

Factors Influencing Wrangell Salmon Fishing. Harvest patterns in all communities in Southeast are affected by a variety of factors, each of which have more or less influence, depending on a community's unique situation. Some factors such as weather conditions, habitat type, resource abundance, availability of boats or other transportation, accessibility of harvest areas, employment patterns, coordination with other harvest activities, or regulations influence all harvest situations, but their relative significance is determined by local conditions. Others, such as harvest competition from non-local residents or other groups, local presence of non-harvesting groups in traditional harvest areas, and effects of logging activities are more discreet, affecting some communities but not others.

Unless engaged in commercial fishing, households generally preferred to fish for salmon in the waters close to Wrangell. More remote waters were expensive to access and distant travel through open waters by skiff was considered risky. Perceived declines in some local salmon runs have led to an increase in harvest in more distant locations, such as Steamer Bay. [Betts et al 1994:Wrangell (Rev. 11/99) pp. 26-28].

Table 5. Estimated Salmon Harvest by Gear Type, Wrangell, 2000

		Subsistence Gear										Removed from Commercial Catch					
		Floating Net		Seine		Dip Net		Other		Subsistence Gear Any Method				Rod and Reel		Any Method	
	Harvest Units	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean
Salmon	Number	807.98	1.08	0.00	0.00	22.87	0.03	769.87	1.03	1,600.71	2.14	2,728.84	3.65	2,660.23	3.56	6,989.79	9.36
	Pounds	4,806.33	6.43	0.00	0.00	120.93	0.16	3,435.30	4.60	8,362.57	11.19	16,150.03	21.62	25,509.84	34.15	50,022.44	66.96
Chum Salmon	Number	15.24	0.02	0.00	0.00	7.62	0.01	0.00	0.00	22.87	0.03	228.67	0.31	0.00	0.00	251.54	0.34
	Pounds	105.82	0.14	0.00	0.00	52.91	0.07	0.00	0.00	158.73	0.21	1,587.27	2.12	0.00	0.00	1,746.00	2.34
Coho Salmon	Number	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,074.77	1.44	678.40	0.91	1,753.16	2.35
	Pounds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5,630.91	7.54	3,554.26	4.76	9,185.17	12.30
Chinook Salmon	Number	160.07	0.21	0.00	0.00	0.00	0.00	0.00	0.00	160.07	0.21	457.35	0.61	1,806.52	2.42	2,423.94	3.24
	Pounds	1,877.45	2.51	0.00	0.00	0.00	0.00	0.00	0.00	1,877.45	2.51	5,364.13	7.18	21,188.32	28.36	28,429.89	38.06
Pink Salmon	Number	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	381.12	0.51	7.62	0.01	388.74	0.52
	Pounds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	948.73	1.27	18.97	0.03	967.70	1.30
Sockeye Salmon	Number	632.66	0.85	0.00	0.00	15.24	0.02	769.87	1.03	1,417.78	1.90	586.93	0.79	167.69	0.22	2,172.40	2.91
	Pounds	2,823.07	3.78	0.00	0.00	68.03	0.09	3,435.30	4.60	6,326.40	8.47	2,618.99	3.51	748.28	1.00	9,693.67	12.98
Unknown Salmon	Number	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pounds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2001.

Table 6. Estimated Percentages of Salmon Harvest By Resource, Gear Type, and Salmon Total Harvest, Wrangell, 2000

		Subsistence Methods															
		Floating Net		Beach Seine		Dip Net		Other		Subsistence Gear Any Method		Removed from Commercial Catch		Rod and Reel		Any Method	
Resource	Percent Base	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
Salmon	Gear Type	100.00	100.00	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		
	Resource	11.56	9.61	0.00	0.00	0.33	0.24	11.01	6.87	22.90	16.72	39.04	32.29	38.06	51.00		
	Total	11.56	9.61	0.00	0.00	0.33	0.24	11.01	6.87	22.90	16.72	39.04	32.29	38.06	51.00	100.00	100.00
Chum Salmon	Gear Type	1.89	2.20	0.00	0.00	33.33	43.75	0.00	0.00	1.43	1.90	8.38	9.83	0.00	0.00		
	Resource	6.06	6.06	0.00	0.00	3.03	3.03	0.00	0.00	9.09	9.09	90.91	90.91	0.00	0.00		
	Total	0.22	0.21	0.00	0.00	0.11	0.11	0.00	0.00	0.33	0.32	3.27	3.17	0.00	0.00	3.60	3.49
Coho Salmon	GearType	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.39	34.87	25.50	13.93		
	Resource	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	61.30	61.30	38.70	38.70		
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.38	11.26	9.71	7.11	25.08	18.36
Chinook Salmon	Gear Type	19.81	39.06	0.00	0.00	0.00	0.00	0.00	0.00	10.00	22.45	16.76	33.21	67.91	83.06		
	Resource	6.60	6.60	0.00	0.00	0.00	0.00	0.00	0.00	6.60	6.60	18.87	18.87	74.53	74.53		
	Total	2.29	3.75	0.00	0.00	0.00	0.00	0.00	0.00	2.29	3.75	6.54	10.72	25.85	42.36	34.68	56.83
Pink Salmon	Gear Type	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.97	5.87	0.29	0.07		
	Resource	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.04	98.04	1.96	1.96		
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.45	1.90	0.11	0.04	5.56	1.93
Sockeye Salmon	Gear Type	78.30	58.74	0.00	0.00	66.67	56.25	100.00	100.00	88.57	75.65	21.51	16.22	6.30	2.93		
	Resource	29.12	29.12	0.00	0.00	0.70	0.70	35.44	35.44	65.26	65.26	27.02	27.02	7.72	7.72		
	Total	9.05	5.64	0.00	0.00	0.22	0.14	11.01	6.87	20.28	12.65	8.40	5.24	2.40	1.50	31.08	19.38
Unknown Salmon	Gear Type	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Resource	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2001.

Table 7. Percentage Households Harvesting Salmon by Gear Type, Wrangell, 2000

	Subsistence Gear							
	Floating Net	Seine	Dip Net	Other	Any Subsistence Gear	Removed from Commercial Catch	Rod and Reel	Any Method
Salmon	6.1%	0.0%	1.0%	2.0%	8.2%	12.2%	39.8%	45.9%
Chum Salmon	1.0%	0.0%	1.0%	0.0%	2.0%	2.0%	0.0%	4.1%
Coho Salmon	0.0%	0.0%	0.0%	0.0%	0.0%	10.2%	10.2%	20.4%
Chinook Salmon	2.0%	0.0%	0.0%	0.0%	2.0%	8.2%	36.7%	38.8%
Pink Salmon	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	2.0%
Sockeye Salmon	6.1%	0.0%	1.0%	2.0%	8.2%	8.2%	5.1%	19.4%

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2001.

HARVEST AND USE OF CUTTHROAT, RAINBOW TROUT, STEELHEAD, EULACHON AND DOLLY VARDEN

In 2000 about 30 percent of Wrangell households reported using and 23.5 percent harvested cutthroat trout. Sixteen percent of households reported using steelhead, and somewhat fewer used rainbows, dolly varden and eulachon. These species offer diversity, and are usually eaten fresh. Eulachon also may be smoked. Table XXXII-8 shows the household participation in use, harvest, and sharing, and the amounts harvested.

Table 8. Harvest and Use of Eulachon, Dolly Varden, Cutthroat and Rainbow Trout and Steelhead for Home Use, Wrangell, 2000

	Percent of Households				Estimated Amount Harvested				Est. Pounds Harvested		
	Used	Harvested	Received	Gave	Total	Units	HH Mean	Per capita	Total	HH Mean	Per capita
Eulachon	5.1%	1.0%	4.1%	1.0%	7,622	ea.	10.2	3.9	1,906	2.6	1.0
Dolly Varden	9.2%	7.1%	2.0%	2.0%	899	ea.	1.2	0.5	2,429	3.3	1.2
Cutthroat Trout	29.6%	23.5%	9.2%	9.2%	3,964	ea.	5.3	2.0	5,946	8.0	3.0
Rainbow Trout	10.2%	8.2%	3.1%	4.1%	907	ea.	1.2	0.5	1,814	2.4	0.9
Steelhead	16.3%	4.1%	13.3%	8.2%	107	ea.	0.1	0.1	907	1.2	0.5

Location, Use Patterns and Factors Affecting Wrangell Non-Salmon Fishing

The information on "areas used for fishing during the past 5 years" collected for the Division's household harvest survey for 1996 is not available at this time. The following discussion about fishing locations, patterns of use and factors influencing fishing for non-salmon species is taken from a review of maps for that project in Betts et al 1994: Wrangell (Rev. 11/99)

Locations of Non-Salmon Fish Harvest. Non-salmon harvest Map #3 for Wrangell residents indicated that non-salmon saltwater finfish harvesting was undertaken in the following general locations:

-Revillagigedo Channel from Foggy Bay to Boca de Quadra; Mary Island area

-Revillagigedo Island: George and Carroll inlets, Clover Pass, Neets Bay, and Traitors Cove.
-Cleveland Peninsula: Helm Bay, Meyers Chuck, Union Bay, and Vixen and Santa Anna inlets.
-Prince of Wales Island: selected nearshore waters on the southeastern, western and northern coasts.
-Coronation and Warren islands area
-Noyes, Baker, and Sumez islands area
-Ernest Sound: the nearshore waters of southern Etolin Island
-Clarence Strait: the northern strait
-Stikine Strait
-Zimovia Strait
-Eastern Passage, Blake Channel and Bradfield Canal
-Duncan Canal
-Stikine River
-Sumner Strait: the nearshore waters and selected bays of Prince of Wales, Kosciusko, Kuiu, Kupreanof, Mitkof, and Zarembo islands
-Kuiu Island: many of the major bays
-Admiralty Island: Gambier, Pybus, Little Pybus, Chaik and Funter Bays; Tyee area; Angoon area, Point Hepburn area
-Frederick Sound: Cape Fanshaw , Portage Bay, and the Cape Bendel area
-Stephens Passage: Hobart Bay and Taku Harbor
-Chatham Strait: including Warm Springs Bay, Kelp Bay, Sitkoh Bay, Whiterock, Basket Bay, Tenakee Inlet, and Freshwater Bay
-Peril Strait: including Hanus Bay, Poison Cove, and Fish Bay
-Baranof Island: the Sitka area and the southern coast line from Snipe Bay to Cape Ommaney
-Icy Strait and parts of Glacier Bay
-Lynn Canal: St. James Bay; Sullivan and Chilkat islands area; Chilkat Inlet; Lutak Inlet

Additional Harvest Areas not Shown on Wrangell Map #3. During review sessions with local residents held on December 9, 1991, Wrangell respondents did not report using additional areas not shown on Map #3.

Intensity of Use by Area. The waters of Anita Bay, Fools Inlet, and the mouth of the Stikine River, as well as distant Suemez Island were used more intensively (by 3 to 5 percent of households) for non-salmon fishing than other areas.

Review Comments on Wrangell Map #3. The levels of non-salmon harvest intensity were shown correctly on Wrangell Map #3.

..... Hooligan were fished in the Stikine River.

Pattern of Use of Non-Salmon Harvest Areas. ..... Hooligan were taken with dipnets. Other non-salmon, including trout, were taken with rod and reel. Skiffs as well as larger boats were used to access fishing areas.

Factors influencing Wrangell Non-Salmon Fishing. Harvest patterns in all communities in Southeast are affected by a variety of factors, each of which have more or less influence, depending on a community's unique situation. Some factors such as weather conditions, habitat type, resource abundance, availability of boats or other transportation, accessibility of harvest areas, employment patterns, coordination with other harvest activities, or regulations influence all harvest situations, but their relative significance is determined by local conditions. Others, such as harvest competition from non-local residents or other groups, local presence of non-harvesting groups in traditional harvest areas, and effects of logging activities are more discreet, affecting some communities but not others.

Most Wrangell residents who harvested non-salmon fish for home use did so in areas within 25-30 miles of Wrangell. More distant areas were often used in conjunction with commercial fishing or other activities. [Betts et al 1994: Wrangell (Rev. 11/99) pp.29-30]

SUBSISTENCE/PERSONAL USE SALMON PERMIT REPORTING

The Alaska Department of Fish and Game, Southeast Region, Division of Commercial Fisheries administers an annual subsistence/personal use salmon permit reporting system for all salmon species in designated waters. Wrangell residents use permits issued from the Petersburg Management Area Office. According to permits returned for 2001 from Wrangell, sockeye salmon were harvested primarily in Mill, and Thoms creeks near Wrangell, and Salmon Bay Creek, at the north end of Prince of Wales Island. Smaller numbers of sockeye were reported taken in Red Lake Creek at the north end of Prince of Wales Island, as well as from the Stikine River. In some years permits returned from Wrangell report sockeye harvests from as far away

as the Taku River/Sweetheart Creek personal use area near Juneau, Alecks Creek in Tebenkof Bay on the west side of Kuiu Island, and the Klawock River and Hatchery Creek/Sweetheart in central Prince of Wales Island. The small numbers of chinook salmon reported on permits returned from Wrangell in the past five years were harvested in Earl West Cove, Mill Creek and other unidentified waters.

COMMERCIAL FISHERIES

Commercial fishing continues to be a vital element of the Wrangell economy. According to the data collected as part of the Division's household harvest survey for 2000, almost 28 percent of households have members involved in commercial fishing. Almost 20 percent of individuals worked in commercial fishing in 2000, and an estimated 30 percent of income in the community comes from commercial fishing. The Commercial Fisheries Entry Commission maintains records on participation in the various commercial fisheries. Not all persons holding permits fish their permits every year. Of the Wrangell residents holding permits in 1990, 197 held permits and participated in the several salmon power and hand troll, and drift gillnet fisheries, as well as sablefish, groundfish, herring, halibut, crab, and shrimp fisheries, fishing 372 permits. By 2000 this had dropped to 146 residents participating in commercial fisheries, fishing 243 permits.

