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# **Overview of Amounts Reasonably Necessary for Subsistence Uses of Salmon in Southeast Alaska**

**Prepared by**

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**and**

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**for the February 2009 Sitka Board of Fisheries meeting**

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January 2009

Alaska Department of Fish and Game

Division of Subsistence



## Symbols and Abbreviations

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

### Weights and measures (metric)

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

### Weights and measures (English)

cubic feet per second	ft <sup>3</sup> /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 <sub>A</sub>
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, $\chi^2$ , 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 <sub>2</sub> , etc.
minute (angular)	'
not significant	NS
null hypothesis	H <sub>0</sub>
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

***SPECIAL PUBLICATION NO. BOF 2009-03***

**OVERVIEW OF AMOUNTS REASONABLY NECESSARY FOR  
SUBSISTENCE USES FOR SALMON IN SOUTHEAST ALASKA**

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## INTRODUCTION

This report provides background information for the Alaska Board of Fisheries' consideration of Proposal 236, submitted by Kootznoowoo Inc., the Alaska Native village corporation for the community of Angoon, at the board's February 2009 meeting in Sitka. The proposal asks the board to modify findings regarding the amount of Pacific salmon *Oncorhynchus* reasonably necessary to provide for subsistence uses in the Southeastern Management Area (5 AAC 01.716(c)). The proposal pertains to the following requirements of Alaska Statute 16.05.258:

- a. Except in nonsubsistence areas, the Board of Fisheries and the Board of Game shall identify the fish stocks and game populations, or portions of stocks or populations, that are customarily and traditionally taken or used for subsistence. The commissioner [of the Alaska Department of Fish and Game] shall provide recommendations to the boards concerning the stock and population identifications. The board shall make identifications required under this subsection after receipt of the commissioner's recommendations.
- b. The appropriate board shall determine whether a portion of a fish stock or game population identified under (a) of this section can be harvested consistent with sustained yield. If a portion of a stock or population can be harvested consistent with sustained yield, the board shall determine the amount of the harvestable portion that is reasonably necessary for subsistence uses ...

Findings made under (a) are called "customary and traditional use findings" or "C&T findings." Findings under (b) are called "amount reasonably necessary for subsistence findings" or "ANS findings."

Table 1 lists the current C&T and ANS findings for salmon for the Southeastern/Yakutat Region.<sup>1</sup> The board has established ANS ranges for salmon (all species combined) for the 6 management areas in this region (Figure 1). The board established these ANS ranges at its January 2006 meeting in Ketchikan. Each range was defined by the lowest and highest annual estimated subsistence harvest of salmon within the permit area from 1996 through 2003. Appendix 1 reports the data upon which the board based these ANS determinations. The action in 2006 replaced a 1993 board administrative ANS finding, not adopted in regulation, of 21,000 to 34,000 salmon for all Southeast Alaska. At the January 2006 meeting, the 1993 finding was considered low because it was based on reported rather than estimated subsistence harvests. The large geographic scale of the finding was also considered not useful for assessing subsistence opportunities on small, local sockeye salmon runs (Turek 2006:1).

Proposal 236 asks the board to "detail the minimum numbers of salmon that are reasonably necessary for subsistence uses by species and location." In other words, the proposal would establish more precise ANS findings at the species and stream levels rather than for all species of salmon combined at the area level. Doing so, the proposal asserts, would "provide specific management targets to meet subsistence priority obligations under AS 16.05.258."

As noted above, AS 16.05.258(a) and (b) direct the board to make C&T and ANS findings for "fish stocks" or "portions of stocks." AS 16.05.940 (16) defines fish stock as "a species,

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<sup>1</sup> Proposal 236 does not address the Yakutat Management Area. We have included the Yakutat Management Area in this discussion to provide background on all the subsistence salmon fisheries that are subject to regulatory action by the board at the February 2009 meeting.

subspecies, geographic grouping or other category of fish manageable as a unit.” The Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222 (f) (34)) also includes a definition of salmon stock as “a locally interbreeding group of salmon that is distinguished by a distinct combination of genetic, phenotypic, life history, and habitat characteristics or an aggregation of two or more interbreeding groups which occur within the same geographic area and is managed as a unit.”

Proposal 236 also suggests that the ANS ranges be based on Alaska Department of Fish and Game (ADF&G) subsistence permit records for species and locations “as long as the numbers account for differences between actual and reported harvests in a precautionary manner.” This portion of the proposal implies the need for an evaluation of subsistence harvest estimates prior to the adoption of revised ANS ranges so that the ANS ranges accurately reflect current levels of subsistence uses of salmon.

