

**Special Report BOF 2008-01**

---

---

**The Kodiak Management Area Subsistence Salmon  
Fishery and Subsistence Permit Program:  
Background for Proposal 45**

**Prepared by**

**Alaska Department of Fish and Game, Division of Subsistence  
for the January 2008 Kodiak Board of Fisheries meeting**

---

---

January 2008

Alaska Department of Fish and Game

Division of Subsistence



## Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

<b>Weights and measures (metric)</b>		<b>General</b>		<b>Measures (fisheries)</b>	
centimeter	cm	Alaska Administrative Code	AAC	fork length	FL
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mid-eye-to-fork	MEF
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	mid-eye-to-tail-fork	METF
hectare	ha	at	@	standard length	SL
kilogram	kg	compass directions:		total length	TL
kilometer	km	east	E		
liter	L	north	N	<b>Mathematics, statistics</b>	
meter	m	south	S	<i>all standard mathematical signs, symbols and abbreviations</i>	
milliliter	mL	west	W	alternate hypothesis	H <sub>A</sub>
millimeter	mm	copyright	©	base of natural logarithm	<i>e</i>
		corporate suffixes:		catch per unit effort	CPUE
<b>Weights and measures (English)</b>		Company	Co.	coefficient of variation	CV
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	common test statistics	(F, t, $\chi^2$ , etc.)
foot	ft	Incorporated	Inc.	confidence interval	CI
gallon	gal	Limited	Ltd.	correlation coefficient (multiple)	R
inch	in	District of Columbia	D.C.	correlation coefficient (simple)	r
mile	mi	et alii (and others)	et al.	covariance	cov
nautical mile	nmi	et cetera (and so forth)	etc.	degree (angular)	°
ounce	oz	exempli gratia	e.g.	degrees of freedom	df
pound	lb	(for example)		expected value	<i>E</i>
quart	qt	Federal Information Code	FIC	greater than	>
yard	yd	id est (that is)	i.e.	greater than or equal to	≥
		latitude or longitude	lat. or long.	harvest per unit effort	HPUE
<b>Time and temperature</b>		monetary symbols		less than	<
day	d	(U.S.)	\$, ¢	less than or equal to	≤
degrees Celsius	°C	months (tables and figures): first three letters	Jan, ..., Dec	logarithm (natural)	ln
degrees Fahrenheit	°F	registered trademark	®	logarithm (base 10)	log
degrees kelvin	K	trademark	™	logarithm (specify base)	log <sub>2</sub> , etc.
hour	h	United States (adjective)	U.S.	minute (angular)	'
minute	min	United States of America (noun)	USA	not significant	NS
second	s	U.S.C.	United States Code	null hypothesis	H <sub>0</sub>
		U.S. state	use two-letter abbreviations (e.g., AK, WA)	percent	%
<b>Physics and chemistry</b>				probability	P
all atomic symbols				probability of a type I error (rejection of the null hypothesis when true)	α
alternating current	AC			probability of a type II error (acceptance of the null hypothesis when false)	β
ampere	A			second (angular)	"
calorie	cal			standard deviation	SD
direct current	DC			standard error	SE
hertz	Hz			variance	
horsepower	hp			population	Var
hydrogen ion activity (negative log of)	pH			sample	var
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

***SPECIAL REPORT BOF 2008-01***

**THE KODIAK MANAGEMENT AREA SUBSISTENCE SALMON  
FISHERY AND SUBSISTENCE PERMIT PROGRAM: BACKGROUND  
FOR PROPOSAL 45**

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

Alaska Department of Fish and Game  
Division of Subsistence  
1255 West 8<sup>th</sup> Street, P.O. Box 115526, Juneau, Alaska 99802-1156

January 2008

*Alaska Department of Fish and Game  
Division of Subsistence,  
1255 West 8<sup>th</sup> Street, P.O. Box 115526, Juneau, Alaska 99802-1156, USA*

*This document should be cited as:*

*Alaska Department of Fish and Game. 2008. The Kodiak Management Area subsistence salmon fishery and subsistence permit program: Background on Proposal 45. Alaska Department of Fish and Game, Special Report BOF 2008-01, Juneau.*

The Alaska Department of Fish and Game (ADF&G) administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act (ADA) of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

**If you believe you have been discriminated against in any program, activity, or facility please write:**

ADF&G ADA Coordinator, P.O. Box 115526, Juneau AK 99811-5526

U.S. Fish and Wildlife Service, 4040 N. Fairfax Drive, Suite 300 Webb, Arlington VA 22203

Office of Equal Opportunity, U.S. Department of the Interior, Washington DC 20240

**The department's ADA Coordinator can be reached via phone at the following numbers:**

(VOICE) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648, (Juneau TDD) 907-465-3646, or (FAX) 907-465-6078

**For information on alternative formats and questions on this publication, please contact:**

ADF&G Division of Subsistence, 333 Raspberry Road, Anchorage AK 99518 (907) 267-2545.

# TABLE OF CONTENTS

	<b>Page</b>
TABLE OF CONTENTS .....	i
LIST OF TABLES.....	ii
LIST OF FIGURES .....	ii
EXECUTIVE SUMMARY .....	1
INTRODUCTION.....	2
SUBSISTENCE SALMON FISHING REGULATIONS, 2007.....	2
REPORTED SUBSISTENCE HARVESTS OF SALMON IN THE KODIAK MANAGEMENT AREA .....	3
COMPARISONS OF SUBSISTENCE PERMIT AND HOUSEHOLD SURVEY DATA .....	4
ADF&G EFFORTS TO IMPROVE SUBSISTENCE HARVEST REPORTING .....	7
DISCUSSION AND CONCLUSIONS .....	9
REFERENCES CITED .....	10
TABLES AND FIGURES .....	11

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1. Population of Kodiak Island Borough communities, 1990-2006. ....	12
2. Estimated total harvests of wild resources and salmon in pounds usable weight per person, 6 communities of the Kodiak Management Area, 1989-2003. ....	13
3. Reported subsistence salmon harvests, Kodiak Area, 1981-2005. ....	14
4. Number of subsistence permits returned by place of residence, Kodiak Management Area, 1981, 1986-2005. ....	15
5. Reported subsistence harvests of salmon by place of residence, Kodiak Management Area, 1981, 1986-2005, based on permit returns. ....	16
6. Average reported subsistence salmon harvest per returned permit by place of residence, Kodiak Management Area, 1981, 1986-2005. ....	17
7. Location of subsistence salmon harvests by section and community of residence of permit holders, 2001-2005 average. ....	18
8. Estimated salmon harvests with subsistence gear, number of fishing households, and average harvests per household, based on household surveys. ....	19
9. Comparison of subsistence salmon harvests, fishing households, and average household harvests based on household surveys and returned subsistence permits. ....	20
10. Comparison of subsistence salmon harvests, participation in the subsistence salmon fishery, and average harvests, communities for which permit and survey data available for the same year. ....	21
11. Percentage of survey respondents who were aware that they could obtain another subsistence permit, 2004 and 2005. ....	22

## LIST OF FIGURES

<b>Figure</b>	<b>Page</b>
1. Map of Kodiak Management Area. ....	23
2. Percentage of total subsistence harvest comprised of salmon, 6 Kodiak Island Borough communities. ....	24
3. Reported subsistence harvests of salmon, Kodiak Management Area, 1981 - 2005. ....	24
4. Average subsistence salmon harvest per returned permit, 6 villages combined and all other permit holders, Kodiak Management Area, 1981 and 1986-2005. ....	25
5. Average subsistence harvest of salmon per returned permit, all years, recent 10-year average, and recent 5-year average. ....	25
6. Location of subsistence salmon fishing by place of residence of permit holder, Kodiak Management Area, 2001-2005. ....	26
7. Percentage of salmon harvest by species and fishery, Kodiak Management Area, 2005. ....	26
8. Subsistence salmon harvests by community, based on permit returns and household surveys. ....	27
9. Number of returned subsistence permits and estimated number of subsistence fishing households based on household surveys by community. ....	27
10. Average number of salmon harvested per returned subsistence permit or per household based on surveys, by community. ....	28
11. Subsistence salmon harvests, combined communities for which permit and survey data are available for the same year. ....	28
12. Number of permits returned and estimated number of subsistence fishing households, combined communities for which permit and survey data are available for the same year. ....	29
13. Average subsistence harvest per returned permit or per fishing household, combined communities for which permit and survey data are available for the same year. ....	29
14. Percentage of households who knew they could obtain another subsistence salmon permit, 2004 and 2005. ....	30

## EXECUTIVE SUMMARY

Proposal 45, submitted by the Alaska Department of Fish and Game (ADF&G), would eliminate the 25 salmon per person harvest limit on subsistence fishing permits for locations off the road system in the Kodiak Management Area (KMA), and retain the limit for fishing locations connected by road to the city of Kodiak. The goal of the proposal is to improve subsistence salmon harvest reporting in the 6 remote communities of the Kodiak Island Borough, where reporting has generally been low. The Alaska Board of Fisheries has made a positive customary and traditional use finding for the salmon stocks of the KMA, and has established a range of 26,800 to 44,700 salmon as the amount reasonably necessary for subsistence uses.

For the period 1981 through 2005, the average annual reported subsistence harvest in the KMA was 30,392 salmon, based on an average of 1,332 returned permits. Residents of the 6 remote villages held approximately 9% of the returned permits and accounted for 24% of the reported subsistence harvest over this 25-year period, averaging a harvest of 63 salmon per returned permit compared to an average of 20 salmon for other participants in the subsistence fishery. From 2001 through 2005, at least 51% of the KMA subsistence salmon harvest occurred at locations accessible from Kodiak Island's road system, but virtually all of the harvest by residents of the 6 villages occurred at locations off the road system. In 2005, reported subsistence harvests accounted for 0.1% of the total salmon harvest in the KMA; sport harvests took 0.2%, and commercial harvests took 99.7%.

During interviews to evaluate the subsistence harvest monitoring program, ADF&G fisheries managers stated that, in their view, reported harvests based on returned permits likely underestimated subsistence salmon harvests in the KMA by residents of the 6 remote communities, due to active fishers not obtaining or returning permits, or underreporting their harvests. Comparisons of reported harvests on permits with harvest estimates from household surveys support this assumption. Combining the 6 communities and averaging harvests for all years results in an estimated annual average subsistence harvest of 20,694 salmon for these communities, based on household surveys, compared to the reported annual harvest of 8,903 salmon based on permit returns, a 132% difference. These comparisons also suggest that there are more participants in the subsistence fishery than returned permits indicate, and that these fishers harvest, on average, more salmon than are reported through the permit system.

Workshops involving subsistence fishers and other community representatives, fisheries managers, and enforcement personnel identified the regulatory limit of 25 salmon per person per permit as an impediment to participation in the permit system as well as to accurate reporting. When interviewed, few subsistence permit holders in the 6 remote communities were aware that they could obtain additional permits if they reached their permit limits and needed more fish. Community representatives at the workshops asked why obtaining multiple permits was necessary if no annual limits were established in regulation, and expressed concern that they might be subject to enforcement actions if they recorded harvests above permit limits. In response to the issues raised in these workshops and during household interviews, the department submitted Proposal 45 for consideration by the Alaska Board of Fisheries as a step towards achieving more accurate reporting of subsistence salmon harvests on permits and building support for the department's subsistence salmon harvest monitoring program in the KMA.

## INTRODUCTION

Proposal 45, submitted by the Alaska Department of Fish and Game (ADF&G) to the Alaska Board of Fisheries for consideration at its January 2008 meeting, would eliminate the 25 salmon per person harvest limit on subsistence fishing permits for locations off the road system in the Kodiak Management Area (KMA) (5 AAC 01.530(b)), and retain the limit for fishing locations connected by road to the city of Kodiak. The goal of the proposal is to improve subsistence salmon harvest reporting in the 6 remote communities of the Kodiak Island Borough (Figure 1), where reporting has generally been low.

In 2006, the population of the Kodiak Island Borough was 13,506 (Table 1). Of this, 757 (6%) lived in the 6 communities off the Kodiak Island road system. The 6 communities, and their 2006 populations are Akhiok (population 44), Karluk (27), Larsen Bay (90), Old Harbor (192), Ouzinkie (193), and Port Lions (211). The total population of these 6 communities has declined from 940 in 2000 and 1,010 in 1990 (Table 1).

