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**Customary and Traditional Use Worksheet and
Options for Amounts Reasonably Necessary for
Subsistence: Tanner Crab, Dungeness Crab, Shrimp,
and Miscellaneous Shellfish, Kodiak Area**

by

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Alaska Department of Fish and Game

Division of Subsistence



Symbols and Abbreviations

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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

<i>all commonly-accepted abbreviations</i>	
<i>e.g., Mr., Mrs., AM, PM, etc.</i>	
<i>all commonly-accepted professional titles e.g., Dr., Ph.D., R.N., etc.</i>	
Alaska Administrative Code	AAC
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	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mid-eye-to-fork	MEF
mid-eye-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 ₀
percent	
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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FOR AMOUNTS REASONABLY NECESSARY FOR SUBSISTENCE:
TANNER CRAB, DUNGENESS CRAB, SHRIMP, AND MISCELLANEOUS
SHELLFISH, KODIAK AREA**

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ABSTRACT

This customary and traditional (C&T) use worksheet is prepared for the Alaska Board of Fisheries (board) for its use when considering Proposal 237, which is scheduled for consideration at the March 2015 Statewide Dungeness Crab, Shrimp, Miscellaneous Shellfish, and Supplemental Issues meeting. Proposal 237 asks the board to review the C&T uses of Tanner crab in the Kodiak Area. This worksheet reviews the history of C&T use findings for marine invertebrates in the area, and provides updates for the harvests and uses of shellfish, primarily by residents of Kodiak Island communities. The worksheet then presents the available data organized by the 8 criteria used by the board to identify C&T uses of fish stocks. This report also offers options for the board to consider if it chooses to adopt amounts reasonably necessary for subsistence.

Key words: crab, shellfish, subsistence fishing, Kodiak, customary and traditional, ANS, amounts reasonably necessary for subsistence.

BACKGROUND

Proposal 237 asks the Alaska Board of Fisheries (board) to consider if there are customary and traditional (C&T) uses of Tanner crab in the Kodiak Area¹ (Figure 1). Since Proposal 237 was submitted to the board for consideration at the 2015 Statewide Dungeness Crab, Shrimp, Miscellaneous Shellfish, and Supplemental Issues meeting it was determined that, in addition to Tanner crab, no C&T use review has been conducted for Dungeness crab, miscellaneous shellfish, or shrimp in the Kodiak Area. This report includes information regarding all of these species in the event the board considers reviewing C&T uses for Dungeness crab, miscellaneous shellfish, and shrimp in addition to Tanner crab.

This report presents an 8-criteria worksheet to assist the board when considering a C&T use finding for Kodiak Area Tanner crab, Dungeness crab, shrimp, and miscellaneous shellfish stocks. In addition to the 1993 C&T use worksheet for marine invertebrates (Appendix A), this report presents: 1) data from a 2004 comprehensive household harvest survey conducted by the department for the 2003 study year in communities of the Kodiak Area (Fall 2013); 2) data from additional department household surveys for various study years spanning from 1982–1997; as well as 3) an update of each subsistence fishery based on Division of Commercial Fisheries subsistence permit data through 2013, which is the latest year for which permit data are available.

Under AS 16.05.258, the board is required to identify fish stocks, or portions of stocks, that are customarily and traditionally taken or used for subsistence. In making these C&T use determinations, the boards of Fisheries and Game evaluate subsistence uses based on 8 criteria that are identified in 5 AAC 99.010, *Boards of fisheries and game subsistence procedures*.

If the board makes a positive C&T use finding for a stock or population, according to AS 16.05.258, the board should then determine the amount of harvestable surplus reasonably necessary for subsistence uses (AS 16.05.258 (b)). This is called an ANS finding, and provides a measure for the board to determine if regulations provide a reasonable opportunity for subsistence uses of that stock and population. “Reasonable opportunity” is defined in statute as “an opportunity, as determined by the appropriate board, that allows a subsistence user to participate in a subsistence hunt or fishery that provides a normally diligent participant with a reasonable expectation of success of taking of fish or game” (AS 16.05.258 (f)).

It should be noted that Alaska regulations have provided for subsistence fisheries for shellfish stocks since statehood: long before the C&T use finding procedure at 5 AAC 99.010 was adopted. A positive C&T use finding for each fishery would result in the continuation of these fisheries in the Kodiak Area.

If the board issues a negative finding for any of these fisheries, the current subsistence fishing regulations for that particular fishery would be invalid and the board would have the option of creating personal use regulations to replace subsistence regulations.

If the board chooses to take no action, current subsistence regulations would stay in place.

KODIAK AREA

The Kodiak Island Borough—which consists of Kodiak Island, adjacent islands, and an unpopulated portion of the Alaska Peninsula—includes 11 incorporated places and census designated places (CDPs), and a “balance” that lives mostly along the Kodiak Island’s road system and is connected to the incorporated city of Kodiak, the U.S. Coast Guard base, and the airport (Fall 2013:111). Six predominantly Alaska Native communities that do not have access to the road system include Ahkiok, Old Harbor, Ouzinkie, Larsen Bay, Karluk, and Port Lions; the Old Believer community of Aleneva is

1. The Kodiak Area has at its northern boundary the latitude of Cape Douglas (58° 51.10’ N. lat), its western boundary the longitude of Cape Kumlik (157° 27.00’ W. long.), its eastern boundary the longitude of Cape Fairfield (148° 50.25’ W. long.), and its seaward boundary the 300-fathom (549 m) depth contour (5 AAC 02.400).

also off the road system. The U.S. Census Bureau population estimate for the entire Kodiak Island Borough for 2013 was 14,135 people.²

CURRENT STATUS: FISHERIES AND FINDINGS

Figure 2 provides a summary of positive C&T use findings for the Kodiak Area. Currently there is a subsistence Tanner crab fishery provided under 5 AAC 02.405 (permits) and 5 AAC 02.425 (subsistence Tanner crab fishing regulations) but no positive C&T use finding or ANS amount under 5 AAC 02.466.

There is a subsistence Dungeness crab fishery provided under 5 AAC 02.405 and 5 AAC 02.415, but no positive C&T use finding under 5 AAC 02.466 (except on the south side of the Alaska Peninsula between Kilokak Rocks at 156° 19' W. long. and Cape Kumlik at 157° 27' W. long.).

A subsistence shrimp fishery is provided under 5 AAC 02.005 and 5 AAC 02.410, but no positive C&T use finding under 5 AAC 02.466.

A subsistence miscellaneous shellfish fishery is provided under 5 AAC 02.005, but no positive C&T use finding under 5 AAC 02.466 (except on the south side of the Alaska Peninsula between Kilokak Rocks 156° 19' W. long. and Cape Kumlik 157° 27' W. long.).

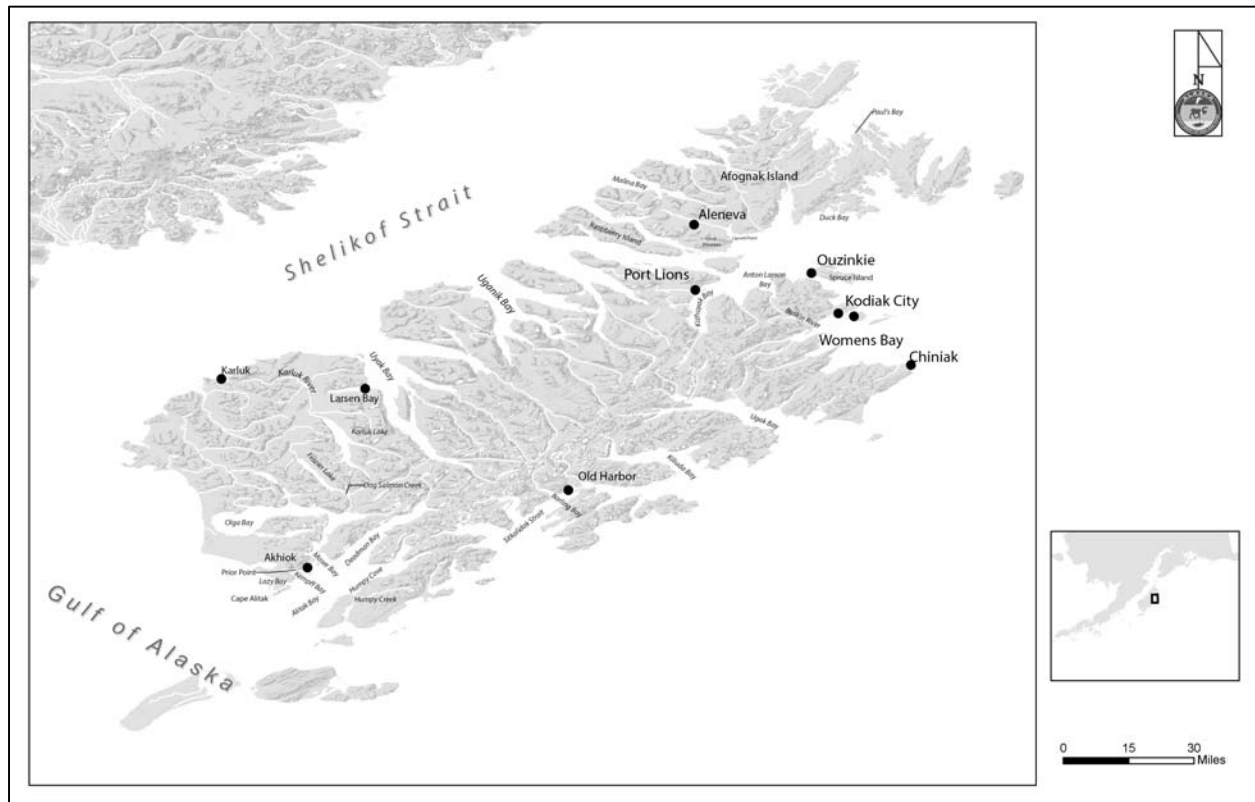


Figure 1.–Map of Kodiak Island.

2. U.S. Census Bureau: State and County QuickFacts. 2014. “Kodiak Island Borough, Alaska, People QuickFacts, Population, 2013 estimate.” Data derived from Population Estimates, American Community Survey, Census of Population and Housing, State and County Housing Unit Estimates. Accessed January 2015. <http://quickfacts.census.gov/qfd/states/02/02150.html>

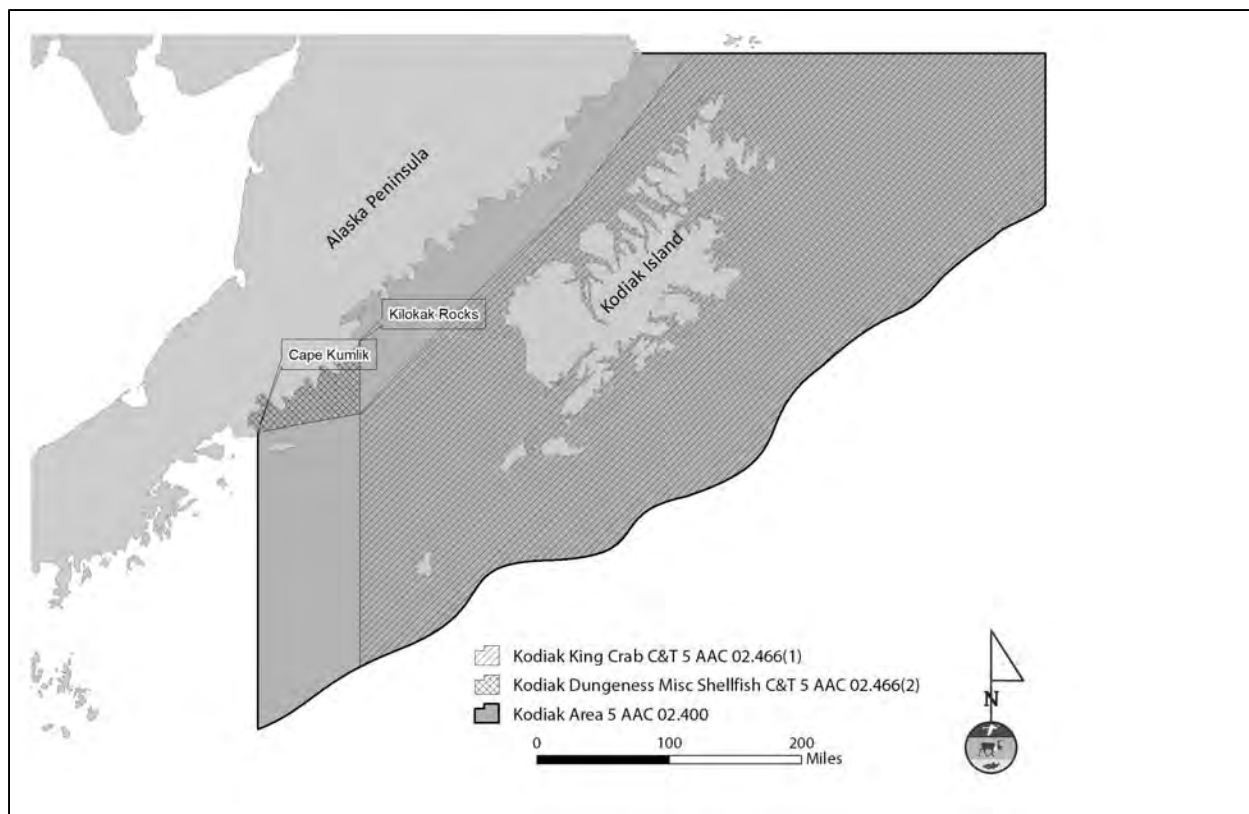


Figure 2.—Customary and traditional use findings, Kodiak Area.

HISTORY OF C&T AND ANS FINDINGS ON SHELLFISH STOCKS IN KODIAK

In 1988, the board determined that there are customary and traditional uses of king crab in the Kodiak Area—except the Semidi Island Overlap Section, the North Mainland Section, and the South Mainland Section. Other than the 1988 king crab determination, prior to 1993, the board had made no C&T use determinations for shellfish in the Kodiak Area.

In 1993, the board reviewed available harvest and subsistence use information, as summarized in an 8-criteria worksheet prepared by the Alaska Department of Fish and Game (department) (see Appendix A), and reconfirmed a positive C&T use finding for king crab of the Kodiak Area (with the exceptions being the Semidi Island Overlap, the North Mainland, and the South Mainland Sections) (5 AAC 02.466 (a) (2)). The board also readopted all regulations allowing subsistence harvests for all shellfish without making C&T use findings. In 2000, the board included a portion of the Kodiak Area in a positive finding for miscellaneous shellfish and Dungeness crab that mostly pertains to the Alaska Peninsula shellfish management area (the south side of the Alaska Peninsula between Kilokak Rocks 156° 19' W. long. and Cape Kumlik 157° 27' W. long. (5 AAC 02.466 (a) (2)) (Figure 2).

The only ANS finding for shellfish in the Kodiak Area is for Dungeness crab and miscellaneous shellfish under 5 AAC 02.466 (b) where the board has found that 22,000 lb–68,000 lb of usable weight of Dungeness crab and miscellaneous shellfish are reasonably necessary for subsistence purposes. This finding was made at an Alaska Peninsula-Aleutian Islands meeting in March 2000 and the ANS is a combined amount for the Alaska Peninsula-Aleutian Islands and a very small portion of the Kodiak Area that borders the Alaska Peninsula (the south side of the Alaska Peninsula between Kilokak Rocks 156° 19' W. long. and Cape Kumlik 157° 27' W. long.) (5 AAC 02.466 (a) (2)).

Current Subsistence Tanner Crab Fishing Regulations for the Kodiak Area

Following are the current regulations for the Tanner crab, Dungeness crab, shrimp, and miscellaneous shellfish subsistence fisheries in the Kodiak Area.

Season

Tanner crab may be taken year-round for subsistence purposes, except in waters 25 fathoms or more in depth during the 14 days immediately before the opening of a commercial king or Tanner crab fishing season in that location (5 AAC 02.425 (a) (2)).

Gear

Although technically Tanner crab may be taken by a wide variety of gear under 5 AAC 02.010, harvesters are only documented as using pots or ring nets. No more than 5 pots or ring nets may be used per person to take subsistence Tanner crab, with a maximum of 10 Tanner crab pots or ring nets per vessel (5 AAC 02.425 (a) (1)). There are requirements specific to subsistence Tanner crab pot construction also in regulation 5 AAC 02.425 (b). In addition to requirements specified in 5 AAC 02.010 (e), a Tanner crab pot must have “Tanner crab” legibly inscribed on a keg or buoy attached to the pot (5 AAC 02.425 (a) (1)). Escapement mechanisms are also required (5 AAC 02.010 (f)).

Permit

A subsistence crab fishing permit is required (5 AAC 02.405) (Appendix B).

Bag and possession limits

The daily bag and possession limit is 12 male Tanner crab per person per day. Only male Tanner crab 5.5 inches or greater in width of shell may be taken or possessed (5 AAC 02.425 (a) (3)–(4)).