SALMON, CHAR AND TROUT OVERVIEW, PETERSBURG

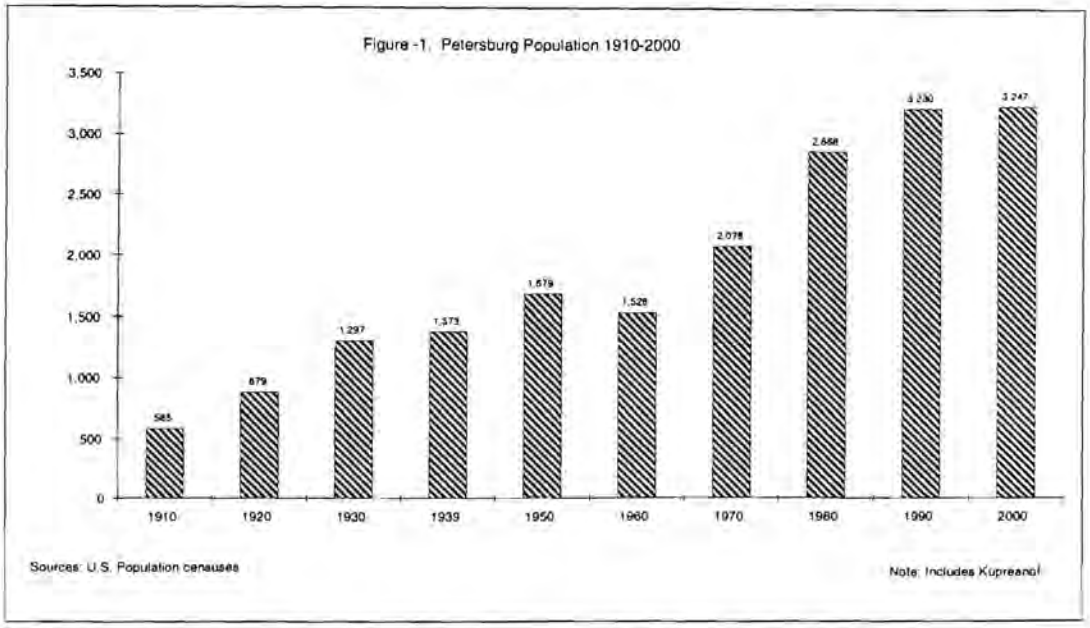
The community of Petersburg is located on the north end of Mitkof Island where Wrangell Narrows meets Frederick Sound. The following brief discussion is taken from Betts et al 1994 (Rev. 11/99):1-2.

> "The population of Petersburg is primarily of Euro-American cultural heritage. The town was developed by persons from the continental United States, many of whom were themselves recent immigrants from European countries, especially Norway. In the early years, Norwegians came to Petersburg directly from their home country."
>
> "Prior to Petersburg's development by homesteaders and fishermen at the turn of this century, Tlingit use of the area occurred at many small settlements. As fish camps or seasonal harvest and production sites, they were part of the traditional land use pattern of Tlingit society. Prior to contact in the 1800s, the location of Petersburg was occupied by three different *kwaans*, the Stikine, Kake, and Auk. By the turn of the 20th century, the Stikine Tlingit had moved to Wrangell while the Tlingit from Kake maintained a summer fishing camp they had established on the north end of Mitkof Island."
>
> "The town of Petersburg grew up around the Icy Strait Packing Company, on the northwest shore of Mitkof Island on Wrangell Narrows, started....in 1900. Along with the evolution of the commercial fishing industry, in which Petersburg has always been a leader in Southeast Alaska, a larger Tlingit community developed in the expanding town. This Indian community has been a permanent and stable component of the town throughout its development."
>
> "Canneries and processors have been operating in the town continuously since...(1906)....."Timber activities and trapping were also regular practices throughout the Petersburg area.....Throughout the years, numerous salmon, crab, and shrimp canneries have operated in Petersburg for different lengths of time. During the 1920s, a new herring seine fishery developed around floating processors which rendered the fish into oil. The best herring was salted, and some was made into fertilizer. The fishery continued until the herring were depleted in the 1930s. Salmon and halibut continued to be the primary fisheries for the Petersburg fleet. The black cod fishery started in the late 1930s and continued strongly in the 1940s."
>
> "Commercial fishing has been the economic foundation of the community since its inception at the turn of the century, and it continues to be primary in the present." Betts et al 1994 (Rev 11/99): 1-2.

POPULATION AND DEMOGRAPHICS

Petersburg first appears in the 1910 U.S. Census of Population , with a population of 585. It grew steadily to a population of 1,679 in 1950, the dropped modestly to 1,528 in 1960, and then resumed it's growth, reaching 3,230 in 1990. During the decade of the 90s Petersburg's population maintained a modest upward trend, but by 2000 the town was about the same size as ten years earlier - 3,247 (includes nearby settlement of Kupreanof), in 1,252 households. (Figure -1). In 2000 the average Petersburg household size was 2.56, and the median age of the population was 36.2 years. Alaska Natives represented 12 percent of the population of Petersburg in 2000. Average household size of the 12 Kupreanof households in 2000 was just

1.92, and median age of Kupreanof residents is somewhat older - 46.3 years. No Alaska Natives were reported for Kupreanof.



PARTICIPATION IN HARVESTING OR USING WILD RESOURCES

Hunting, fishing and gathering are an important part of the life of Petersburg. In 2000 nearly all (96.3 percent) households in Petersburg used at least one wild resource species. Almost as many attempted to harvest, harvested, or received at least one wild species. Seventy-eight percent of Petersburg households used at least one salmon and 80.0 percent used at least one non-salmon fish species.

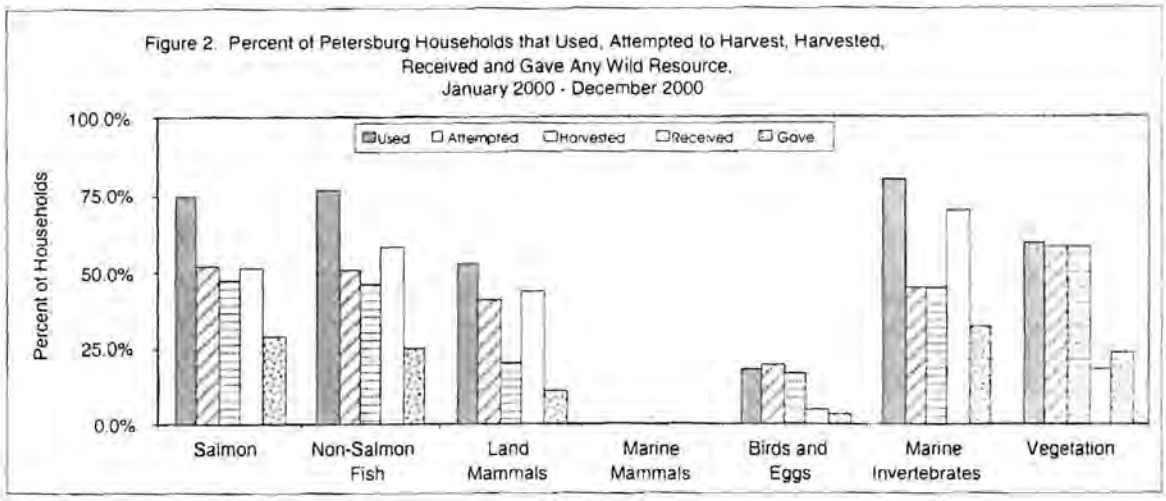
Somewhat fewer households were actively involved in harvesting resources. Seventy-eight percent of Petersburg households reported harvesting at least one wild resource. Forty-seven percent harvested salmon and 45.6 percent harvested non-salmon fish species.

Table 1. Percentages of Households Using, Attempting to Harvest, Harvesting, Receiving and Giving Wild Resources, Petersburg 2000

Resource Category	Used	Attempted	Harvested	Received	Gave
All Resources	96.3%	80.8%	77.6%	87.2%	55.2%
Fish	89.6%	62.4%	58.4%	70.4%	36.8%
Salmon	78.4%	52.0%	47.2%	51.2%	30.4%
Non-Salmon Fish	80.0%	50.4%	45.6%	57.6%	24.8%
Land Mammals	52.8%	40.8%	20.0%	43.2%	10.4%
Marine Mammals	4.0%	0.0%	0.0%	4.0%	0.0%
Birds and Eggs	17.6%	19.2%	16.8%	4.8%	3.2%
Marine Invertebrates	81.6%	44.8%	44.8%	69.6%	32.0%
Vegetation	60.8%	60.0%	60.0%	17.6%	24.0%

Sharing of wild resource is common too. Fifty-five percent of Petersburg households reported giving at least one resource to other households, and 87 percent of surveyed households received at least one resource from their neighbors. Figure 2 displays the

percentage of Petersburg households that used, attempted to harvest, harvested, received or gave by resource category.



DIVERSITY AND QUANTITY OF RESOURCES USED

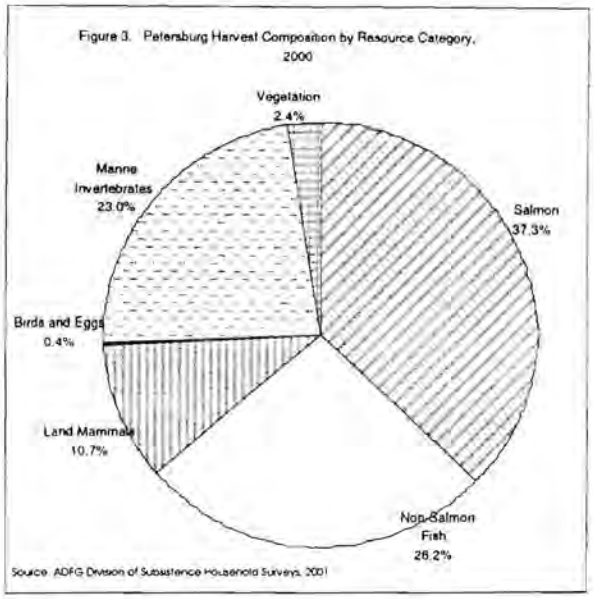
In 2000 some Petersburg households used as many as 31 different animal or plant species, while other households used none. The average (mean) number of different wild resources used by Petersburg households was 9, out of a possible 195 species listed on the survey. The average number of resources harvested by Petersburg households was about 6 ranging from 0 to 24.

Based on the sample in 2000, it is estimated that about 475,321 pounds of wild resources were harvested by Petersburg households from January through December 2000 (measured in pounds of useable weight). The harvest came from six main resource categories - fish, land mammals, marine mammals, birds and eggs, marine invertebrates, and plants. Overall the average Petersburg household used 444 pounds of wild resources in the survey year. This amounts to 161.4 pounds per person in the community.

As for other Southeast communities, fish contributed the overwhelming portion of the useable weight harvested (63.5 percent), while marine invertebrates contributed 23 percent, and land mammals, (principally deer) contributed almost 11 percent. Table 2 shows the estimated total pounds of usable weight for the community, average (mean) pounds per household and average pounds per person by resource category. Figure 3 shows the composition of the harvest and the percentage each resource category comprises of the total, as measured in pounds.

Table 2. Estimated Community Harvest by Resource Category, Petersburg 2000

Resource Category	Total Pounds Harvested	Mean Pounds Per Household	Pounds Per Person
All Resources	475,321.38	444.23	161.42
Fish	301,580.36	281.85	102.42
Salmon	177,209.55	165.62	60.18
Non-Salmon Fish	124,370.81	116.23	42.24
Land Mammals	50,846.40	47.52	17.27
Marine Mammals	0.00	0.00	0.00
Birds and Eggs	1,984.89	1.86	0.67
Marine Invertebrates	109,286.53	102.14	37.11
Vegetation	11,623.20	10.86	3.95



The top ten species used by most Petersburg households is shown in Table 3. Species used by 50 percent or more of the households included one salmon species - chinook - as well as halibut, dungeness crab and berries. About 40 percent of Petersburg households reported using deer and coho salmon in 2000.

Table 3. Top Ten Species Used by the Most Petersburg Households, 2000

	Petersburg	% HH
1	Halibut	72.0%
2	Dungeness Crab	67.2%
3	Chinook Salmon	64.8%
4	Berries	55.2%
5	Coho Salmon	45.6%
6	Deer	40.0%
7	King Crab	36.0%
8	Shrimp	33.6%
9	Clams & Cockles	32.8%
10	Tanner Crab	28.8%

SALMON

Harvest Size and Composition

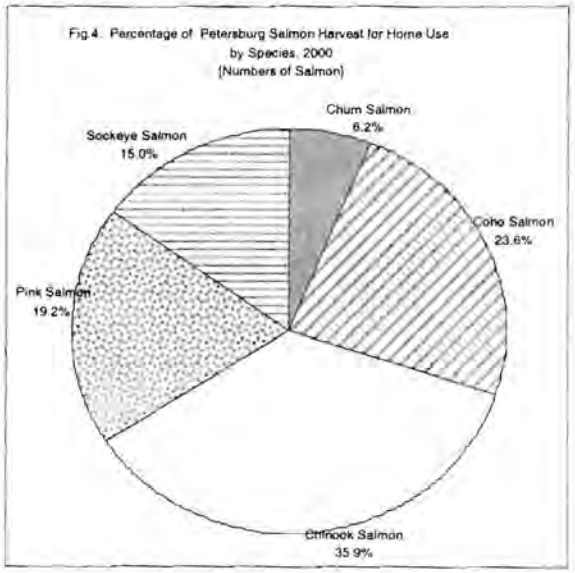
Salmon made up 37.3 percent of the wild resource harvest for home use in Petersburg in 2000, as measured in pounds of useable weight, contributing 177,210 pounds for the community, or about 165.6 pounds per household. Chinook salmon comprised the largest portion of the Petersburg salmon harvest in terms of numbers of fish (35.9 percent), and in terms of pounds of useable weight (59.9 percent), providing 9,056 fish and 106,222 pounds for the community, and 8.5 fish per household. Coho salmon were next in importance, both in numbers of fish and pounds - Petersburg households reported an estimated 5,958 coho salmon in 2000 that contributed 31,214 pounds for the community, and about 5.6 fish per household. Pink salmon

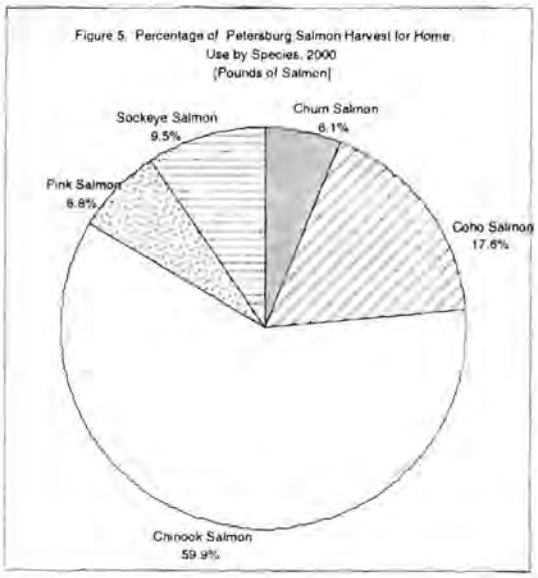
contributed 4,828 fish (19.2 percent of numbers of salmon) and 12,018 pounds (6.8 percent of pounds of salmon) for the community, and 4.5 fish per household. Sockeye salmon contributed 3,784 fish and 16,883 pounds for the community, about 3.5 fish per household (Table 4).