In all 6 remote communities within the Kodiak Island Borough, salmon provide the largest portion of total subsistence harvests, as estimated in usable pounds (Table 2). In most years for which comprehensive survey data are available, salmon contributed 40% or more of each community's total subsistence harvest (Figure 2), and over 100 pounds per person, usable weight (Table 2). Salmon were widely and frequently shared, especially by very active harvesters providing for elders and others unable to harvest enough salmon for their families. An ethnographic description of the contemporary subsistence salmon fishery and other subsistence activities in Old Harbor and Ouzinkie can be found in Mishler (2003).

### **SUBSISTENCE SALMON FISHING REGULATIONS, 2007**

The Alaska Board of Fisheries has found that the 5 species of salmon in the KMA support customary and traditional uses (5 AAC 01.536(a)). The Board has determined that 26,800 to 44,700 salmon are reasonably necessary for subsistence uses in the KMA (5 AAC 01.536(b)(1)).

Participation in the KMA subsistence fishery is open to any Alaska resident. Key features of the 2007 state subsistence regulations are as follows:

- A permit is required (5 AAC 01.530 (a)). The regulation further stipulates:  
“A subsistence fishing permit allows the holder to take 25 salmon plus an additional 25 salmon for each member of the same household whose names are listed on the permit. An additional permit may be obtained if it can be shown that more fish are needed” (5 AAC 01.530(b)).
- The number of salmon harvested must be recorded on the permit (5 AAC 01.530(c)).
- Subsistence salmon fishing is open year-round, from 6:00 a.m. until 9:00 p.m. (5 AAC 01.510(a)).
- Salmon may only be taken by gillnet and seine. Subsistence fishers must be physically present at the net all times the net is being fished (5 AAC 01.520(b) and (d)).
- Waters closed to subsistence fishing are listed in 5 AAC 01.525.

The Federal Subsistence Board has adopted subsistence salmon fishing regulations for federal public lands and waters within the KMA. Only qualified rural Alaska residents may participate in federal subsistence fisheries. Federal subsistence regulations for salmon in the KMA are identical to state regulations, except rod and reel may be used for subsistence salmon fishing and fishing is open all day (rather than from 6:00 a.m. to 9:00 p.m. only). There is no separate subsistence permit issued by federal authorities for the KMA. Those qualified to participate under the federal rules must obtain the permit issued by ADF&G and comply with state harvest reporting requirements.

## **REPORTED SUBSISTENCE HARVESTS OF SALMON IN THE KODIAK MANAGEMENT AREA**

Table 3 and Figure 3 describe reported subsistence salmon harvests for the KMA for 1981 through 2005. During that period, the annual average number of permits returned was 1,332; the recent 5-year average of permits returned for the period 2001 through 2005 was 2,168 permits. The annual average total subsistence salmon harvest for the KMA from 1981 through 2005 was 30,392 salmon; the recent 5-year average annual harvest was 39,941 salmon. The composition by species of the recent 5-year average annual harvest was 78% sockeye, 16% coho, 4% pink, 1% Chinook, and 1% chum (Table 3).

Table 4 describes the number of returned subsistence permits for the KMA by place of residence. For the 21 years for which data are available (estimated subsistence harvests that account for unreturned permits are not calculated for the KMA), an average of 120 subsistence permits per year were returned by residents of the 6 villages, representing 9% of the annual average of 1,377 returned permits. The average annual number of permits returned by residents of the 6 villages increased to 168 for the period 2001 through 2005, which is 8% of the total annual return of 2,168 permits. Of all subsistence permits returned, residents of the Kodiak Island Borough accounted for 88% over the 21-year period, and 84% from 2001 through 2005. Residents of other Alaska communities accounted for the balance of the returned permits.<sup>1</sup>

Table 5 shows reported total subsistence salmon harvests in the KMA by place of residence.<sup>2</sup> The average annual reported harvest by residents of the 6 villages over the 21-year period was 7,478 salmon, which is 24% of the KMA total. For the recent 5-year period of 2001 - 2005, the villages' reported harvest averaged 9,030 salmon annually, which is 23% of the area total. Kodiak Island Borough residents harvested 97% of the subsistence salmon taken in the KMA during the 21-year period, and 95% during the period 2001 through 2005.

On average, residents of the 6 Kodiak Island Borough villages who returned permits reported a subsistence salmon harvest about 3 times higher than fishery participants overall (Table 5, Figure 4); village permit holders on average reported harvesting 63 salmon annually, while the average for other permit holders was 20 salmon and the average for all permit holders was 24 salmon (Figure 5). During the recent 5-year period (2001 – 2005), village permit holders reported an annual subsistence harvest of 54 salmon, compared to 15 salmon for other permit holders and 18

---

<sup>1</sup> In 2005, 342 subsistence permits were returned by households not living in the Kodiak Island Borough. Of these, 124 lived in Anchorage, 35 lived in Fairbanks, 19 lived in Homer, 19 lived in Soldotna, 17 lived in Palmer, 16 lived in Eagle River, and the balance lived in 35 other locations (Fall et al. 2007).

<sup>2</sup> Subsistence permit data by place of residence are available only for 1981 and 1986 through 2005.

salmon for all permit holders in the KMA subsistence fishery. For the 21 years for which data are available, subsistence permit holders from Karluk reported an annual average of 117 salmon harvested per permit; Old Harbor residents reported an average of 68 salmon; Ouzinkie, 65 salmon; Port Lions, 60 salmon; Larsen Bay, 54 salmon; and Akhiok, 42 salmon.

Most subsistence salmon fishing by residents of the 6 communities takes place near each village and off the island's road system. (See maps of areas used for subsistence salmon fishing in the 1960s, 1970s, and 1980s in ADF&G 1985.) On average for the years 2001 - 2005, only 0.3% of the reported subsistence salmon by residents of the 6 communities occurred in waters bordering the road system, while 98% occurred in waters not accessible by road (Table 7, Figure 6). For other Kodiak Island Borough residents who participated in the subsistence salmon fishery (and who returned permits) over these 5 years, about 71% of their harvest took place in areas accessible by the island road system, as did 40% of the harvest of other Alaska residents who returned subsistence permits. On average for these 5 years, 53% of the subsistence salmon harvest in the KMA took place in road-accessible locations, 45% in non-road accessible places, and 2% in unknown locations. Of the total annual subsistence salmon harvest that occurred off the road system in these 5 years (17,891 salmon), residents of the 6 remote communities harvested 49%, other Borough residents harvested 43%, and other Alaska residents harvested 7%.

In 2005, subsistence harvests comprised 0.1% of the total salmon harvests in the KMA. Sport harvests made up 0.2% and commercial harvests represented 99.7% (ADF&G 2006; Dinnocenzo et al. 2007; Jennings et al. in prep; Figure 7). For sockeye salmon, the most numerous species in the subsistence harvest, the subsistence fishery took 0.9% of the KMA total in 2005, sport fishers took 0.3%, and the commercial fishery caught about 98.8%.

## **COMPARISONS OF SUBSISTENCE PERMIT AND HOUSEHOLD SURVEY DATA**

In 2000, the Division of Subsistence of ADF&G and the Alaska Inter-Tribal Council (AI-TC) received funding from the U.S. Fish and Wildlife Service, Office of Subsistence Management, for a study titled "Statewide Subsistence Fisheries Harvest Monitoring Strategy" (Fall and Shanks 2000). The overall goal of the project was to develop recommendations to improve subsistence fisheries harvest monitoring programs in Alaska. An early step involved evaluating existing programs through interviews with fisheries managers. Regarding the subsistence salmon permit program in the KMA, the evaluation found that:

Managers within the ADF&G Division of Commercial Fisheries are uncertain of the extent to which subsistence activities in the KMA are covered by the permit system. Suspicions are the farther from Kodiak City subsistence harvesters live and fish, the less likely they are to obtain permits. Managers believe a substantial amount of subsistence harvesting occurs without permits. (Fall and Shanks 2000:29)

The evaluation also noted that while managers believed the harvest data recorded on subsistence permits were "reasonably accurate," they also observed that, "the permit system provides no information on subsistence users who do not obtain permits, and managers believe this number is substantial, especially in outlying areas (away from the city of Kodiak and the Kodiak road system" (Fall and Shanks 2000:29).

Comparisons of subsistence salmon harvests in the KMA as reported on returned permits with harvest estimates based on systematic household surveys conducted by the ADF&G Division of Subsistence in selected study years from 1989 through 2005 support the view expressed by fisheries managers that the permit data underestimate subsistence harvests by residents of the 6 remote communities.<sup>3</sup> Table 8 describes estimated subsistence salmon harvests, number of subsistence fishing households, and average salmon harvests per fishing household for each of the 6 remote communities based on the division's systematic household surveys.<sup>4</sup> Table 9 compares average annual subsistence salmon harvests, levels of participation in the subsistence salmon fishery (as indicated by the number of subsistence permits returned and the estimated number of subsistence fishing households based on household surveys), and the average subsistence salmon harvests per fishing household for each of the 6 communities, also based on the household surveys and the permit returns.

As illustrated in Figure 8, for each community, the household surveys consistently resulted in subsistence salmon harvest estimates substantially higher than those reported on returned permits. For Akhiok, 21 years of permit returns result in an annual average subsistence harvest estimate of 267 salmon; for those years for which both permit and survey data are also available (1989, 1993, 2003, and 2004), permit returns result in an annual average harvest of 258 salmon for Akhiok. However, the household survey estimates for Akhiok average 1,674 salmon for these 4 survey years. For Karluk, the average harvest based on 3 years of household survey data was 3,393 salmon, compared to an average annual reported harvest from permits of 1,112 salmon for the same 3 years and 446 salmon for the 21 years for which permit data are available. Larsen Bay's average annual subsistence salmon harvest for 9 household survey years was 2,911 fish; reported harvests from permits for those years averaged 910 salmon, and for all years, 722 salmon. Based on the household surveys, Old Harbor averaged an annual subsistence harvest of 5,240 salmon over 6 study years; the reported harvests based on permits returned by Old Harbor households for those 6 years averages 2,108 salmon, and averages 1,579 salmon over the 21-year period. At Ouzinkie, the community averaged an annual subsistence harvest of 3,451 salmon during 9 study years, while returned permits for the same 9 years resulted in an annual average harvest of 2,190 salmon, and for all 21 years, 2,019 salmon. Finally, in 5 study years, annual subsistence harvests in Port Lions, based on household surveys, averaged 4,025 salmon, while harvests reported on returned permits for those years averaged 2,325 salmon, and averaged 2,546 salmon for all 21 years. Combining all communities and averaging harvests for all study years results in an estimated annual average subsistence salmon harvest for the 6 remote communities of the KMA of 20,694 salmon, based on household surveys, which is more than double (132% higher) the reported average annual harvest for the same years of 8,903 salmon.

---

<sup>3</sup> Harvest estimates based on household surveys are expanded estimates that account for non-interviewed households. In most study years, high response rates were achieved in these surveys, which are usually conducted face-to-face in respondents' homes, often with the help of a local research assistant. For example, for the 2004 study years, sample achievement was 73% in Akhiok, 81% in Larsen Bay, 68% in Old Harbor, 74% in Ouzinkie, and 76% in Port Lions (Fall 2006:13).

<sup>4</sup> These household surveys are not conducted annually but only for selected study years. Since 1989, ADF&G has received primary funding support for these surveys from the U.S. Minerals Management Service (Fall and Utermohle 1995) and the *Exxon Valdez* Oil Spill Trustee Council (Fall and Utermohle 1999; Fall 2006). More recently, the U.S. Fish and Wildlife Service, Office of Subsistence Management, provided funding support for household surveys focusing on salmon harvests (Williams et al. *in prep*).