Current Subsistence Dungeness Crab Fishing Regulations for the Kodiak Area

Season

Dungeness crab may be taken year-round for subsistence purposes. Subsistence taking of Dungeness crab is prohibited in waters 25 fathoms or more in depth during the 14 days immediately before the opening of a commercial king or Tanner crab fishing season in the location (5 AAC 02.415 (b)).

Gear

For harvesting Dungeness crab, no more than 5 pots per person and 10 pots per vessel may be used to take crab (5 AAC 02.010 (i) (1)).

Permit

A subsistence crab fishing permit is required (5 AAC 02.405) (Appendix B).

Bag and possession limits

The daily bag and possession limit is 12 Dungeness crab per person. Only male Dungeness crab 6.5 inches or greater in width of shell may be taken or possessed (5 AAC 02.415 (a)).

Current Subsistence Miscellaneous Shellfish Fishing Regulations for the Kodiak Area

“Miscellaneous shellfish” is defined in regulations at 5 AAC 39.975 (42) as “all shellfish and marine invertebrates, except shrimp, and king, Tanner, and Dungeness crab.”

Season

Miscellaneous shellfish may be taken for subsistence purposes at any time in the Kodiak Area by any method (5 AAC 02.005).

Gear

Legal types of gear for subsistence fishing of miscellaneous shellfish are: 1) gear specified in 5 AAC 39.105; 2) jigging gear, which consists of a line or lines with lures or baited hooks which are operated during periods of ice cover from holes cut in the ice and which are drawn through the water by hand; 3) a spear which is a shaft with a sharp point or fork-like implement attached to one end, used to thrust through the water to impale or retrieve fish and which is operated by hand; 4) a lead which is a length of net employed for guiding fish into a seine or a length of net or fencing employed for guiding fish into a fish wheel, fyke net, or dip net; and 5) chemical baits or lures may be used to attract shellfish (5 AAC 02.010 (a)–(d)). Pots used for subsistence fishing must comply with the escape mechanism requirement in 5 AAC 39.145 (5 AAC 02.010 (f)).

Marking requirements for subsistence shellfish gear are as follows: 1) a person who is subsistence fishing shall plainly and legibly inscribe that person's first initial, last name, and address on a keg or buoy attached to unattended subsistence fishing gear, except that if a person is fishing through ice, a stake inscribed with the first initial, last name, and address inserted in the ice near the hole may be substituted for the keg or buoy; and 2) kegs or buoys attached to subsistence crab pots or ring nets also must be inscribed with the name or the division of motor vehicles boat registration number, issued under 2 AAC 70, of the vessel used to operate the pots or ring nets (5 AAC 02.010 (e)).

Permit

Kodiak subsistence fishers are not required to obtain a permit to fish for miscellaneous shellfish (5 AAC 02.005).

Bag and possession limits

No limit exists in regulation for retention of subsistence-caught miscellaneous shellfish in the Kodiak Area (5 AAC 02.005).

Current Subsistence Shrimp Fishing Regulations for the Kodiak Area

Season

Shrimp may be taken for subsistence purposes at any time in the Kodiak Area by any method (5 AAC 02.005).

Gear

Legal types of gear for subsistence shrimp fishing are: 1) gear specified in 5 AAC 39.105; 2) jigging gear which consists of a line or lines with lures or baited hooks which are operated during periods of ice cover from holes cut in the ice and which are drawn through the water by hand; 3) a spear which is a shaft with a sharp point or fork-like implement attached to one end, used to thrust through the water to impale or retrieve fish and which is operated by hand; 4) a lead which is a length of net employed for guiding fish into a seine or a length of net or fencing employed for guiding fish into a fish wheel, fyke net, or dip net; and 5) chemical baits or lures may be used to attract shellfish (5 AAC 02.010 (a)–(d)).

Marking requirements for subsistence shellfish gear are as follows: 1) a person who is subsistence fishing shall plainly and legibly inscribe that person's first initial, last name, and address on a keg or buoy attached to unattended subsistence fishing gear, except that if a person is fishing through ice, a stake inscribed with the first initial, last name, and address inserted in the ice near the hole may be substituted for the keg or buoy; and 2) pots used for subsistence fishing must comply with the escape mechanism requirements in 5 AAC 39.145 (5 AAC 02.010 (e)–(f)).

Permit

Kodiak Area subsistence fishers are not required to obtain a permit to fish for shrimp (5 AAC 02.005); the exception being if the operator of a commercially licensed and registered shrimp fishing vessel wants to

subsistence shrimp fish during a closed commercial shrimp fishing season or within a closed commercial shrimp fishing district, section or subsection. In this case, the skipper must obtain a subsistence fishing permit from the department prior to fishing. The permit shall specify the area and the date the vessel operator intends to fish and the permit holder may possess no more than 500 lb (227 kg) of shrimp aboard the vessel (5 AAC 02.410).

Bag and possession limits

With the exception of the rules noted for commercial shrimp fishing vessels used for fishing under a subsistence permit (5 AAC 02.410), no limit exists in regulation for retention of subsistence-caught shrimp in the Kodiak Area (5 AAC 02.410).

THE EIGHT CRITERIA: CUSTOMARY AND TRADITIONAL USES OF KODIAK AREA SHELLFISH STOCKS

The information presented here includes a complete record of all shellfish species in the entire Kodiak Area, not just for king crab outside of the excepted areas described in regulation, and Dungeness crab and miscellaneous shellfish outside of the excepted areas described in regulation. This report provides data that were included in the earlier C&T use worksheet from 1993 (Appendix A) with additions from recently published works and updated harvest assessment data through 2013, the most recent year data are available.

CRITERION 1

A long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock or game population that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the user's control, such as unavailability of the fish or game caused by migratory patterns.

Shellfish have long played an important role in the wild resource harvests of Kodiak Island communities. Regarding prehistoric and early historical uses:

Shellfish (sea urchins, periwinkles, clams, blue mussels, chitons, etc.) were consumed in large quantities, judging from shell midden deposits at late prehistoric and early historic settlement sites. Shellfish exploitation often is interpreted as primarily an activity of the late winter season of scarcity, but circumstantial evidence of clam shells at inland summer salmon fishing sites suggests that there also was an epicurean interest in shellfish. (Clark 1984:190)

The importance of all types of marine invertebrates, including crabs, in subsistence harvests of Kodiak Island residents in early contact times was noted by Gavriil Davydov, an officer in the Russian navy, who wrote while on expedition in 1810–1812:

There is almost nothing which the [Kodiak] islanders do not eat. There is hardly a shellfish or crab or shiny sea worm, and virtually no growing plant, which they would not use in their food. (Davydov 1977:174)

Davydov (1977:175) further noted that the Kodiak islanders "eat whatever food the sea provides them with," and that they ate shellfish "raw or warmed a little over a fire." He also wrote, "the islanders are at all times, even [in] times of plenty, great lovers of shellfish." These observations made by Davydov document a strong use of shellfish, including crabs, in the early 19th century.

Craig Mishler (2001) documented the importance of shellfish for the people of Old Harbor and Ouzinkie in the 1990s when he wrote that "clams are a favorite Alutiiq food, and many of the old villages around Kodiak Island, such as Larsen Bay and Ahkiok, are virtually built on top of shell middens. Ancient times when fish and game were scarce, clams undoubtedly provided a staple winter food supply." Mishler (2001) goes on to state that Old Harbor and Ouzinkie people generally harvest butter clams, littlenecks, small chitons (*bidarkis* in Alutiiq), and a few geoducks. For centuries miscellaneous shellfish have been a staple of the Alutiiq diet on Kodiak Island and elsewhere in Alaska.

Presently, many species of shellfish remain important subsistence resources in all Kodiak Island communities. Tables 1–4 provide information from ADF&G household surveys regarding uses, sharing, and harvests of Tanner crab, Dungeness crab, miscellaneous shellfish, and shrimp from 1982–2003. These data include harvests of each species for home use either by removal from commercial catch or subsistence fishing methods. Note that not all communities on Kodiak Island were surveyed during the study years shown in tables 1–4; however, the tables show that a majority of households surveyed by the department used shellfish. Harvest quantities vary by species and community. Tanner crab harvests

ranged from 0.3 lb per capita in Ahkiok to 21.3 lb per capita in Larsen Bay in 2003 (Table 1). Dungeness crab harvests ranged from zero pounds per capita in Ahkiok to 1.6 lb per capita in Old Harbor in 2003 (Table 2). Miscellaneous shellfish harvests ranged from 5.5 lb per capita in Port Lions to 29 lb per capita in Larsen Bay in 2003 (Table 3). For 2003, only Ouzinkie, where 0.2 lb per capita of shrimp was harvested, had harvest data recorded during the survey; all other communities showed a shrimp harvest of zero for the 2003 survey (Table 4). A decline in the Kodiak shrimp stocks in the 1970s and 1980s resulted in many Kodiak Area communities abandoning their subsistence shrimp harvesting practices (Sagalkin 2008).

State of Alaska regulations have allowed for the subsistence harvesting of all shellfish in the Kodiak Areas since statehood, with the exception of the mainland areas for king crab, as noted above. The Division of Commercial Fisheries distributes a yearly subsistence harvest permit for salmon (Appendix B), which includes a table for reporting crab and herring harvests. The data collected each year from returned harvest permits represent the only consistent historical reporting for crab harvests in the Kodiak Area. Only Alaska residents are allowed to obtain subsistence salmon/herring/crab permits. In 2014, 16% of permits were returned from Alaska residents with addresses outside the Kodiak Area.³ Based on the Division of Commercial Fisheries subsistence salmon/herring/crab harvest permit returns, the recent 5-year average subsistence Tanner crab harvest is 6,922 individual (ind) Tanner crab and the recent 10-year average is 6,651 Tanner crab (ind) (numbers based on reported harvest; data are not expanded) (Table 5; Figure 3). The recent 5-year average subsistence Dungeness crab harvest is 1,555 (ind) Dungeness crab and the recent 10-year average is 2,019 (ind) Dungeness crab (Table 6; Figure 4).

Tanner and Dungeness crab harvest estimates are based on low permit returns (15% for 5-year average and 16% for 10-year average for both crab species) (Table 5; Table 6). Because the crab harvests are only recorded on the back of the subsistence salmon permit, the return rates are not representative of the number of subsistence salmon/herring/crab permits returned, but rather the number of salmon/herring/crab permits returned with crab harvests reported. The salmon/herring/crab subsistence permit does not have a section that requires a record of any miscellaneous shellfish or shrimp harvests. Therefore there are no historical data regarding miscellaneous shellfish or shrimp subsistence harvests available from the Division of Commercial Fisheries.

Table 7 provides a list of shellfish used in 5 communities in the Kodiak Island Borough that were surveyed for the 2003 study year, which is the latest year for which household harvest survey information is available. Shellfish with the highest harvest weight included clams, chitons (“bidarkis”), octopi, and Tanner crabs. As shown in Table 7 and Figure 5, in 2003 Tanner crab made up the largest percentage (29%) of the total shellfish harvest in the study communities. The majority of households in 3 of 5 communities used Tanner crab during the 2003 study year (Table 1). Shrimp was one of the smallest shellfish harvests in the 2003 study communities (<1% of total shellfish harvest) (Figure 5). Dungeness crab made up 3% of the total shellfish harvest for the 2003 study communities, and king crab made up 2%. Miscellaneous shellfish made up the remaining 66% of the total shellfish harvest. Miscellaneous shellfish were used by the majority of households in 2 of the 5 study communities (Table 3). It was noted by residents of all study communities in 2003 that there was little to no harvest of mussels and several households commented on the lack of mussels available (Fall 2013).

In 2003, the communities with the highest estimated Tanner crab harvest weight were Larsen Bay and Old Harbor, with Port Lions harvesting an estimated 3 lb less than Old Harbor (Table 1). Old Harbor and Ouzinkie recorded the highest estimated harvest weight of miscellaneous shellfish (Table 3). Old Harbor harvested the highest harvest weight of Dungeness crab (Table 2). Commercial fishers also retained Tanner crab for home use in 2 communities in the 2003 study—Old Harbor and Port Lions (Table 8). According to survey respondents, for Old Harbor households 110 Tanner crab were retained from

3. Preliminary data released by the Alaska Department of Fish and Game Division of Commercial Fisheries to the Division of Subsistence.

commercial harvests for home use in 2003 and 310 Tanner crab were retained for use by Port Lions households. As a percentage of the total harvest in 2003, Tanner crab made up 1.6% of the overall harvest of all wild resources in Old Harbor, 2.8% of the overall harvest in Port Lions, and 6.5% of the overall harvest in Larsen Bay (Community Subsistence Information System⁴).

Table 9 and Figure 6 illustrate the historical subsistence harvest of king, Tanner, and Dungeness crabs in the Kodiak Area according to permit data collected by the Division of Commercial Fisheries. The recent 10-year average (2004–2013) harvest of king, Tanner, and Dungeness crabs according to 16% of permits returned indicating crab harvest for the Kodiak Area was 9,003 individual crabs; the recent 5-year average (2009–2013) harvest based on 15% of permits returned was 8,753 individual crabs; and the average harvest for all years where permits were issued (1995–2013), with a return rate of 25%, was 8,058 individual crabs.

Table 10 represents the only historical harvest data available from the Division of Commercial Fisheries regarding the subsistence harvests of miscellaneous shellfish. A permit is not required to harvest miscellaneous shellfish; however, during the time that salmon/herring/crab permits have been issued (1995–present) a few harvesting households have returned subsistence permits documenting miscellaneous shellfish harvests. In 1996, 50 individual miscellaneous shellfish were documented as being harvested for subsistence, 19 were harvested in 1997, and 67 were harvested in 1998. Since 1998, the highest harvest recorded was 12 miscellaneous shellfish in 2010. Household harvest survey data for years in which subsistence surveys were conducted provide the only comprehensive miscellaneous shellfish historical harvest estimates for Kodiak Area communities (Table 3).

Figure 7 shows the estimated historical subsistence shrimp harvest for Kodiak Area communities based on household surveys (Table 4 shows the estimated subsistence shrimp harvests by study community for each survey year). According to reports by Kodiak Area residents during the 2003 study, the decline in shrimp harvests was in part due to the *Exxon Valdez* oil spill and overharvesting for commercial use (Fall 2006). The numbers of shrimp harvested for subsistence and, as a result, the effort put into subsistence shrimp harvesting decreased drastically during the 1980s and had not recovered in 2003 (Fall 2006). In 1982, 4,062 gallons of shrimp were harvested for subsistence by residents of Ahkiok, Larsen Bay, Old Harbor, Ouzinkie, Port Lions, and Kodiak City (Figure 7; Table 4). Estimated shrimp harvests by Kodiak Area communities did not exceed 864 gallons of shrimp in the subsequent study years (1986, 1989–1993, 1999, and 2003), and in general subsistence harvests were much less after the 1991 study year (Figure 7).

4. ADF&G Division of Subsistence, Community Subsistence Information System (CSIS): <http://www.adfg.alaska.gov/sb/CSIS/>.

Table 1.—Estimated harvest and use of Tanner crab, Kodiak Island and Afognak Island communities, 1982, 1986, 1989–1993, 1997, and 2003.

Year	Community	Species		Percentage of households				Estimated harvest		
		Tanner crab	Using	Attempting harvest	Harvesting	Giving away	Receiving	Individual	Total pounds	Pounds per capita
1982	Akhiok		23.8		23.8			73	117	1.1
	Chiniak		41.2		35.3			633	1,012	1.6
	Karluk		30.0		10.0			33	52	0.5
	Kodiak City		52.3		15.5			11,026	17,641	2.1
	Larsen Bay		46.9		15.6			145	232	1.4
	Old Harbor		32.5		22.1			283	453	1.3
	Ouzinkie		68.8		31.3			228	364	1.6
	Port Lions		54.5		32.7			553	886	3.1
1986	Akhiok		0.0	0.0	0.0	0.0	0.0	0	0	0.0
	Karluk		5.3	0.0	0.0	0.0	5.3	0	0	0.0
	Larsen Bay		51.4	18.9	18.9	8.1	40.5	468	749	4.4
	Old Harbor		38.6	13.6	13.6	6.8	29.5	746	1,194	3.2
	Ouzinkie		41.2	20.6	20.6	11.8	32.4	252	403	2.1
	Port Lions		41.5	24.6	24.6	12.3	24.6	457	731	2.5
1989	Akhiok		20.0	0.0	0.0	0.0	20.0	0	0	0.0
	Karluk		14.2	7.1	7.1	14.2	7.1	49	78	1.1
	Larsen Bay		52.9	20.6	20.6	20.6	38.2	531	850	6.5
	Old Harbor		52.1	27.1	27.1	14.6	33.3	453	725	2.6
	Ouzinkie		17.1	5.7	5.7	14.3	14.3	128	205	0.9
	Port Lions		38.9	19.4	19.4	5.6	22.2	364	582	3.0
1990	Karluk		0.0	0.0	0.0	0.0	0.0	0	0	0.0
	Larsen Bay		77.1	20.0	20.0	20.0	65.7	611	977	6.7
	Ouzinkie		39.6	13.2	13.2	15.1	28.3	292	467	2.3
1991	Karluk		7.7	0.0	0.0	0.0	7.7	0	0	0.0
	Kodiak City		56.0	18.0	17.0	21.0	45.0	8,224	13,158	2.4
	Kodiak Coast Guard Station		35.5	22.6	22.6	3.2	25.8	1,712	2,739	4.5
	Kodiak Road		46.1	18.4	17.1	14.5	40.8	12,519	20,031	5.0
	Larsen Bay		68.4	39.5	39.5	26.3	50.0	1,080	1,727	11.1
	Old Harbor		76.2	21.4	21.4	28.6	66.7	591	945	4.4
	Ouzinkie		53.1	12.5	12.5	12.5	40.6	179	286	1.5
	Akhiok		20.8	12.5	12.5	8.3	16.7	40	64	0.8
1992	Kodiak City		50.0	17.0	16.0	27.0	37.0	11,657	18,652	3.9
	Larsen Bay		70.3	40.5	40.5	35.1	37.8	1,316	2,106	15.5
	Ouzinkie		61.5	17.3	15.4	21.2	53.8	541	866	4.7
	Kodiak City		45.7	16.2	13.3	14.3	37.1	11,518	18,428	3.0
1993	Larsen Bay		80.0	35.0	35.0	40.0	62.5	1,389	2,223	17.1
	Ouzinkie		49.2	8.2	8.2	16.4	42.6	374	598	2.6
	Port Lions		71.1	20.0	20.0	13.3	60.0	878	1,406	5.9
	Larsen Bay		15.4	15.4	15.4	7.7	3.8	447	715	5.7
1997	Old Harbor		76.7	25.6	23.3	39.5	55.8	607	971	3.3

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Table 1.–Page 2 of 2.