Proposal 236 provides an opportunity for the board to reexamine its ANS procedures and its ANS findings for the Southeastern Alaska and Yakutat areas. Specifically, the proposal raises several important questions, including:

1. What is the appropriate geographic scope for defining a stock for an ANS finding?
2. What is the appropriate species focus for defining a stock for an ANS finding?
3. What are the appropriate sources of data for establishing an ANS range for each stock?
4. What is an appropriate time period for subsistence harvests when considering the establishment of an ANS range for each stock?

As the board addresses Proposal 236, two points need to be raised. First, an ANS finding is intended to be a tool for assessing the subsistence opportunities provided by regulations and management practices. Second, consistent with the statutory and regulatory definitions of “stock,” ANS findings need to be structured so that they are achievable by fisheries management: stocks are biologically- or geographically-defined groups of fish manageable as a unit.

## **II. DATA SOURCES AND ANALYSIS**

This report includes data on salmon harvests in Southeast Alaska from 1996 to 2006 obtained through household surveys conducted by the ADF&G Division of Subsistence and through the subsistence/personal use salmon<sup>2</sup> fishing permit program, which is administered by the ADF&G Division of Commercial Fisheries. The household survey data are managed by the information management section of the Division of Subsistence. The annual permit data are stored in the

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<sup>2</sup> “Personal use fishing” means the taking, attempting to take or possession of finfish, shellfish or aquatic plants by an individual for consumption as food or use as bait by that individual or his immediate family (5 AAC 77.001 (f)). Before the state subsistence law defined subsistence fishing as “customary and traditional” and created nonsubsistence areas Southeast Alaska personal use salmon fisheries took place under subsistence regulations. Since the gear for these fisheries is different from that historically associated with sport fishing, personal use fisheries cannot be classified as sport fisheries (5 AAC 77.001). Personal use fisheries do not have a priority and fish can only be shared with the harvesters’ immediate family.

Integrated Fisheries Database (IFDB) maintained by the ADF&G Division of Commercial Fisheries, Region I office in Douglas.<sup>3</sup>

Salmon harvests reported in household surveys were expanded to account for nonsurveyed households in each community. Appendix 2 summarizes all community and years presented in this report, the total number of households in the sampling universe, and the number of households surveyed in each community, by year. Appendix 2 also indicates whether information on location of harvest (water body), amount removed from commercial catch, and harvest by rod and reel is available from the household survey results for each community by year.

Salmon harvest data from the permit reporting program were expanded to account for nonreturned permits. An expansion factor was calculated for each year and management area. Consequently, harvest estimates in this report may differ from those generated from the Integrated Fisheries Database, which includes nonexpanded data from returned permits only. The number of permits issued is not available for years prior to 1996; therefore, it is not possible to use the permit data to develop a harvest estimate upon which to base an ANS that would include years before 1996.

More information on data analysis procedures can be found in Turek and Naves (*In prep*), the report from a project developed to summarize and contextualize available information on subsistence/personal use harvests of salmon in Southeast Alaska based on comprehensive household surveys and the permit program. This report will describe temporal trends between 1996 and 2006 and assess the contemporary socioeconomic importance of salmon in this region, in order to assist fisheries managers and subsistence users in developing management plans based on sound biological, cultural, social, and economic principles.

### **III. SUBSISTENCE SALMON FISHERIES IN SOUTHEAST ALASKA**

#### **TRADITIONAL TLINGIT AND HAIDA SUBSISTENCE SALMON FISHERIES**

Salmon were, and continue to be, a key subsistence resource for the indigenous Tlingit and Haida of Southeast Alaska (de Laguna 1990:210; Blackman 1990:244). Among the Tlingit, salmon fishing took place from late spring to early autumn at fish camps. Most salmon were harvested in rectangular wooden traps set in salmon streams. Other gear included spears, harpoons, and gaff hooks (de Laguna 1990:210-211). Rights to fish at certain locations were held by matrilineal clans (Goldschmidt and Haas 1998:7-17). A fundamental unit of Tlingit social organization is the *kwaan*, consisting of all individuals living within the boundaries of the lands and waters controlled by the clans residing in a particular winter village. Traditional Tlingit territory included approximately 18 *kwaans*, many of which continue to be associated with contemporary Southeast Alaska communities and the areas they use for subsistence hunting, fishing, and gathering (Thornton 2008:44-46).

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<sup>3</sup> In this database, permits are organized by area office in which the permit was issued. Therefore, in the analysis that follows, a few fishing locations appear in more than one management area. A useful future modification to the database would be a classification of each fishing location according to the ANS areas established by the board.

## **SUBSISTENCE/PERSONAL USE SALMON FISHING REGULATIONS**

The Division of Commercial Fisheries is responsible for managing the subsistence/personal use salmon fisheries in Southeast Alaska. Therefore, the geographic areas used for subsistence/personal use management follow those established for commercial fisheries.