Table 4. Petersburg Salmon Harvest for Home Use, by Species, 2000

Species	Estimated Total Number	Estimated Total Pounds	Per Household Number	Per Capita Number	Per Household Pounds	Per Capita Pounds
Salmon	25,192	177,210	23.5	8.6	165.62	60.18
Chum Salmon	1,566	10,873	1.5	0.5	10.16	3.69
Coho Salmon	5,958	31,214	5.6	2.0	29.17	10.60
Chinook Salmon	9,056	106,222	8.5	3.1	99.27	36.07
Pink Salmon	4,828	12,018	4.5	1.6	11.23	4.08
Sockeye Salmon	3,784	16,883	3.5	1.3	15.78	5.73

The composition of the salmon harvest in any particular year may vary considerably, depending on a number of factors, such as species abundance, timing of the runs, inter-face with commercial salmon fishing activity by Petersburg fishers and by others, and with the growing charter vessel sport fishing business in the waters of central southeast Alaska. Figure 4 shows the composition of the Petersburg salmon harvest by numbers of fish, and Figure 5 shows the composition by pounds. The varying size and weight of the several species accounts for the different values when calculated by weight.

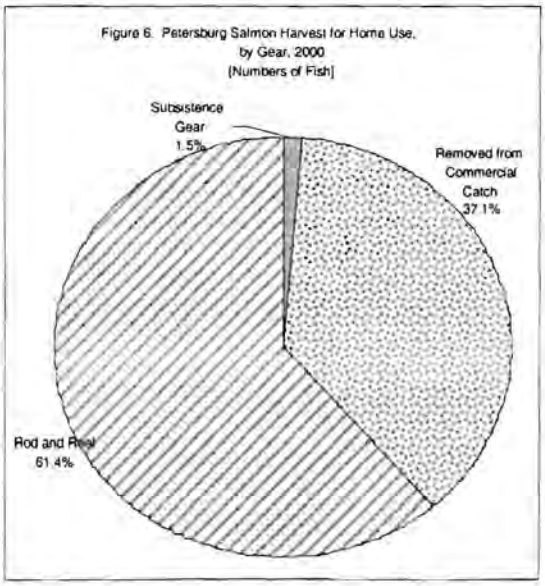


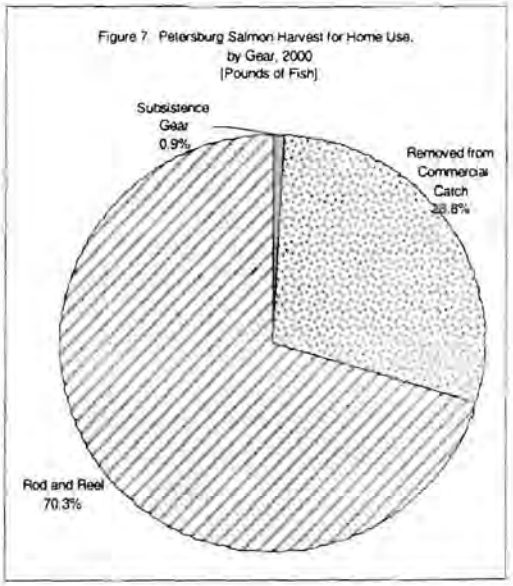


Salmon Harvest Methods

Petersburg fishers harvested their salmon primarily with rod and reel. Some brought home salmon from their commercial catches. Salmon harvested with rod and reel comprised about 61 percent of the salmon harvested for home use in numbers of fish, and 70 percent of the pounds of salmon harvested. Salmon removed from commercial catches by households involved in commercial salmon fisheries as permit holders and crew members represented 37 percent of the numbers of salmon harvested. Only very small amount of Petersburg's salmon was caught with recognized subsistence gear. Figures 6 and 7 show the composition of the Petersburg salmon harvest in 2000 by gear type used, in numbers of fish and pounds of fish.

Petersburg fishers used rod and reel to catch all the salmon species. Forty-six percent of salmon caught with rod and reel were chinook salmon, about 30 percent were coho salmon, and about 18 percent were sockeye. Rod and reel was the preferred method used to harvest chinook and coho salmon (78 percent of both those species), and sockeye (75 percent). Petersburg fishers preferred to remove their pink and chum salmon from their commercial catches - 92 percent of Petersburg's pink salmon, and 65 percent of it's chum harvest in 2000 were removed from commercial catches. Pink salmon comprised the largest share of the salmon removed from commercial catches (47.6 percent), followed by chinook (21.3 percent), coho (14.2 percent), and chum (10.9 percent) (Tables 5 and 6).





Forty-seven percent of Petersburg households reported harvesting salmon for home use in 2000. Forty-four percent harvested salmon using rod and reel, 3 percent used subsistence methods, and about 11 percent removed salmon from commercial catches (Table 7).

Location, Use Patterns and Factors Affecting Petersburg Salmon Fishing

The information on "areas used for fishing during the past 5 years" collected as part of the Division's household harvest survey for 2000 is not available at this time. Petersburg households identified areas used for salmon fishing on maps as part of the Division's 1987 household harvest survey project. The following discussion about salmon fishing locations, patterns of use and factors affecting salmon fishing is taken from a review of maps for that project in Betts et al 1994: Petersburg (Rev. 11/99).

Locations of Salmon Harvest. Salmon harvest Map #2 for Petersburg residents indicated that salmon were fished in the following general locations:

- Nearshore waters of Mitkof and eastern Kupreanof islands, including Wrangell Narrows and portions of Duncan Canal, and Sumner Strait between Zarembo and Mitkof islands
- Nearshore waters of northern Kupreanof Island
- Waters of Frederick Sound between Mitkof, northeast Kupreanof, and the mainland
- Le Conte and Thomas bays
- Isolated locations including Gambier and Pybus bays, Cape Fanshaw, Sitka and south Baranof Island, Port Malmesbury, Tebenkof, and Kadake bays on Kuiu Island, and portions of the northern coast of Prince of Wales Island and Bucareli Bay
- Primary king salmon harvest areas include Frederick Sound and Wrangell Narrows south to Beecher Pass
- Primary coho salmon harvest areas include Blind Sough, Petersburg Creek, eastern shore of Mitkof Island, and Duncan Canal
- Primary sockeye salmon harvest areas include Kah Sheets Creek
- Primary pink salmon harvest areas include Petersburg, Five Mile, Bear, Fall, and Ohmer creeks

Additional Harvest Areas Not Shown on Petersburg Map #2. During review sessions with local residents held on May 1 and 2, 1991, Petersburg respondents reported using areas in addition to those shown on Map #2. These additional areas included:
- sockeye harvest at Port Malmesbury, Gut Bay, and Falls Creek
- sockeye harvest at Red and Salmon bays on Prince of Wales Island
- sockeye harvest at Pillar Bay and chum salmon harvest at Security Bay on Kuiu Island

Intensity of Use by Area. Wrangell Narrows, the nearshore waters of Frederick Sound on the northern and northeastern shores of Mitkof and Kupreanof islands, and North Arm of Farragut Bay and the head of Thomas Bay were shown on Petersburg Map #2 to have been fished by a greater number of households than were other fishing areas. Lower Duncan Canal, nearshore waters of south Mitkof Island and north Kupreanof Island, Thomas and Farragut bays, and Cape Fanshaw were also heavily used. The remainder of the fishing areas, those more distant from Petersburg, were shown to have been used by lower percentages of households.

Review Comments on Petersburg Map #2. Intensity of use was generally shown correctly on Map #2, with some exceptions. Map reviewers had several comments. High intensity areas were shown correctly. Some areas shown at the lower levels were thought to be underrepresented. Kah Sheets Creek, a sockeye harvest location, is shown on Map #2 at the lowest intensity of use, but may be used by more residents than indicated. Portions of Duncan Canal, including North Arm, Bains Cove, and Castle River outlet area are heavily used for rod and reel harvest of coho salmon. Greys Pass (between Mitkof and Greys islands) and the Stikine Flats are increasingly used for harvest of king salmon. The north shore of Kupreanof Island east of Pinta Point should show higher intensity of use on Map #2. Lower Wrangell Narrows between Mitkof and Woewodski islands is increasingly used more heavily by local residents, and should show higher intensity of use on Map #2.

The highest intensity use areas on the northeast side of Mitkof Island, and in Thomas and Farragut bays, indicate rod and reel (sport trolling) areas.

Blind Slough is a gillnet harvest area for coho returning to the Crystal Lake Hatchery. High intensity use is correct. The area of Wrangell Narrows from Petersburg to Blind Slough is a harvest area for pink, chum, and coho salmon.

The harvest area shown at a creek on southwest Kupreanof Island (possibly Lovelace Creek) is used primarily by Kake residents for sockeye harvest; the low intensity of use shown on Petersburg Map #2 is correct for Petersburg harvesters.

Pattern of Use of Salmon Harvest Areas. Salmon harvest by Petersburg residents was primarily accomplished by marine rod and reel trolling or shore casting. Skiffs and fiberglass or wood cruisers up to 35' were used for marine trolling, as occasionally were commercial trolling boats. Trolling was generally done within a days' trip from Petersburg.

One gillnet harvest area has been permitted in recent years in the vicinity of Blind Slough, targeting Crystal Lake Hatchery coho salmon. Occasional net harvest of sockeye was undertaken in other permitted locations (Gut Bay, Pillar Bay, Red Bay, Salmon Bay), at some distance from Petersburg.

The closest substantial sockeye creek was Kah Sheets, which was not permitted for net fishing but harvested with rod and reel.

Factors Influencing Petersburg Salmon Fishing. Harvest patterns in all communities in Southeast are affected by a variety of factors, each of which have more or less influence, depending a community's unique situation. Some factors, such as weather conditions, resource abundance, availability of boats or other transportation, accessibility of harvest areas, employment patterns, coordination with other harvest activities, or regulations influence all harvest situations, but their relative significance is determined by local conditions. Others, such as harvest competition from non-local residents or other user groups, local presence of non-harvesting groups in traditional harvest areas, and effects of logging activities are more discreet, affecting some communities but not others.

Net fishing for salmon for home use was more prevalent in Petersburg in the early 20th century than it has been since changes have taken place in commercial fisheries and in subsistence regulations after 1960. Subsistence beach seine fishing, using a variety of nets adapted from the early commercial seine fisheries, had been undertaken at Petersburg Creek and Blind Slough until permits were no longer issued sometime after 1960. Commercial gill net fishers through the early 1950s commonly retained most of their salmon for home use from their commercial catches, and also fished with a variety of gill net types for home use. Commercial fishing locations, including the Stikine River mouth, Wrangell Narrows, Blind Slough, and Petersburg Creek, were also used for subsistence net fishing. A portion of commercial net catches was destined to supply local fur farms; subsistence fish were commonly retained from these catches. The last Petersburg fur farm ended its operation in 1967. Subsistence or personal use net fisheries were no longer permitted in the local Petersburg

area by the 1980s. Commercial rod and reel trolling had also been undertaken since the early 1900s in Petersburg; commercial trolling areas in the northern part of Wrangell Narrows and adjacent Frederick Sound have been used for non-commercial trolling in recent years. Rod and reel harvest of salmon has become the primary harvest method of Petersburg residents for home use.

Table 5. Estimated Salmon Harvest by Gear Type, Petersburg, 2000

		Subsistence Methods								Removed from Commercial Catch					
		Floating Net		Beach Seine		Dip Net		Subsistence Gear Any Method				Rod and Reel		Any Method	
	Harvest Units	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean
Salmon	Number	376.64	0.35	0.00	0.00	0.00	0.00	376.64	0.35	9,356.08	8.74	15,459.36	14.45	25,192.08	23.54
	Pounds	1,680.64	1.57	0.00	0.00	0.00	0.00	1,680.64	1.57	51,016.15	47.68	124,512.76	116.37	177,209.55	165.62
Chum Salmon	Number	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,018.64	0.95	547.84	0.51	1,566.48	1.46
	Pounds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7,070.58	6.61	3,802.67	3.55	10,873.25	10.16
Coho Salmon	Number	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,326.80	1.24	4,630.96	4.33	5,957.76	5.57
	Pounds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,951.37	6.50	24,262.53	22.68	31,213.90	29.17
Chinook Salmon	Number	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,994.48	1.86	7,062.00	6.60	9,056.48	8.46
	Pounds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23,392.86	21.86	82,828.79	77.41	106,221.64	99.27
Pink Salmon	Number	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,451.20	4.16	376.64	0.35	4,827.84	4.51
	Pounds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11,080.37	10.36	937.57	0.88	12,017.94	11.23
Sockeye Salmon	Number	376.64	0.35	0.00	0.00	0.00	0.00	376.64	0.35	564.96	0.53	2,841.92	2.66	3,783.52	3.54
	Pounds	1,680.64	1.57	0.00	0.00	0.00	0.00	1,680.64	1.57	2,520.96	2.36	12,681.22	11.85	16,882.82	15.78
Unknown Salmon	Number	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pounds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2001.