Year	Community	Species		Percentage of households				Estimated harvest		
		Tanner crab	Using	Attempting harvest	Harvesting	Giving away	Receiving	Individual	Total pounds	Pounds per capita
1997	Ouzinkie		14.9	6.4	6.4	10.6	8.5	100	160	0.8
2003	Akhiok		18.2	18.2	18.2	9.1	0.0	15	24	0.3
	Larsen Bay		44.0	16.0	16.0	20.0	36.0	843	1,349	21.3
	Old Harbor		71.2	30.8	28.8	28.8	61.5	734	1,175	5.8
	Ouzinkie		72.5	15.7	13.7	19.6	68.6	365	584	2.8
	Port Lions		59.3	24.1	22.2	18.5	44.4	732	1,172	6.1

Source ADF&G Division of Subsistence, Community Subsistence Information System (CSIS): <http://www.adfg.alaska.gov/sb/CSIS/> (Accessed December 2014).

Note Empty cells indicate that data were not collected.

Table 2.–Estimated harvest and use of Dungeness crab, Kodiak Island and Afognak Island communities, 1982, 1986, 1989–1993, 1997, and 2003.

Year	Community	Species		Percentage of households				Estimated harvest		
		Dungeness crab	Using	Attempting harvest	Harvesting	Giving away	Receiving	Individual	Total pounds	Pounds per capita
1982	Akhiok		14.3		9.5			13	9	0.1
	Chiniak		58.8		29.4			697	488	0.8
	Karluk		35.0		5.0			52	36	0.3
	Kodiak City		61.3		16.8			7,901	5,531	0.7
	Larsen Bay		53.1		25.0			297	208	1.2
	Old Harbor		40.3		32.5			453	317	0.9
	Ouzinkie		65.6		34.4			494	346	1.5
	Port Lions		54.5		38.2			973	681	2.3
1986	Akhiok		0.0	0.0	0.0	0.0	0.0	0	0	0.0
	Karluk		5.3	5.3	5.3	0.0	0.0	142	99	0.9
	Larsen Bay		40.5	13.5	13.5	8.1	32.4	361	253	1.5
	Old Harbor		15.9	9.1	9.1	6.8	9.1	433	303	0.8
	Ouzinkie		50.0	35.3	35.3	11.8	29.4	522	365	1.9
	Port Lions		30.8	20.0	18.5	12.3	16.9	497	348	1.2
1989	Akhiok		20.0	10.0	10.0	10.0	10.0	16	11	0.2
	Karluk		14.3	0.0	0.0	14.3	14.3	0	0	0.0
	Larsen Bay		41.2	14.7	14.7	11.8	29.4	99	69	0.5
	Old Harbor		41.7	20.8	20.8	12.5	31.3	374	262	0.9
	Ouzinkie		20.0	8.6	8.6	11.4	14.3	321	225	1.0
	Port Lions		27.8	8.3	8.3	2.8	19.4	298	208	1.1
1990	Karluk		17.6	5.9	5.9	17.6	17.6	34	23	0.3
	Larsen Bay		57.1	17.1	17.1	8.6	51.4	123	86	0.6
	Ouzinkie		34.0	9.4	9.4	5.7	26.4	121	85	0.4
1991	Karluk		7.7	0.0	0.0	7.7	7.7	0	0	0.0

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Table 2.–Page 2 of 2.

Year	Community	Species						Percentage of households			Estimated harvest		
		Dungeness crab	Using	Attempting harvest	Harvesting	Giving away	Receiving	Individual	Total pounds	Pounds per capita			
1991	Kodiak City		57.0	23.0	22.0	19.0	39.0	9,165	6,416	1.1			
	Kodiak Coast Guard Station		48.4	29.0	29.0	6.5	29.0	1,183	828	1.4			
	Kodiak Road		59.2	22.4	21.1	18.4	48.7	8,594	6,016	1.5			
	Larsen Bay		42.1	18.4	15.8	7.9	31.6	131	92	0.6			
	Old Harbor		52.4	19.0	19.0	16.7	40.5	457	320	1.5			
	Ouzinkie		31.3	9.4	6.3	6.3	28.1	24	17	0.1			
1992	Akhiok		25.0	4.2	4.2	0.0	20.8	15	11	0.1			
	Kodiak City		55.0	22.0	21.0	16.0	40.0	14,655	10,259	2.2			
	Larsen Bay		27.0	13.5	13.5	8.1	16.2	62	43	0.3			
1993	Ouzinkie		36.5	7.7	7.7	9.6	30.8	467	327	1.8			
	Kodiak City		43.8	12.4	10.5	8.6	39.0	2,345	1,642	0.3			
	Larsen Bay		47.5	17.5	17.5	12.5	32.5	109	76	0.6			
	Ouzinkie		23.0	4.9	4.9	9.8	19.7	70	49	0.2			
1997	Port Lions		42.2	24.4	24.4	15.6	28.9	1,348	943	4.0			
	Larsen Bay		11.5	3.8	0.0	0.0	11.5	0	0	0.0			
	Old Harbor		58.1	30.2	30.2	32.6	32.6	767	537	1.8			
2003	Ouzinkie		6.4	4.3	4.3	4.3	2.1	21	15	0.1			
	Akhiok		9.1	9.1	9.1	0.0	0.0	1	1	0.0			
	Old Harbor		32.7	21.2	17.3	13.5	25.0	475	332	1.6			
	Ouzinkie		31.4	5.9	5.9	9.8	27.5	53	37	0.2			
	Port Lions		20.4	3.7	3.7	3.7	16.7	34	24	0.1			
	Larsen Bay		4.0	0.0	0.0	4.0	4.0	0	0	0.0			

Source ADF&G Division of Subsistence, Community Subsistence Information System (CSIS): <http://www.adfg.alaska.gov/sb/CSIS/> (Accessed December 2014).

Note Empty cells indicate that data were not collected.

Table 3.–Estimated harvest and use of miscellaneous shellfish, Kodiak Island and Afognak Island communities, 1982, 1986, 1989–1993, 1997, and 2003.

Year	Community	Species						Percentage of households			Estimated harvest		
		Miscellaneous shellfish	Using	Attempting harvest	Harvesting	Giving away	Receiving	Quantity ^a	Total pounds	Pounds per capita			
1982	Akhiok		51.2		51.2			526	3,237	31.5			
	Chiniak		27.2	11.0	23.5			1,075	7,368	12.0			
	Karluk		50.0		35.0			201	1,152	11.2			
	Kodiak City		21.3	7.7	14.1			10,005	63,742	7.7			
	Larsen Bay		38.7		34.0			992	5,255	31.0			
	Old Harbor		45.8		43.8			1,128	7,427	21.1			
	Ouzinkie		47.7		39.5			923	6,851	29.8			

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Table 3.–Page 2 of 3.

Year	Community	Species					Percentage of households				Estimated harvest		
		Miscellaneous shellfish	Using	Attempting harvest	Harvesting	Giving away	Receiving	Quantity ^a	Total pounds	Pounds per capita			
1982	Port Lions		33.7		24.3			600	4,306	14.9			
1986	Akhiok		22.0	18.2	18.2	8.3	3.8	184	1,057	8.7			
	Karluk		25.8	16.8	16.8	1.4	9.1	181	1,086	10.1			
	Larsen Bay		23.8	15.5	15.2	7.4	12.3	478	2,957	17.4			
	Old Harbor		24.4	20.7	20.2	10.9	12.4	869	7,036	18.6			
	Ouzinkie		24.9	21.9	21.7	7.0	10.4	648	3,702	19.0			
	Port Lions		16.4	14.3	14.3	6.2	5.3	807	5,719	19.3			
1989	Akhiok		37.5	36.7	36.7	22.5	11.7	695	1,836	32.9			
	Karluk		16.1	10.7	10.7	10.1	6.6	112	301	4.1			
	Larsen Bay		25.2	19.3	19.3	11.0	11.0	1,259	3,472	26.5			
	Old Harbor		24.0	18.4	18.4	8.9	10.6	2,377	6,250	22.4			
	Ouzinkie		9.3	8.4	8.4	4.1	2.4	369	1,084	4.9			
	Port Lions		11.8	10.2	10.2	3.7	3.5	608	1,916	9.8			
1990	Karluk		20.1	14.7	14.7	11.8	12.3	367	1,040	12.6			
	Larsen Bay		31.2	23.3	23.1	17.9	17.1	2,358	6,540	45.1			
	Ouzinkie		19.5	16.0	16.0	5.5	7.2	706	2,117	10.4			
1991	Karluk		24.5	14.7	14.7	16.1	18.9	109	300	4.3			
	Kodiak City		9.0	6.0	5.7	2.5	4.8	26,693	34,612	6.2			
	Kodiak Coast Guard Station		5.8	4.5	3.9	0.6	1.9	117	449	0.7			
	Kodiak Road		8.2	5.0	4.7	2.6	4.4	7,137	20,907	5.2			
	Larsen Bay		28.2	22.3	22.3	16.0	12.7	2,139	6,210	39.8			
	Old Harbor		28.6	21.0	21.0	16.7	18.8	2,332	6,199	28.6			
	Ouzinkie		22.7	18.5	17.6	4.8	8.0	685	2,083	10.6			
1992	Akhiok		29.9	24.3	24.3	12.1	12.8	1,265	3,145	39.3			
	Kodiak City		7.4	4.2	3.8	2.7	4.8	8,458	25,724	5.4			
	Larsen Bay		23.2	18.5	18.2	10.6	11.0	1,862	5,214	38.3			
	Ouzinkie		22.1	17.9	17.8	10.1	9.1	1,255	3,922	21.1			
1993	Kodiak City		8.9	4.4	4.2	3.8	5.7	11,923	26,835	4.4			
	Larsen Bay		26.5	17.7	17.5	13.3	15.0	1,806	5,338	41.1			
	Ouzinkie		18.7	15.0	14.2	9.4	8.5	1,411	4,437	19.0			
	Port Lions		15.6	13.5	13.5	6.5	5.2	1,506	4,570	19.3			
1997	Larsen Bay		8.3	8.0	7.4	4.4	4.7	250	853	6.9			
	Old Harbor		15.9	10.9	10.9	7.3	6.8	1,330	3,712	12.6			
	Ouzinkie		9.8	8.0	8.0	3.8	3.4	430	1,361	6.5			

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Table 3.–Page 3 of 3.

Year	Community	Species						Percentage of households			Estimated harvest		
		Miscellaneous shellfish	Using	Attempting harvest	Harvesting	Giving away	Receiving	Quantity ^a	Total pounds	Pounds per capita			
2003	Akhiok		81.8	80.0	78.2	36.4	21.8	679	1,605	22.6			
	Larsen Bay		22.4	17.6	17.6	16.0	11.2	658	1,835	29.0			
	Old Harbor		50.4	28.5	28.5	21.2	31.9	1,126	3,087	15.3			
	Ouzinkie		36.9	22.9	22.2	12.7	20.9	618	2,304	10.9			
	Port Lions		14.0	10.3	10.1	5.3	6.1	308	1,058	5.5			

Source ADF&G Division of Subsistence, Community Subsistence Information System (CSIS): <http://www.adfg.alaska.gov/sb/CSIS/> (Accessed December 2014).

Note Empty cells indicate that data were not collected.

- a. The units for this category are mixed. As a result, the data presented are the quantities of harvest in the reported units without regard to what those units actually are.

Table 4.– Estimated harvest and use of shrimp, Kodiak Island and Afognak Island communities, 1982, 1986, 1989–1993, 1997, and 2003.

Year	Community	Species						Percentage of households			Estimated harvest		
		Shrimp	Using	Attempting harvest	Harvesting	Giving away	Receiving	Gallons	Total pounds	Pounds per capita			
1982	Akhiok		4.8		4.8			13	26	0.3			
	Chiniak		29.4		0.0			0	0	0.0			
	Karluk		15.0		0.0			0	0	0.0			
	Kodiak City		60.0		13.5			3,638	7,276	0.9			
	Larsen Bay		28.1		15.6			47	94	0.6			
	Old Harbor		28.6		16.9			117	233	0.7			
	Ouzinkie		28.1		15.6			44	88	0.4			
	Port Lions		47.3		27.3			203	405	1.4			
1986	Akhiok		0.0	0.0	0.0	0.0	0.0	0	0	0.0			
	Karluk		10.5	5.3	5.3	0.0	5.3	50	99	0.9			
	Larsen Bay		27.0	5.4	5.4	2.7	21.6	39	77	0.4			
	Old Harbor		2.3	0.0	0.0	0.0	2.3	0	0	0.0			
	Ouzinkie		38.2	11.8	11.8	5.9	32.4	224	447	2.3			
	Port Lions		9.2	3.1	3.1	1.5	7.7	42	83	0.3			
1989	Akhiok		0.0	0.0	0.0	0.0	0.0	0	0	0.0			
	Karluk		0.0	0.0	0.0	0.0	0.0	0	0	0.0			
	Larsen Bay		5.9	0.0	0.0	2.9	5.9	0	0	0.0			
	Old Harbor		6.3	4.2	4.2	2.1	2.1	54	107	0.4			
	Ouzinkie		2.9	2.9	2.9	2.9	0.0	20	39	0.2			
	Port Lions		8.3	8.3	8.3	0.0	0.0	24	48	0.3			

-continued-

Table 4.–Page 2 of 2.

Year	Community	Species						Percentage of households			Estimated harvest		
		Shrimp	Using	Attempting harvest	Harvesting	Giving away	Receiving	Gallons	Total pounds	Pounds per capita			
1990	Karluk		0.0	0.0	0.0	0.0	0.0	0	0	0.0			
	Larsen Bay		11.4	5.7	5.7	2.9	5.7	25	49	0.3			
	Ouzinkie		1.9	0.0	0.0	0.0	1.9	0	0	0.0			
1991	Karluk		0.0	0.0	0.0	0.0	0.0	0	0	0.0			
	Kodiak City		9.0	2.0	2.0	2.0	7.0	376	751	0.1			
	Kodiak Road		6.6	3.9	2.6	2.6	3.9	408	815	0.2			
	Larsen Bay		0.0	2.6	0.0	0.0	0.0	0	0	0.0			
	Old Harbor		4.8	2.4	2.4	2.4	2.4	79	157	0.7			
	Ouzinkie		3.1	3.1	3.1	0.0	0.0	1	2	0.0			
1992	Akhiok		4.2	0.0	0.0	0.0	4.2	0	0	0.0			
	Kodiak City		8.0	2.0	2.0	2.0	6.0	272	543	0.1			
	Larsen Bay		8.1	10.8	8.1	2.7	0.0	7	13	0.1			
	Ouzinkie		1.9	1.9	0.0	0.0	1.9	0	0	0.0			
1993	Kodiak City		3.8	0.0	0.0	1.0	3.8	0	0	0.0			
	Larsen Bay		5.0	2.5	2.5	0.0	2.5	2	4	0.0			
	Ouzinkie		3.3	0.0	0.0	1.6	3.3	0	0	0.0			
	Port Lions		2.2	4.4	2.2	0.0	0.0	9	18	0.1			
1997	Larsen Bay		3.8	0.0	0.0	0.0	3.8	0	0	0.0			
	Old Harbor		7.0	4.7	4.7	2.3	4.7	28	56	0.2			
	Ouzinkie		2.1	2.1	2.1	0.0	0.0	7	13	0.1			
2003	Akhiok		0.0	0.0	0.0	0.0	0.0	0	0	0			
	Larsen Bay		0.0	0.0	0.0	0.0	0.0	0	0	0			
	Old Harbor		0.0	0.0	0.0	0.0	0.0	0	0	0			
	Ouzinkie		27.5	2.0	2.0	5.9	27.5	21	41	0.2			
	Port Lions		1.9	0.0	0.0	0.0	1.9	0	0	0			

Source ADF&G Division of Subsistence, Community Subsistence Information System (CSIS): <http://www.adfg.alaska.gov/sb/CSIS/> (Accessed December 2014).