The Southeast/Yakutat Region includes all waters between Cape Muzon (Dixon Entrance, southern tip of Prince of Wales Island) on the south and Cape Suckling (Gulf of Alaska) on the north to the intersection with the seaward limit of the 3 nmi territorial sea. For management and administrative purposes, the Southeast/Yakutat Region is divided into 6 management areas: Ketchikan (regulatory districts 1, 2, 3, and 4), Petersburg/Wrangell (districts 5, 6, 7, 8 and 10 and Section 9B), Sitka (Section 9A and District 13), Juneau (districts 11 and 12 except subdistricts 12-11, 12-14, and part of 12-12), Haines (District 15), and Yakutat (districts 81, 82, 83, 85, 86, 91, and 92) from south to north (Figure 1). Permit data have been identified separately for the Petersburg and Wrangell subareas.

The Southeastern/Yakutat Region includes 2 nonsubsistence areas: the Ketchikan Nonsubsistence Area (5 AAC 99.015(1)) and the Juneau Nonsubsistence Area (5 AAC 99.015(2)). The board may not permit subsistence fishing in nonsubsistence areas, and harvest opportunities are provided through personal use regulations (5 AAC 77.682).

Subsistence/personal use fisheries in Southeast Alaska are managed under a permit program that includes an annual harvest assessment component. Permit conditions referring to open dates, salmon species, water bodies, gear type, and possession and annual limits are specific to each management area and may change between years to respond to management and conservation strategies. Specific conditions of personal use fisheries differ from subsistence fisheries conditions mainly in regard to gear type, location, and limits.

Permits are available at area ADF&G offices and in some additional communities where ADF&G has delegated authority to issue permits on its behalf. Only one permit is allowed per household. Permits identify the permit holder, his/her contact information, and other household members authorized to fish the permit. At the end of each fishing season, permit holders are required to return the permit with a completed harvest report by mail or telephone to ADF&G. Information on harvest reports include date and location of harvest (water body), gear used, species of salmon, and amount harvested.

## **ESTIMATED SUBSISTENCE/PERSONAL USE SALMON HARVESTS BASED ON PERMIT DATA**

Table 2 reports estimated subsistence and personal use harvests of salmon by species in the Southeastern/Yakutat Region for 1996 through 2006. During this 11-year period, total annual subsistence harvests ranged between 48,854 salmon (in 2005) and 80,071 salmon (in 1996), and averaged 68,183 salmon (Figure 2). The largest portion of the 11-year annual average harvest was sockeye salmon *O. nerka* (84%), followed by chum *O. keta* (5%), pink *O. gorbuscha* (5%), coho *O. kisutch* (4%), and Chinook salmon *O. tshawytscha* (2%) (Figure 3). From 1996 through 2006, the largest average annual harvest occurred in the Ketchikan Area (annual average of 23,246 salmon; 32% of the Southeastern/Yakutat Region total), followed by the Sitka Area (15,580 salmon; 22%), the Juneau Area (12,585 salmon; 18%), the Haines Area (12,585 salmon; 12%), the Yakutat Area (6,418 salmon; 9%), the Petersburg Area (3,850 salmon; 5%), and the Wrangell Area (1,213 salmon; 2%) (Figures 4 and 5). In all areas, sockeye salmon were by far

the largest component of the harvest, ranging from 98% in Sitka, to 85% in Ketchikan, 82% in Petersburg, 78% in Wrangell, 78% in Haines, 77% in Juneau, and 62% in Yakutat.

The average number of subsistence/personal use permits issued annually for the Southeastern/Yakutat region from 1996 through 2006 was 3,790, and ranged from 4,308 (in 1999) to 3,315 (in 2005) (Table 2, Figure 6). Most permits (98.9%) were issued to residents of Southeast Alaska communities, who accounted for 99.2% of the subsistence/personal use salmon harvest over the 11-year period (Figure 7).

## **COMPARISONS OF SALMON HARVEST ESTIMATES BY PERMIT AND HOUSEHOLD SURVEY DATA**

Estimates of subsistence harvests of salmon based on permit returns represent a minimum estimate of salmon harvested for home use in the Southeastern/Yakutat Region, for at least two reasons (see also Eggers et al. 2008:5). First, subsistence harvests may be underreported on returned permits; and second, harvest methods in addition to those authorized under subsistence regulations are also used to harvest salmon for home uses. As shown in Table 3 and Figure 8, in all but one year for which both permit and survey data were available for particular communities, harvest estimates based on postseason surveys were higher than estimates based on permit returns (the exception is Petersburg in 2000). In 10 of the 20 community cases, permit estimates were less than 50% of the estimates based on surveys.