Table 6. Estimated Percentages of Salmon Harvest By Resource, Gear Type, and Salmon Total Harvest, Petersburg, 2000

		Subsistence Methods															
		Floating Net		Beach Seine		Dip Net		Other		Subsistence Gear Any Method		Removed from Commercial Catch		Rod and Reel		Any Method	
Resource	Percent Base	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
Salmon	GearType	100.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00		
	Resource	1.50	0.95	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.95	37.14	28.79	61.37	70.26		
	Total	1.50	0.95	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.95	37.14	28.79	61.37	70.26	100.00	100.00
Chum Salmon	GearType	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.89	13.86	3.54	3.05		
	Resource	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.03	65.03	34.97	34.97		
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.04	3.99	2.17	2.15	6.22	6.14
Coho Salmon	GearType	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.18	13.63	29.96	19.49		
	Resource	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.27	22.27	77.73	77.73		
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.27	3.92	18.38	13.69	23.65	17.61
Chinook Salmon	GearType	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.32	45.85	45.68	66.52		
	Resource	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.02	22.02	77.98	77.98		
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.92	13.20	28.03	46.74	35.95	59.94
Pink Salmon	GearType	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.58	21.72	2.44	0.75		
	Resource	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	92.20	92.20	7.80	7.80		
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.67	6.25	1.50	0.53	19.16	6.78
Sockeye Salmon	GearType	100.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	6.04	4.94	18.38	10.18		
	Resource	9.95	9.95	0.00	0.00	0.00	0.00	0.00	0.00	9.95	9.95	14.93	14.93	75.11	75.11		
	Total	1.50	0.95	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.95	2.24	1.42	11.28	7.16	15.02	9.53
Unknown Salmon	GearType	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Resource	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2001.

Table 7. Percentage of Households Harvesting Salmon by Gear Type And Species, Petersburg, 2000

Resource	Subsistence Methods					Removed from Commercial Catch	Rod and Reel	Any Method
	Floating Net	Set Net	Seine	Dip Net	Any Subsistence Gear			
Salmon	3.2%	0.0%	0.0%	0.0%	3.2%	11.2%	44.0%	47.2%
Chum Salmon	0.0%	0.0%	0.0%	0.0%	0.0%	3.2%	3.2%	6.4%
Coho Salmon	0.0%	0.0%	0.0%	0.0%	0.0%	8.0%	20.8%	27.2%
Chinook Salmon	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	40.8%	42.4%
Pink Salmon	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	4.8%	6.4%
Sockeye Salmon	3.2%	0.0%	0.0%	0.0%	3.2%	4.0%	6.4%	12.0%

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2001.

HARVEST AND USE OF CUTTHROAT, RAINBOW TROUT, STEELHEAD, EULACHON AND DOLLY VARDEN

In 2000 about 17 percent of Petersburg households reported using dolly varden and cutthroat trout. A few Petersburg households reported using steelhead. Table 8 shows the household participation in use, harvest, and sharing, and the amounts harvested.

Table 8. Harvest and Use of Eulachon, Dolly Varden, Cutthroat and Rainbow Trout and Steelhead for Home Use, Petersburg, 2000

	Percent of Households				Estimated Amount Harvested				Est. Pounds Harvested		
	Used	Harvested	Received	Gave	Total	Units	HH Mean	Per capita	Total	HH Mean	Per capita
Eulachon	0.0%	0.0%	0.0%	0.0%	0	ea.					
Dolly Varden	16.8%	15.2%	3.2%	4.8%	2,448	ea.	2.3	0.8	6,610	6.2	2.2
Cutthroat Trout	16.8%	15.2%	3.2%	3.2%	1,267	ea.	1.2	0.4	1,900	1.8	0.6
Rainbow Trout	0.0%	0.0%	0.0%	0.0%	0	ea.			0	0.0	0.0
Steelhead	3.2%	1.6%	2.4%	0.0%	265	ea.	0.2	0.1	2,256	2.1	0.8

Location, Use Patterns and Factors Affecting Petersburg Non-Salmon Fishing

The information on "areas used for fishing during the past 5 years" collected for the Division's household harvest survey for 1996 is not available at this time. The Division's 1987 household harvest survey project's mapped information on areas used for fishing for non-salmon species by Klukwan residents was found to have serious inadequacy, according to Betts. The following discussion about fishing locations, patterns of use and factors influencing fishing for non-salmon species is taken from a review of maps for that project in Betts et al 1994: Klukwan (Rev.6/99)

Locations of Non-Salmon Fish Harvest. Non-salmon harvest Map #3 for Petersburg residents indicated that non-salmon saltwater finfish were harvested in the following general locations:

-Nearshore waters of Mitkof and eastern and northern Kupreanof islands, including Wrangell Narrows and portions of Duncan Canal, and Sumner Strait between Zarembo and Mitkof islands
-waters of Frederick Sound between Mitkof Island, northeast Kupreanof Island, and the mainland

-Thomas and Farragut bays
-Isolated locations including Seymour Canal, Gambier and Pybus bays, Cape Fanshaw, nearshore waters around Sitka and south and northeast Baranof Island, Port Malmesbury, Tebenkof, and Kadake bays on Kuiu Island, and portions of the northern coast of Prince of Wales Island

Freshwater trout were fished in the following general locations:
-Kah Sheets (creek), Tunehean Creek, Totem Bay creek, and Kadake Bay on Kupreanof Island
-Petersburg and Falls creeks
-Streams emptying into Duncan Canal
-Harvey Lake on Woewodski Island

Additional Harvest Areas Not Shown on Petersburg Map #3. During review sessions with local residents held on May 1 and 2, 1991, Petersburg respondents reported using areas in addition to those shown on Map #3. These additional areas included:

-Francis Anchorage in Farragut Bay formerly was a eulachon harvest area. People dug holes on the beach to trap the hooligan when the tide went out, or caught them with a herring beach seine.
-Locations in Sitka Sound including Middle, Gavanski, and Siginaka islands, Long Island and Cape Burunof; for herring roe harvest; the channel between Sitka and Mount Edgecomb for herring roe on kelp;
-Steelhead trout are harvested in Barrie Creek on Kupreanof Island and in Anan Creek on the mainland at the mouth of Bradfield Canal.

Intensity of Use by Area. Portions of Wrangell Narrows, portions of Frederick Sound north of Mitkof and east of Kupreanof islands, were shown on Petersburg Map #3 to have been fished by a greater number of households than were other fishing areas. Petersburg Creek, portions of Wrangell Narrows, the mouth of Thomas Bay, and waters off Indian Point were also heavily used. Lower Duncan Canal, nearshore waters of north Kupreanof Island, portions of Wrangell Narrows, Frederick Sound, and Thomas Bay, were used by fewer households. The remainder of the fishing areas, those more distant from Petersburg, and the shore to shore expanse of Frederick Sound near Petersburg, were shown to have been used by the lowest percentages of households.

Frederick Sound adjacent to northern Mitkof Island is a bottomfish harvest area, but the mapped area should not include the middle section of the sound, only the nearshore waters. Also this area should show a lower intensity of use than 6 to 10 percent, because activity there includes only occasional harvest of halibut.

The low intensity shown in Farragut Bay is misleading. As respondents pointed out, several households harvest herring eggs there. It is common for one or a few households to harvest herring eggs for several others, so the intensity categories on the map do not represent the importance of an area to a wide range of local households.

Pattern of Use of Non-Salmon Harvest Areas. ..... Rod and reel fishing for marine fish took place primarily in Frederick Sound near Petersburg, and in Wrangell Narrows. Trout fishing with rod and reel was done in creeks primarily within a days' trip from Petersburg

Factors Influencing Petersburg Non-Salmon Fishing. Harvest patterns in all communities in Southeast are affected by a variety of factors, each of which have more or less influence, depending a community's unique situation. Some factors, such as weather conditions, resource abundance, availability of boats or other transportation, accessibility of harvest areas, employment patterns, coordination with other harvest activities, or regulations influence all harvest situations, but their relative significance is determined by local conditions. Others, such as harvest competition from non-local residents or other user groups, local presence of non-harvesting groups in traditional harvest areas, and effects of logging activities are more discreet, affecting some communities but not others.

SUBSISTENCE/PERSONAL USE SALMON PERMIT REPORTING

The Alaska Department of Fish and Game, Southeast Region, Division of Commercial Fisheries administers an annual subsistence/personal use salmon permit reporting system for all salmon species in designated waters. Petersburg residents use permits issued from the Petersburg Management Area Office. According to permits returned for 2001 from Petersburg, sockeye salmon were harvested primarily in Salmon Bay Creek, at the north end of Prince of Wales Island. Smaller numbers of sockeye were reported taken in the waters off Point Baker, and Red Lake Creek at the north end of Prince of Wales Island, as well as from Falls Creek on Baranof Island, through Frederick Sound and across Chatham Strait, in the Stikine River, and as far away as the Taku River/Sweetheart Creek personal use area near Juneau. Most coho salmon were reported harvested in Crystal Creek in 2001.

COMMERCIAL FISHERIES

Commercial fishing continues to be a vital element of the Petersburg economy. According to the data collected as part of the Division's household harvest survey for 2000, almost 28 percent of households have members involved in commercial fishing. Twenty percent of individuals worked in commercial fishing in 2000, and an estimated 28 percent of income in the community comes from commercial fishing. The Commercial Fisheries Entry Commission maintains records on participation in the various commercial fisheries. Not all persons holding permits fish their permits every year. Of the Petersburg residents holding permits in 1990, 397 held permits and participated in the several salmon power and hand troll, drift gillnet and purse seine fisheries, as well as sablefish, groundfish, herring, halibut, crab, other shellfish fisheries, fishing 905 permits. By 2000 this had dropped to 356 residents participating in commercial fisheries, fishing 747 permits.

Wild Resource Harvests and Uses in Two Southeast Alaska Communities: Petersburg and Wrangell

An Overview of Study Findings

Division of Subsistence
Alaska Department of Fish and Game

December 2002

Background

In the fall of 2000, researchers employed by the Alaska Department of Fish and Game's (ADF&G) Division of Subsistence conducted 223 interviews with households of two communities of southern southeast Alaska - Petersburg and Wrangell. Both communities had been surveyed previously as part of the Division's Tongass Resource Use Cooperative Study (TRUCS) which collected information on harvest and use of wild resources for the calendar year 1987. The current study was designed to collect updated information about the harvest and use of wild fish, game, and plant resources, demography, and aspects of the local cash economy such as employment and income, for a 12 month period. The survey covered the period January - December 2000.

Methods

Information was collected during face-to-face interviews using a standard survey form. The goal was to talk with representatives of a randomly selected sample of year-round households in these two communities. Table 1 shows the sample achievements in each study community. Households also were asked to show on a map areas used in the past five years for fishing (salmon and non-salmon fish), gathering marine invertebrates, hunting, and plant gathering, and to identify specific locations where salmon and deer were harvested during the 12-month period covered by the survey.

Table 1. Sample Achievement

Community	Total Households	Interviewed	Percent Interviewed	Declined an Interview	Failed to Contact
Petersburg	1,194	125	11.7	19	21
Wrangell	848	98	13.1	16	5
Total	2,042	223	10.9	35	26

Demography

The population of Petersburg grew unevenly since the first decades of the 1900s, experiencing significant growth in the period between 1960 and 1980, rising 36 percent in the 1960s, and another 40 percent in the 1970s. Petersburg experienced continued growth during the 1980s, but at a more moderate rate, rising about 12.6 percent in that decade. During the 1990s annual population estimates show an uneven pattern, reaching a high in the last half of the decade, and ending the decade at about the same level as the start. Petersburg's estimated year-round population for the study year was 2,944.6.[1] Wrangell also experienced a steady population growth between 1910 and 1960. During the decade of the 1960s Wrangell's population grew by 54.3 percent. This growth continued at a more modest rate during the 1970s and 1980s, and into the first half of the 1990s. Since 1994 Wrangell has experienced a steady decline in population, dropping to below it's 1990 level by 2000. Wrangell's estimated year-round population for the

study year was 1,959.[1] During the decade of the 1990s the Alaska Native percentage of the population of both Petersburg and Wrangell has increased modestly. In 2000 Alaska Natives comprised 12 percent of the population in Petersburg, compared with 10.3 percent in 1990. Alaska Natives comprised 9.9 percent of the population in households sampled as part of the Division's survey in 2000. In 2000 Alaska Natives comprised 23.8 percent of the population in Wrangell, compared with 20 percent in 1990. Alaska Natives comprised 29.6 percent of the population in households sampled as part of the Division's survey in 2000. The average length of residency for household heads was 18.7 years in Petersburg, and 20.2 years in Wrangell, based on the survey

Local Cash Economy

Table 2 reports some findings regarding features of the local cash economy in Petersburg and Wrangell in 2000. Most adults in both communities had jobs, but in Wrangell less than half were employed year-round. In Petersburg the government, trade and commercial fishing sectors of the economy offered the biggest share of the jobs, followed by services. In Wrangell also, government, services and commercial fishing provided the bulk of the jobs, followed by logging, construction and trade. In both communities, commercial fishing provided the biggest portion of income, followed by government, services, trade and logging.[2]

Table 2. Some Features of the Local Economy, Petersburg and Wrangell 2000

	Petersburg	Wrangell
% of Adults with Cash Employment	75.53%	77.39%
% of Employed Adults with Year-Round Employment	75.53%	43.51%
Mean Number of Weeks Employed	42.14	38.94
Percentage of Jobs in:		
Commercial Fishing	16.99%	14.56%
Mining	0.00%	0.97%
Construction	5.83%	10.68%
Cannery	7.28%	4.85%
Logging	1.46%	11.17%
Transportation & Utilities	5.34%	1.94%
Trade	17.96%	11.65%
Services	15.53%	16.99%
Government	23.30%	19.90%
Other	4.85%	6.31%
Percentage of Income from:		
Commercial Fishing	27.57%	29.36%
Mining	0.00%	2.68%
Construction	8.25%	9.21%
Cannery	5.41%	2.25%
Logging	1.38%	11.27%
Transportation & Utilities	8.21%	0.27%
Trade	10.48%	10.00%
Services	13.63%	14.58%
Government	23.55%	17.51%
Other	1.51%	2.87%
Average Household Income	$68,773	$61,223
Per Capita Income	$24,990	$23,346
% of Income from Jobs	82.2%	80.9%
% of Income from PFD	7.0%	6.8%
% of Income from Retirement	7.0%	9.1%

Harvests and Uses of Wild Resources for Home Use

Table 3 reports selected findings about patterns of harvest and use of wild resources for home use in Petersburg and Wrangell in 2000. Almost all the households used wild foods and a large majority fished, hunted or gathered resources. Harvests in Petersburg and Wrangell, as estimated in pounds of usable weight per household and per person were very similar - 444 pounds per household in Petersburg and 439 pounds per household in Wrangell. The average number of different kinds of resources used per household in 2000 was also very similar in these two communities.