Note Empty cells indicate that data were not collected.

Table 5.—Historical subsistence Tanner crab harvests, Kodiak Management Area, 1995–2013.

Year	Number of permits		Percentage of permits returned	Harvest amount, individual
	Issued	Returned		Tanner crab
1995	1,935	1,191	62%	2,478
1996	1,556	1,297	83%	2,181
1997	2,081	1,572	76%	2,764
1998	1,816	543	30%	2,260
1999	1,422	182	13%	2,875
2000	1,710	242	14%	5,311
2001	2,376	497	21%	9,180
2002	2,276	362	16%	6,843
2003	2,268	406	18%	7,211
2004	2,239	437	20%	8,757
2005	2,290	424	19%	7,736
2006	2,094	383	18%	6,517
2007	2,096	304	15%	4,765
2008	2,037	281	14%	4,124
2009	1,926	330	17%	6,210
2010	2,022	410	20%	8,498
2011	2,210	389	18%	9,623
2012	2,120	255	12%	5,660
2013	2,071	209	10%	4,620
10-year average (2004–2013)	2,111	342	16%	6,651
5-year average (2009–2013)	2,070	319	15%	6,922
Average (all years)	2,029	511	25%	5,664

Source ADF&G Division of Commercial Fisheries, 2014.

Note The number of returned permits and percentage of returned permits are based only on the returned permits that indicated a crab harvest.

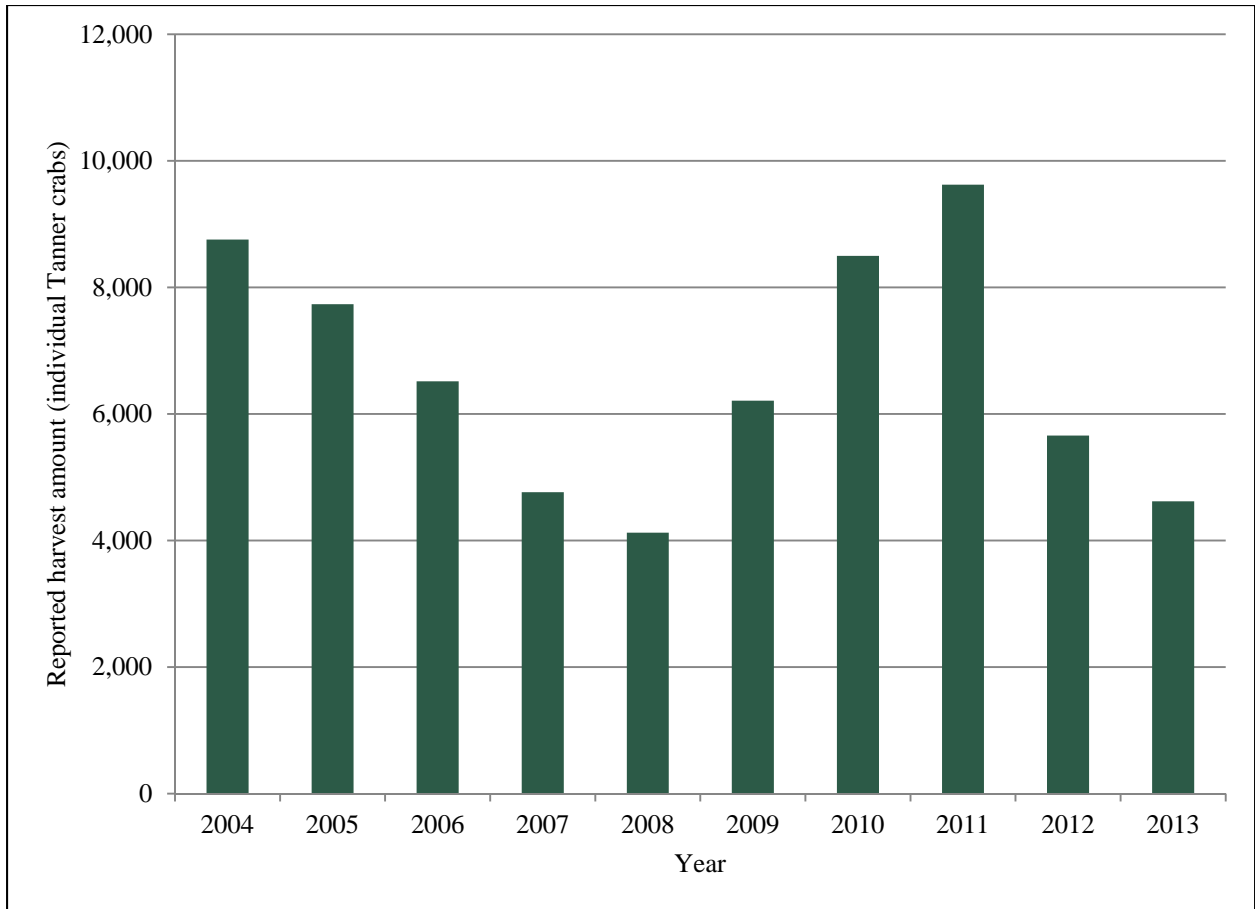


Figure 3.—Historical subsistence Tanner crab harvests, Kodiak Management Area, 2004–2013.

Table 6.—Historical subsistence Dungeness crab harvests, Kodiak Management Area, 1995–2013.

Year	Number of permits		Percentage of permits returned	Harvest amount, individual
	Issued	Returned		Dungeness crab
1995	1,935	1,191	62%	1,817
1996	1,556	1,297	83%	1,552
1997	2,081	1,572	76%	1,667
1998	1,816	543	30%	1,516
1999	1,422	182	13%	1,510
2000	1,710	242	14%	1,324
2001	2,376	497	21%	1,476
2002	2,276	362	16%	2,295
2003	2,268	406	18%	3,838
2004	2,239	437	20%	2,615
2005	2,290	424	19%	3,074
2006	2,094	383	18%	2,692
2007	2,096	304	15%	2,192
2008	2,037	281	14%	1,844
2009	1,926	330	17%	1,992
2010	2,022	410	20%	2,520
2011	2,210	389	18%	2,115
2012	2,120	255	12%	721
2013	2,071	209	10%	425
10-year average (2004–2013)	2,111	342	16%	2,019
5-year average (2009–2013)	2,070	319	15%	1,555
Average (all years)	2,029	511	25%	1,957

Source ADF&G Division of Commercial Fisheries, 2014.

Note The number of returned permits and percentage of returned permits are based only on the returned permits that indicated a crab harvest.

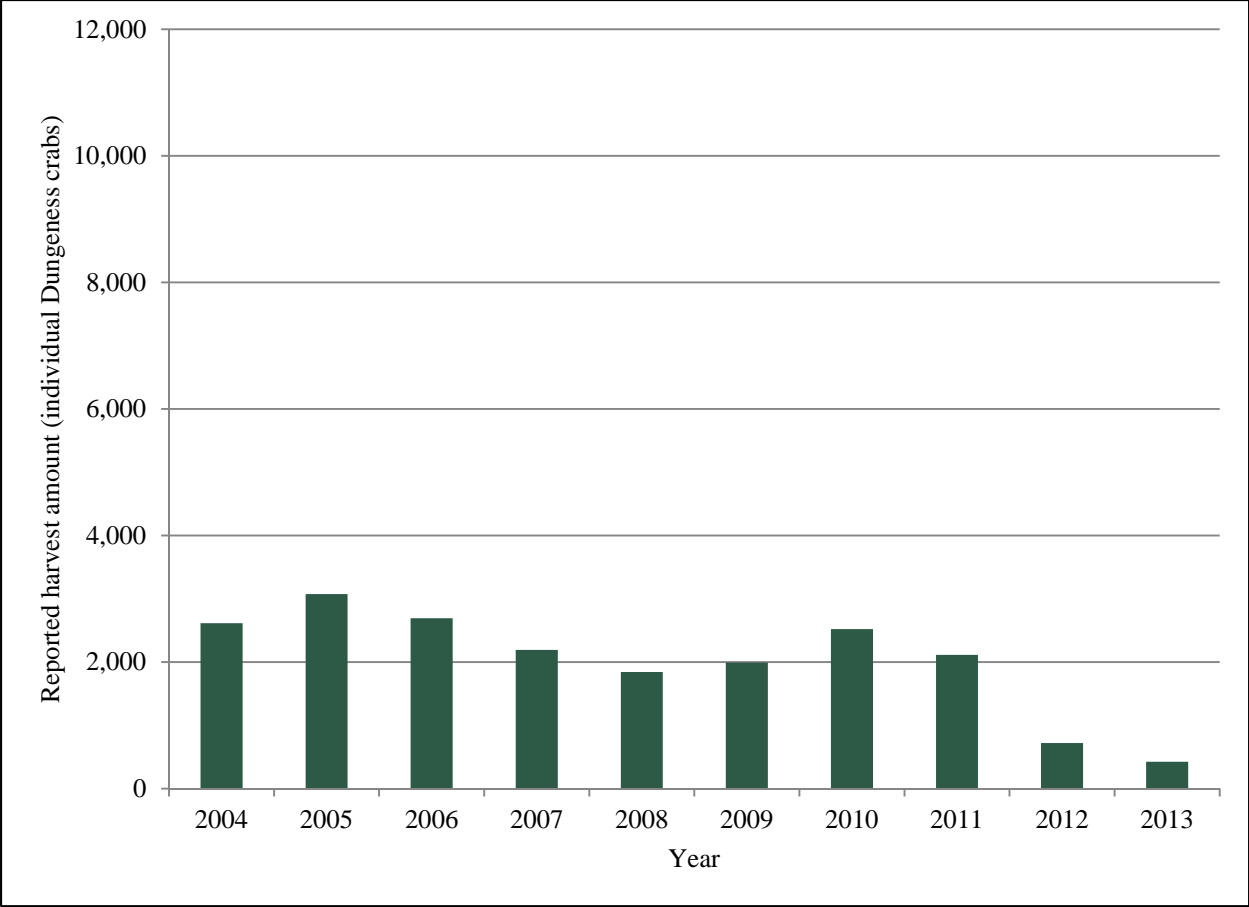


Figure 4.—Historical subsistence Dungeness crab harvests, Kodiak Management Area, 2004–2013.

Table 7.—Composition of shellfish harvest, Akhiok, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions, 2003.

Resource	Estimated harvest		
	Pounds per capita	Total pounds	Percentage of total
Black (small) chitons	4.21	3,020	20.2%
Butter clams	5.15	3,691	24.7%
Dungeness crab	0.55	394	2.6%
Horse clams (gaper)	0.01	4	0.0%
King crab	0.40	290	1.9%
Limpets	0.02	12	0.1%
Octopus	1.90	1,358	9.1%
Pacific littlenecks (steamers)	0.71	511	3.4%
Razor clams	1.16	833	5.6%
Red (large) chitons	0.04	27	0.2%
Sea cucumber	0.01	10	0.1%
Sea urchin	0.37	267	1.8%
Shrimp	0.06	41	0.3%
Snails	0.00	2	0.0%
Tanner crab	6.01	4,304	28.8%
Unknown cockles	0.21	148	1.0%
Unknown mussels	0.01	4	0.0%
Weathervane scallops	0.00	3	0.0%
All shellfish	20.8	14,919	

Source ADF&G Division of Subsistence, Community Subsistence Information System (CSIS): <http://www.adfg.alaska.gov/sb/CSIS/> (Accessed January 2015); Fall (2006).

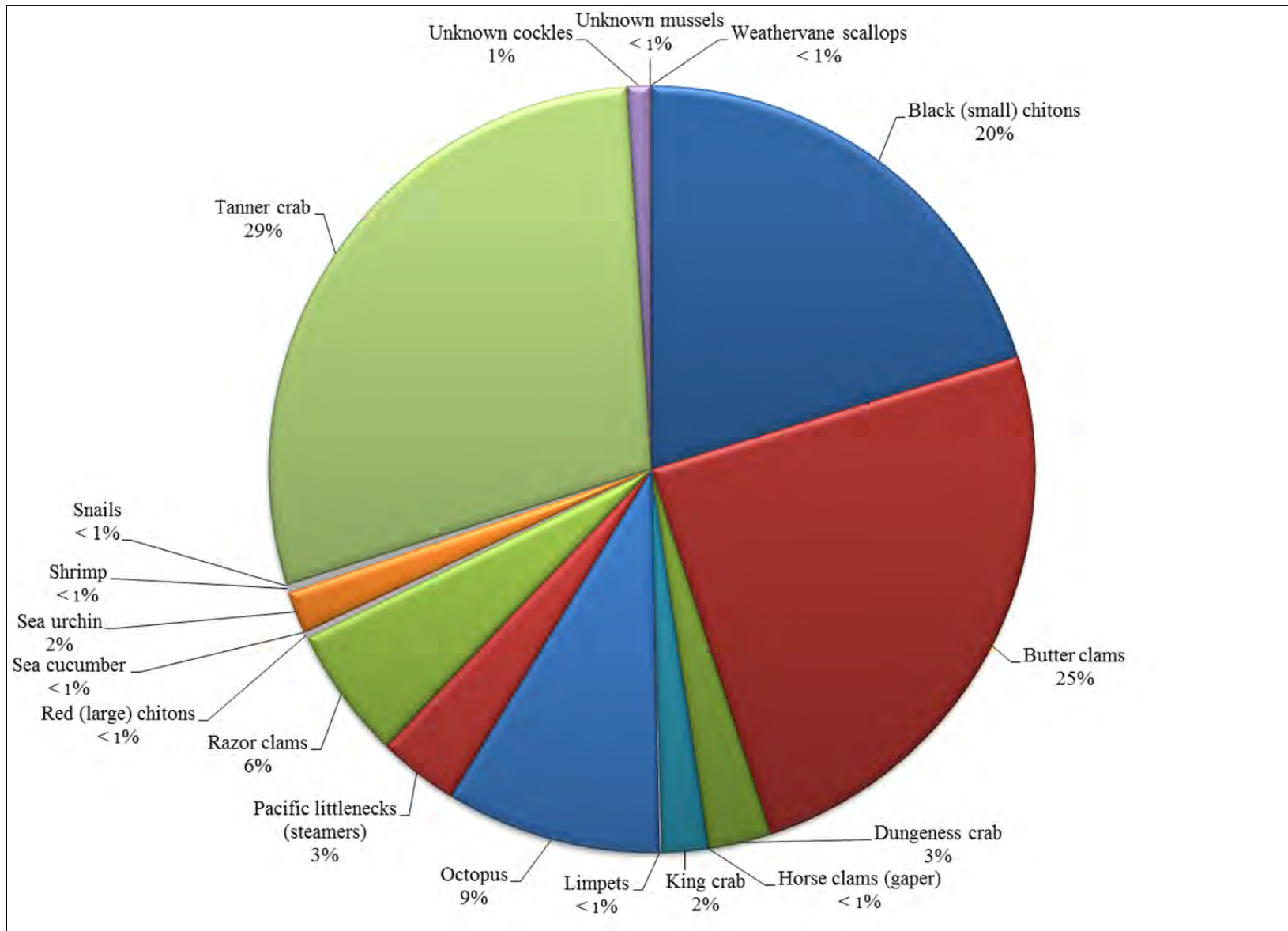


Figure 5.—Composition of shellfish harvest, Akhiok, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions, 2003.

Table 8.—Retention of marine invertebrates from commercial harvests, Akhiok, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions, 2003.

Resource	Akhiok			Larsen Bay			Old Harbor			Ouzinkie			Port Lions			Unit-to-pound conversion
	Amount	Unit	Pounds	Amount	Unit	Pounds	Amount	Unit	Pounds	Amount	Unit	Pounds	Amount	Unit	Pounds	
Pacific littlenecks (steamers)	0.0	gal	0.0	0.0	gal	0.0	0.0	gal	0.0	0.0	gal	0.0	6.6	gal	19.7	3.0
Dungeness crab	0.0	ind	0.0	0.0	ind	0.0	0.0	ind	0.0	0.0	ind	0.0	0.0	ind	0.0	0.7
King crab	0.0	ind	0.0	0.0	ind	0.0	23.4	ind	53.8	0.0	ind	0.0	0.0	ind	0.0	2.3
Tanner crab	0.0	ind	0.0	0.0	ind	0.0	109.6	ind	175.4	0.0	ind	0.0	310.3	ind	496.5	1.6
Octopus	0.0	ind	0.0	0.0	ind	0.0	7.3	ind	29.2	0.0	ind	0.0	0.0	ind	0.0	4.0

Source ADFG Division of Subsistence household surveys, 2004.