Subsistence fishers in Southeast Alaska have expressed concern that the permit program, with its limitations on daily possession and annual limits, opening and closing dates, and, in some cases, allowable gear, does not accommodate traditional practices. For example, in the summary of a December 2001 workshop about subsistence fisheries harvest monitoring attended by ADF&G staff and community representatives held in Juneau, Fall noted:

In the Southeast region, subsistence regulations create the greatest challenges for harvest assessment programs because of small salmon systems and consequent relatively low seasonal and, in some cases, daily harvest limits on permits that are needed for resource conservation. Workshop participants asserted, and household surveys confirmed that this likely leads to under-reporting on the permits. Often, people need to travel relatively long distances to harvest subsistence fish, and have obligations to share with other families. (Fall 2003:9-10)

The permit conditions also generally do not accommodate local practices of specialization in resource harvest activities and sharing among families and households. In Alaska communities, a relatively small number of households typically provides a large portion of the total harvest, which is then widely shared (Wolfe 1987). Opening and closing dates may not provide for traditional methods of processing and preserving salmon, methods that require a specific timing of the harvest. Fishers respond to the regulatory system in a variety of ways, such as obtaining more than one permit per household, bringing permits from several households along on a single trip, reporting the permit limit rather than actual amounts harvested, fishing without a permit, fishing at locations not listed on the permit, or fishing with gear not listed on the permit, such as rod and reel. If one or more of these factors are in play, the resulting data provided to ADF&G may be considerably different from actual harvests (Fall et al. 2003:161-163).

The high cost of field efforts required to conduct household surveys explains why harvest estimates based on this approach are available only for a limited number of communities and

years, and preclude an extensive geographic and temporal coverage of subsistence harvests. Household surveys also require a significant amount of time on the part of survey participants and surveying a community too frequently may lead to low rates of participation in the survey. Also, household harvest surveys typically address one year of harvests through recall at the end of the year. Long recall periods may increase recall bias (USFWS and Westat Inc. 1989), which includes respondents' "memory bias" (inability to precisely remember events), "prestige bias" (upgrading actual fishing success), and "digit preference" (preferring numbers that end either in zero or 5) (Tarrant and Manfredo 1993). Recall bias most commonly leads to overestimations of harvest rather than underestimation (Atwood 1956; Tarrant and Manfredo 1993). Recall bias may partially explain the differences between harvest estimates obtained by household surveys and the permit reporting program. However, extensive contributions of rod and reel harvest and removals from commercial catch for home use likely explain much of the difference between salmon harvest estimates obtained by household surveys and the permit program.

On the other hand, household surveys as a salmon harvest assessment approach in Southeast Alaska offer confidentiality to respondents, thus providing the potential for more accurate harvest reports despite nonobservance of permit conditions/regulations. The surveys cover a larger variety of gear types and methods of acquiring salmon for home uses than the permit reporting program, which focuses on the regulated subsistence/personal use gear. The structure of survey forms and the help of surveyors make it easier for fishers to respond with accurate information. Depending on the number of people who fished without permits or who did not return permits, household surveys also may include information from a higher proportion of households in a community (Fall et al. 2001:135).

More collaboration between resource users and management agencies, among other things, could help improve subsistence fisheries harvest estimates in Southeast Alaska. This is one of the several recommendations for developing more effective and reliable subsistence fisheries harvest assessment programs developed by the Subsistence Fisheries Harvest Assessment Working Group (Fall and Shanks 2000).

## **ROD AND REEL AND REMOVAL FROM COMMERCIAL CATCHES AS SOURCES OF SALMON FOR HOME USES**

In addition to harvests with gill nets or seines that occur under subsistence or personal use regulations, the 2 other sources of salmon for home uses in Southeast Alaska communities are harvests with rod and reel under sport fishing regulations and fish removed from commercial harvests. Table 3 and Figure 9 include estimates of salmon harvests by community, year, and gear type. As the study findings show, rod and reel harvests for home use can be substantial, contributing one-third or more of the total salmon harvests in 11 of the community cases. Commercial removals were also notable in some communities in some years: for example, contributing 35% of the salmon for home uses in Angoon in 1996, 30% in Hoonah in 1996, 54% in Petersburg in 2000, and 55% in Wrangell in 2000 (Figure 9).

## **LOCATIONS OF SUBSISTENCE/PERSONAL USE HARVESTS**

The Southeastern/Yakutat region contains over 200 sockeye salmon-producing systems (Eggers et al. 2008:1). There are approximately 5,980 water bodies that support runs of salmon in the region, including 397 lakes and 5,583 streams (Johnson and Klein *In press*). For the 11-year period from 1996-2006, permit records document subsistence harvests of salmon in 139 of these streams. An additional 5 streams supported personal use salmon harvests. Data from returned

permits produce a minimum harvest estimate because the use of some streams may be unreported and other streams may be fished only with rod and reel. Also, different streams were used prior to 1996.