As shown in Figure 9 (see also Table 8), the household surveys resulted in notably higher estimates of the number of households participating in the KMA subsistence salmon fishery than did the returned permit data for 3 of the remote communities: Akhiok, Karluk, and Old Harbor. Comparing results for the years for which both survey and permit data are available shows an estimated average of 13 households participate in Akhiok subsistence salmon fishing, based upon surveys, compared to an average of 5 returned subsistence permits. For Karluk, the household surveys resulted in an estimated annual average of 14 subsistence fishing households, compared to 5 returned permits per year. Based on the household surveys, an average of 41 Old Harbor households participated in the subsistence salmon fishery; in the same years, an average of 30 Old Harbor households returned permits. For comparable study years, the annual average number of returned subsistence permits and the estimated average number of subsistence fishing households based on surveys in Larsen Bay (16 returned permits, 16 fishing households), Ouzinkie (34 returned permits, 35 fishing households), and Port Lions (43 returned permits, 43 fishing households) were similar. However, the returned permit totals likely included some families who were seasonal residents of these communities, while the household surveys only included year-round resident households (Williams et al., *in prep*). Therefore, there may be an even greater difference in participation when comparing permit returns and household surveys.

When surveyed, subsistence fishing households in all 6 communities reported harvests that were on average much higher than those reported on returned permits (Figure 10; Table 8). For the same study years, subsistence fishing households in Akhiok averaged an annual harvest of 129 salmon, but returned permits averaged 49 salmon. On average, subsistence fishing households surveyed in Larsen Bay harvested 186 salmon, but returned permits averaged 56 salmon. Surveyed Old Harbor households that fished harvested 128 salmon on average, while returned permits averaged 71 salmon. At Ouzinkie, households' subsistence harvests averaged 99 salmon; harvests on returned permits averaged 64 salmon. For Port Lions, the average subsistence salmon harvest based on surveys was 94 salmon per household, while returned permits averaged 54 salmon. Only in Karluk during 1989, 1990, and 1991 did the average harvest as reported on the survey (238 salmon) resemble the average harvest as reported on returned permits (222 salmon). However, for all years, the average subsistence harvest reported on permits returned by Karluk residents was much lower, at 117 salmon.

In Table 10, total subsistence salmon harvests based on household surveys are compared to harvests reported on returned permits for those years for which survey data are available. Only data for those communities that were surveyed are included in these comparisons. Results are similar to those just reviewed for all communities and all years. As shown in Figure 11, the 4 surveyed communities in 1993 harvested an estimated 18,687 salmon with subsistence gillnets and seines, 154% higher than the 7,366 salmon they reported harvesting on returned subsistence permits. In 1998, 3 surveyed communities had an estimated subsistence harvest of 11,099 salmon, 231% higher than the 3,349 salmon reported on returned permits. Five communities in 2003 harvested an estimated 14,240 salmon with subsistence methods, 65% higher than the 8,626 salmon reported in permit returns. For 2004, household surveys in 5 communities resulted in a subsistence harvest estimate of 21,509 salmon, while harvests from returned permits totaled 7,845 salmon (a 174% difference). In 2005, the total estimated subsistence harvest for 4 communities based on surveys was 16,946 salmon, 68% higher than the 10,065 salmon reported on returned permits.

Figure 12 compares participation in the KMA subsistence salmon fishery based on household surveys and returned permits for those communities surveyed in the same years (see also Table 10). The total estimated number of subsistence fishing households in the study communities in 1993 and 1998 exceeded the number of returned permits by 55% and 98%, respectively. However, in 2003, 2004, and 2005, the estimated number of subsistence fishing households and the number of returned permits were similar for the combined study communities. The inclusion of seasonally-resident households in the returned permit totals for some communities may account for some of this similarity, but improved participation in the subsistence permit system may be responsible for some of the similarity as well (see the following section).

Figure 13 compares the average number of salmon harvested per subsistence fishing household as reported by the household survey with the average number of salmon harvested as reported on returned permits for those communities surveyed in the same years (see also Table 10). The pattern is similar in all 5 years: surveyed households report larger harvests than reported on returned permits. On average, surveyed households in 1993 reported subsistence salmon harvests 64% higher than reported on returned permits; average harvests based on household surveys were 68% higher than average harvests from permit returns in 1998; and 102% higher in 2003, 158% higher in 2004, and 68% higher in 2005.

In summary, comparisons of returned permit and household survey data suggest that the permit system underestimates subsistence salmon harvests by the 6 remote communities. These underestimates appear to be the result of 2 factors: one, not all participants in the subsistence fishery obtain or return permits, as illustrated by the larger estimate of the number of subsistence fishing households based on household surveys compared to the number of returned permits; and, two, participants who return permits underreport their subsistence salmon harvests, based on the average number of harvested salmon reported by surveyed households compared to the average of harvested salmon reported on returned permits.

## **ADF&G EFFORTS TO IMPROVE SUBSISTENCE HARVEST REPORTING**

The ADF&G divisions of Subsistence and Commercial Fisheries have taken steps to improve subsistence salmon harvest reporting in the KMA. As a follow-up to the first study of subsistence fisheries harvest monitoring programs initiated in 2000, 11 area workshops involving subsistence fishers and managers took place under a study titled “Implementation of Statewide Subsistence Fisheries Harvest Assessment Strategy” (Fall 2003). The goal was to review subsistence fisheries harvest monitoring programs in each management area across the state and develop a list of action items to improve these programs. The KMA workshop took place in Kodiak in May 2001. Twenty-four people participated, including, among others, representatives of 3 ADF&G divisions, the Alaska Department of Public Safety (DPS), Division of Fish and Wildlife Protection, and the 6 villages. The participants identified problems with the quality of subsistence salmon permit data for the 6 villages, and cited the link to the harvest limits imposed by regulations on subsistence permits as one example. Notably, village representatives were not aware that additional permits could be obtained if the limit of 25 salmon per person were reached and more fish were needed. Participants also recommended that outreach take place in the villages about the importance of collecting accurate subsistence harvest data. In response, ADF&G developed cooperative agreements with the 6 tribal governments to assist with permit issuance and collection. Employees from the divisions of Commercial Fisheries and Subsistence

traveled to the 6 communities in June 2001 to train permit vendors (Fall 2003:7-8). Permit vendors were hired for the villages in subsequent years as well.

Additional follow-up took place as part of another study called “Subsistence Harvests and Uses of Salmon, Trout, and Char in Akhiok, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions, Alaska, 2004 and 2005” (Williams et al. *in prep*).<sup>5</sup> A second workshop involving subsistence fishers, fishery managers, and enforcement personnel took place in Kodiak in January 2006. Again, community representatives cited the 25 salmon per person limit on subsistence permits as an impediment to accurate and complete documentation of subsistence harvests. Citing their traditional harvest levels and logistical challenges, their question was, “If there is no annual limit, why must we get more than one permit?” At the workshop, ADF&G staff offered 2 reasons why the harvest limit on permits may have been adopted. The first was to deter “mom and pop” commercial fishing enterprises from operating under the guise of subsistence fishing.<sup>6</sup> The second was to prevent waste that might occur if subsistence fishers caught more salmon than they needed because there was “no limit.”<sup>7</sup> The 2 DPS Fish and Wildlife Protection officers in attendance explained that the most important function of the permit was to accurately record harvests, even if those harvests exceeded the permit limit. Neither officer could recall ever writing a citation specifically related to subsistence salmon permits. Nevertheless, community representatives expressed concern that other enforcement officers would interpret the regulations differently, and impose sanctions on subsistence fishers who reported harvests over the permit limits (Williams et al. *in prep*).

Also as part of the study, local research assistants were hired in 2004 and 2005 to help with outreach, and to assist with post-season interviews of subsistence fishers in order to obtain data that could be compared with subsistence permit findings. Some of the findings of this research are summarized above in the comparisons of permit and household survey harvest data. The 2004 and 2005 household surveys also included additional questions to add context for understanding the harvest information. One question asked was: “Did you know you can get another subsistence salmon permit after you harvest the amount on the first one?” As shown in Table 11 and Figure 14, in 2004, 36% of all households in the 5 study communities knew that they could obtain another subsistence permit, and just 46% of the households in these communities with subsistence permit holders were aware of this provision in the regulations. Awareness of this provision was particularly low in Old Harbor (20% of permit holders) and Ouzinkie (37%). In 2005, after community outreach, 50% of all households in 4 study communities knew that obtaining another permit was an option after reaching their limit on their first permit, as did 65% of households who obtained permits. Among permit holders, awareness of this option improved to 72% in Old Harbor and 53% in Ouzinkie.

Improvements in participation in the permit system may also have resulted from community outreach and household interviewing as part of the study. For example, for the 5 study communities in 2004, just 51% of fishing households returned subsistence permits. In 2005, for the 4 communities interviewed, 69% of fishing households returned permits (Williams et al. *in prep*).

---

<sup>5</sup> The community of Karluk opted not to participate in this project.

<sup>6</sup> Unless otherwise specified, state regulations prohibit the sale of subsistence-taken fish (5 AAC 01.010(d)).

<sup>7</sup> Alaska Statute 16.05.831(a) states that “A person may not waste salmon intentionally, knowingly, or with reckless disregard for the consequences.”

## DISCUSSION AND CONCLUSIONS

Salmon are a vital subsistence resource in the 6 remote communities of the Kodiak Island Borough, typically providing 100 pounds or more per person of food per year and contributing 40% or more of the annual total subsistence harvest of more than 300 pounds per person per year. The Alaska Board of Fisheries has acknowledged the importance of the salmon stocks of the KMA for subsistence uses by making a positive customary and traditional use finding, establishing an amount necessary to provide for these uses, and adopting subsistence salmon fishing regulations, the goal of which is to provide reasonable opportunities for subsistence fishing.

Both permit data and survey data show that harvest patterns in the 6 remote communities of Akhiok, Karluk, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions differ in some ways from those of other fishery participants. On average, subsistence fishers from these communities harvest more salmon (63 salmon per returned permit) than do other permit holders (20 salmon). Although residents of the 6 communities held just 9% of the returned permits, they accounted for 24% of the total reported harvest. Almost all of the harvest by these 6 communities takes place at locations inaccessible by Kodiak Island's road system.

When interviewed in 2000, fisheries managers for the KMA expressed the view that harvest data from returned permits provided an incomplete documentation of subsistence salmon harvests by residents of the 6 communities. Participants at workshops and interviewed subsistence fishers shared this evaluation of the permit data. Comparisons of data from returned permits with data from household surveys suggest that participation in the subsistence salmon fishery, average harvests by subsistence fishers, and total community harvests are substantially higher than reported permit totals, perhaps by a factor of 2 or more in most years.

Workshops involving fishery managers, enforcement personnel, and community representatives identified the regulatory limit of 25 salmon per person per permit as an impediment to participation in the permit system and to accurate reporting. Most subsistence fishers were unaware that they could obtain another permit if they reached their limits and needed more fish.

ADF&G submitted Proposal 45 to address the issues raised during the workshops and household interviews about the quality of subsistence salmon harvest data. The proposal would remove the 25 per person limit from permits that are fished in locations off the Kodiak Island road system, thereby eliminating the need for fishers at these locations to obtain additional permits and the fear that reporting harvest totals accurately on permits could result in enforcement actions. Based on workshop discussions and household survey findings, this regulatory change is unlikely to result in increased harvests, but could result in more accurate harvest data and more support for the department's subsistence salmon harvest monitoring program.

Regardless of board action on Proposal 45, further outreach in all Kodiak Island Borough communities is important and encouraged, along with further collaborative projects. These are additional key steps to ensure that accurate data about subsistence uses are available for future management decisions that affect Kodiak's salmon resources.