Note No other commercial home pack of marine invertebrates was reported for these communities.

Table 9.—Historical subsistence king, Tanner, and Dungeness crab harvests, Kodiak Management Area, 1995–2013.

Year	Number of permits		Percentage of permits returned	Harvest amount, individual
	Issued	Returned		All crabs
1995	1,935	1,191	62%	6,898
1996	1,556	1,297	83%	4,246
1997	2,081	1,572	76%	4,723
1998	1,816	543	30%	3,993
1999	1,422	182	13%	4,562
2000	1,710	242	14%	6,850
2001	2,376	497	21%	10,979
2002	2,276	362	16%	9,443
2003	2,268	406	18%	11,371
2004	2,239	437	20%	11,831
2005	2,290	424	19%	11,250
2006	2,094	383	18%	9,603
2007	2,096	304	15%	7,255
2008	2,037	281	14%	6,328
2009	1,926	330	17%	8,608
2010	2,022	410	20%	11,357
2011	2,210	389	18%	12,001
2012	2,120	255	12%	6,599
2013	2,071	209	10%	5,201
10-year average (2004–2013)	2,111	342	16%	9,003
5-year average (2009–2013)	2,070	319	15%	8,753
Average (all years)	2,029	511	25%	8,058

Source ADF&G Division of Commercial Fisheries, 2014.

Note The number of returned permits and percentage of returned permits are based only on the returned permits that indicated a crab harvest.

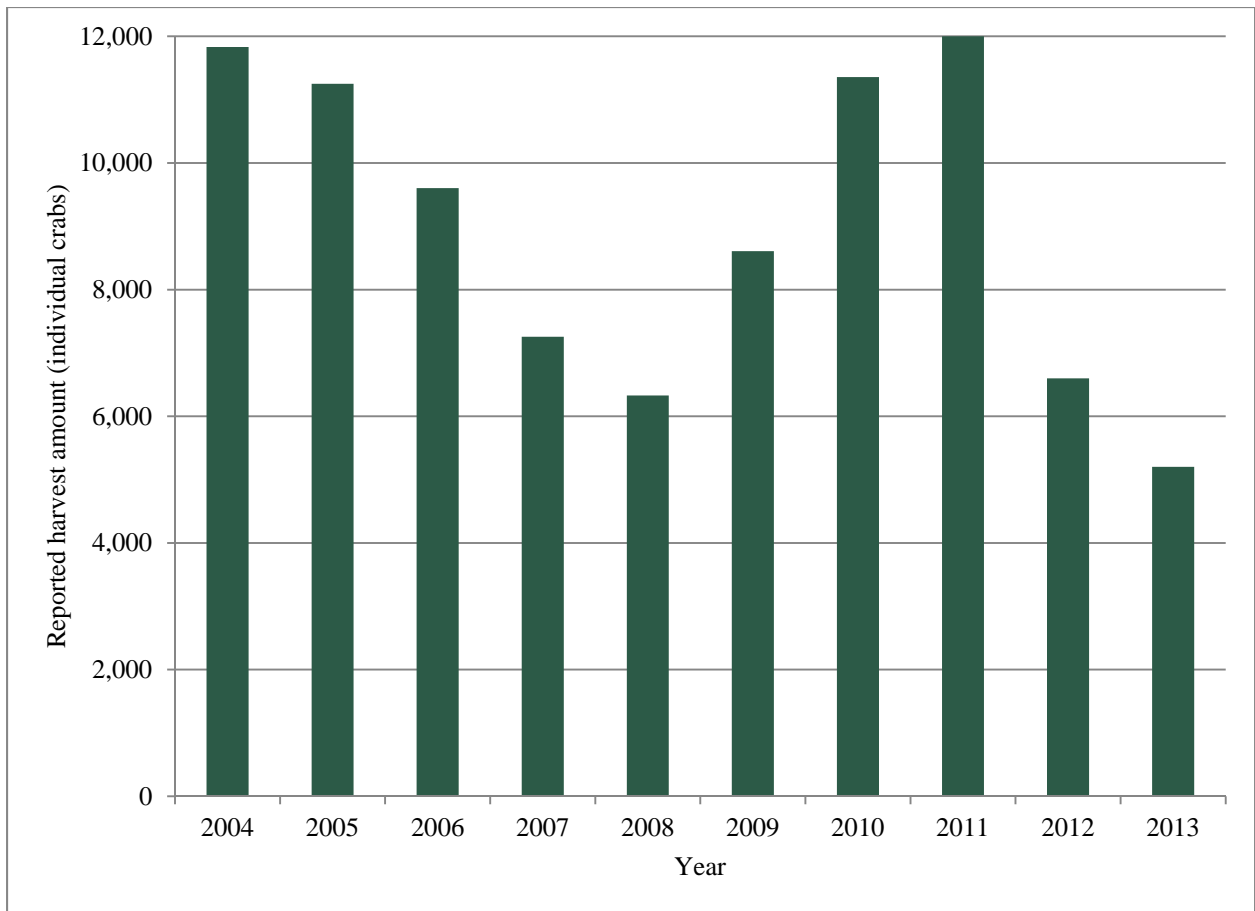


Figure 6.—Historical subsistence king, Tanner, and Dungeness crab harvests, Kodiak Management Area, 2004–2013.

Table 10.—Historical subsistence miscellaneous shellfish permit data and harvests, Kodiak Management Area, 1995–2013.

Year	Number of permits		Percentage of permits returned	Harvest amount, individual
	Issued	Returned		Miscellaneous shellfish
1995	1,935	1,191	62%	0
1996	1,556	1,297	83%	50
1997	2,081	1,572	76%	19
1998	1,816	543	30%	67
1999	1,422	182	13%	0
2000	1,710	242	14%	0
2001	2,376	497	21%	0
2002	2,276	362	16%	0
2003	2,268	406	18%	0
2004	2,239	437	20%	1
2005	2,290	424	19%	0
2006	2,094	383	18%	0
2007	2,096	304	15%	0
2008	2,037	281	14%	0
2009	1,926	330	17%	0
2010	2,022	410	20%	12
2011	2,210	389	18%	0
2012	2,120	255	12%	0
2013	2,071	209	10%	0
10-year average (2004–2013)	2,111	342	16%	1
5-year average (2009–2013)	2,070	319	15%	2
Average (all years)	2,029	511	25%	8

Source ADF&G Division of Commercial Fisheries, 2014.

Note The number of returned permits and percentage of returned permits are based only on the returned permits that indicated a crab harvest.

Note “Miscellaneous shellfish” does not include crab and shrimp species.

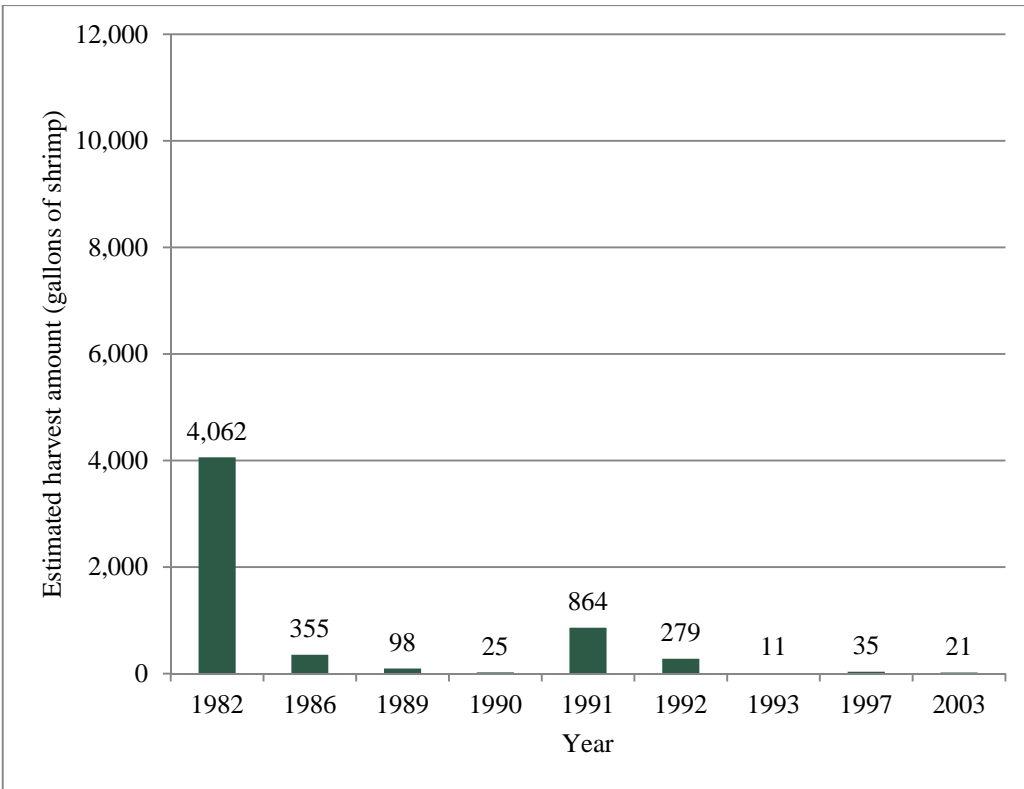


Figure 7.—Estimated historical subsistence shrimp harvests, Akhiok, Kodiak City, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions, 1982; Karluk, Larsen bay, Ouzinkie, and Port Lions, 1986; Old Harbor, Ouzinkie, and Port Lions, 1989; Larsen Bay, 1990; Kodiak City, Kodiak Road, Old Harbor, and Ouzinkie, 1991; Kodiak City and Larsen Bay, 1992; Larsen Bay and Port Lions, 1993; Old Harbor and Ouzinkie, 1997; and Ouzinkie, 2003.

Source ADF&G Division of Subsistence, Community Subsistence Information System (CSIS): <http://www.adfg.alaska.gov/sb/CSIS/> (Accessed January 2015).

CRITERION 2

A pattern of taking or use recurring in specific seasons of each year.

Harvests of shellfish occur year-round (Schroeder et al. 1987:474–479). The subsistence Tanner crab and Dungeness crab fisheries are open year-round except in waters 25 fathoms or more in depth during the 14 days immediately before the opening of a commercial king or Tanner crab fishing season in the location (5 AAC 02.415). Miscellaneous shellfish and shrimp may be taken for subsistence purposes at any time in the Kodiak Area by any method (5 AAC 02.005).

Throughout the year shellfish are harvested by Kodiak residents, however certain communities have preferred harvesting times for each species. Craig Mishler (2001) wrote that the winter months have always been preferred months for digging clams and gathering shellfish. Ouzinkie and Old Harbor residents traditionally go clamming only during the “R months,” from September through April, due to the belief that this is the period of time when paralytic shellfish poisoning is not a danger (Mishler 2001). Octopi are traditionally and contemporarily hunted as they lay beneath rocks during minus tides throughout the year (Mishler 2001). Many miscellaneous shellfish are harvested at times of the year when there is a minus tide and it is presumed safe, or safer, to consume them.

CRITERION 3

A pattern of taking or use consisting of methods and means of harvest that are characterized by efficiency and economy of effort and cost.

Tables 1–4 summarize data regarding the harvest of shellfish for home use either by removal from commercial catches or subsistence fishing methods. Tanner crab is the shellfish species most often retained from commercial catches for home use. Home pack is an efficient way of harvesting enough Tanner crab to share with Kodiak communities, and sharing is an efficient way of distributing a resource that requires specialized equipment and knowledge to harvest. Table 8 shows that in 2003, Old Harbor households retained 175 lb of Tanner crab from commercial harvests and Port Lions households retained 497 lb of Tanner crab from commercial harvests.

Sharing remains necessary for all of the communities in the Kodiak Area to acquire subsistence foods. In 2003, 18% of households in Ahkiok harvested and used Tanner crab; 16% of households in Larsen Bay harvested Tanner crab while 44% used Tanner crab; 29% of households in Old Harbor harvested Tanner crab while 71% used Tanner crab; 14% of households in Ouzinkie harvested Tanner crab while 73% used Tanner crab; and in Port Lions 22% of households harvested Tanner crab and 59% used Tanner crab (Table 1). Thus, Tanner crab are widely shared since these findings show that a small percentage of households from these communities (approximately 20% on average from each) harvested Tanner crab and they efficiently shared the resource such that 44%–73% of community households used Tanner crab.

Dungeness crab were harvested and used by 9% of households in Ahkiok in 2003; 17% of households in Old Harbor harvested Dungeness crab while 33% used Dungeness crab; 6% of households in Ouzinkie harvested Dungeness crab while 31% used Dungeness crab; and in Port Lions 4% of households harvested Dungeness crab while 20% used Dungeness crab (Table 2). These findings show that a small percentage of households from these communities (approximately 9% on average from each) harvested Dungeness crab and they shared the resource such that 9%–33% of community households used Dungeness crab.

In 2003, 78% of households in Ahkiok harvested miscellaneous shellfish while 82% used miscellaneous shellfish; 18% of households in Larsen Bay harvested miscellaneous shellfish while 22% used miscellaneous shellfish; 29% of households in Old Harbor harvested miscellaneous shellfish while 50% used miscellaneous shellfish; 22% of households in Ouzinkie harvested miscellaneous shellfish while 37% used miscellaneous shellfish; and in Port Lions 10% of households harvested miscellaneous shellfish and 14% used miscellaneous shellfish (Table 3). These numbers show that miscellaneous shellfish were

shared since a small percentage of households in these communities (approximately 31% on average from each) harvested miscellaneous shellfish and they shared the resource such that 14%–82% of community households used miscellaneous shellfish. In addition, the number of households harvesting miscellaneous shellfish is notably greater than those households harvesting miscellaneous shellfish.

During a salmon ethnography study conducted by ADF&G Division of Subsistence in 2013 and 2014, researchers witnessed the family-wide effort often put into the harvest of miscellaneous shellfish on beaches at low tide.⁵ Unlike crabs and shrimp, many miscellaneous shellfish can be easily accessed by 4-wheelers or by foot and therefore more people are able to participate in the harvest activity than can participate when resource access is achieved by skiff.

Sharing of shrimp remained important in Ouzinkie in 2003; 2% of households harvested shrimp while 28% used shrimp. However, it was found in 2003 that 15 resources that were used by households in 1994 were no longer used in 2003; one of these resources was shrimp (Fall 2006). Concern was expressed by members of all 5 study communities in 2003 regarding the availability of shrimp. It was determined by the department that the decreased availability of shrimp in the Kodiak Area was in large part due to the *Exxon Valdez* oil spill (Fall 2006). The decrease in availability of shrimp is the reason community members gave for their decreased use.

Ouzinkie shrimp harvests provide insight into pre- and post-spill shrimp availability. The average amount of shrimp harvested by the community of Ouzinkie prior to the oil spill, based on 2 survey years (1982 and 1986), was 268 lb (Table 4). On average, 14% of Ouzinkie households harvested shrimp in 1982 and 1986. After the oil spill, on average 1% of households harvested shrimp in 7 study years (1989–1993, 1997, and 2003). In 1989, the community harvested 39 lb of shrimp (Table 4). During 5 post-spill survey years (1990–1993, 1997), the average community shrimp harvest was 3 lb per year (Table 4). In 2003, the total community harvest of shrimp was 41 lb (Fall 2006). Similar fluctuations in shrimp harvests pre- and post-oil spill were found in Larsen Bay, Old Harbor, Port Lions, and Ahkiok.

Gear Types

Although other gear types are authorized, most subsistence Tanner and Dungeness crabs are harvested with pots. Ring nets and baited hooks on lines are sometimes used for crab fishing as well, but pots are the most efficient method to harvest larger quantities needed for sharing, and require the fewest expensive boat trips to set.

Miscellaneous shellfish are harvested by a variety of methods, depending on the targeted species. Many miscellaneous shellfish harvest locations are accessed by all-terrain vehicle or by foot during minus tides. Depending on the species, some miscellaneous shellfish are most often collected by hand. Tools such as shovels, hoses, and buckets can be used to aid in resource harvesting.

Shrimp are collected most often via shrimp pots.

CRITERION 4

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.

Most of the Kodiak Area marine waters are used by residents of Kodiak Island Borough for harvesting shellfish. Due to the expense of marine gas and time necessary to get to the fishing grounds, harvest effort specific for shellfish is probably concentrated near each community (Wright et al. 1985). There are certainly exceptions with contemporary practices since some resources become less desirable in certain locations or become harder to find in traditional areas and one must go farther to harvest them, or abandon harvesting them all together. For example, residents of Old Harbor used to have 2 preferred

5. Alaska Depart of Fish and Game. *In prep.* "Changing Patterns and Trends in the Subsistence Salmon Fishery on Kodiak Island, Alaska," Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. NNN.

clamming locations—at Sheep Island and at the culvert (a body of water on the side of the community’s road system) (Mishler 2001). The culvert stopped being used after some clams tested positive for oil after the *Exxon Valdez* oil spill (Mishler 2001). Sheep Island continues to be a preferred clamming area for the residents of Old Harbor.

CRITERION 5

A means of handling, preparing, preserving, and storing fish or game that has been traditionally used by past generations, but not excluding recent technological advances where appropriate.