Table 4 reports the number of locations of subsistence harvests of salmon as recorded on permits by place of residence of permit holders from 1996 to 2006. For example, for Angoon, the minimum number of locations of subsistence salmon harvests in any year was 4 and the maximum was 9, with a mean of 5.6 annual harvest locations. Communities with the largest annual mean number of locations fished were Juneau (22.5 locations, with a range of 17 to 28 locations), Sitka (18.3 locations; range 14 to 21), Ketchikan (16.1 locations; range 11 to 20), Craig (11.6 locations; range 9 to 15), and Hoonah (10.5 locations; range 6 to 16).

### **Haines Management Area**

In the Haines Management Area, the number of water bodies fished per year in the subsistence salmon fisheries from 1996 through 2006 varied between 4 and 7, with the average at 5.7 water bodies (Table 5). In each year, 2 or 3 water bodies in total contributed at least 80% of the estimated subsistence salmon harvest in this permit area (Figure 10).

The Chilkat River was the most important water body in 9 out of 11 years, with a contribution to the total subsistence salmon harvest varying between 34% and 57% annually. Chilkat Inlet (19%-50%) and Lutak Inlet (1%-30%) were the two other main water bodies for salmon harvest. The contribution of Chilkoot Inlet to the total harvest increased from 2% in 2000 to 10% in 2006 (Figure 10).

### **Juneau Management Area**

During the period 1996 through 2006, the number of water bodies fished per year in the Juneau Management Area subsistence/personal use salmon fisheries varied between 13 and 29 with the average at 19.5 locations (Table 5). In each year, 3 to 6 water bodies in total contributed at least 80% of all the subsistence salmon harvest in this permit area (Figure 11).

Sweetheart Creek was the most important water body in 9 out of 11 years, with a contribution to total estimated subsistence/personal use salmon harvest varying between 14% and 58% annually. Contributions of the Taku River (10%-27%), Hoktaheen Cove (8%-20%), and the Kook Lake Outlet (2%-12%) were present in all 11 years of data. Kanalku Bay contributed 14% to 25% of the yearly harvest between 1996 and 2001, but its contribution dropped to less than 1% in 2002 and years after. Neva Creek contributed 11% and 17% of the total harvest in 1996 and 1997, but its contributions were much smaller (2%-5%) and inconstant in 1998 and years after (Figure 11).

### **Ketchikan Management Area**

In the Ketchikan Management Area, the number of water bodies fished per year in the subsistence/personal use salmon fisheries from 1996 through 2006 varied between 15 and 22 with average of 18.5 water bodies (Table 5). In each year, 3 to 5 water bodies contributed at least 80% of all the subsistence salmon harvest in this permit area (Figure 12).

Wolverine Creek was the most important water body in 10 of the 11 years reported, with a contribution to the yearly estimated salmon harvest varying between 25% and 52%. The Klawock River (11%-30%) was the second most important water body, followed by Hetta Inlet (4%-13% from 1996-2005, but 27% in 2006), Sakar Bay (2%-10%), Hatchery Creek (4%-9%), and the Karta River (2%-10%) (Figure 12).

### **Petersburg Management Area**

From 1996 through 2006, the number of water bodies fished per year in the Petersburg Management Area subsistence salmon fisheries varied between 12 and 18, with an average of 14.7 water bodies (Table 5). In each year, 3 to 6 water bodies contributed at least 80% of all salmon harvest in this management area (Figure 13).

Falls Creek-Baranof Island (28%-51%) was the most important water body for salmon harvest in all 11 years reported. Salmon Bay Creek (6%-28%), Kutlaku Creek (up to 26%), Gut Bay Head (3%-18%), and Crystal Creek (4%-14%) were the other water bodies relatively important for salmon harvest. The contribution of Kutlaku Creek decreased from 20%-26% in 1996-1999 to 3%-9% in 2000-2006, while the contribution of Salmon Bay Creek increased from 9%-15% in 1996-2000 to 22%-28% in 2001-2004 (Figure 13).

### **Sitka Management Area**

In the Sitka Management Area subsistence salmon fisheries, the number of water bodies fished per year from 1996 through 2006 varied between 13 and 18, with an average of 15.9 water bodies (Table 5). In each year, 2 to 4 water bodies contributed at least 80% of all salmon harvest in this management area (Figure 14).

Necker Bay Lake (14%-76%) was the most important water body for salmon harvest in 6 out of the 11 years reported. Redoubt Lake Outlet (up to 69%) was the most important water body in the remaining 5 years, although its contribution was less than 1% in 2000 and 2001. Fish Camp-Klag Bay (6%-22%), Redfish Bay Head (2%-11%), and Lake Stream Ford Arm (up to 8%) were the other important water bodies for salmon harvest (Figure 14).

### **Wrangell Management Area**

In the Wrangell Management Area, the number of water bodies fished per year from 1996 through 2006 in the subsistence salmon fisheries varied between 3 and 9, with an average of 5.7 water bodies (Table 5). In each year, 2 or 3 water bodies contributed at least 80% of all salmon harvest in this management area (Figure 15).