## REFERENCES CITED

- Alaska Department of Fish and Game. 1985. Alaska Habitat Management Guide Reference Maps, Southwest Region Volume IV: Human Use of Fish and Wildlife. Division of Habitat. Juneau.
- Alaska Department of Fish and Game. 2006. Alaska Subsistence Fisheries Database. Division of Subsistence. Juneau.
- Alaska Department of Fish and Game. 2007. Community Subsistence Information System. Division of Subsistence. <http://www.subsistence.adfg.state.ak.us/CSIS/>. Juneau.
- Alaska Department of Labor and Workforce Development. 2004. Alaska Population Overview: 2001-2002 Estimates and Census 2000. Research and Analysis Section. Juneau.
- Alaska Department of Labor and Workforce Development. 2007. Population for Alaska places, 2006 (Excel file). <http://www.labor.state.ak.us/research/pop/estimates/o6t4-3.xls> Accessed 12/2007.
- Dinnocenzo, Joe, Geoff Spalinger, and Jeff Wadle. 2007. Kodiak Management Area Commercial Salmon Annual Management Report, 2006.. Alaska Department of Fish and Game, Fishery Management Report No. 07-25. Anchorage.
- Fall, James A. and Roland Shanks. 2000. Statewide Subsistence Fisheries Harvest Monitoring Strategy. Final Report for Project FIS 00-017. Alaska Department of Fish and Game, Division of Subsistence and the Alaska Inter-Tribal Council. Anchorage.
- Fall, James A. 2003. Implementation of Statewide Subsistence Fisheries Harvest Assessment Strategy. Final Report for Project FIS 01-107. Alaska Department of Fish and Game, Division of Subsistence and the Alaska Inter-Tribal Council. Anchorage.
- Fall, James A. [editor]. 2006. Update of the Status of Subsistence Uses in *Exxon Valdez* Oil Spill Area Communities, 2003. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 312. Juneau.
- Fall, James A. and Charles J. Utermohle [editors]. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Volume IV: Kodiak Island. OCS Study MMS 95-013. Alaska Department of Fish and Game, Division of Subsistence. Anchorage.
- Fall, James A. and Charles J. Utermohle [editors]. 1999. Subsistence Uses in Eight Communities Ten Years After the *Exxon Valdez* Oil Spill. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 252. Juneau.
- Fall, James A., Dave Caylor, Michael Turek, Caroline Brown, James Magdanz, Tracie Krauthoefer, Jeannie Heltzel, and David Koster. 2007. Alaska Subsistence Salmon Fisheries 2005 Annual Report. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 318. Juneau.
- Jennings, Gretchen B., Kathrin Sundet, and Allen E. Bingham. *In prep.* Participation, Catch, and Harvest in Alaska Sport Fisheries During 2005. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.
- Mishler, Craig. 2003. Black Ducks and Salmon Bellies: An Ethnography of Old Harbor and Ouzinkie, Alaska. Occasional Paper Series, Volume Two, The Alutiiq Museum and Archaeological Repository. Kodiak.
- Williams, Liz, Philippa Coiley-Kenner, and David Koster. *In prep.* Subsistence Harvests and Uses of Salmon, Trout, and Char in Akhiok, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions, Alaska, 2004 and 2005. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 329. Juneau.

## **TABLES AND FIGURES**

**Table 1.**—Population of Kodiak Island Borough communities, 1990-2006.

<b>Place</b>	<b>1990</b>	<b>2000</b>	<b>2006</b>
Akhiok	77	80	44
Karluk	71	27	27
Larsen Bay	147	115	90
Old Harbor	284	237	192
Ouzinkie	209	225	193
Port Lions	222	256	211
<b>SixOff-Road Community Subtotal</b>	<b>1,010</b>	<b>940</b>	<b>757</b>
Aleneva CDP	0	68	46
Chiniak CDP	69	50	44
Kodiak City	6,365	6,334	5,937
Kodiak Station CDP	2,025	1,840	1,941
Womens Bay CDP	620	690	703
Remainder, Kodiak Island Borough	3,220	3,991	4,078
<b>Other Subtotal</b>	<b>12,299</b>	<b>12,973</b>	<b>12,749</b>
<b>Borough Total</b>	<b>13,309</b>	<b>13,913</b>	<b>13,506</b>

CDP = Census Designated Place.

Source: Alaska Department of Labor and Workforce Development 2004, 2007.

**Table 2.**—Estimated total harvests of wild resources and salmon in pounds usable weight per person, 6 communities of the Kodiak Management Area, 1989-2003.

Year <sup>1</sup>	Akhiok			Karluk			Larsen Bay			Old Harbor			Ouzinkie			Port Lions		
	All Resources	Salmon	Salmon as % of total	All Resources	Salmon	Salmon as % of total	All Resources	Salmon	Salmon as % of total	All Resources	Salmon	Salmon as % of total	All Resources	Salmon	Salmon as % of total	All Resources	Salmon	Salmon as % of total
1989	297.7	110.0	37.0%	254.9	196.7	77.1%	212.0	68.4	32.3%	272.4	148.9	54.7%	88.9	29.4	33.0%	146.7	60.5	41.2%
1990				401.6	293.1	73.0%	344.5	104.9	30.4%				205.2	75.5	36.8%			
1991				268.7	192.2	71.5%	294.6	108.8	36.9%	390.9	206.9	52.9%	209.6	88.5	42.2%			
1992	321.7	199.5	62.0%				353.4	182.1	51.5%				347.3	213.4	61.4%			
1993							451.0	202.7	44.9%				218.2	102.4	46.9%	331.5	157.7	47.6%
1994																		
1995																		
1996																		
1997																		
1998							370.5	213.5	57.6%	300.4	110.5	36.8%	264.0	126.5	47.9%			
1999																		
2000																		
2001																		
2002																		
2003	184.7	96.3	52.1%				326.4	181.0	55.4%	357.2	166.2	46.5%	315.7	130.6	41.4%	221.4	95.4	43.1%

<sup>1</sup> Year for which household survey data are available. Harvests for 1989, the year of the *Exxon Valdez* oil spill, were atypically low for many families. Source: Fall 2006.

**Table 3.**—Reported subsistence salmon harvests, Kodiak Area, 1981-2005.

YEAR	PERMITS RETURNED	REPORTED SALMON HARVEST					TOTAL
		CHINOOK	SOCKEYE	COHO	CHUM	PINK	
1981	658	49	12,924	4,029	566	2,458	19,944
1982	993	110	16,615	7,192	484	3,558	28,142
1983	1,082	111	15,526	6,283	667	2,536	25,256
1984	1,061	265	17,620	5,808	800	1,877	26,290
1985	1,196	172	16,231	8,873	720	2,756	28,887
1986	1,002	90	14,391	6,998	605	2,371	24,455
1987	880	101	13,198	6,463	1,299	2,421	23,482
1988	699	108	10,081	4,291	377	1,320	16,177
1989	717	43	12,638	4,123	419	1,553	18,776
1990	1,167	131	17,959	8,627	655	1,605	28,977
1991	1,225	177	21,835	8,208	714	1,743	32,677
1992	1,195	318	20,684	8,643	643	1,646	31,934
1993	959	243	19,471	7,176	838	2,696	30,424
1994	1,464	205	17,962	7,491	440	1,758	27,856
1995	1,194	175	19,416	5,603	293	1,548	27,035
1996	1,390	253	28,287	5,117	381	1,125	35,163
1997	1,638	383	33,293	6,369	234	1,458	41,737
1998	1,126	350	20,459	5,348	214	1,412	27,783
1999	1,438	397	26,497	4,932	388	1,266	33,480
2000	1,376	273	24,873	5,399	341	742	31,628
2001	2,153	273	33,833	5,920	427	1,158	41,611
2002	2,271	593	32,977	6,057	350	1,665	41,642
2003	2,275	500	32,104	6,096	384	1,484	40,568
2004	2,240	379	30,217	5,819	261	1,395	38,071
2005	1,900	431	27,002	7,447	592	2,343	37,815
<b>5-Year</b>							
Average	2,168	435	31,227	6,268	403	1,609	39,941
<b>10-Year</b>							
Average	1,781	383	28,954	5,850	357	1,405	36,950
<b>25-Year</b>							
Average	1,332	245	21,444	6,332	524	1,836	30,392

Sources: ADF&amp;G 2006; Dinnocenzo et al. 2007:36.

**Table 4.**—Number of subsistence permits returned by place of residence, Kodiak Management Area, 1981, 1986-2005.

Year <sup>1</sup>	Number of Subsistence Permits Returned										Total
	Akhiok	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions	Six village subtotal	Other Kodiak Island <sup>2</sup>	Kodiak Island Subtotal	Other Alaska <sup>3</sup>	
1981	1	1	2	4	20	15	43	595	638	24	662
1986	10	8	20	12	32	42	124	825	949	53	1,002
1987	10	1	14	19	31	47	122	666	788	92	880
1988	7	0	5	13	18	30	73	557	630	69	699
1989	2	0	6	11	20	28	67	574	641	74	715
1990	9	5	21	35	37	49	156	836	992	175	1,167
1991	9	10	15	33	38	54	159	832	991	234	1,225
1992	10	9	11	21	36	50	137	800	937	258	1,195
1993	4	2	7	25	28	45	111	739	850	109	959
1994	4	2	10	16	26	36	94	1,270	1,364	100	1,464
1995	0	3	10	16	22	36	87	1,040	1,127	67	1,194
1996	0	3	8	17	24	41	93	1,200	1,293	96	1,389
1997	2	3	13	16	31	43	108	1,373	1,481	156	1,637
1998	3	2	10	10	27	39	91	937	1,028	99	1,127
1999	5	1	10	18	32	46	112	1,163	1,275	115	1,390
2000	2	0	10	21	26	41	100	1,108	1,208	168	1,376
2001	6	9	26	49	45	54	189	1,671	1,860	293	2,153
2002	11	5	24	40	40	47	167	1,745	1,912	359	2,271
2003	7	5	21	41	40	51	165	1,758	1,923	352	2,275
2004	8	3	28	39	43	49	170	1,717	1,887	353	2,240
2005	5	1	24	38	36	43	147	1,411	1,558	342	1,900
Average	5	3	14	24	31	42	120	1,087	1,206	171	1,377
Recent 10-year average	5	3	17	29	34	45	134	1,408	1,543	233	1,776
Recent 5-year average	7	5	25	41	41	49	168	1,660	1,828	340	2,168

<sup>1</sup> Note that permit data by place of residence are not available for years prior to 1981 and for 1982 through 1985.

<sup>2</sup> “Other Kodiak Island” includes road system and a small number of remote locations.

<sup>3</sup> “Other Alaska” includes “unknown city.”

Source: ADF&G 2006.

**Table 5.**—Reported subsistence harvests of salmon by place of residence, Kodiak Management Area, 1981, 1986-2005, based on permit returns.

Year <sup>1</sup>	Reported Number of Salmon Harvested <sup>4</sup>										Total
	Akhiok	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions	Six village subtotal	Other Kodiak Island <sup>2</sup>	Kodiak Island Subtotal	Other Alaska <sup>3</sup>	
1981		32	49	381	961	847	2,270	16,951	19,221	723	19,944
1986	730	821	861	896	1,656	1,921	6,885	16,795	23,680	775	24,455
1987	575	139	991	1,490	2,017	2,453	7,665	14,775	22,440	1,042	23,482
1988	63		307	945	948	1,343	3,606	12,304	15,910	267	16,177
1989	120		350	591	555	969	2,585	16,044	18,629	147	18,776
1990	272	997	1,598	2,547	2,002	3,185	10,601	18,228	28,829	148	28,977
1991	463	1,227	883	2,966	2,261	3,574	11,374	20,894	32,268	409	32,677
1992	525	1,065	577	1,644	2,518	3,653	9,982	21,640	31,622	312	31,934
1993	389	266	661	2,173	2,038	4,278	9,805	20,130	29,935	489	30,424
1994	105	655	551	1,119	2,323	2,317	7,070	19,957	27,027	829	27,856
1995		326	504	808	1,873	2,448	5,959	20,609	26,568	467	27,035
1996		250	590	986	1,744	2,960	6,530	27,866	34,396	767	35,163
1997	122	525	729	874	2,308	3,846	8,404	32,533	40,937	800	41,737
1998	106	670	637	661	2,051	2,246	6,371	20,625	26,996	787	27,783
1999	300	77	556	1,194	2,275	2,070	6,472	26,028	32,500	1,080	33,580
2000	105		459	1,139	2,110	2,486	6,299	23,648	29,947	1,681	31,628
2001	51	565	841	2,022	2,269	3,286	9,034	30,407	39,441	2,170	41,611
2002	260	317	628	2,506	2,467	3,208	9,386	30,206	39,592	2,050	41,642
2003	408	88	917	2,710	2,346	2,245	8,714	29,396	38,110	2,458	40,568
2004	113	0	1,021	2,204	2,265	2,242	7,845	28,983	36,828	1,243	38,071
2005	107	0	1,453	3,303	3,416	1,893	10,172	26,099	36,271	1,544	37,815
Average	267	446	722	1,579	2,019	2,546	7,478	22,577	30,055	961	31,016
Recent 10-year average	175	277	783	1,760	2,325	2,648	7,923	27,579	35,502	1,458	36,960
Recent 5-year average	188	194	972	2,549	2,553	2,575	9,030	29,018	38,048	1,893	39,941

<sup>1</sup>Note that permit data by place of residence are not available for years prior to 1981 and for 1982 through 1985.