It is likely that most harvests of shellfish are cooked and eaten while fresh, though some may be frozen for later use. An Old Harbor elder spoke of how important butter clams and littlenecks were to the people of Old Harbor, “We’ve got clam fettuccine, we’ve got half-shelled clam, we’ve got clam chowder, we’ve got, I mean steamers. We’ve got a tremendous amount of ways of cooking clams, and that’s a very important subsistence food also” (Mishler 2001). Bidarkis, which cling to the underside of rocks, have traditionally been eaten raw or covered with boiling water before being consumed. Octopi and crabs are often boiled while fresh.

CRITERION 6

A pattern of taking or use that includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation.

Subsistence activities in Kodiak Island communities, including the harvesting of shellfish, are often family activities. It is common for extended family groups to cooperate in these harvest activities. Oftentimes crab pots will be checked at the same time that family members go subsistence fishing for halibut, or bidarkis will be collected on the way back from a salmon fishing trip, since combining harvest practices conserves fuel. When a minus tide occurs in the evening, many families on Kodiak Island will go out in search of bidarkis and octopi with flashlights, establishing a knowledge transfer and bonding exercise. Clam digging is another subsistence activity done by extended families on Kodiak Island during minus tides. Tanner crab harvesting is an important activity for some commercial fishers who have traditionally brought crab to distribute within their communities (Table 8).

CRITERION 7

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.

During the Division of Subsistence’s study for 2003, it was found that sharing was strong within the communities of Ahkiok, Old Harbor, Ouzinkie, Larsen Bay, and Port Lions. Sharing is an important element of the subsistence way of life. In some cases, resource scarcity and decreased harvests lead community members to adjust their patterns of distribution in an attempt to maintain sharing relationships (Fall 2006). As shown in tables 1–4, giving and receiving of shellfish is very common throughout the Kodiak Island Borough, and sharing of shellfish takes place within the wider sphere of noncommercial exchange of wild foods. Exchanges take place between households within the same community as well as between households from different communities in the Kodiak Area. Kodiak communities have familial connections on the Alaska and Kenai peninsulas and sharing subsistence resources with these ties is common. It should be noted that in all 5 study communities more households used shellfish than harvested shellfish, thus demonstrating reciprocity within and between communities.

CRITERION 8

A pattern that includes taking, use, and reliance for subsistence purposes upon a wide diversity of fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life.

As shown in Table 11 of Appendix A, harvests of wild resources for home use are relatively large and diverse in surveyed Kodiak Area communities. For example, harvests, as measured in usable pounds, were 147 lb per person in the Kodiak City area in 1982–1983 and about 140 lb per person in 1991. For the 5-year period 2007–2011, estimated annual fish and wildlife harvests for the Kodiak Island Borough was 159 lb per person (Fall 2013:18). Subsistence harvests in the smaller Kodiak Island communities have generally ranged from about 300 lb to 400 lb per person per year (except in 1989, the year of the *Exxon Valdez* oil spill, when subsistence harvests dropped substantially in most communities) (Appendix A, Table 11). Noncommercial harvests are historically also diverse with the average household in Kodiak Island Borough communities using between 10 and 20 kinds of wild foods per year (Appendix A, Table 11).

Shellfish have been immensely important subsistence foods for the people of the Kodiak Area for centuries. According to the department’s subsistence data, the continued harvest, use, and sharing of all species of shellfish is important for the nutrition and customary practices of Kodiak Area residents.

ANS OPTIONS, KODIAK AREA SHELLFISH

If the board chooses to make a positive C&T use determination for Tanner crab, Dungeness crab, miscellaneous shellfish, or shrimp, then board members may consider adopting an ANS for each stock or population. The following tables provide possible ANS options for the board to consider.

The Tanner and Dungeness crab options are based on ADF&G subsistence permit harvest data from 1995–2013. The tables provide ANS options based on: 1) the low and high harvests for the period for which data are available (1995–2013), and 2) the low and high harvests for the most recent 10-year range for which data are available (2004–2013), and 3) the mean harvest for each time period, plus or minus the standard deviation for those time periods. Since low and high harvests may be extreme within a time series (there may have been unusual circumstances that increased or decreased harvest levels), calculating a standard deviation from the mean (or average) harvest may provide a more statistically accurate assessment of harvest trends. It should be noted that the ANS options provided for crab are minimum harvest estimates and are not expanded to account for people who are harvesting crab without permits.

The same options and methods are presented for miscellaneous shellfish and shrimp; however, these ANS options are based on harvest estimates collected during household harvest surveys done for 1982, 1986, 1989–1993, 1997, and 2003 since permit data are not available (Table 3; Table 4; Figure 7). This includes the total harvest for all communities included during each study year. Miscellaneous shellfish harvest ANS options are based on the sum of the low and high harvest of each community each year studied and the sum of each community’s average harvest across every study year.

The options below for Tanner crab and Dungeness crab are for individual crab. The options presented below for miscellaneous shellfish and shrimp are in pounds.

Table 11.–ANS option 1 for Kodiak Area Tanner crab: range based on low and high harvests, 1995–2013.

Harvest (ind)		ANS range option (rounded)	
Low	High	Low	High
2,181	9,623	2,200	9,600

Table 12.–ANS option 2 for Kodiak Area Tanner crab: range based on mean and standard deviation of harvests, 1995–2013.

Range of harvest (ind)				<i>Bounded by</i>	Mean ± SD		<i>Equals</i>	ANS range option (rounded)	
Low	High	Mean	SD		Low	High		Low	High
2,181	9,623	5,664	2,463		3,201	8,127		3,200	8,100

Table 13.–ANS option 3 for Kodiak Area Tanner crab: range based on low and high harvests, 2004–2013.

Harvest (ind)		ANS range option (rounded)	
Low	High	Low	High
4,124	9,623	4,100	9,600

Table 14.–ANS option 4 for Kodiak Area Tanner crab: range based on mean and standard deviation of harvests, 2004–2013.

Range of harvest (ind)				<i>Bounded by</i>	Mean ± SD		<i>Equals</i>	ANS range option (rounded)	
Low	High	Mean	SD		Low	High		Low	High
4,124	9,623	6,651	1,918		4,733	8,569		4,700	8,600

Table 15.–ANS option 1 for Kodiak Area Dungeness crab: range based on low and high harvests, 1995–2013.

Harvest (ind)		ANS range option (rounded)	
Low	High	Low	High
425	3,838	400	3,900

Table 16.–ANS option 2 for Kodiak Area Dungeness crab: range based on mean and standard deviation of harvests, 1995–2013.

Range of harvest (ind)				<i>Bounded by</i>	Mean ± SD		<i>Equals</i>	ANS range option (rounded)	
Low	High	Mean	SD		Low	High		Low	High
425	3,838	1,957	798		1,159	2,755		1,200	2,800

Table 17.–ANS option 3 for Kodiak Area Dungeness crab: range based on low and high harvests, 2004–2013.

Harvest (ind)		ANS range option (rounded)	
Low	High	Low	High
425	3,074	400	3,000

Table 18.–ANS option 4 for Kodiak Area Dungeness crab: range based on mean and standard deviation of harvests, 2004–2013.

Range of harvest (ind)				<i>Bounded by</i>	Mean ± SD		<i>Equals</i>	ANS range option (rounded)	
Low	High	Mean	SD		Low	High		Low	High
425	3,074	2,019	848		1,171	2,867		1,200	2,900

Table 19.—ANS option 1 for Kodiak Area miscellaneous shellfish: range based on low and high harvest estimates, 1982, 1986, 1989–1993, 1997, and 2003.

Estimated harvest (lb)			ANS range option (rounded)	
Low	High	Average	Low	High
60,451	103,050	77,900	60,500	103,000

Note The estimated harvests are the sum of the low and high harvests of each community for each study year, and the estimated average is the sum of each available community's average harvest across every study year.

Table 20.—ANS option 1 for Kodiak Area shrimp: range based on low and high harvest estimates, 1982, 1986, 1989–1993, 1997, and 2003.

Estimated harvest (lb)			ANS range option (rounded)	
Low	High	Average	Low	High
1,004	8,504	3,173	1,000	8,500

Note The estimated harvests are the sum of the low and high harvests of each community for each study year, and the estimated average is the sum of each available community's average harvest across every study year.

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**APPENDIX A. 1993 CUSTOMARY AND TRADITIONAL USE
WORKSHEET, MARINE INVERTEBRATES, KODIAK
MANAGEMENT AREA**

CUSTOMARY AND TRADITIONAL USE WORKSHEET 11-9

MARINE INVERTEBRATES: KODIAK MANAGEMENT AREA

Prepared by the Division of Subsistence
Alaska Department of Fish and Game

January 1993

Note: Other than king crab, the Board of Fisheries has made no customary and traditional use determinations for marine invertebrates in the Kodiak Management Area. In 1988, the Board determined that king crab in the Kodiak Management area, except the Semidi Island Section, the North Mainland Section, and the South Mainland Section, supported customary and traditional uses of king crab. No finding was made for the three previously named sections.

Criterion 1. A long-term consistent pattern of use and reliance on the fish stock or game population that has been established over a reasonable periods of time, excluding interruption by circumstances beyond the user's control, such as unavailability of the fish or game caused by migratory patterns.

Marine invertebrates have long played an important role in the wild resource harvests of communities of the Kodiak Area. Regarding prehistoric and early historic uses, Clark (1984:190) noted that:

Shellfish (sea urchins, periwinkles, clams, blue mussels, chitons, etc) were consumed in large quantities, judging from shell midden deposits at late prehistoric and early historic settlement sites. Shellfish exploitation often is interpreted as primarily an activity of the late winter season of scarcity, but circumstantial evidence of clam shells at inland summer salmon fishing sites suggests that there also was an epicurean interest in shellfish.

The importance of all types of shellfish, including crab, in subsistence harvests of Kodiak Island residents in early contact times, was noted by Gavriil Davydov, an officer in the Russian navy, who wrote in 1810/12 (Davydov 1977:174, describing the period 1802/07):

There is almost nothing which the [Kodiak] islands do not eat. There is hardly a shellfish or crab or shiny sea worm, and virtually no growing plant, which the would not use in their food.

Davydov (1977: 175) further noted that the Kodiak islanders "eat whatever food the sea provides them with," and that they ate shellfish "raw or warmed a little over a fire." He also wrote that, "The islanders are at all times, even times of plenty, great lovers of shellfish."

In 1990, the population of the Kodiak Island Borough was 13,309; of this, 92 percent lived along the road system and most of the remainder in six predominantly Alaska Native villages (Table 1). Subsistence uses of various marine invertebrates remain important in all these communities. As shown in Table 2 and Figure 1, the vast majority of households interviewed during Division of Subsistence surveys reported using marine invertebrates. Harvest quantities vary by community and by year; they generally have ranged between 10 and 50 pounds useable weight per person annually (Table 2, Figure 2).

Table 3 provides a list of marine invertebrates used in five study communities in the Kodiak Island Borough in 1991. Resources used by the most households included clams (mostly butter clams and littleneck clams), dungeness, king, and tanner crab, chitons ("bidarkies"), octopus, and sea urchins. As shown in Table 4, in 1991 clams made up the largest percentage of the total marine invertebrate harvest in four of the

five study communities. The exception was the Kodiak road system area, where crab ranked first and clams were second.

Table 5 provides information from Division of Subsistence household surveys regarding uses of crab. Except for Karluk, the majority of households in all communities reported using crab during the study years. All three kinds (dungeness, king, and tanner) are used in each community. King crab generally rank first in the number of pounds harvested, followed by tanner, and then dungeness (Tables 6, 7, and 8; see also Tables 3 and 4 for recent data for 1991).

Harvest data from shellfish permits issued by the Department of Fish and Game are available from the Division of Commercial Fisheries. While it is likely that since the permit requirement was adopted in the mid 1980s, most residents of the Kodiak road system who fish for crab have obtained and returned permits, permit returns from other communities and returns for shellfish other than crab are generally low.

Criterion 2. A use pattern recurring in specific seasons of each year.

Harvests of marine invertebrates occur year-round (Schroeder et al. 1987:474-479). In the past, king crab harvests likely occurred in the spring when they were available near shore. Current subsistence regulations provide a June 1 - January 31 season for king crab.

Criterion 3. A use pattern consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost.

Marine invertebrates are obtained for home use either by removal from commercial catches or by subsistence methods. Table 9 summarizes data regarding the percentage of the total marine invertebrate harvest by each general category (commercial removal or subsistence methods). The vast majority of this harvest (at least 80 percent and usually 90 percent or more) takes place using subsistence methods.

Table 10 summarizes data regarding the harvest of crab for home use either through removal from commercial catches or subsistence methods. Compared to marine invertebrates overall, a larger percentage of the crab harvest is removed from commercial catches. In most years in most communities, however, 50 percent or more of the crab are harvested under subsistence regulations.

A variety of methods is used to harvest marine invertebrates. Clams and cockles are harvested with shovels or rakes. Pots are set for crab. Some people use dip nets for crab at low tides. Ring nets and baited hooks on lines (rare today but perhaps more common in the past) are sometimes used for crab as well. In the past, spears were used for crab. Mussels, chitons, snails, and sea urchins are picked by hand or pried off rocks with knives. Octopus are extracted from dens with the use of laundry bleach and rubber hoses.

Criterion 4. 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.

Most of the Kodiak Management Area is used by residents of the Kodiak Island Borough for harvesting marine invertebrates. Effort is probably concentrated near each community (Wright et al. 1985: Map --). Kodiak road system area residents mostly use the areas accessible along the road system for marine invertebrate harvests (Schroeder et al. 1987:472).

Several beaches along the Alaska Peninsula within the Kodiak Shellfish Management Area are used for subsistence harvesting of clams, and probably other marine invertebrates as well. These include Kashvik Bay, Alinchak Bay, and Wide Bay (Wright et al. 1985:Map 7). Residents of several communities of the

Bristol Bay side of the Alaska Peninsula, including the Bristol Bay Borough, Egegik, and Pilot Point, use planes to access these areas for clam harvests. These areas may also be used for subsistence clam harvesting while people are in these areas engaged in commercial fishing. There are no permanent communities along this stretch of the Alaska Peninsula coast.

Criterion 5. The means of handling, preparing, preserving, and storing fish or game which has been traditionally used by past generations, but not excluding recent technological advances where appropriate.

It is likely that most harvests of marine invertebrates are eaten fresh. Crab may be frozen for later use.

Criterion 6. A use pattern which includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation.

Subsistence activities in Kodiak Island communities, including collecting marine invertebrates, are often family activities. It is common for extended family groups to cooperate in these harvest activities. Many Alaska Native families avoid eating clams in the "non-r" months for fear of PSP.

Criterion 7. 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.

As shown in Table 2, giving and receiving marine invertebrates is very common throughout the Kodiak Island Borough, and take place within the wider sphere of noncommercial exchange of wild foods. Exchanges take place between households within the same community as well as between communities. It should be noted, for example, the Karluk generally has a low harvest of marine invertebrates but a high percentage of households that use marine invertebrates. This is due to reciprocity with Larsen Bay, which receives much of its salmon from Karluk. These two communities are interrelated and interdependent.

Criterion 8. 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.

As shown in Table 11, harvests of wild resources for home use are relatively large and diverse in all Kodiak Management Area communities. Harvests as measured in useable pounds were 147 pounds per person in the Kodiak City area in 1982/83 and about 140 pounds per person in 1991. Subsistence harvests in the six smaller communities have generally ranged from about 300 to 400 pounds per person per year (except in 1989, the year of the *Exxon Valdez* oil spill, when subsistence harvests dropped substantially in most communities). Harvests of marine invertebrates generally make up between about 10 to 20 percent of each community's take of wild resources for home use. Noncommercial harvests are also diverse, with the average household in Kodiak Island Borough communities using between 10 and 20 kinds of wild foods per year (Table 11). In addition to marine invertebrates, other kinds of resources used for subsistence purposes include salmon, other finfish, deer, birds, and wild plants. Marine mammals remain important in some of the smaller communities.