Mill Creek was the most important water body for salmon harvest in 7 of the 11 years, contributing 23%-71% of the yearly harvest. Thoms Creek was the most important water body for salmon harvest in the remaining 4 years (16%-49%). Salmon Bay Creek (4%-29%) was the third most important water body for salmon harvest in this area (Figure 15).

### **Yakutat Management Area**

From 1996 through 2006, the number of water bodies fished per year in the Yakutat Management Area subsistence salmon fisheries varied between 7 and 13, with an average of 10.2 water bodies (Table 5). In each year, 2 to 4 water bodies contributed at least 80% of all the subsistence salmon harvest in this management area (Figure 16).

The Situk River was the most important water body for subsistence salmon harvests in all 11 years, with a contribution to the total estimated harvest varying between 65% and 83%. Yakutat Bay (2%-23%) and the Alsek River (2%-7%) were the two other important water bodies and contributed to salmon harvests in every year between 1996 and 2006 (Figure 16).

## **ACHIEVEMENT OF ANS**

Table 6 compares the estimated subsistence harvests of salmon in each management area from 1996 through 2006 with the ANS ranges as established in 5 AAC 01.716(c). In the Sitka and Haines areas, estimated subsistence salmon harvests were within or above the ANS range in all 11 years (Figure 17). In the Yakutat Area, the estimated subsistence salmon harvest fell below the ANS range in two years, 2005 and 2006. In the Petersburg/Wrangell Area, estimated harvests were within or above the ANS range from 1996 through 2004, but dropped below the range in 2005 and 2006. In the Juneau Area, estimated subsistence salmon harvests were below the ANS range in 3 years: 2002, 2005, and 2006. In the Ketchikan Area, subsistence harvests were below the ANS range in 6 years, from 2001 through 2006.

The ANS is a primary tool to assess the performance of subsistence regulations, for resource management, and to provide reasonable subsistence opportunities. There are at least 3 explanations for a subsistence harvest estimate falling below the ANS range. These include:

1. Reduced abundance of the fish stock, which might be the result of natural short-term fluctuations in runs, harvests by other fisheries (sport or commercial), or long-term trends caused by one or more environmental factors.
2. Reduced demand for subsistence salmon harvests that may result from demographic changes in the communities that use the resource (a decline in population or a shift in the composition of population); changing subsistence use patterns brought about by demographic, cultural, or economic changes; and the availability of alternative subsistence resources within the harvest year.
3. Reduced participation in the harvest monitoring program or underreporting of harvests on returned permits.

An appropriate ANS range should reflect natural cycles in stock abundance as well as variations in annual harvests caused by economic conditions or availability of other resources. However, if estimated harvests consistently fall below the ANS, investigation into the cause of the decline should take place and remedial action, such as changes to subsistence regulations, allocations, or management practices, might be necessary.

## **COMMUNITY CASE STUDIES**

### **Angoon Case Study**

Subsistence salmon fisheries in the waters traditionally used by the community of Angoon are under the management responsibility of the Juneau and Sitka area management offices of the Division of Commercial Fisheries. In 1989, the board adopted a positive C&T finding for salmon in the waters of District 12 south of a line from Fishery Point to South Passage Point and north of the latitude of Point Caution, and in waters of Section 13C east of the longitude of Point Elizabeth (5 AAC 01.716(5)).

The residents of Angoon are the principal subsistence fishers in this area. In 2000, Angoon had a population of 572 in 184 households; the population in 2007 was 478 (ADLWD 2009). Angoon Tlingit (of the *Xutsnoowù Kwáan* [Thornton 2008:45]) have traditionally used most of the west coast of Admiralty Island, from Hawk Inlet to the southern tip of Admiralty Island, as well as the lands and waters of the east coasts of Chichagof and Baranof islands (Goldschmidt and Haas 1998:67-72). Over the years, the waters of Kootznahoo Inlet, Favorite Bay, and Hood Bay to the

south, Mitchell Bay, Salt Lake, and Kanalku Bay further east, and Chatham Strait have provided Angoon residents with salmon and other marine resources (Figure 18).

Department research has shown that Angoon residents primarily harvest sockeye salmon using subsistence nets. Net fishing is conducted with beach seines at the heads of bays or near mouths of creeks. Drift gillnets are also used to harvest salmon in bays. Since the early 1990s, Kook (Basket) Bay and Kanalku Bay have been the primary subsistence sockeye salmon sources for residents of Angoon. In 2002, the community of Angoon instituted a “voluntary closure” of Kanalku Bay due to concerns about the declining numbers of sockeye salmon returning to spawn (Conitz and Cartwright 2005).