<sup>2</sup>“Other Kodiak Island” includes road system and a small number of remote locations.

<sup>3</sup>“Other Alaska” includes “unknown city.”

<sup>4</sup>Blank cells indicate no permits returned.

Source: ADF&G 2006.

**Table 6.**—Average reported subsistence salmon harvest per returned permit by place of residence, Kodiak Management Area, 1981, 1986-2005.

Year <sup>1</sup>	Average Number of Salmon Reported Harvested per Returned Permit <sup>4</sup>										All returned permits
	Akhiok	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions	Six village subtotal	Other Kodiak Island <sup>3</sup>	Kodiak Island Subtotal	Other Alaska <sup>4</sup>	
1981	0	32	25	95	48	56	53	28	30	30	30
1986	73	103	43	75	52	46	56	20	25	15	24
1987	58	139	71	78	65	52	63	22	28	11	27
1988	9		61	73	53	45	49	22	25	4	23
1989	60		58	54	28	35	39	28	29	2	26
1990	30	199	76	73	54	65	68	22	29	1	25
1991	51	123	59	90	60	66	72	25	33	2	27
1992	53	118	52	78	70	73	73	27	34	1	27
1993	97	133	94	87	73	95	88	27	35	4	32
1994	26	328	55	70	89	64	75	16	20	8	19
1995		109	50	51	85	68	68	20	24	7	23
1996		83	74	58	73	72	70	23	27	8	25
1997	61	175	56	55	74	89	78	24	28	5	25
1998	35	335	64	66	76	58	70	22	26	8	25
1999	60	77	56	66	71	45	58	22	25	9	24
2000	53		46	54	81	61	63	21	25	10	23
2001	9	63	32	41	50	61	48	18	21	7	19
2002	24	63	26	63	62	68	56	17	21	6	18
2003	58	18	44	66	59	44	53	17	20	7	18
2004	14	0	36	57	53	46	46	17	20	4	17
2005	21	0	61	87	95	44	69	18	23	5	20
Average	42	117	54	68	65	60	63	22	26	6	24
Recent 10-year average	37	90	49	61	69	59	61	20	24	6	22
Recent 5-year average	25	29	40	63	64	53	54	18	21	6	18

<sup>1</sup>Note that permit data by place of residence are not available for years prior to 1981 and for 1982 through 1985.

<sup>2</sup>"Other Kodiak Island" includes road system and a small number of remote locations.

<sup>3</sup>"Other Alaska" includes "unknown city."

<sup>4</sup> Blank cells indicate no permits returned.

Source: ADF&G 2006.

**Table 7.**—Location of subsistence salmon harvests by section and community of residence of permit holders, 2001-2005 average.

	Akhiok	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions	Total, Six Communities	Chiniak	Kodiak	Other	Total
Chiniak Section	4				8		12	422	12,323	451	13,209
Ugak Bay Section	4		4			10	17	195	7,228	471	7,911
On Road System	8		4		8	10	30	617	19,551	922	21,120
Kizhuyak Section				15	2,181	2,294	4,490		1,515	314	6,319
Sitkalidak Section				2,365			2,365		48	31	2,444
Alitak Bay Section	179			107			286		892	177	1,355
Red River Section	1						1		47	2	50
Karluk Section										150	150
Sturgeon River Section		194	581				775		161		935
Uyak Bay Section			388			4	392		694	73	1,159
Uganik Bay Section					38	26	64		1,088	146	1,298
Afognak Section					272	158	430	16	3,276	414	4,137
Mainland Section					19		19		19	7	45
Off Road System	180	194	968	2,486	2,510	2,483	8,821	16	7,741	1,313	17,891
Unknown Section				63	38	83	183	30	587	66	867
Total	188	194	972	2,549	2,556	2,575	9,034	663	27,880	2,302	39,878

Source: ADF&G 2006.

**Table 8.**—Estimated salmon harvests with subsistence gear, number of fishing households, and average harvests per household, based on household surveys.

Year <sup>1</sup>	Akiok			Karluk			Larsen Bay			Old Harbor			Ouzinkie			Port Lions		
	Salmon Harvest	HHs Fishing <sup>2</sup>	Salmon Per HH	Salmon Harvest	HHs Fishing	Salmon Per HH	Salmon Harvest	HHs Fishing	Salmon Per HH	Salmon Harvest	HHs Fishing	Salmon Per HH	Salmon Harvest	HHs Fishing	Salmon Per HH	Salmon Harvest	HHs Fishing	Salmon Per HH
1989	1,342	9	147	2,549	12	210	1,765	18	96	5,210	39	134	296	12	25	1,870	35	53
1990				4,723	16	302	2,382	16	149				2,093	33	63			
1991				2,907	15	194	2,597	19	135	6,138	31	195	2,408	31	78			
1992							3,018	17	177				3,924	35	112			
1993	2,253	17	133				5,380	21	258				3,640	35	104	7,414	57	130
1994																		
1995																		
1996																		
1997																		
1998							2,641	11	239	3,669	41	90	4,789	41	117			
1999																		
2000																		
2001																		
2002																		
2003	1,604	12	131				1,556	7	209	3,637	34	108	4,479	39	114	2,965	36	84
2004	1,498	14	111				4,384	14	309	7,286	56	131	4,616	47	98	3,725	47	79
2005							2,478	17	147	5,500	46	120	4,815	40	120	4,153	39	106
Average	1,674	13	129	3,393	14	238	2,911	16	186	5,240	41	128	3,451	35	99	4,025	43	94

<sup>1</sup> Year for which household survey data are available. Harvests for 1989, the year of the *Exxon Valdez* oil spill, were atypically low for many families.

<sup>2</sup> HH = household.

Sources: ADF&G 2007; Fall 2006; Williams et al. *in prep.*

**Table 9.**—Comparison of subsistence salmon harvests, fishing households, and average household harvests based on household surveys and returned subsistence permits.

	Akhiok	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions	All Six Communities
Average Annual Salmon Harvest, Permits, All Years	267	446	722	1,579	2,019	2,546	7,478
Average Annual Salmon Harvest, Permits, in Survey Years	258	1,112	910	2,108	2,190	2,325	8,903
Average Annual Salmon Harvest, Surveys	1,674	3,393	2,911	5,240	3,451	4,025	20,694
Average Permits Returned, All Years	5	3	14	24	31	42	120
Average Permits Returned, in Survey Years	5	5	16	30	34	43	134
Average Number of Households Harvesting, Surveys	13	14	16	41	35	43	162
Average Harvest per Permit, All Years	42	117	54	68	65	60	63
Average Harvest per Permit, in Survey Years	49	222	56	71	64	54	67
Average Harvest per Household, Surveys	129	238	186	128	99	94	128

Sources: ADF&G 2006; ADF&G 2007; Williams et al. *in prep.*

**Table 10.**—Comparison of subsistence salmon harvests, participation in the subsistence salmon fishery, and average harvests, communities for which permit and survey data available for the same year.

Year	Communities Included <sup>1</sup>	Estimated Harvests		Participation		Average Harvests	
		Reported on Returned Permits	Estimated from Household Surveys	Returned Permits <sup>2</sup>	Estimated Fishing Households	Per Returned Permit	Per Fishing Household
1993	Akhiok, Larsen Bay, Ouzinkie, Port Lions	7,366	18,687	84	130	88	144
1998	Larsen Bay, Old Harbor, Ouzinkie	3,349	11,099	47	93	71	119
2003	Akhiok, Larsen Bay, Old Harbor, Ouzinkie, Port Lions	8,626	14,240	156	128	55	111
2004	Akhiok, Larsen Bay, Old Harbor, Ouzinkie, Port Lions	7,845	21,509	167	178	47	121
2005	Larsen Bay, Old Harbor, Ouzinkie, Port Lions	10,065	16,946	141	142	71	119

<sup>1</sup> See Tables 4, 5, 6, and 8 for results for each community.

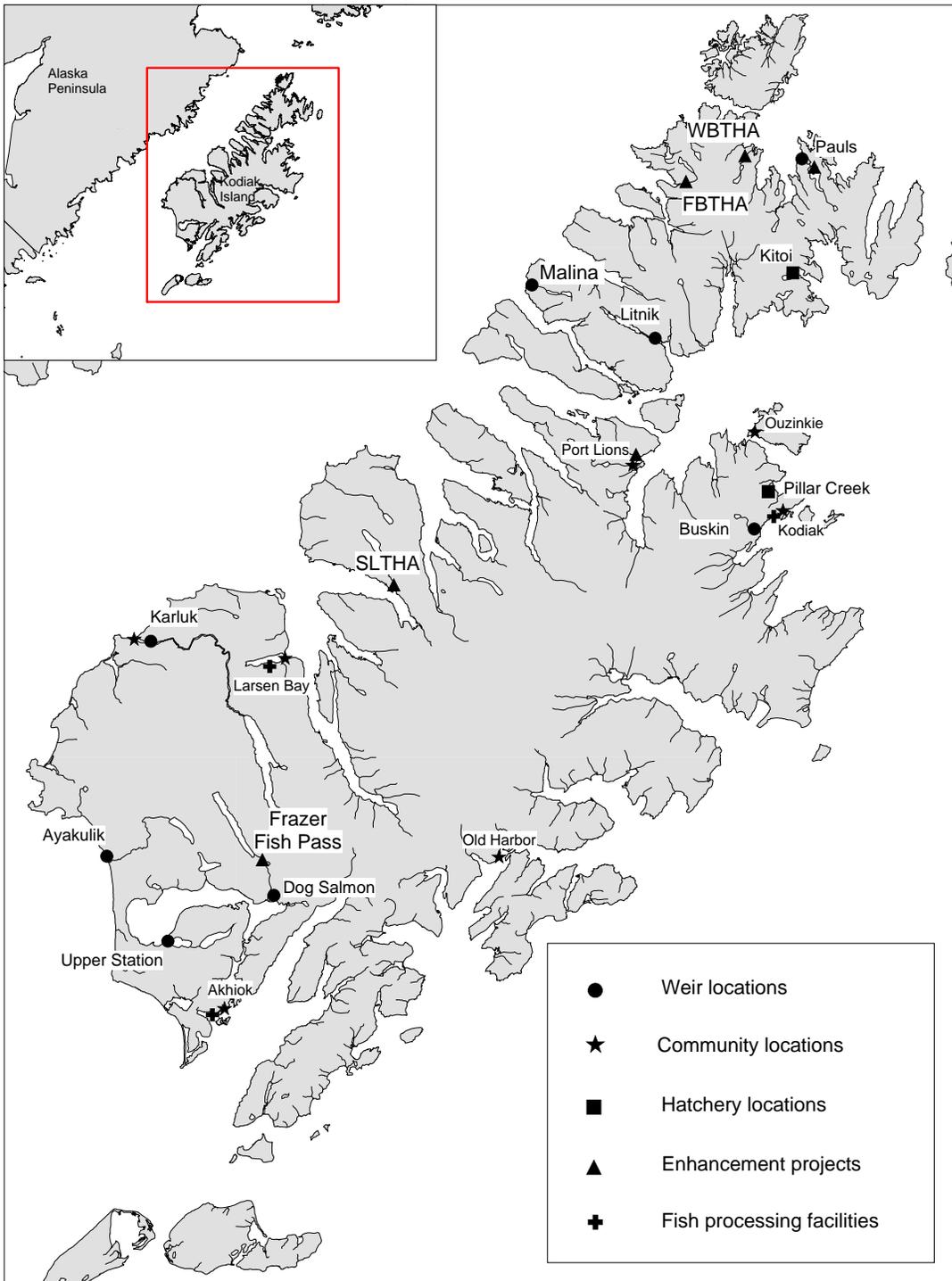
<sup>2</sup> Based on address on returned permit. In some cases, may include seasonal residents of the community. Surveys only include year-round residents. Sources: ADF&G 2006; ADF&G 2007; Williams et al. *in prep*.