Table 3. Resource Harvest and Use Characteristics, Study Communities, 2000

	Petersburg	Wrangell
Percentage of households:		
Using any Resource	94%	94%
Attempting any resource harvest	81%	81%
Harvesting any resource	78%	79%
Receiving any resource	87%	89%
Giving away any resource	55%	65%
Mean household harvest	444 lbs	439 lbs
Per capita harvest	161 lbs	167 lbs
Mean number of kinds of resources per household		
Used	9.2	10.6
Attempted	6.4	7.0
Harvested	5.7	6.5
Received	4.6	5.1
Gave Away	2.3	3.6

Figure 1 reports per capita harvests for each community for six resource categories. As expressed by a percentage of the total harvest (Figure 2) salmon ranked first in Petersburg, with 36 percent of the total, but marine invertebrates ranked first in Wrangell, with 36 percent of the total harvest of wild resources. The Petersburg survey apparently missed the households involved in seal hunting. The specialized nature of seal hunting means that a random sample of households could easily miss the few households. The findings of the Division's marine mammal survey conducted annually with seal hunters is a better source of information on the use of this resource. Resources removed from commercial harvests for home use provided 24.5 percent of the total harvest in Petersburg, and 13.1 percent at Wrangell. Rod and reel harvests provided 61.4 percent of the salmon harvested for home use in Petersburg and 38.1 percent in Wrangell. Petersburg households obtained 37.1 percent of their salmon from their commercial catches. Subsistence methods provided only a very minimal amount of salmon (1.5 percent) for Petersburg households. In Wrangell 39.1 percent of the numbers of salmon were obtained from commercial catches and 22.9 percent were harvested using subsistence methods.

Land mammals were more important to Wrangell households, accounting for 23 percent of the wild food harvest for home use there, but just 11 percent of the harvest in Petersburg. Deer was the principal land mammal used in both communities.

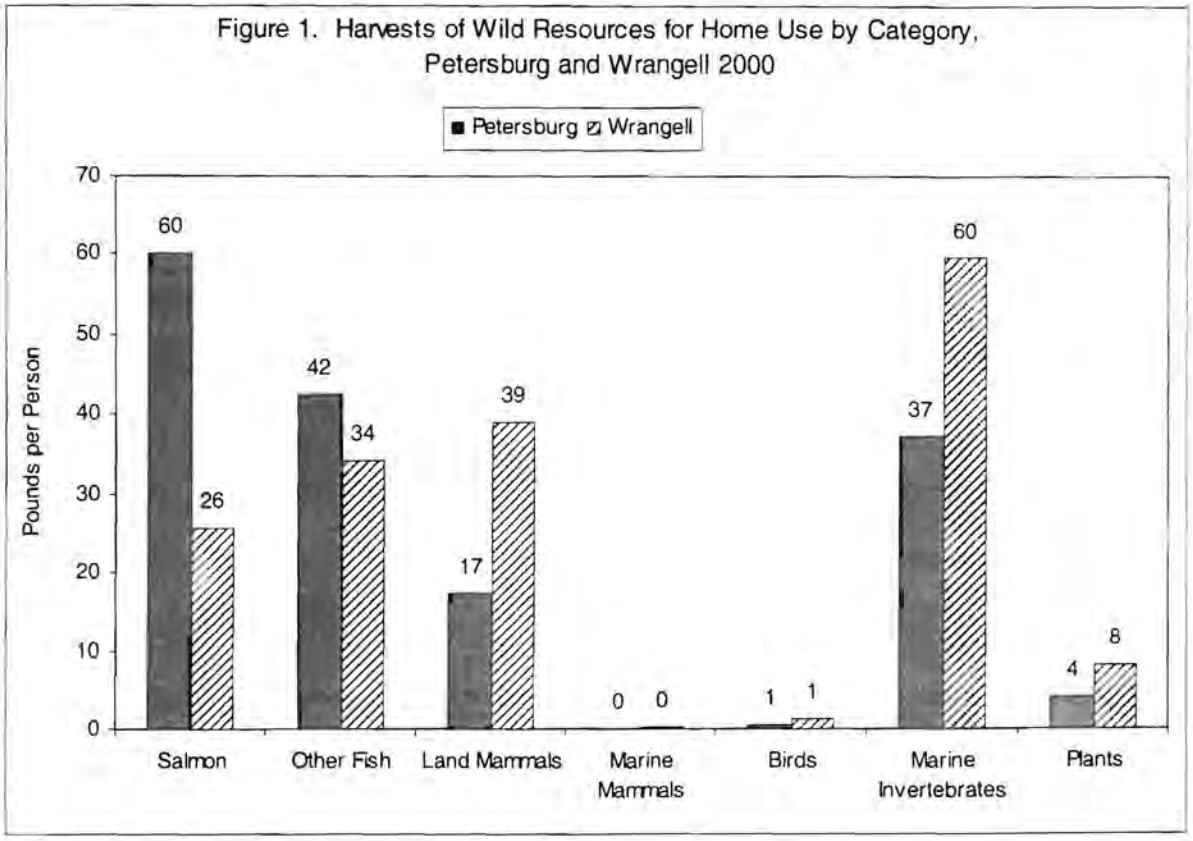


Figure 1. Harvests of Wild Resources for Home Use by Category, Petersburg and Wrangell 2000
Petersburg
Wrangell
Pounds per Person
70
60
50
40
30
20
10
0
60
26
42
34
17
39
0
0
1
1
37
60
4
8
Salmon
Other Fish
Land Mammals
Marine Mammals
Birds
Marine Invertebrates
Plants

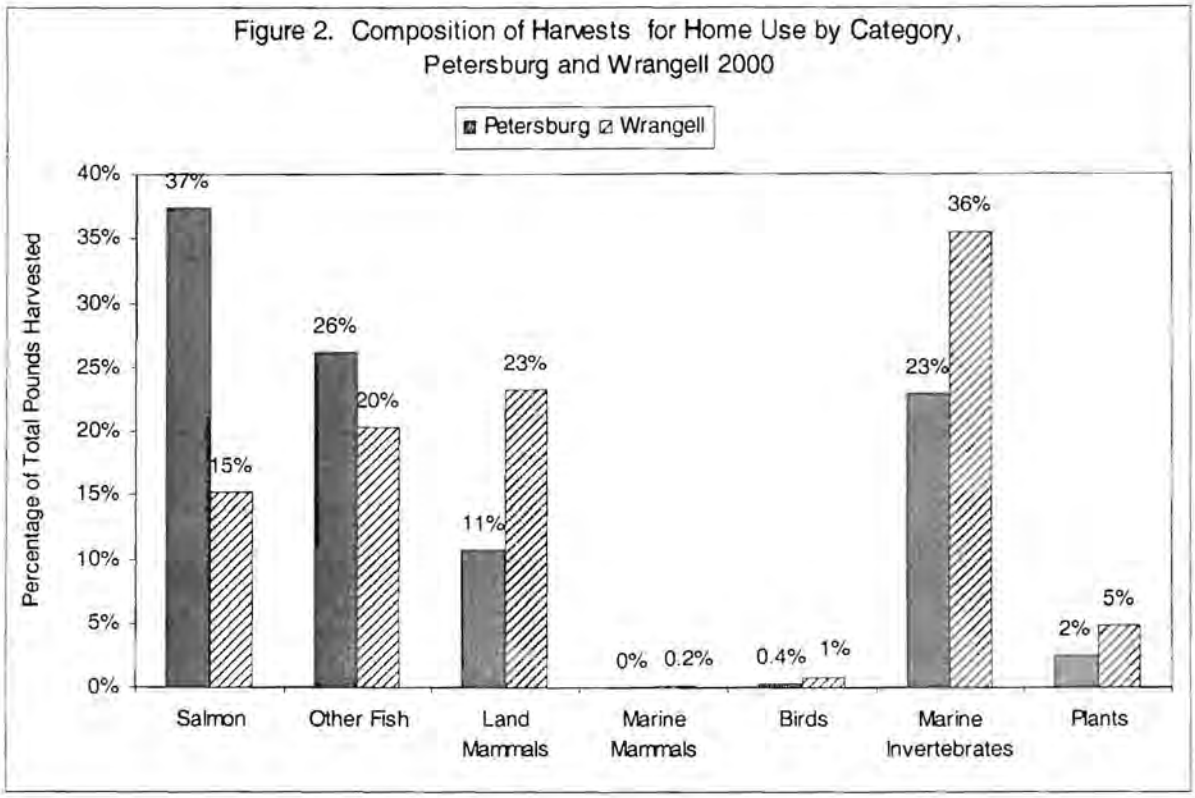


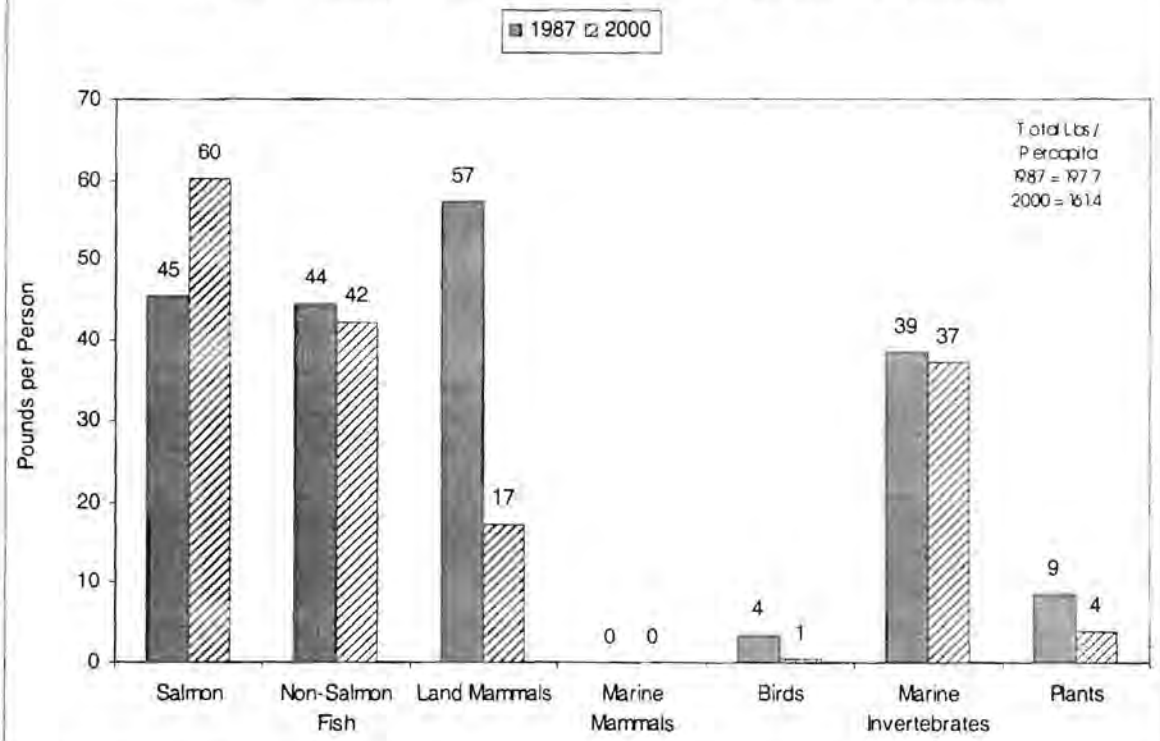
Figure 2. Composition of Harvests for Home Use by Category, Petersburg and Wrangell 2000
Petersburg
Wrangell
Percentage of Total Pounds Harvested
40%
35%
30%
25%
20%
15%
10%
5%
0%
37%
15%
26%
20%
11%
23%
0%
0.2%
0.4%
1%
23%
36%
2%
5%
Salmon
Other Fish
Land Mammals
Marine Mammals
Birds
Marine Invertebrates
Plants

Comparing Petersburg in 2000 with Petersburg in 1987

The findings for Petersburg in 2000 can be compared with the results of the TRUCS survey covering the calendar year 1987. During the thirteen year interval Petersburg has retained its focus on commercial fishing. The average length of residency of Petersburg's household heads in 2000 was 19 years, indicating most were living in the community at the time of the previous research. Since the previous research the population has declined by 9 percent. While the role of commercial fishing has declined since 1988, it is still important. The percentage of households with employment in commercial fisheries has dropped from just over 40 percent in 1987 to 27.5 percent in 2000. Commercial fishing jobs accounted for almost 23 percent of all jobs in the community in 1987. By 2000 just 17 percent of jobs were in commercial fishing. Jobs in federal and local government, trade, transportation, communications and utilities, and manufacturing (primarily fish processing) have gained in importance.