Since the early 20th century, commercial salmon fishing and processing have played a vital role in the life of the community; since the late 1980s, however, the role of commercial fishing in Angoon has diminished. In 1990, 76 Angoon residents held 119 CFEC permits and participated in salmon, Pacific halibut *Hippoglossus stenolepis* and other fisheries. By 1997, the number had dropped to 42 residents fishing 59 commercial permits. By 2000, only 24 commercial fishing permit holders were fishing 28 permits. This decline in commercial fishing has led to an increasing reliance on procuring fish in the subsistence fisheries, rather than retaining fish caught in commercial fisheries.

From 1996-2006, residents of Angoon held an average of 107 subsistence salmon permits, with a range of 90 permits in 2005 and 134 permits in 1998; about 59% of issued permits were returned over the 11-year period (Table 7). From 1996-2006, Angoon residents averaged an annual subsistence harvest of 2,019 salmon, ranging from 2,894 salmon in 1996 to 455 salmon in 2005 (Table 8, Figure 19). Overall, estimated harvests declined over the 11-year period. A household survey in Angoon pertaining to 1996 resulted in an estimated harvest of salmon for home use of 7,896 fish, including 3,646 salmon with subsistence nets (46%), 1,456 salmon with rod and reel (18%), and 2,794 salmon removed from commercial harvests (35%) (Table 3). According to the results of a household survey pertaining to 2001, Angoon residents harvested 2,457 salmon, including 2,319 salmon with subsistence nets (94%) and 138 salmon with rod and reel (6%). Salmon removed from commercial harvests for home use were not recorded in this survey (Table 3).

From 1996-2006, Angoon’s subsistence salmon harvests took place within the Juneau and Sitka management areas. From 1996-2001, Kanalku Bay provided most of the harvest: from 1,261 to 2,125 salmon and from 62% to 88% of the total salmon harvest (Table 9, Figure 20). Since 2002, however, following the voluntary closure of subsistence fishing at this location, virtually no subsistence salmon harvests have occurred at Kanalku Bay. In 1996 through 1998, Hasselborg Creek was the second-most important subsistence salmon fishing area for Angoon residents, but harvests there also dropped notably after 1998. Kook Lake Outlet and Sitkoh Lake Creek were the primary subsistence salmon harvest locations from 2002 to 2004. During those 3 years, Kook Lake Outlet accounted for an average of 850 salmon and from 30% to 63% of the total, compared to an average of 85 salmon from 1996 through 2001. In the same 3 years, Sitkoh Lake Creek averaged a harvest of 820 salmon and contributed between 21% and 62% of the total harvest. However, harvests in both of these locations dropped in 2005 and 2006. In 2006, harvests of 491 salmon in Little Basket Bay accounted for 46% of the total estimated harvest of 1,071 (the second lowest total harvest in the 11 year period). No harvests were reported at this location from 1996 through 2005.

In summary, at Angoon from 1996-2006, consistent with the regional pattern, annual subsistence salmon harvests were concentrated in 2 or 3 locations each year. However, these primary harvest locations changed over the 11-year period.

### **Kake Case Study**

Subsistence salmon fisheries in the waters traditionally used by the people of Kake (Tlingit *Kéex' Kwáan* [Thornton 2008:45]) are under the management responsibility of the Petersburg area office of the Division of Commercial Fisheries. In 1989, the board adopted a positive finding for customary and traditional uses of salmon in the waters of Section 9A and 9B, in waters north of the latitude of Swain Point, in the waters of District 10 west of a line from Pinta Point to False Point Pybus, and in waters of District 5 north of a line from Point Barrie to Boulder Point (5 AAC 01.716(10)). Principal salmon waters and streams used by Kake fishers include Gut Bay and Falls Lake Creek flowing into Chatham Strait on the southwest coast of Baranof Island, as well as Saginaw, Security (Salt Lake), Pillar (Kutlaku Creek), and Tebenkof (Alecks Creek) bays on Kuiu Island (Goldschmidt and Haas 1998:91-95).

The residents of Kake are the principal subsistence users of the salmon stocks in Gut Bay and Falls Lake Creek on Baranof Island and in Saginaw, Security, Pillar, and Tebenkof bays on Kuiu Island. In 2000, Kake had a population of 710 in 246 households; the population was estimated at 535 in 2007 (ADLWD 2009). Kake residents shared the use of the southern coastal waters of Admiralty Island with the residents of Angoon and Petersburg. In recent years, the principal subsistence salmon fishing effort by Kake residents has occurred in Gut Bay and Falls Creek on Baranof Island, and at Kutlaku Creek in Pillar Bay.