**Table 11.**—Percentage of survey respondents who were aware that they could obtain another subsistence permit, 2004 and 2005.

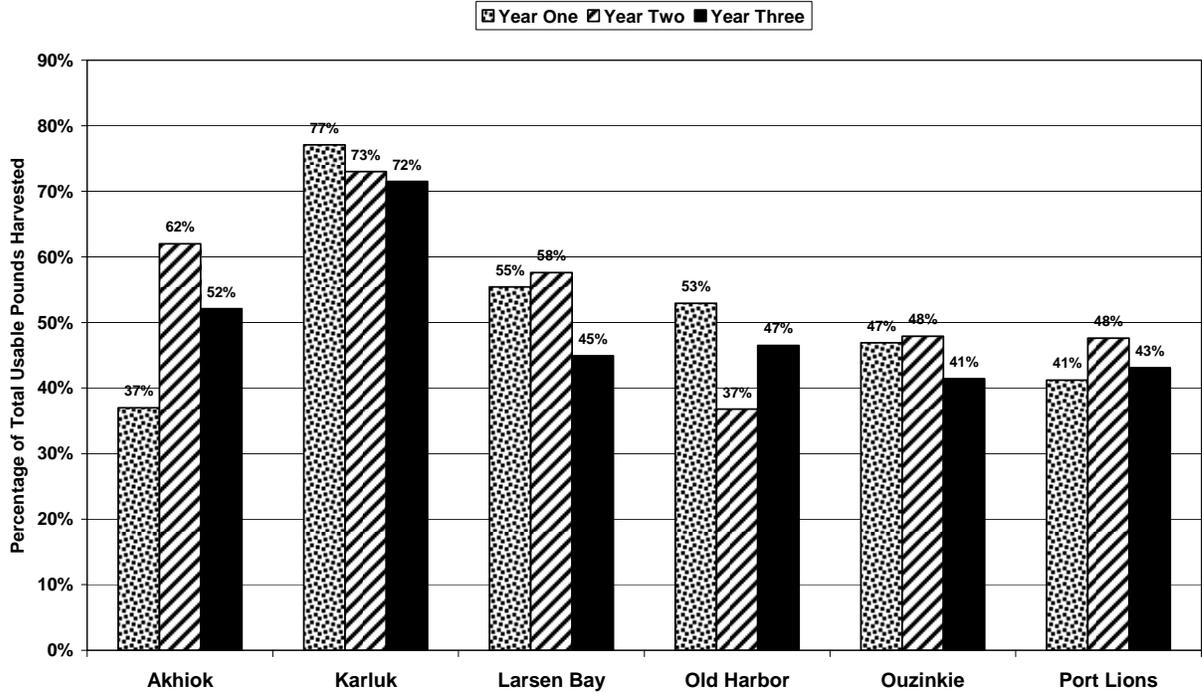
Community <sup>1</sup>	2004		2005	
	Percentage of All Households	Percentage of Households Who Obtained Permits	Percentage of All Households	Percentage of Households Who Obtained Permits
Akhiok	46.2%	41.6%	NA	NA
Larsen Bay	55.6%	66.7%	51.4%	73.7%
Old Harbor	17.2%	20.0%	55.1%	72.4%
Ouzinkie	31.0%	37.0%	40.0%	53.0%
Port Lions	50.0%	77.3%	54.0%	65.0%
All study communities	36.2%	46.2%	50.1%	64.8%

<sup>1</sup> No surveys were conducted in Akhiok for 2005.

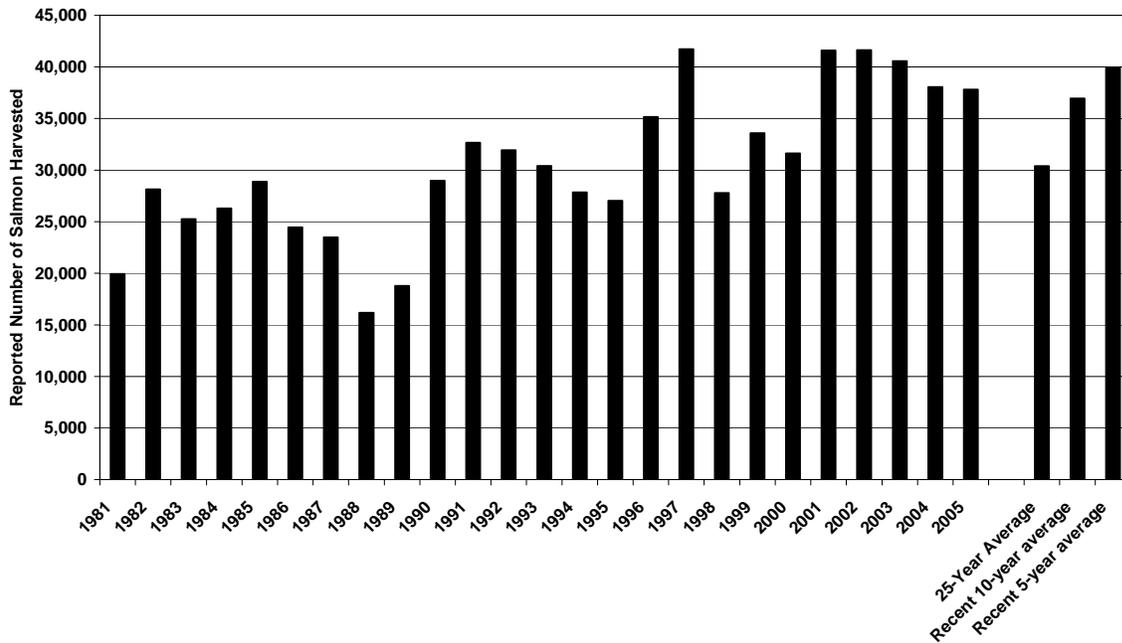
Source: Williams et al. *in prep.*



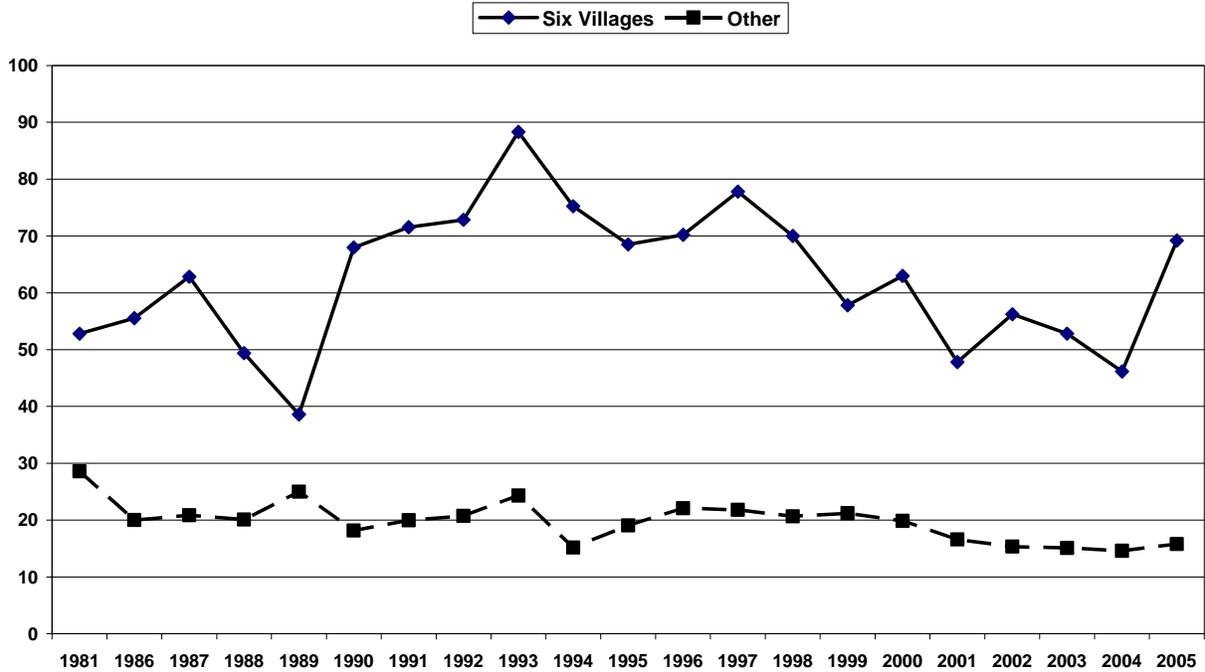
**Figure 1.**—Map of Kodiak Management Area.



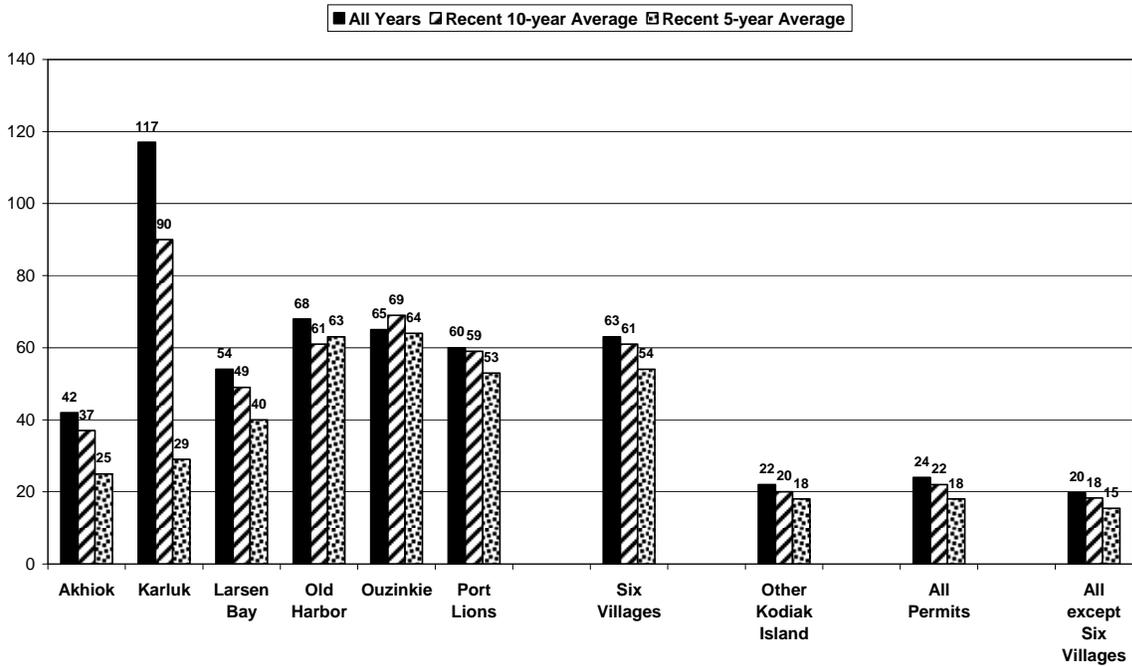
**Figure 2.**—Percentage of total subsistence harvest comprised of salmon, 6 Kodiak Island Borough communities.