As estimated in pounds of usable weight per person, harvests for home use in Petersburg in 2000 (161.42 pounds per person) were about 18 percent lower than that of 1987 (197.67 pounds per person). Salmon harvests increased substantially over the period, and land mammal and plant harvests dropped significantly. Land mammals comprised a smaller portion of the overall wild resource harvest. Deer harvests in 2000 were down by 66 percent from 1987, dropping from an estimated total 2,053 deer harvested in the community in 1987 to just 694 in 2000. It is possible that the 1987 survey overestimated deer harvests. Based on the Division of Wildlife Conservation's mail-in survey, in 1987 Petersburg hunters harvested 1,439 deer. State and federal regulations in 2000 for Mitkof Island within the Petersburg city limits and the portion of Kupreanof Island within the Kupreanof city limits in GMU 3, remained closed to deer hunting, but in other portions of those islands beyond the city limits a registration permit hunt for a two-week period in October for one buck, and other portions of GMU 3 were open from August 1 - November 30 with a bag limit of two bucks.

Figure 3. Petersburg Wild Resource Harvests by Category,1987 and 2000



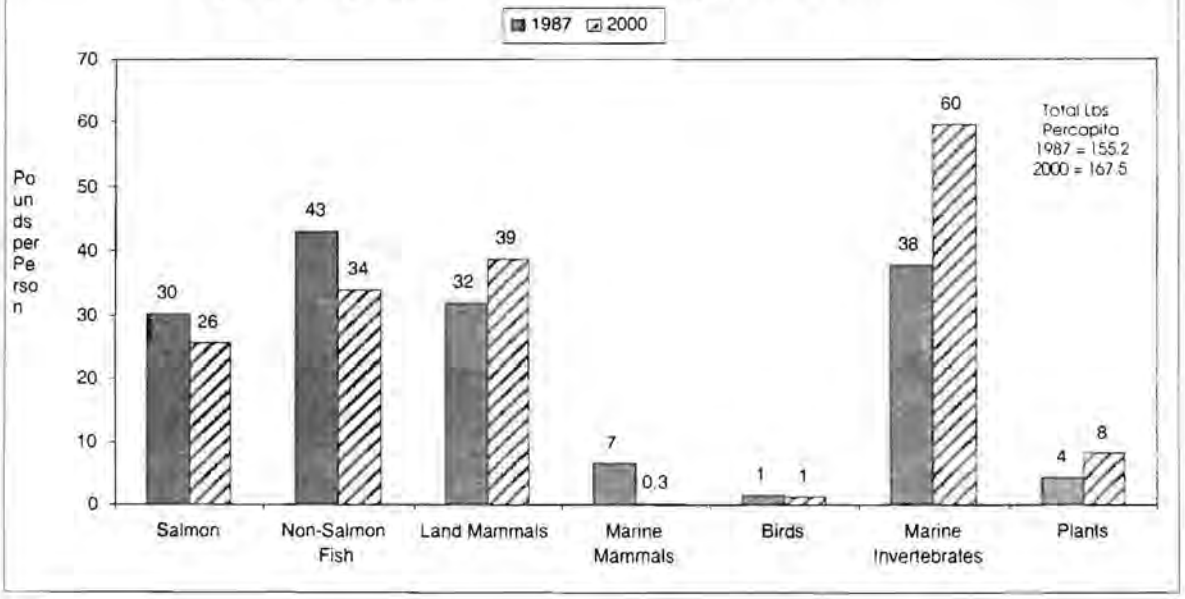
In 2000 a slightly smaller percentage of Petersburg residents used wild foods than in 1987 (94 percent compared with 97 percent of households in 1987), and a smaller percentage of households were involved in harvesting resources (78 percent in 2000 compared with 94 percent of households in 1987), and in giving resources away to neighbors (just 55 percent in 2000, compared with 87 percent in 1987). Amount harvested per person in the community was lower in 2000 than in 1987, dropping from 197 pounds per person in 1987 to 161 pounds per person in 2000.

Comparing Wrangell in 2000 with Wrangell in 1987

The findings for Wrangell in 2000 can be compared with the results of the TRUCS survey covering the calendar year 1987. During the thirteen year interval Wrangell's economy continued with reliance on the manufacturing - logging and milling,- construction, services and government sectors. The average length of residency of Wrangell household heads in 2000 was just over 20 years, indicating most were living in the community at the time of the previous research. Population has declined by about 4.5 percent since the previous research. A larger percentage of Wrangell households were involved in commercial fishing, manufacturing (primarily logging and millwork), trade and government work by 2000. A smaller percentage of Wrangell households had members employed in construction and transportation/utilities/communications in 2000 than in 1987.

As estimated in pounds of usable weight per person, harvests for home use in Wrangell in 2000 (167.5 pounds per person) were slightly higher than that of 1987 (155.2 pounds per person). Wrangell households harvested substantially more marine invertebrates in 2000 than in 1987 - jumping from 38 pounds per person to 60 pounds per person. Amounts of land mammals rose from 32 pounds per person to 39 pounds per person, and use of plants doubled, from 4 pounds to 8 pounds per person. Deer harvests in 2000 were down by 4.4 percent from 1987, dropping from an estimated total 725 deer harvested by the community in 1987 to 693 in 2000, but this likely reflects the decline in Wrangell's population since pounds per person of deer rose from 20.4 in 1987 to 28.3 in 2000. It is possible that the 1987 survey overestimated deer harvests.

Figure 4. Wrangell Wild Resource Harvests by Category,1987 and 2000



Based on the Division of Wildlife Conservation's mail-in survey, in 1987 Wrangell hunters harvested 321 deer, mostly in the Exchange Cove, and Whale Passage areas, and Woronkofski Island and islands at the mouth of the Stikine River. Moose continued to represent an important food source for Wrangell households, but black bear contributed a smaller share of its wild game. Both salmon and other non-salmon fish species contributed a smaller share of Wrangell's wild resource harvests in 2000 than in 1987. In 1987 salmon contributed 30.2 pounds per person. By 2000 this had dropped to 25.5 pounds per person. Likewise, non-salmon fish species dropped from 43 pounds per person in 1987 to 34 pounds per person in 2000. The increase in amounts of shellfish more than made up the difference, as noted above.

Wrangell households continue to participate in using, harvesting, giving and receiving wild foods at about the same rates in 2000 as documented for 1987. Amount harvested per person in the community was slightly higher in 2000 than in 1987, rising from 155 pounds per person in 1987 to 167 pounds per person in 2000.

Comparing Petersburg and Wrangell with Other Southeast communities

Comparing Petersburg and Wrangell with other southeast Alaska communities studied in the recent round of surveys for which income and employment data were collected, both rank in the top quarter in income per capita. During the survey year for Hydaburg (1997), the Native for-profit village corporation made a distribution to shareholders that likely misrepresents the income level for that community. In terms of percentage of the adult population employed year-round, Petersburg was at the top, with 53.6 percent, but in Wrangell less than half of the adults (43.5 percent) had year-round employment. These two communities have greater opportunities for wage employment than many of the smaller places.

Table 4. Selected Demographic and Economic Characteristics, Southeast Alaska Communities

Community	Study Year	Estimated Population	Average Length of Residency HH Heads	Per Capita Income	Average Months Employed	Percent Employed Year Round
Angoon	1996	580.9	n/a	n/a	n/a	n/a
Coffman Cove	1998	213.0	10.3	$16,578	8.06	21.3%
Craig	1997	1,764.3	13.8	$18,038	9.61	47.5%
Edna Bay	1998	52.4	7.8	$13,740	6.75	18.8%
Game Creek	1996	63.8	n/a	n/a	n/a	n/a
Haines	1996	2,172.8	n/a	n/a	n/a	n/a
Hollis	1998	155.2	7.9	$20,400	8.50	40.3%
Hoonah	1996	890.9	n/a	n/a	n/a	n/a
Hydaburg	1997	398.1	33.5	$28,098	9.22	34.9%
Kake	1996	747.0	n/a	n/a	n/a	n/a
Kasaan	1998	43.7	17.7	$20,232	7.76	41.2%
Klawock	1997	847.3	19.2	$15,758	9.26	44.8%
Klukwan	1996	108.0	n/a	n/a	n/a	n/a
Naukati Bay	1998	146.5	6.3	$14,089	8.02	33.3%
Petersburg	2000	2,936.1	18.7	$24,990	9.73	53.6%
Point Baker	1996	47.5	n/a	n/a	n/a	n/a
Port Protection	1996	97.5	n/a	n/a	n/a	n/a
Saxman	1999	379.7	15.5	$13,128	8.58	47.9%
Sitka	1996	8,535.1	n/a	n/a	n/a	n/a
Thorne Bay	1998	518.0	10.0	$23,022	9.47	55.3%
Whale Pass	1998	54.7	10.2	$24,879	10.36	54.6%
Whitestone Logging Camp	1996	141.8	n/a	n/a	n/a	n/a
Wrangell	2000	1,959.0	20.2	$23,346	8.99	43.5%
Yakutat	2000	634.7	19.4	$18,348	9.65	46.9%

In terms of per capita wild food harvests, Petersburg and Wrangell rank at the low end of the continuum, along with Saxman and Hollis. In terms of average number of kinds of resources used and harvested both communities are among the lower third compared with other southeast Alaska communities. This was also the case regarding sharing, as expressed in the average number of resources received or given away per household. Both Petersburg and Wrangell ranked in the lower third among the 24 southeast communities in average number of kinds of resources received or given away.

Table 5. Selected Characteristics of Wild Resource Harvests and Uses, Southeast Alaska Communities

		Estimated Harvests (Lbs)		Average Number of Kinds of Resources per Household				
Community	Study Year	Household	Per Capita	Use	Attempt	Harvest	Receive	Give
Angoon	1996	809.8	224.5	10.1	7.6	7.5	5.7	2.7
Coffman Cove	1998	784.2	276.1	20.3	17.6	16.8	6.3	4.3
Craig	1997	673.1	232.0	14.1	10.6	10.2	5.4	4.7
Edna Bay	1998	1,181.7	383.3	17.7	17.0	16.4	2.7	4.2
Game Creek	1996	795.7	187.2	28.9	16.6	15.2	18.4	6.8
Haines	1996	534.8	195.8	15.0	9.5	9.2	7.1	3.9
Hollis	1998	445.3	169.3	9.7	8.2	7.8	2.8	2.3
Hoonah	1996	1,183.8	372.0	17.1	12.7	12.1	8.0	7.1
Hydaburg	1997	1,182.3	384.1	17.3	11.3	11.0	9.4	7.2
Kake	1996	537.3	179.1	17.0	8.9	8.4	9.2	3.3
Kasaan	1998	1,097.7	452.0	16.3	11.1	10.7	7.9	6.4
Klawock	1997	894.6	320.4	14.5	10.6	10.2	5.7	4.6
Klukwan	1996	1,881.8	608.3	21.8	11.9	11.0	16.5	10.0
Naukati Bay	1998	536.2	241.5	13.9	10.7	10.5	4.8	2.9
Petersburg	2000	444.0	161.4	9.2	6.4	5.7	4.6	2.3
Point Baker	1996	721.4	288.6	19.0	15.0	14.4	7.1	5.5
Port Protection	1996	1,100.1	450.9	25.1	20.1	19.2	9.8	6.9
Saxman	1999	439.1	167.4	13.4	8.3	7.9	7.0	5.3
Sitka	1996	573.1	205.0	13.1	8.8	8.4	5.7	4.4
Thorne Bay	1998	455.1	179.2	9.4	8.9	8.1	2.2	1.8
Whale Pass	1998	505.6	185.0	11.9	9.7	9.5	4.7	3.9
Whitestone Logging Camp	1996	617.0	178.4	10.5	9.7	9.5	1.6	1.4
Wrangell	2000	439.1	167.4	10.6	7.0	6.5	5.1	3.6
Yakutat	2000	1,045.6	385.5	22.1	15.2	14.3	12.1	9.2

Conclusions

Resource uses in the study communities in 2000 continue to reflect a pattern which successfully incorporates active hunting and fishing to provide important and valued wild foods, with local market-based economies with moderate levels of opportunities for wage employment. Both Petersburg and Wrangell rank among the Southeast communities with the highest average length of residency of household heads - only Hydaburg and Klawock had a higher average length of residency. (Data on length of residency, and other demographic and economic indices were not collected for the ten communities studied in 1996). The relatively stable population of the year-round residents of Petersburg and Wrangell is likely responsible for the steady reliance on wild resources.

The Division's household survey in Petersburg and Wrangell was conducted in 2001, collecting information on the calendar year 2000. It is likely that the full impact of declines in both logging and commercial salmon fisheries had not been felt. It is not clear if falling opportunities for wage

employment and cash income results in stronger dependence on wild resources to make ends meet, or in lower use levels due to limitations on ability to engage in hunting and fishing. Such an analysis remains to be undertaken.

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[1] Estimated year-round community population based on expansion from households surveyed in December2000/January 2001, to unsurveyed year-round households. This differs from the U.S. census of population counted in April 2000, which includes all residents of each community, both year-round and seasonal residents.

[2] Income data may underestimate the contribution of commercial fishing to the income of Petersburg and Wrangell households, since reported income was missing for some commercial fishing households.

CUSTOMARY AND TRADITIONAL USE WORKSHEET

Eulachon Smelt in the Bradfield, Chickamin, Klahini, Unuk and Stikine Rivers of Southeast Alaska
Prepared by the Division of Subsistence
Alaska Department of Fish and Game

Alaska Board of Fisheries, Sitka Alaska
January 2003

PROPOSAL NUMBERS: 109 & 111
FISHING DISTRICTS: Section 1-C, 1-D, District 7 and District 8
SPECIES/STOCK: eulachon (Hooligan) *(Thaleichthys pacificus)*

Note: This worksheet contains background information on the uses of eulachon *(Thaleichthys pacificus)* in the Bradfield, Chickamin, Klahini, Unuk and Stikine rivers in Southeast Alaska. These watersheds are located in Section 1-C, 1-D, District 7 and District 8. The Board of Fisheries requires this information in order to determine whether there are "customary and traditional" (subsistence) uses of eulachon in this area. It is intended that the information in this worksheet be supplemented by any written and oral public testimony provided during the board meeting.