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TABLE 1. POPULATION OF THE KODIAK ISLAND BOROUGH, 1990

<u>Community</u>	<u>Population</u>	<u>Number of Households</u>
Akhiok	77	19
Chiniak	69	23
Karluk	71	18
Kodiak	6,365	2,051
Kodiak Station	2,025	414
Larsen Bay	147	44
Old Harbor	284	87
Ouzinkie	209	68
Port Lions	222	73
Women's Bay	620	220
Balance	3,220	1,485
Total	13,309	4,083

Source: Alaska Department of Labor 1991

Table 2

HARVEST SUMMARY FROM DIVISION OF SUBSISTENCE HOUSEHOLD SURVEYS
 RESOURCE: MARINE INVERTEBRATES

GMU	Community	Year	Percentage of Households				Estimated Number Harvested	Estimated Pounds Harvested	Pounds Harvested		
			Used	Attempt	Harvested	Received			Gaveaway	Household	Percapita
08											
	Akhiok	82	100.		100.		4536	4536	168.0	44.1	
	Akhiok	86	75.	58.3	58.3	25.	41.7	1219	1219	35.8	10.0
	Akhiok	89	100.	100.	100.	100.	100.	2488	2488	191.4	44.5
	Chiniak	82	100.		100.			15075	15076	96.6	24.5
	Karluk	82	90.		70.			1321	1321	50.8	12.8
	Karluk	86	84.2	63.2	63.2	47.4	10.5	1351	1351	50.0	12.5
	Karluk	89	85.7	78.6	78.6	50.	71.4	379	379	22.2	5.1
	Karluk	90	82.4	82.4	82.4	52.9	58.8	1063	1063	55.9	12.6
	Kodiak City	82	95.5		69.			135583	135577	54.5	16.2
	Larsen Bay	82	87.5		81.3			6384	6384	148.4	35.7
	Larsen Bay	86	89.2	64.9	59.5	70.3	48.6	4096	4097	78.7	24.0
	Larsen Bay	89	97.1	79.4	79.4	76.5	52.9	4527	4527	116.0	34.3
	Larsen Bay	90	100.	80.	80.	88.6	71.4	7965	7965	199.1	54.4
	Old Harbor	82	98.7		98.7			10541	10541	112.1	29.5
	Old Harbor	86	88.6	84.1	84.1	61.4	47.7	8830	8830	74.2	23.3
	Old Harbor	89	95.8	83.3	83.3	79.2	64.6	7457	7457	80.1	26.7
	Ouzinkie	82	100.		93.8			11834	11834	169.0	50.5
	Ouzinkie	86	76.5	61.8	61.8	52.9	26.5	5505	5505	88.7	28.2
	Ouzinkie	89	62.9	48.6	48.6	45.7	40.	1693	1693	24.5	7.7
	Ouzinkie	90	94.3	75.5	75.5	62.3	43.4	2823	2823	47.8	13.9
	Port Lions	82	100.		92.7			10358	10358	116.3	35.7
	Port Lions	86	96.9	84.6	81.5	72.3	53.8	9599	9599	106.6	32.4
	Port Lions	89	91.7	83.3	83.3	75.	41.7	3161	3161	47.1	16.1

TABLE 3. PERCENTAGE OF SAMPLED HOUSEHOLDS USING MARINE INVERTEBRATES, KODIAK ISLAND BOROUGH COMMUNITIES, 1991/92

Resource	Percentage of Sampled Households Using Resource:				
	Karluk	Kodiak	Larsen Bay	Old Harbor	Ouzinkie
Clams	69.2	35.3	89.5	88.1	93.8
Butter Clams	69.2	28.4	84.2	85.7	90.6
Razor Clams	0.0	7.9	5.3	28.6	0.0
Littleneck Clams	38.5	5.9	52.6	23.8	18.8
Pinkneck Clams	0.0	0.5	2.6	0.0	0.0
Unknown Clams	0.0	5.1	5.3	0.0	3.1
Crabs	15.4	76.4	84.2	83.3	65.6
Dungeness Crab	7.7	57.3	42.1	52.4	31.3
King Crab	0.0	56.0	28.9	40.5	25.0
Tanner Crab	7.7	51.3	68.4	76.2	53.1
Unknown Crab	0.0	0.5	2.6	0.0	0.0
Cockles	0.0	3.3	5.3	21.4	25.0
Geoducks	7.7	0.6	7.9	4.8	6.3
Scallops	7.7	9.2	0.0	7.1	0.0
Mussels	38.5	4.1	10.5	9.5	3.1
Chitons	61.5	6.6	55.3	57.1	71.9
Octopus	61.5	17.6	76.3	47.6	25.0
Sea Cucumber	0.0	0.0	7.9	7.1	0.0
Sea Urchin	23.1	6.6	50.0	61.9	25.0
Shrimp	0.0	7.6	0.0	4.8	3.1
Snails	0.0	1.3	2.6	4.8	0.0
Limpets	0.0	2.0	5.3	4.8	0.0
Squid	0.0	2.2	0.0	0.0	0.0
ANY MARINE INVERTEBRATE	84.6	80.9	97.4	97.6	96.9

Kodiak includes the road system area.

Source: Alaska Department of Fish and Game, Division of Subsistence Household Survey, 1992

TABLE 4. HARVESTS OF MARINE INVERTEBRATES, POUNDS USABLE WEIGHT PER PERSON, KODIAK ISLAND BOROUGH COMMUNITIES, 1991/92

Resource	Pounds Usable Weight per Person				
	Karluk	Kodiak	Larsen Bay	Old Harbor	Ouzinkie
Clams	2.0	3.6	28.7	20.2	6.4
Butter Clams	1.6	2.8	22.4	18.0	5.6
Razor Clams	0.0	0.2	0.1	1.1	0.0
Littleneck Clams	0.4	0.4	5.3	1.1	0.4
Pinkneck Clams	0.0	0.0	0.1	0.0	0.0
Unknown Clams	0.0	0.1	0.9	0.0	0.5
Crabs	0.0	6.3	12.4	7.0	1.7
Dungeness Crab	0.0	1.3	0.6	1.5	0.1
King Crab	0.0	1.5	0.8	1.2	0.1
Tanner Crab	0.0	3.5	11.1	4.3	1.5
Unknown Crab	0.0	0.0	0.0	0.0	0.0
Cockles	0.0	0.1	0.1	1.4	1.2
Geoducks	0.2	<0.1	0.1	1.0	0.2
Scallops	0.0	0.1	0.0	0.0	0.0
Mussels	0.5	0.1	0.1	0.2	0.0
Chitons	1.5	0.1	2.8	3.1	2.5
Octopus	0.1	0.5	7.1	1.3	0.7
Sea Cucumber	0.0	0.0	0.1	0.4	0.0
Sea Urchin	0.1	<0.1	0.7	0.9	0.1
Shrimp	0.0	0.2	0.0	0.7	<0.1
Snails	0.0	<0.1	0.0	<0.1	0.0
Limpets	0.0	<0.1	<0.1	0.1	0.0
Squid	0.0	0.9	0.0	0.0	0.0
ALL MARINE INVERTEBRATES	4.3	11.8	52.2	36.1	12.7

Kodiak includes the road system area. SuNeys were not conducted in Akhiok or Port Lions.

Source: Alaska Department of Fish and Game, Division of Subsistence Household SuNey, 1992

Table 5

HARVEST SUMMARY FROM DIVISION OF SUBSISTENCE HOUSEHOLD SURVEYS
 RESOURCE: Crabs

GMU	Community	Year	Percentage of Households				Estimated Number Harvested	Estimated Pounds Harvested	Pounds Harvested	
			Used	Attempt	Harvested	Received Gaveaway			Household	Percapita
08										
	Akhiok	82	95.2		90.5		585	1274	47.1	12.3
	Akhiok	86	50.	25.	25.	25.	71	163	4.7	1.3
	Akhiok	89	90.	40.	30.	90.	295	654	50.2	11.7
	Chiniak	82	94.1	70.6	76.5		4028	7706	49.4	12.5
	Karluk	82	85.		25.		120	169	6.5	1.6
	Karluk	86	10.5	5.3	5.3	10.5	171	165	6.1	1.5
	Karluk	89	21.4	7.1	7.1	14.3	49	78	4.5	1.0
	Karluk	90	17.6	5.9	5.9	17.6	34	24	1.2	0.2
	Kodiak City	82	91.6	37.4	34.2		36923	64559	25.9	7.7
	Larsen Bay	82	78.1		31.3		701	1037	24.1	5.8
	Larsen Bay	86	62.2	29.7	24.3	51.4	869	1093	21.0	6.4
	Larsen Bay	89	61.8	20.6	20.6	50.	689	1057	27.1	8.0
	Larsen Bay	90	88.6	31.4	31.4	77.1	870	1376	34.4	9.4
	Old Harbor	82	77.6		64.5		1615	2781	29.5	7.8
	Old Harbor	86	45.5	22.7	22.7	34.1	1301	1779	14.9	4.7
	Old Harbor	89	66.7	35.4	35.4	58.3	907	1176	12.6	4.2
	Ouzinkie	82	93.8		53.1		2542	4896	69.9	20.9
	Ouzinkie	86	61.8	38.2	38.2	44.1	1089	1494	24.0	7.6
	Ouzinkie	89	34.3	8.6	8.6	31.4	515	580	8.4	2.6
	Ouzinkie	90	52.8	17.	17.	41.5	480	705	11.9	3.4
	Port Lions	82	100.		63.6		3299	5645	63.4	19.4
	Port Lions	86	92.3	50.8	44.6	67.7	2178	3899	43.3	13.1
	Port Lions	89	77.8	33.3	33.3	66.7	861	1249	18.6	6.3

Table 6

HARVEST SUMMARY FROM DIVISION OF SUBSISTENCE HOUSEHOLD SURVEYS
 RESOURCE: King Crab

IGMU	Community	Year	Percentage of Households				Estimated Number Harvested	Estimated Pounds Harvested	Pounds Harvested		
			Used	Attempt	Harvested	Received			Gaveaway	Household	Per capita
08	Akhiok	82	95.2		90.5		499	1148	42.5	11.1	
	Akhiok	86	50.	25.	25.	25.	33.3	71	163	4.7	1.3
	Akhiok	89	90.	40.	30.	80.	40.	280	643	49.4	11.5
	Chiniak	82	94.1		70.6			2698	6206	39.7	10.0
	Karluk	82	80.		20.			35	81	3.1	0.7
	Karluk	86	5.3	5.3	5.3	5.3	0.	28	65	2.4	0.6
	Karluk	89	7.1	0.	0.	7.1	0.	0	0	0.0	0.0
	Karluk	90	5.9	0.	0.	5.9	5.9	0	0	0.0	0.0
	Kodiak City	82	87.1		31.6			17997	41383	16.6	4.9
	Larsen Bay	82	78.1		28.1			259	596	13.8	3.3
	Larsen Bay	86	27.	16.2	13.5	21.6	0.	41	94	1.8	0.5
	Larsen Bay	89	35.3	11.8	11.8	23.5	11.8	61	140	3.5	1.0
	Larsen Bay	90	51.4	17.1	17.1	40.	11.4	136	313	7.8	2.1
	Old Harbor	82	73.7		61.8			870	2000	21.2	5.6
	Old Harbor	86	20.5	6.8	6.8	11.4	6.8	124	286	2.4	0.7
	Old Harbor	89	45.8	14.6	14.6	41.7	10.4	84	193	2.0	0.6
	Ouzinkie	82	90.6		50.			1820	4186	59.8	17.8
	Ouzinkie	86	35.3	29.4	26.5	26.5	14.7	315	725	11.7	3.7
	Ouzinkie	89	22.9	5.7	5.7	20.	0.	65	150	2.1	0.6
	Ouzinkie	90	17.	3.8	3.8	15.1	3.8	67	153	2.6	0.7
	Port Lions	82	98.2		56.4			1774	4079	45.8	14.0
	Port Lions	86	89.2	44.6	40.	64.6	26.2	1228	2825	31.3	9.5
	Port Lions	89	72.2	22.2	22.2	61.1	13.9	199	458	6.8	2.3

Table 7

HARVEST SUMMARY FROM DIVISION OF SUBSISTENCE HOUSEHOLD SURVEYS
 RESOURCE: Dungeness Crab

GMU	Community	Year	Percentage of Households					Estimated Number Harvested	Estimated Pounds Harvested	Pounds Harvested	
			Used	Attempt	Harvested	Received	Gaveaway			Household	Per capita
08											
	Akhiok	82	14.3		9.5			13	9	0.3	0.0
	Akhiok	86	0.	0.	0.	0.	0.	0	0	0.0	0.0
	Akhiok	89	20.	10.	10.	10.	10.	16	11	0.8	0.2
	Chiniak	82	52.9		29.4			697	488	3.1	0.7
	Karluk	82	35.		5.			52	36	1.4	0.3
	Karluk	86	0.	5.3	5.3	0.	0.	142	99	3.6	0.9
	Karluk	89	14.3	0.	0.	14.3	14.3	0	0	0.0	0.0
	Karluk	90	17.6	5.9	5.9	17.6	17.6	34	24	1.2	0.2
	Kodiak City	82	61.3		16.8			7901	5539	2.2	0.6
	Larsen Bay	82	53.1		25.			297	208	4.8	1.1
	Larsen Bay	86	40.5	16.2	13.5	32.4	8.1	361	253	4.8	1.4
	Larsen Bay	89	41.2	14.7	14.7	29.4	11.8	99	69	1.7	0.5
	Larsen Bay	90	57.1	17.1	17.1	51.4	8.6	123	86	2.1	0.5
	Old Harbor	82	40.8		32.9			459	321	3.4	0.9
	Old Harbor	86	18.2	9.1	9.1	9.1	6.8	433	303	2.5	0.8
	Old Harbor	89	41.7	20.8	20.8	31.3	12.5	372	260	2.8	0.9
	Ouzinkie	82	65.6		34.4			494	346	4.9	1.4
	Ouzinkie	86	47.1	35.3	35.3	29.4	11.8	522	365	5.8	1.8
	Ouzinkie	89	20.	8.6	8.6	14.3	11.4	321	225	3.2	1.0
	Ouzinkie	90	34.	9.4	9.4	26.4	5.7	121	85	1.4	0.4
	Port Lions	82	54.5		38.2			973	681	7.6	2.3
	Port Lions	86	30.8	23.1	18.5	16.9	12.3	496	347	3.8	1.1
	Port Lions	89	27.8	8.3	8.3	19.4	2.8	298	208	3.1	1.0

Table 8

HARVEST SUMMARY FROM DIVISION OF SUBSISTENCE HOUSEHOLD SURVEYS
 RESOURCE: Tanner Crab

GMU	Community	Year	Percentage of Households					Estimated Number Harvested	Estimated Pounds Harvested	Pounds Harvested	
			Used	Attempt	Harvested	Received	Gaveaway			Household	Percapita
08											
	Akhiok	82	23.8		23.8			73	117	4.3	1.1
	Akhiok	86	0.	0.	0.	0.	0.	0	0	0.0	0.0
	Akhiok	89	20.	0.	0.	20.	0.	0	0	0.0	0.0
	Chiniak	82	41.2		35.3			633	1012	6.4	1.6
	Karluk	82	30.		10.			33	52	2.0	0.5
	Karluk	86	5.3	0.	0.	5.3	0.	0	0	0.0	0.0
	Karluk	89	14.3	7.1	7.1	7.1	14.3	49	78	4.5	1.0
	Karluk	90	0.	0.	0.	0.	0.	0	0	0.0	0.0
	Kodiak City	82	51.		15.5			11026	17636	7.1	2.1
	Larsen Bay	82	46.9		15.6			145	232	5.4	1.3
	Larsen Bay	86	51.4	24.3	18.9	40.5	8.1	467	747	14.3	4.3
	Larsen Bay	89	52.9	20.6	20.6	38.2	20.6	530	848	21.7	6.4
	Larsen Bay	90	77.1	20.	20.	65.7	20.	611	977	24.4	6.6
	Old Harbor	82	32.9		22.4			287	459	4.8	1.2
	Old Harbor	86	34.1	13.6	13.6	29.5	4.5	744	1190	10.0	3.1
	Old Harbor	89	52.1	27.1	27.1	33.3	14.6	451	723	7.7	2.5
	Ouzinkie	82	68.8		31.3			228	364	5.2	1.5
	Ouzinkie	86	38.2	26.5	20.6	32.4	11.8	252	402	6.4	2.0
	Ouzinkie	89	17.1	5.7	5.7	14.3	14.3	128	205	2.9	0.9
	Ouzinkie	90	39.6	13.2	13.2	28.3	15.1	292	467	7.9	2.3
	Port Lions	82	54.5		32.7			553	886	9.9	3.0
	Port Lions	86	40.	36.9	24.6	24.6	12.3	454	726	8.0	2.4
	Port Lions	89	38.9	19.4	19.4	22.2	5.6	364	582	8.6	2.9

TABLE 9. PERCENTAGE OF HARVEST OF MARINE INVERTEBRATES HARVESTED FOR HOME USE TAKEN FROM COMMERCIAL CATCHES AND HARVESTED WITH SUBSISTENCE METHODS, KODIAK ISLAND BOROUGH COMMUNITIES

Community	<u>Percentage of Total Harvest (Pounds) Obtained by:</u>	
	<u>Commercial Removal</u>	<u>Subsistence Methods</u>
<i>Study Year 1989</i>		
Akhiok	0.0	100.0
Karluk	10.3	89.7
Larsen Bay	7.9	92.1
Old Harbor	4.7	95.3
Ouzinkie	6.5	93.5
Port Lions	7.6	92.4
<i>Study Year 1990</i>		
Karluk	19.5	80.5
Larsen Bay	11.7	88.3
Ouzinkie	6.4	93.6
<i>Study Year 1991</i>		
Karluk	0.0	100.0
Kodiak	17.7	82.3
Larsen Bay	1.3	98.7
Old Harbor	9.9	90.1
Ouzinkie	8.8	91.2