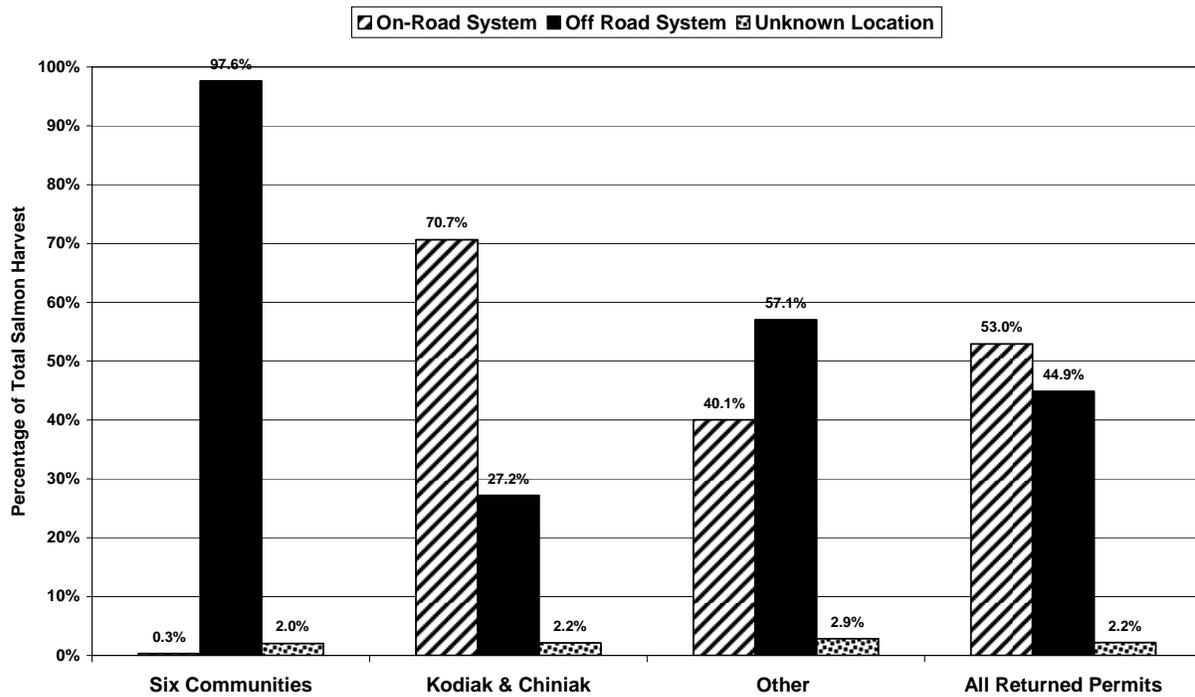
**Figure 3.**—Reported subsistence harvests of salmon, Kodiak Management Area, 1981 - 2005.



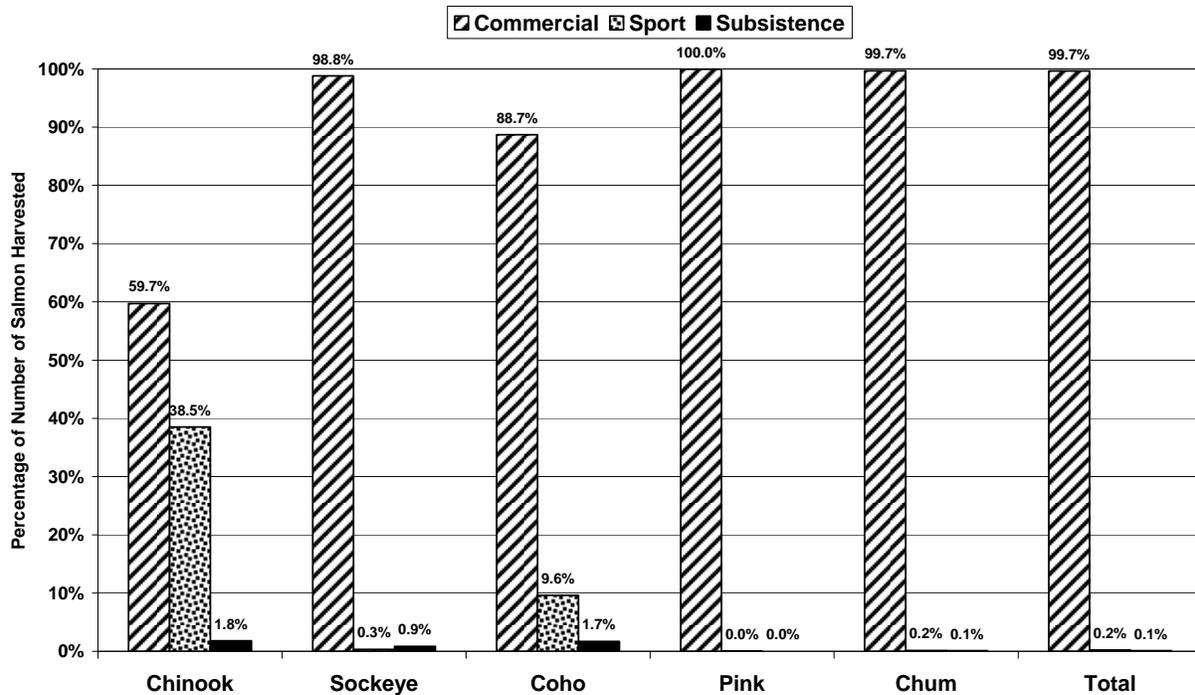
**Figure 4.**—Average subsistence salmon harvest per returned permit, 6 villages combined and all other permit holders, Kodiak Management Area, 1981 and 1986-2005.



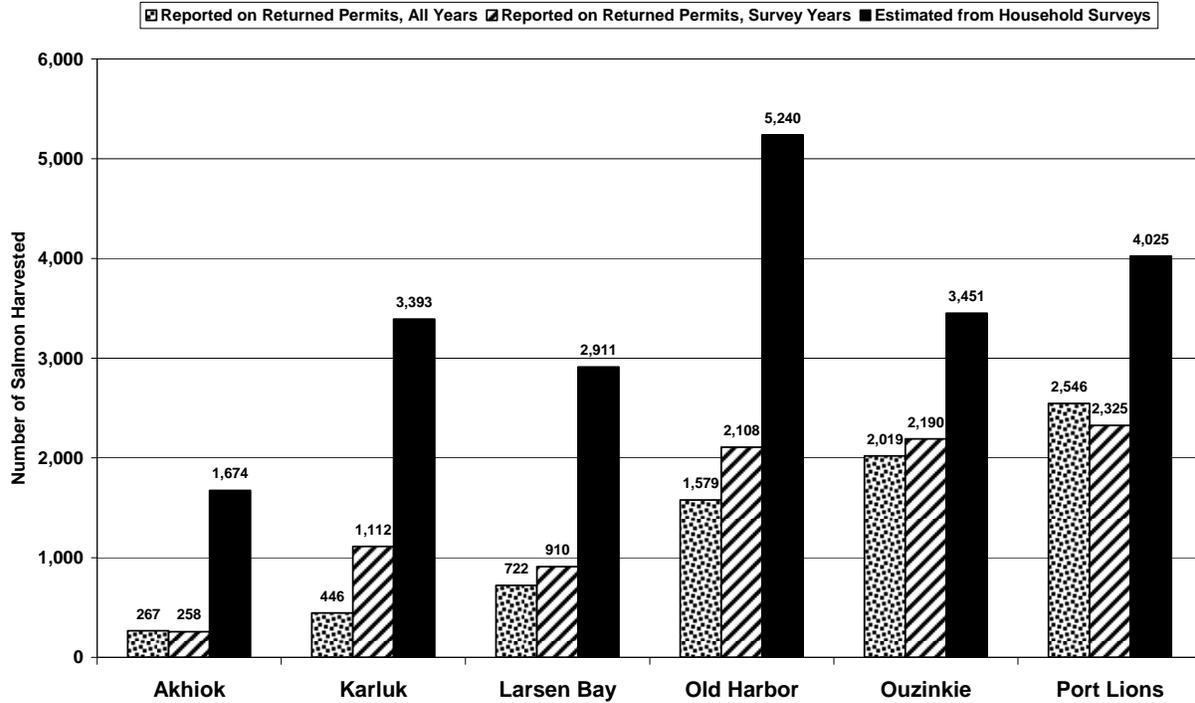
**Figure 5.**—Average subsistence harvest of salmon per returned permit, all years, recent 10-year average, and recent 5-year average.



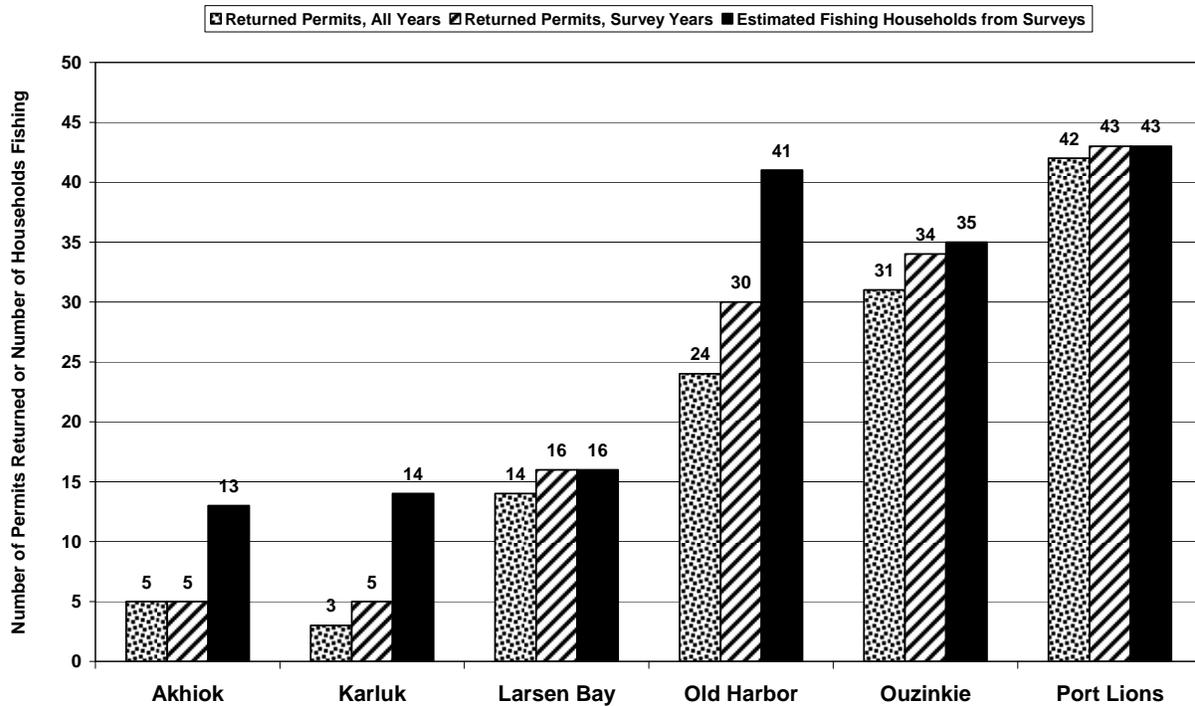
**Figure 6.**—Location of subsistence salmon fishing by place of residence of permit holder, Kodiak Management Area, 2001-2005.



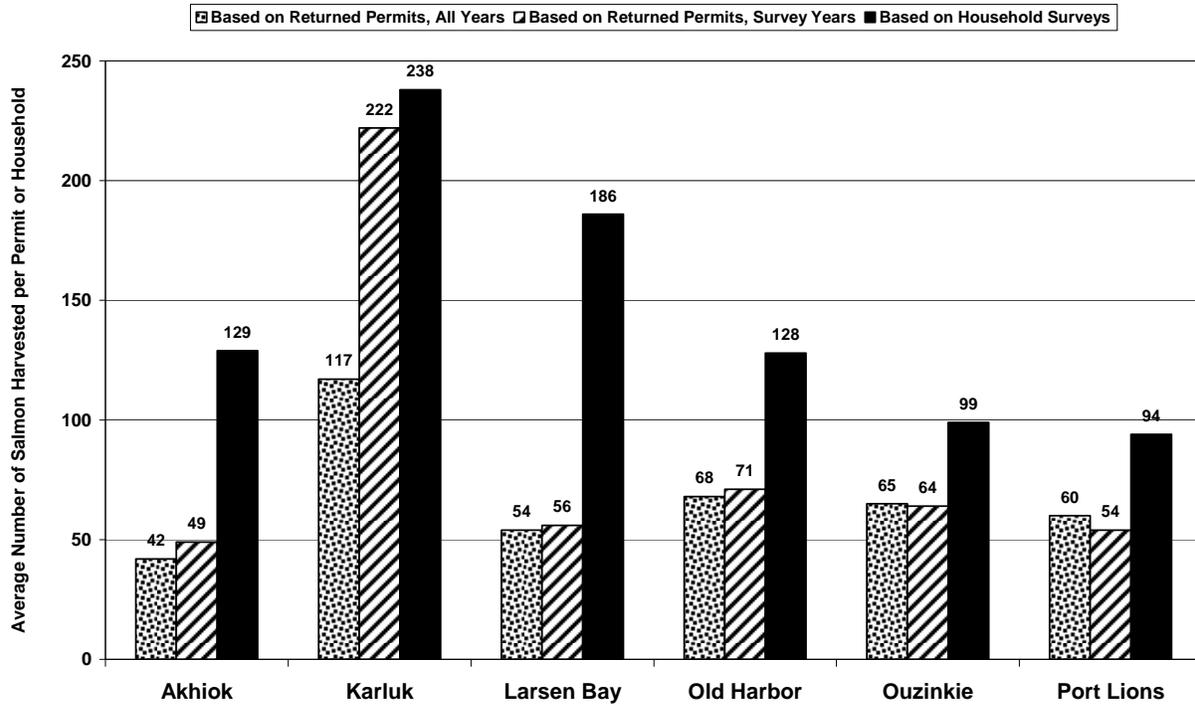
**Figure 7.**—Percentage of salmon harvest by species and fishery, Kodiak Management Area, 2005.