MAIN COMMUNITIES USING THE SPECIES
Ketchikan, Saxman, Section 1-C and 1-D.
Wrangell and Petersburg, Districts 7 and 8.

1. Length and consistency of use (a long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the users' control, such as unavailability of the fish caused by migratory patterns).

Eulachon or "hooligan" *(Thaleichthys pacificus)* is an anadromous member of the smelt family, spawning in several southeast Alaska river systems. Eulachon have been harvested by Tlingit, Haida and Tsimshian for centuries (Niblack 1890:299; Krause 1956 [1885]: 122; Mills 1982:8-10; de Laguna 1972:360). Once called "salvation fish", eulachon were known to have been an historically important food fish, providing fresh food at the end of winter (Stewart 1977:95). In addition, eulachon oil has been extensively traded among southeast Tlingit, Tsimshian and Haida populations, as well as with inland Athabaskan peoples, and with northwest coast groups (Magdanz 1988:6). Eulachon stocks occur in several rivers, but many of the smaller runs are probably not large enough to use in the production of oil. Extensive trade networks serve to distribute fish and oil throughout most communities in Southeast. Harvest and preparation of eulachon continues today much as it has historically, incorporating some changes to methods of harvest and preparation (Betts 1994).

Historically, Tlingit and Haida clans in southeast Alaska claimed territorial rights to eulachon fishing sites, at which, however, whole villages camped to harvest and process the fish (Stewart 1977:149, 150, Goldschmidt and Haas 1998). Family and community camps were occupied for several weeks to harvest the fish and render oil.

Ethno-historic sources report harvest of eulachon at major spawning rivers in Southeast (Chilkat, Chilkoot, Situk, Alsek, Taku, Chickamin, Unuk, and Stikine). Tlingit, Haida, and Tsimshian have harvested eulachon from the Unuk, Klahini, Chickamin, and Stikine, Rivers for at least one hundred years. (Goldschmidt and Haas 1998: 74, 79-82). Use of eulachon by Cape Fox or Saxman residents in the Chickamin and Unuk rivers is described in Goldschmidt and Haas (1998: 79-82). They report eulachon camps owned by Saxman residents at the mouths of those rivers. Saxman residents rendered eulachon oil from fresh, rather than fermented, fish (de Laguna 1972:403). Wrangell residents have harvested eulachon in the Stikine River historically and continue to do so (Goldschmidt and Haas 1998: 74; Cohen 1988:37). Tongass Tlingit, currently of Ketchikan, formerly harvested eulachon in the Nass River, British Columbia, as well as on the Unuk and Chickamin Rivers (Goldschmidt and Haas 1998: 79, 82-83).

Data from Division of Subsistence surveys indicate that the largest harvests of eulachon by community were taken by Haines residents, followed by Klukwan, Yakutat and Wrangell (Table D-1). Per capita harvest was greatest in Haines and Klukwan (Table D-1). Highest household harvest participation rates also occurred in Haines and Klukwan (Table D-1). These data suggest that currently the Chilkat, Situk and Stikine rivers produce the bulk of the eulachon harvest in Southeast.

2. Seasonality (a pattern of taking or use recurring in specific seasons of each year).

Historically, eulachon were harvested during each of two spawning runs, in late winter and again in spring (de Laguna 1972:360, Goldschmidt and Haas 1998). Eulachon appear in the mouths of the larger rivers from February to May. Traditionally, the first wave of eulachon were caught and eaten fresh, a welcome respite in the harsh late winter months when the stores of smoked fish were running low. For this reason the eulachon was known as the "savior" and "preserver" fish (Byram and Lewis 2001: 10; Collison 1941: 25; Krause 1956: 122). As the run built up and peaked large quantities were harvested, smoked, dried, and rendered into oil for storage and trade (Stewart 1977: 97). Today eulachon are still harvested in late winter - early spring when the runs are strong and the fish appear at the mouths of the Unuk, Klahini, Chickamin, and Stikine Rivers.

3. Means and Methods of Harvest (A pattern of taking or use consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost).

Tlingit, Haida, and Tsimshian developed specialized fishing gear, harvest, and processing methods for eulachon. Eulachon fishing was traditionally done with hooks, traps, baskets, and nets. Historically, dip nets or traps were used to harvest eulachon. Early dip nets were made of spruce roots and sinew sewn to forked branches or lashed frames. Dip

nets and bag nets have been used since at least the 19th century. Krause mentions seeing dip nets made of sinews, dig-ha,' for catching eulachon, in 1881 (Emmons 1991:120; Krause1956: 122, 128; Stewart 1977: 95). Today, dip nets and beach seines are the most common gear used to harvest eulachon. Beach seines are sometimes used, in addition to dip nets, on the flats at the mouths of the Stikine and Unuk Rivers.

4. Geographic Area (The area in which the noncommercial, long-term, and consistent pattern of taking, use, and reliance upon the fish stock or game population has been established).

Eulachon are primarily harvested in the intertidal waters at the mouths of glacial fed rivers. The Tongass Tlingit and the Cape Fox or Sanya Tlingit presently residing in Ketchikan and Saxman, regard the mouth of the Unuk River as their place of origin and have harvested eulachon from the Unuk, Klahini, and Chickamin Rivers since pre-contact times (Goldschmidt and Haas 1998: 74, 79-84). Wrangell or the Stikine Tlingit have harvested eulachon from the Stikine River since pre-contact times (Goldschmidt and Haas 1998: 79-82). Natives and non-natives continue to harvest eulachon from the Unuk, Klahini, Chickamin and Stikine Rivers.

5. Means of Handling, Preparing, Preserving and Storing (a means of handling, preparing, preserving and storing fish which has been traditionally used by past generations, but not excluding recent technological advances where appropriate).

Eulachon camps were established on rivers where families returned year after year to fish and render oil. Historically, eulachon were eaten fresh when they first appeared, and were harvested in great quantity for rendering oil when the runs peaked. Eulachon were also dried and smoked for long term storage. Smoking took place in family or community camps, using racks in the open air or roofed-over with boughs. Eulachon was smoked in smokehouses in conjunction with the smoking and drying of other resources (Stewart 1977:139-40).

To render the oil, a large pit was dug in the ground and filled with eulachon, covered with wood, and left to ripen 10 days to 3 weeks. The fish were then put into canoes, large wooden boxes or barrels full of water, and boiled for several hours. They were left to stand and cool, after which the oil was skimmed off and put into sealed containers (Krause 1956 (1885]:122; Stewart 1977:149-54; Betts 1994). The oil was eaten with most foods, and used for preserving berries, roots, and herbs. It was eaten fresh and distributed in large quantities during feasts (Oberg 1973).

Eulachon is currently eaten fresh, as well as dried and smoked, and salted. Salting is done in five-gallon buckets; salted fish are boiled before being eaten. Contemporary harvesters continue to render eulachon into oil by first "ripening" the fish in pits or wooden boxes at traditional campsites, as well as in the communities. Large steel drums are used to boil and settle the fish. Oil is skimmed with ladles from the surface, and poured into jars to settle. A variety of recipes for producing oil are followed, particularly varying the length of time used for each of the steps, and slightly varying methods of straining the final

product. Oil is used primarily for eating, as a condiment or a "dip" for many foods. It is also used medicinally, and is believed to relieve many common afflictions (Betts 1994).

Large quantities of eulachon are required for making oil. Variations in the amount of oil rendered from cooking were said to result from fermentation time and gender of fish. Female fish were reportedly richer in oil, and fish that had fermented longer tended to yield more oil. Betts reported on pounds of whole eulachon needed to make one gallon of oil. From 90 to 135 pounds of whole eulachon were needed to make one gallon of oil (Betts 1994).

6. Intergenerational Transmission (a pattern or taking or use which includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation).

In southeast Alaska eulachon are harvested using similar methods as were used historically. The fish are prepared as they were historically, and oil continues to be rendered following long-used methods. In some areas family camps are still used. In general, new generations of harvesters learn the skills needed to harvest, process, and prepare eulachon from observation of others and participation with elder relatives or community residents in subsistence activities. Much is taught and learned in both Native and non-Native communities through stories describing fishing lore and skills. In traditional Tlingit culture, young boys learned most of their hunting and fishing skills from their mother's brothers and other older members of their own clan (Oberg 1973 (1933):32).

7. Distribution and Exchange (a pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving).

Since eulachon were available in large enough quantity for oil production only in a limited number of rivers, the oil rendered from these fish was a highly valued trade item. Prior to the time of European contact, the Tlingit traded extensively with coastal and interior peoples. Items such as dried fish, dried mountain goat meat, and eulachon oil were traded for furs, caribou skin, leather armor, lichen dye, sharks' teeth and mother of pearl (Magdanz 1988: 6). The Tlingit exchange of eulachon oil was so significant that their trade routes into the interior of Alaska and Canada became known as "grease trails" (de Laguna 1972:350; Stewart 1977:150).

Today eulachon and its oil remain highly prized and are distributed widely among communities. Table D-2 compares harvest and use of eulachon within 33 study communities. (In communities where no harvest occurs, use indicates receipt of eulachon). Residents of all but one of the 33 communities harvesting eulachon reported receiving eulachon as well (Table D-2). Also, many communities that reported no harvest received eulachon. Eulachon oil is widely shared through giving, bartering, and cash sale. Bartering involves exchange for other resources as well as for services. The value of eulachon oil remains high due to its relative scarcity and desirability.

8. Diversity and Economic, Cultural, Social, and Nutritional Elements (a pattern that includes taking, use, and reliance for subsistence purposes upon a wide variety of the fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life).

Historically as well as for contemporary users, eulachon has constituted a valuable spring food resource, becoming available when other food stores and fishing and hunting activities are generally low. In addition, the widespread distribution of eulachon and oil activates trade networks which remain economically valuable to Southeast residents. Eulachon continue to comprise one of many different food resources used by southeast communities, including salmon and other finfish, shellfish, marine and terrestrial mammals, birds, and plants. Data from the Division of Subsistence, Community Profile Database, technical papers, and reports to the boards of fish and game show the range of fish and wildlife resources used by southeast Alaska communities (Bosworth 1991; Cohen 1989; ADFG 2000; Smythe 1988).

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Subsistence Use of Herring Spawn in the Sitka Sound Area of Southeastern Alaska, Spring 2002

Mike Turek, Division of Subsistence
Alaska Department of Fish and Game

Alaska Board of Fisheries, Sitka Alaska
January 2003

The following report provides background information for one proposal in front of the Board – Proposal 110. This proposal was submitted by Mr. Grant Miller and requests a permit system for the subsistence herring roe fishery in Sitka Sound.

Current regulations pertaining to the subsistence harvest of herring roe in Sitka Sound include a customary and traditional subsistence use finding and amount necessary for subsistence uses finding. (5AAC 01.716(7). Also, regulations allow the subsistence harvest of herring and herring spawn in Districts 13(A) and 13(B) north of Latitude of Aspid Cape (5AAC 01.716(b). The board found that 105,000 – 158,000 pounds of herring spawn are reasonably necessary for subsistence uses in Section 13-A and Section 13-B north of the latitude of Aspid Cape. 5AAC 01.730(k). In addition to the reporting requirement under (e) of this section, the department will, to the extent practicable, use a subsistence harvest monitoring program with surveys and interviews to record the harvest of herring spawn on branches, kelp, and seaweed taken in the waters of Section 13-A and Section 13-B north of the latitude of Aspid Cape.

Background

In 1990 the Division of Subsistence published Technical Report Number 173, *The Subsistence Harvest of Herring Eggs in Sitka Sound, 1989* by Robert Schroeder and Matthew Kookesh. This report documents the non-commercial harvest of Pacific herring (*Culpea hurengus*) eggs on western hemlock branches, on hair seaweed (*Desmarestia viridis sp.*), and on macrocystis kelp (*Macrocystis inregrifolia*) that took place in the Sitka area in April and May, 1989.

Field observation of the harvest and interviews with elders and key harvesters supplied most of the information presented in this report. Additional information was available from historical documents describing herring roe harvest in Sitka Sound. Some quantitative data were available from earlier research conducted by the Alaska Department of Fish and Game (ADF&G), Division of Subsistence in Sitka and in other communities that use this resource and from permit files kept by ADF&G. Based on their observations and the data available from earlier research, Schroeder and Kookesh estimated between 80,000 and 120,000 pounds of herring roe harvested in 1989.

In 1997 the Division of Subsistence and the Sitka Tribe of Alaska (STA) conducted a household harvest survey in Sitka. A two-strata sampling design was followed. A sample of 100 households was randomly drawn from the Sitka area general population. A second sample of 50 households was randomly drawn from a list compiled by STA. A total of 150 households (approximately 11.7 percent of the total population of the City and Borough of Sitka) were interviewed. Each household was asked to estimate the weight of their subsistence harvest during the twelve-month period from February 1, 1996 through January 31, 1997. The documented subsistence harvest of herring eggs for the 1996 harvest year was 55 tons, or 110,000 pounds of eggs.

In January 2001 the Sitka Tribe of Alaska submitted an Agenda Change Request to the Alaska Board of Fisheries that requested dispersal of the commercial sac roe herring fishery in Sitka Sound. This proposal was to ensure traditional harvesters a reasonable opportunity by protecting the historically important geographic areas used for subsistence herring roe harvest. In January of 2002, the board determined that the amount "reasonably necessary for subsistence" was between 105,000 and 158,000 pounds of herring roe harvested from Section 13-A and the portion of Section 13-B north of the latitude of Aspid Cape. The board also voted to amend proposed regulations that would have enacted a requirement for a subsistence permit. Instead of a permit the board requested that the ADF&G Division of Subsistence work with STA and conduct a harvest survey in 2002.

2002 Harvest Survey

The primary goal of this survey was to use face-to-face interviews to estimate the amount of herring eggs-on-hemlock-branches harvested by Sitka Sound subsistence fishermen in 2002. The survey provided harvest estimates (with confidence ranges) for total pounds of herring eggs on hemlock-branches, Macrocystis, (Hair Seaweed or Ne), and other substrates.