Source: Scott et al. 1992

TABLE 10. PERCENTAGE OF HARVEST OF CRAB HARVESTED FOR HOME USE TAKEN FROM COMMERCIAL CATCHES AND HARVESTED WITH SUBSISTENCE METHODS, KODIAK ISLAND BOROUGH COMMUNITIES

Community	Percentage of Total Harvest (Pounds) Obtained by:	
	<u>Commercial Removal</u>	<u>Subsistence Methods</u>
<i>Study Year 1989</i>		
Akhik	0.0	100.0
Karluk	49.0	51.0
Larsen Bay	28.9	71.1
Old Harbor	29.3	70.7
Ouzinkie	19.0	81.0
Port Lions	14.3	85.7
<i>Study Year 1990</i>		
Karluk	100.0	0.0
Larsen Bay	65.8	34.2
Ouzinkie	21.7	78.3
<i>Study Year 1991</i>		
Karluk	No harvest	
Kodiak	13.6	86.4
Larsen Bay	4.2	95.8
Old Harbor	39.5	60.5
Ouzinkie	29.8	70.2

TABLE 11. PER CAPITA HARVESTS OF WILD RESOURCES AND AVERAGE NUMBER OF RESOURCES USED, COMMUNITIES OF THE KODIAK ISLAND BOROUGH

Community	Year	Total Pounds Per Person	Average Number Of Resources Per Household
Akhiok	1982/83	519.5	15.5
Akhiok	1986	162.4	NA
Akhiok	1989*	297.7	20.0
Chiniak	1982/83	217.2	13.9
Karluk	1982/83	863.2	19.1
Karluk	1986	385.2	13.7**
Karluk	1989*	250.5	13.2
Karluk	1991/90	396.2	15.9
Karluk	1991/92	262.2	15.5
Kodiak	1982/83	147.2	11.9
Kodiak	1991	139.8	12.1
Larsen Bay	1982/83	403.5	16.3
Larsen Bay	1986	209.0	13.8**
Larsen Bay	1989*	209.9	14.3
Larsen Bay	1990/91	341.8	19.3
Larsen Bay	1991/92	294.6	17.5
Old Harbor	1982/83	491.1	15.4
Old Harbor	1986	423.2	13.7**
Old Harbor	1989*	271.7	15.5
Old Harbor	1991/92	388.1	20.1
Ouzinkie	1983	369.1	17.7
Ouzinkie	1986	402.8	17.0**
Ouzinkie	1989*	88.8	9.4
Ouzinkie	1990/91	205.3	17.4
Ouzinkie	1991/92	209.3	18.8
Port Lions	1982/83	279.8	13.5
Port Lions	1986	333.1	NA
Port Lions	1989*	146.4	11.5

* Year of the Exxon Valdez oil spill, which severely disrupted subsistence harvests of some households

** Fewer resource categories were used to collect the 1986 data; therefore, this average is not immediately comparable with the others.

Sources: Scott et al. 1992; Files, ADF&G, Division of Subsistence, Anchorage

Figure 1. Percent of Sampled Households Using Marine Invertebrates, Kodiak Island Borough Communities

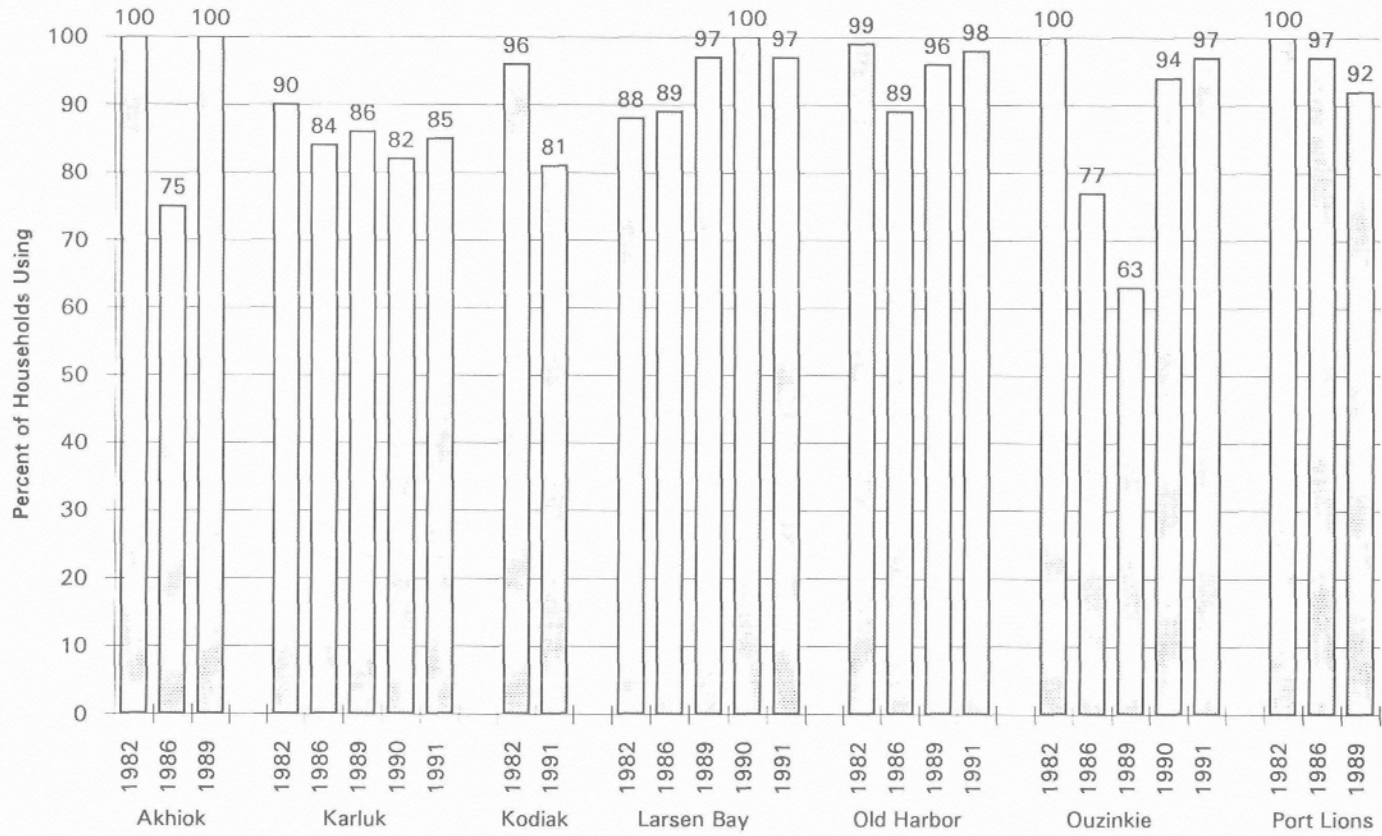


Figure 2. Harvests of Marine Invertebrates in Pounds per Person, Kodiak Island Borough Communities

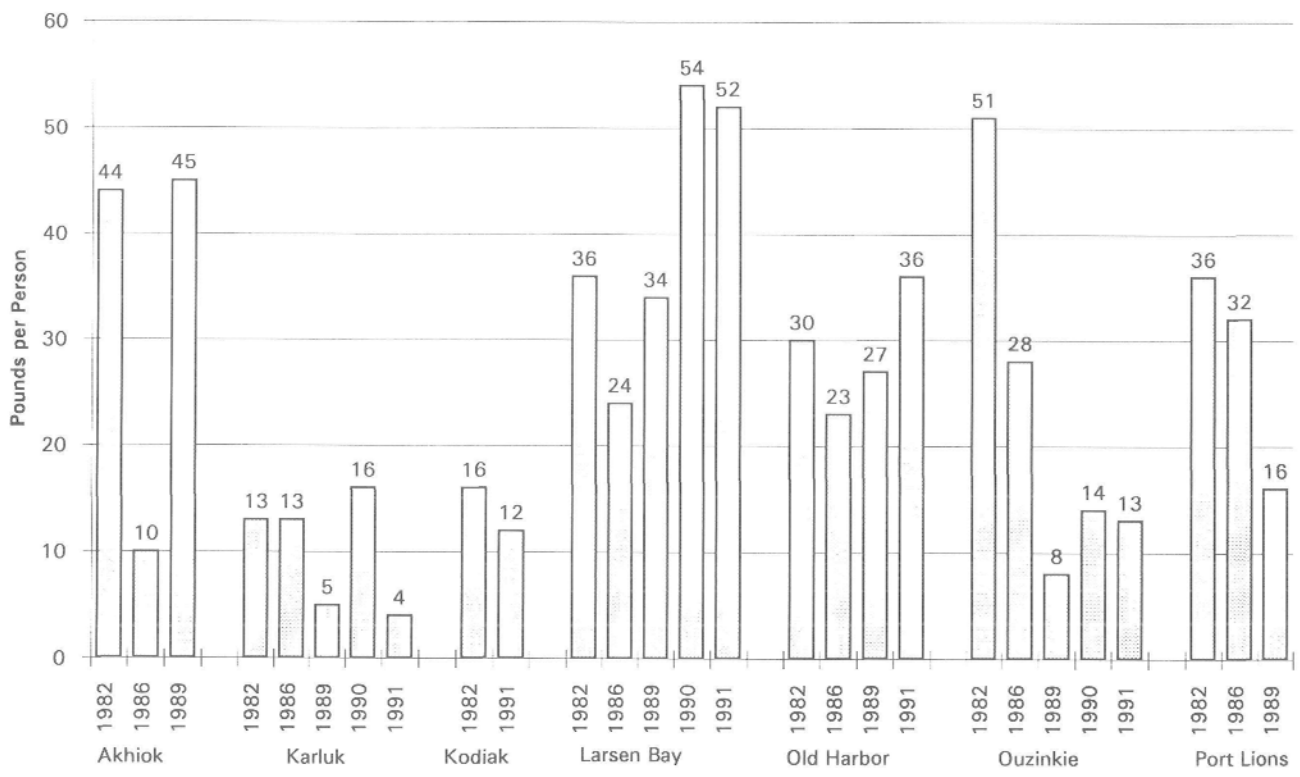


Figure 3. Percent of Sampled Households Using Crab, Kodiak Island Borough Communities

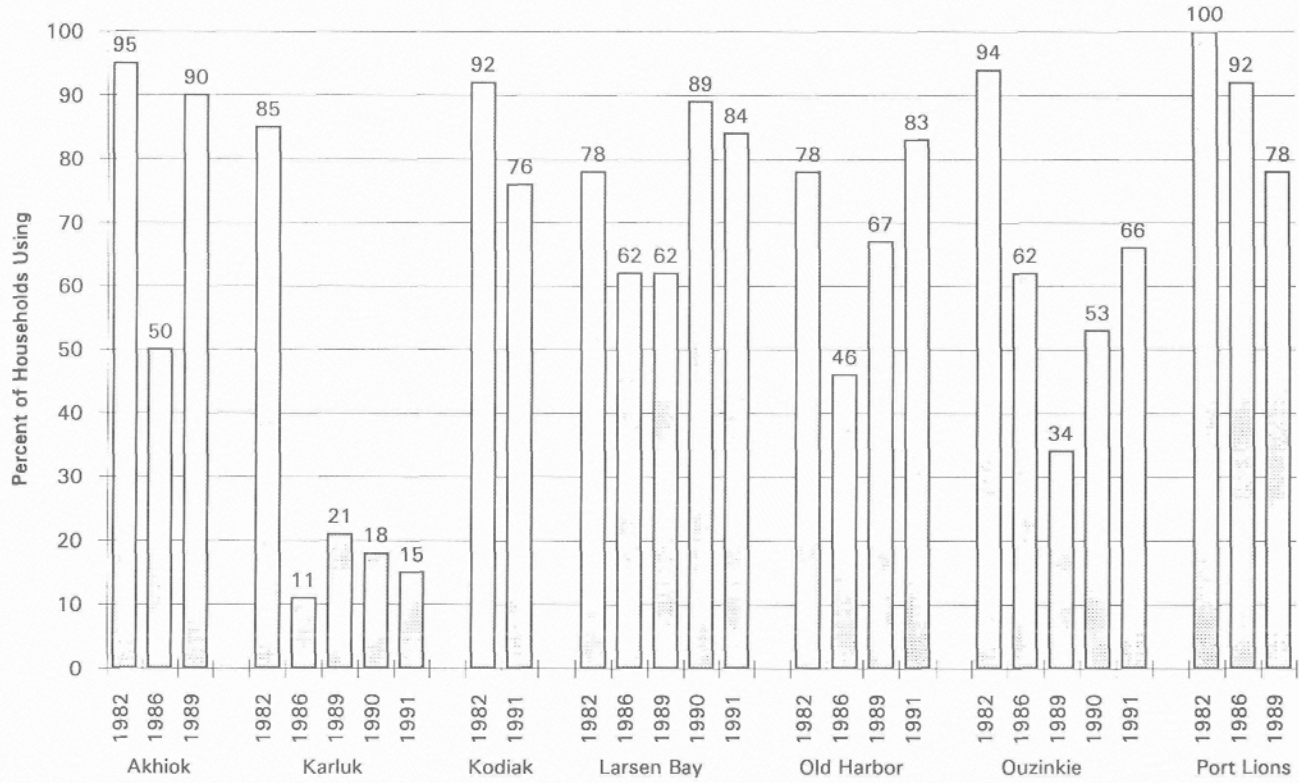
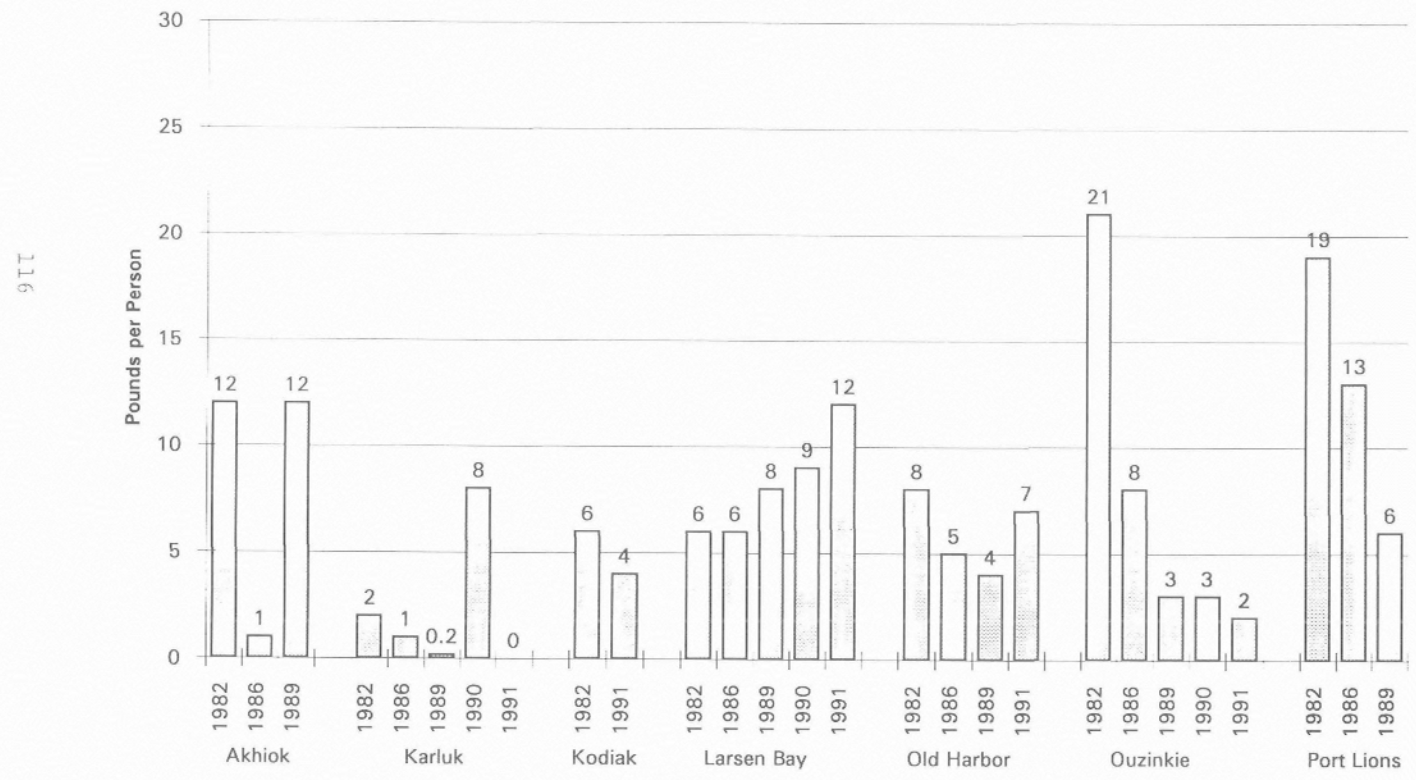


Figure 4. Harvests of Crab in Pounds per Person, Kodiak Island Borough Communities



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**APPENDIX B. KODIAK SALMON/HERRING/CRAB
SUBSISTENCE PERMIT**