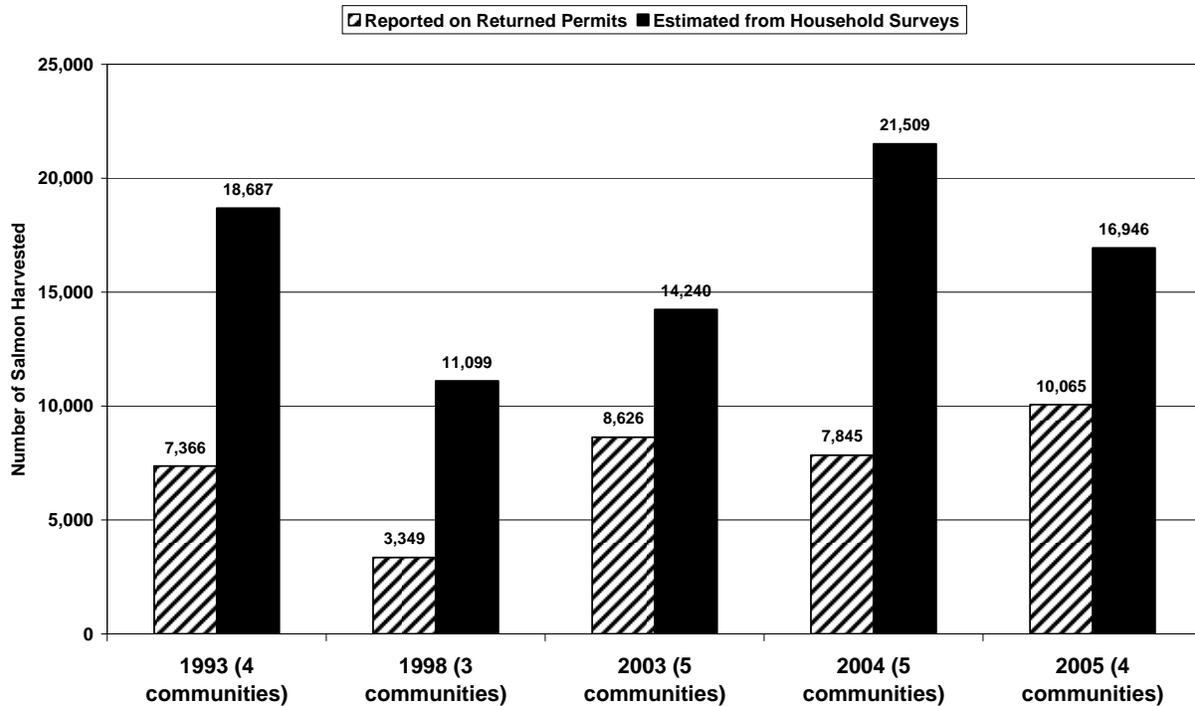
**Figure 8.**—Subsistence salmon harvests by community, based on permit returns and household surveys.



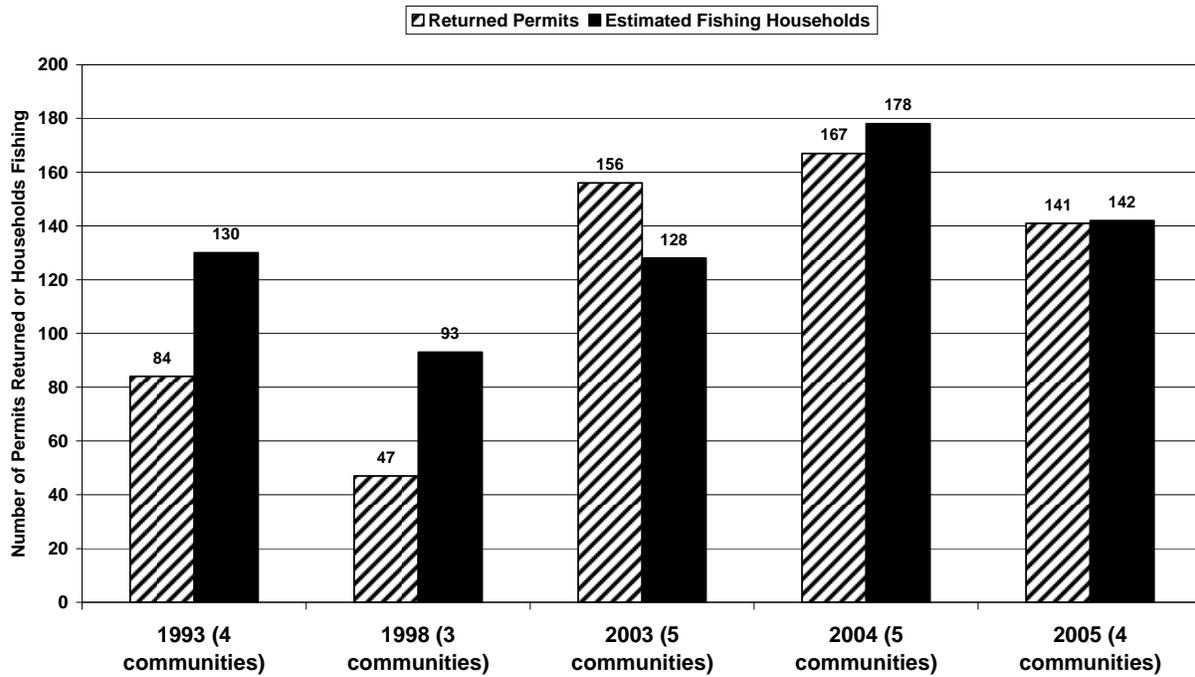
**Figure 9.**—Number of returned subsistence permits and estimated number of subsistence fishing households based on household surveys by community.



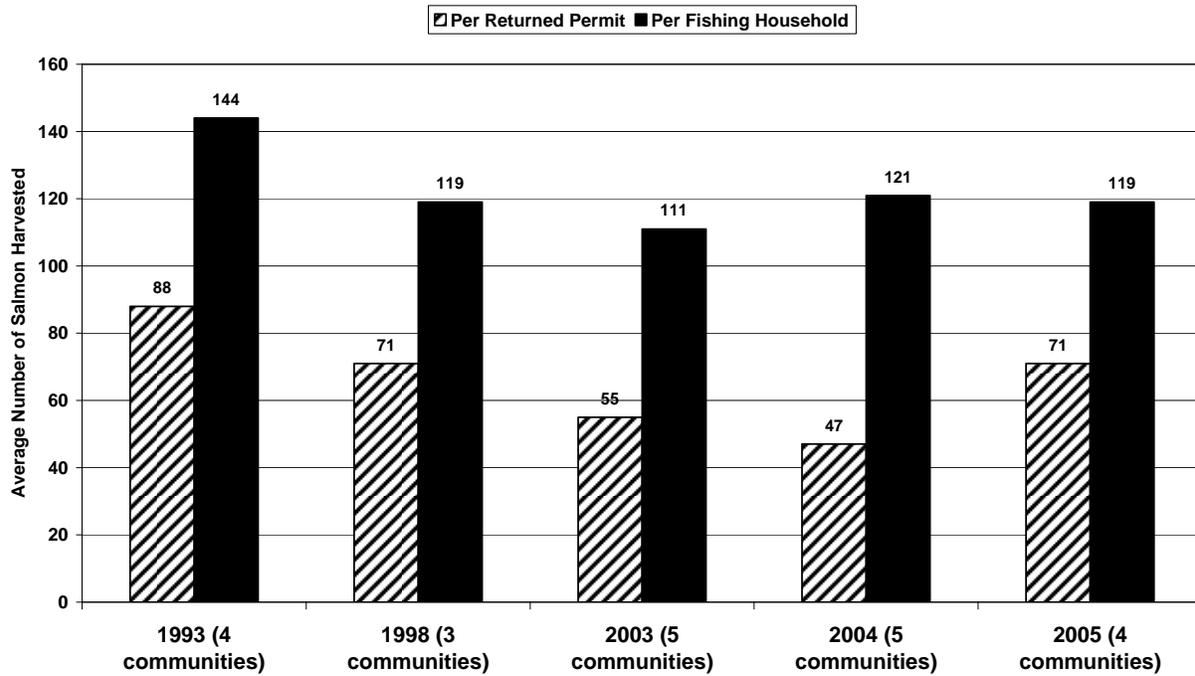
**Figure 10.**—Average number of salmon harvested per returned subsistence permit or per household based on surveys, by community.



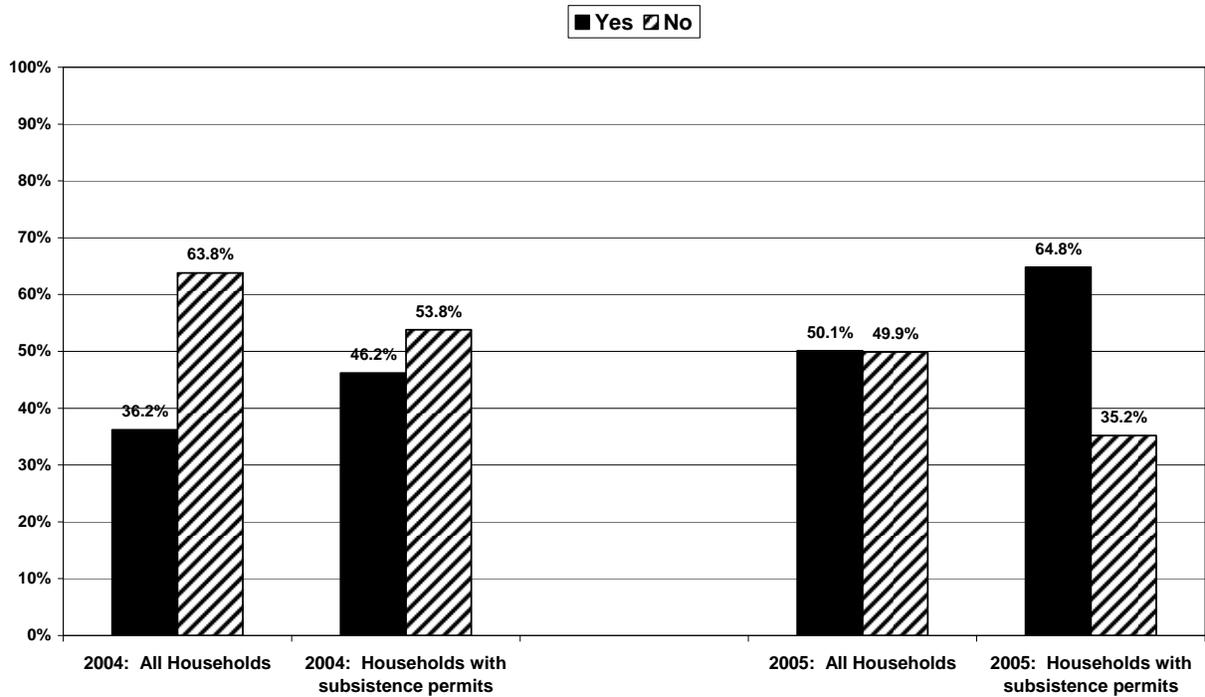
**Figure 11.**—Subsistence salmon harvests, combined communities for which permit and survey data are available for the same year.



**Figure 12.**—Number of permits returned and estimated number of subsistence fishing households, combined communities for which permit and survey data are available for the same year.



**Figure 13.**—Average subsistence harvest per returned permit or per fishing household, combined communities for which permit and survey data are available for the same year.



**Figure 14.**—Percentage of households who knew they could obtain another subsistence salmon permit, 2004 and 2005.