Methodology

The project began in March 2002 with preparation of the interview questionnaire and development of the household list. Training of STA interview staff by the ADF&G Division of Subsistence took place in March. Local harvesters provided input in designing the questionnaire. ADF&G Division of Subsistence staff trained and supervised the STA Cultural and Traditional Resources (C&TR) Division staff. Division of Subsistence staff visited the grounds to observe and contact subsistence harvesters during the fishery. Interviews were conducted during and shortly after the subsistence fishery, in April and May 2002. Data entry and data processing was completed by late summer of 2002.

In order to estimate the area's subsistence herring egg harvest, a list of subsistence households was developed by STA staff, citizens, traditional herring egg harvesters and the Division of Subsistence using chain referral methodology. The list was composed of 108 households. Of these 108 households, STA and ADF&G conducted face-to-face interviews with representatives from 86 households (79.6%). Surveyors were unsuccessful in attempts to contact 21 households. Only one household refused to be interviewed. The project had a sample goal of 100 to 150 interviewed households. Harvests of interviewed households in Sitka were expanded to the estimated number of all households on the list of fishing households. Confidence ranges around harvest estimates were done following Cochran (1966:513, 5.15).

Research Findings

The estimated harvest of herring roe by subsistence users in Sitka in 2002 was 151,717 pounds, on all substrate combined (Table 1). Of this total, 139,755 pounds were harvested on hemlock branches, 7,642 pounds on hair seaweed and 4,270 pounds on kelp. The percentage of households *using* herring roe (on any or all substrate) was estimated at 97.3 percent. The percentage of households *harvesting* herring roe (on any or all substrate) was estimated at 71.2 percent. Harvest on hemlock branches was the most common substrate at 65.2 percent, followed by herring roe on kelp at 32 percent, and on hair seaweed at 16.6 percent. Sharing is demonstrated by 54.6 percent of the households having *received* herring roe while 40 percent *gave* herring roe away (Table 1).

Table 1. Estimated Harvest and Use of Herring Roe, Sitka, 2002

	Percentage of Households				Pounds Harvested		
Resource Name	Use	Harvest	Received	Gave	Total	Mean HH	Per capita
Herring Roe	97.3	71.2	54.6	40.3	151717.40	1404.79	457.64
Herring Roe/Unspecified		1.2			50.23	.47	.15
Herring Spawn on Kelp		32.0			4269.77	39.53	12.88
Herring Roe on Hair Seaweed		16.6			7641.63	70.76	23.05
Herring Roe on Hemlock Branches		65.2			139755.77	1294.03	421.54

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

Table 1. Southeast Alaska Community and Regional Population, 1960-2000

	1960	1970	1980	1988	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Northern Southeast	**19,257**	**23,776**	**32,489**	**39,205**	**41,841**	**43,100**	**44,023**	**44,385**	**44,281**	**44,365**	**44,854**	**45,315**	**45,621**	**45,615**	**46,182**
Angoon	395	400	465	624	638	665	636	636	610	601	605	570	586	576	572
Bal Angoon CSA			109	213	19	16	16	14	14	12	12	12	12	17	***9***
Bal. Hoonah CSA		298	382	324	140	158	175	142	114	109	108	102	102	98	***40***
Bal. Other Sitka District	1,111														
Cube Cove				19	156	163	178	172	173	196	174	139	134	139	72
Ellin Cove	46	49	28	76	57	57	57	65	56	44	52	52	50	50	32
Freshwater Bay				26	68	57	65	50	53	0	0	0	0	0	0
Game Creek				38	61	67	66	71	76	75	74	70	61	50	35
Gustavus	107	64	98	219	258	256	279	288	314	319	344	340	371	377	429
Haines	792	1,401	1,680	1,967	2,117	2,242	2,230	2,293	2,331	2,280	2,352	2,404	2,461	2,475	2,392
Hobart Bay				142	187	108	90	83	84	77	117	105	81	48	3
Hoonah	686	748	680	894	795	796	843	871	885	877	902	890	892	877	860
Juneau	9,745	13,556	19,528	24,621	26,751	27,579	28,253	28,448	28,454	28,700	29,230	29,713	30,021	30,189	30,711
Klukwan	121	103	135	160	129	129	130	135	140	165	140	160	141	136	139
Pelican	135	133	180	247	222	231	233	231	210	207	199	148	150	137	163
Sitka	5,121	6,073	7,803	8,257	8,588	8,878	9,059	9,083	8,941	8,868	8,650	8,708	8,722	8,681	8,835
Skagway	659	675	814	704	692	726	758	786	798	775	778	815	811	825	862
Tenakee Springs	109	86	138	120	94	97	100	101	97	106	113	100	99	93	104
Whitestone Camp				27	164	153	175	209	204	184	205	165	152	118	116
Yakutat	230	190	449	527	705	722	680	707	727	770	799	822	775	729	808
Central Southeast	**3,316**	**4,949**	**6,167**	**6,770**	**7,042**	**7,171**	**7,345**	**7,290**	**7,248**	**7,198**	**7,202**	**7,142**	**7,165**	**7,137**	**6,684**
Bal. Petersburg CSA		358	295	118	225	225	229	227	223	226	229	230	230	230	228
Bal. Wrangell CSA			179	181	87	89	92	92	94	92	90	88	88	88	88
Kake	455	448	555	678	700	711	727	725	695	703	727	756	775	745	710
Petersburg [1]	1,528	2,078	2,868	3,230	3,230	3,306	3,338	3,331	3,285	3,334	3,412	3,434	3,423	3,439	3,247
Port Alexander	18	36	86	85	119	115	116	114	101	95	104	93	87	86	81
Rowan Bay				62	133	135	127	110	96	50	22	0	2	0	0
St. John Harbor					69	0	0	0	0	0	0	0	0	0	0
Thoms Place															22
Wrangell	1,315	2,029	2,184	2,416	2,479	2,590	2,716	2,691	2,754	2,698	2,618	2,541	2,560	2,549	2,308

[1] Petersburg includes Kupreanof

Prepared by Division of Subsistence, ADFG from
U.S. Census of Population sources, and Ak Dept of Labor estimates

Table 1. Southeast Alaska Community and Regional Population, 1960-2000

	1960	1970	1980	1988	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Southern Southeast	**11,842**	**13,823**	**15,138**	**18,207**	**20,106**	**20,806**	**21,243**	**21,511**	**21,530**	**21,509**	**21,651**	**21,363**	**21,061**	**20,550**	**20,216**
Bal. Outer Ketchikan CSA		345	11	3	21	16	19	11	15	11	7	4	10	10	9
Bal. Prince of Wales CSA	726	822	571	344	430	444	436	451	408	388	414	421	392	337	337
Bal. Other Ketchikan District	974														
Coffman Cove			193	195	186	194	226	226	243	251	238	251	236	228	199
Craig	273	272	527	1,087	1,260	1,415	1,413	1,695	1,798	1,900	2,062	2,041	2,144	2,136	1,725
Dora Bay					57	65	60	52	2	0	0	0	0	0	0
Edna Bay	135	112		78	86	95	84	81	78	75	76	68	58	55	49
Hollis				5	111	102	112	93	106	110	166	173	195	111	139
Hydaburg	251	214	298	457	384	409	417	427	406	405	405	404	397	369	382
Hyder	32	49	77	91	99	113	127	121	123	130	136	149	130	126	97
Kasaan	36	30	25	38	54	52	64	43	41	41	41	42	41	48	39
Ketchikan	7,843	9,906	11,043	12,322	13,459	13,876	14,248	14,324	14,367	14,390	14,268	14,111	13,852	13,590	13,639
Klawock	257	213	318	735	722	775	779	726	739	739	720	699	656	673	854
Labouchere Bay				88	149	123	114	116	79	0	0	0	0	0	0
Long Island				130	198	125	13	1	0	0	0	0	0	0	0
Metlakatla-Annette	1,135	1,245	1,195	1,569	1,469	1,554	1,598	1,585	1,586	1,589	1,632	1,590	1,568	1,537	1,447
Meyers Chuck	27	37	50	46	37	40	42	38	42	36	37	29	29	30	21
Naukati Bay				8	93	121	134	121	147	145	156	134	170	164	135
Point Baker			90	73	39	38	48	57	55	58	53	56	52	51	35
Polk Inlet				41	135	117	126	142	101	65	90	38	16	16	0
Port Alice				7	30	42	52	42	24	22	2	8	4	4	0
Port Protection [1]				28	62	56	48	50	56	59	55	58	52	50	63
Saxman	153	135	273	308	369	379	387	390	389	385	387	379	379	371	431
Thorne Bay		443	377	513	581	564	604	623	622	622	627	628	588	582	557
Whale Pass			90	41	75	91	92	96	103	88	79	80	92	62	58

[1] Included with Point Baker in 1980

Prepared by Division of Subsistence, ADFG from
U.S. Census of Population sources, and Ak Dept of Labor estimates

Table 2. Estimated Southeast Harvest of Dungeness Crab for Home Use, 2000

Community	Number of Dungeness Crab Per Capita	Pounds of Dungeness Crab Percapita	units	conv fact	2000 Population	Estimated Number Dungeness Crab 2000	Estimated Total Pounds Dungeness Crab 2000	Source for Unsurveyed Places
Angoon	1.6	2.13	lnd	1.32	572	923.6	1,218.4	Survey 1996
Bal Angoon CSA	1.6	2.13	lnd	1.32	9	14.4	19.2	Per Capita of Angoon
Bal. Hoonah CSA	5.8	7.69	lnd	1.32	40	233.2	307.6	Per Capita of Hoonah
Bal. Outer Ketchikan CSA	4.67	6.17	lnd	1.32	11	51.4	67.9	Regional Sample Mean
Bal. Prince of Wales CSA	4.67	6.17	lnd	1.32	663	3,099.0	4,090.6	Regional Sample Mean
Bal. Petersburg CSA	4.81	6.35	lnd	1.32	228	1,096.3	1,447.1	Per Capita of Petersburg
Bal. Wrangell CSA	11.77	15.53	lnd	1.32	88	1,035.5	1,366.8	Per Capita of Wrangell
Coffman Cove	13.2	17.45	lnd	1.32	199	2,630.9	3,472.6	Survey 1998
Craig	3.5	4.67	lnd	1.32	1,397	4,942.7	6,524.0	Survey 1997
Cube Cove	4.67	6.17	lnd	1.32	72	336.5	444.2	Regional Sample Mean
Edna Bay	1.4	1.93	lnd	1.32	49	71.0	94.6	Survey 1998
Elfin Cove	6.2	8.22	lnd	1.32	32	199.4	263.0	Survey 1987
Game Creek	15.4	20.32	lnd	1.32	35	538.6	711.2	Survey 1996
Gustavus	15.6	20.59	lnd	1.32	429	6,691.4	8,833.1	Survey 1987
Haines	3.4	4.54	lnd	1.32	2,392	8,153.1	10,859.7	Survey 1996
Hobart Bay	4.67	6.17	lnd	1.32	3	14.0	18.5	Regional Sample Mean
Hollis	9.3	12.33	lnd	1.32	139	1,297.8	1,713.9	Survey 1998
Hoonah	5.8	7.69	lnd	1.32	860	5,012.8	6,613.4	Survey 1996
Hydaburg	9.3	12.11	lnd	1.32	382	3,549.0	4,626.0	Survey 1997
Hyder	30.9	40.77	lnd	1.32	97	2,995.4	3,954.7	Survey 1987
Kake	2.0	2.66	lnd	1.32	710	1,429.5	1,888.6	Survey 1996
Kasaan	17.3	22.83	lnd	1.32	39	674.5	890.4	Survey 1998
Klawock	4.6	6.08	lnd	1.32	854	3,930.1	5,192.3	Survey 1997
Klukwan	1.9	2.37	lnd	1.32	139	257.4	329.4	Survey 1996
Metlakatla	2.3	3.01	lnd	1.32	1,447	3,294.0	4,355.5	Survey 1987
Meyers Chuck	10.1	13.37	lnd	1.32	21	212.8	280.8	Survey 1987
Naukati Bay	11.6	15.36	lnd	1.32	135	1,570.9	2,073.6	Survey 1998
Pelican	3.5	4.62	lnd	1.32	163	570.6	753.1	Survey 1987
Petersburg	4.8	6.35	lnd	1.32	3,247	15,612.0	20,607.9	Survey 2000
Point Baker	6.0	7.92	lnd	1.32	35	210.0	277.2	Survey 1996
Port Alexander	2.2	2.86	lnd	1.32	81	175.6	231.7	Survey 1987
Port Protection	7.1	9.35	lnd	1.32	63	446.5	589.1	Survey 1996
Saxman	4.0	5.33	lnd	1.32	431	1,739.4	2,296.0	Survey 1999
Sitka	3.2	4.28	lnd	1.32	8,835	28,678.6	37,813.8	Survey 1996
Skagway	0.6	0.73	lnd	1.32	862	480.9	629.3	Survey 1987
Tenakee Springs	12.1	16.01	lnd	1.32	104	1,261.1	1,665.0	Survey 1987
Thoms Place	4.67	6.17	lnd	1.32	22	102.8	135.7	Regional Sample Mean
Thorne Bay	4.4	5.83	lnd	1.32	557	2,462.3	3,247.3	Survey 1998
Whale Pass	7.8	10.24	lnd	1.32	58	449.8	593.9	Survey 1998
Whitestone Logging Camp	6.0	7.87	lnd	1.32	116	692.1	912.9	Survey 1996
Wrangell	11.8	15.53	lnd	1.32	2,308	27,157.2	35,847.5	Survey 2000
Yakutat	6.3	8.29	lnd	1.32	808	5,073.0	6,698.3	Survey 2000
					28,732	**139,367**	**183,955**	
Straight Mean	**4.7**	**6.2**						
Regional Adjusted Mean [1]	**4.9**	**6.4**			**28,732**	**139,367**	**183,955**	

[1] Based on Southeast regional rural 2000 population of 28,732