From 1996-2006, Kake residents held an average of 177 subsistence salmon permits, ranging from 133 in 2006 to 214 in 1999 (Table 7). The average annual subsistence salmon harvest by Kake residents during that 11-year period was 2,729 fish, ranging from 2,007 salmon in 2005 to 3,672 salmon in 2003 (Table 10, Figure 21). There were no apparent trends in harvest levels over this 11-year period. A household survey in Kake pertaining to 1996 resulted in an estimated harvest of salmon for home use of 6,331 fish, including 4,564 salmon with subsistence nets (72%), 771 salmon with rod and reel (12%), and 996 salmon removed from commercial harvests (16%) (Table 3). According to the results of a household survey pertaining to 2001, Kake residents harvested 5,302 salmon, including 4,665 salmon with subsistence nets (88%) and 637 salmon with rod and reel (12%). Salmon removed from commercial harvests for home use were not recorded in this survey (Table 3).

Falls Creek on Baranof Island was the primary subsistence salmon harvest location for Kake residents from 1996-2006, with an annual average harvest of 1,483, which is 54% of the 11-year total (Table 11, Figure 22). From 1996 through 1999, Kutlaku Creek ranked second, but harvests at that location dropped beginning in 2000. Gut Bay was the other major fishing location, with about 16% of the harvest over the 11-year period.

Kake exhibited more stability in harvest patterns over the 11-year period than did Angoon, with Falls Creek ranking first in terms of size of salmon harvests in all years. The contribution of Kutlaku Creek declined, with corresponding increases in harvests at Falls Creek and Gut Bay.

### **Sitka Case Study**

Subsistence salmon fisheries in the waters traditionally used by the residents of Sitka (Tlingit *Sheet'ká* or *Sheey At'iká Kwáan* [Thornton 2008:45]) are under the management responsibility of

the Sitka area office of the Division of Commercial Fisheries. In 1989, the board adopted a positive finding for customary and traditional uses of sockeye salmon in the waters of Section 13A south of the latitude of Cape Edward, in waters of Section 13B north of the latitude of Redfish Cape, and in waters of Section 13C (5 AAC 01.716 (8)). At the March 1997 board meeting in Sitka, this finding was extended to include all other salmon species (5 AAC 01.716 (21)). Principal salmon waters and streams used by Sitka fishers include Klag Bay-Lake Anna, Lake Stream-Ford Arm, Necker Bay, Redoubt Bay, Salmon Lake, and Redfish Bay. The Sitka area office also manages the subsistence salmon fisheries at Surge Bay and Hoktaheen Cove on the west coast of Yakobi Island, and Sitkoh Bay on the east side of Chichagof Island.

The residents of Sitka are the principal subsistence users of the salmon stocks in the Sitka Management Area. In 2000, Sitka had a population of 8,835 in 3,278 households; the 2007 estimate was 8,640 (ADLWD 2009). The Sitka Tlingit have traditionally used most of the Pacific coast of Baranof and Chichagof islands from Point Urey in the north to Cape Ommaney, including the myriad islands lying off the coast, and extending up Peril Strait between Chichagof and Baranof islands into Hoonah Sound as far as Patterson Bay (Goldschmidt and Haas 1998:61-66). Sitkans share the uses of Yakobi Island, the sockeye salmon fisheries at Hoktaheen Cove, and Surge Bay with residents of Hoonah. Sitka territory touches that of Angoon in Peril Strait and Sitkoh Bay.

During the 11-year period from 1996 through 2006, Sitka residents held an average of 713 subsistence salmon permits, ranging from 519 in 2001 to 840 in 1999 (Table 7). They averaged an annual subsistence salmon harvest of 16,572 fish, and ranged from a low of 10,711 salmon in 1997 to a high of 21,614 salmon in 2003 (Table 12, Figure 23). No discernable trend in harvest levels is evident over this 11-year period. Household surveys resulted in an estimate of 32,829 salmon taken in subsistence nets by residents of Sitka in 1996 and an estimate of 15,304 salmon harvested in subsistence nets in 2001 (Table 3).

In every year from 1996 through 2006, except 1997, three streams contributed 80% or more of Sitka's subsistence salmon harvest (Table 13, Figure 24). However, harvests in particular streams varied widely during this period. For example, Necker Bay Lake provided the largest portion of the harvest, 41%, over the 11 year period, but as a percentage of the total harvest, its contribution ranged from 77% in 2000 (with a harvest of 9,837 salmon) and 74% in 2001 (with a harvest of 11,291 salmon), to 25% in 2004 (with a harvest of 4,708 salmon) and just 15% in 2006 (harvest of 3,009 salmon). Harvests at Redoubt Lake Outlet had even more variation from year to year. This location ranked second, with 33% of the total harvest over the 11-year period and ranked first from 2003 through 2006, with harvests ranging from 5,467 salmon in 2005 to 13,864 salmon in 2006. However, virtually no harvests occurred at Redoubt Lake Outlet in 2000 and 2001. Over the 11-year period, Fish Camp-Klag Bay generally ranked third, contributing 13% of the total harvest, but harvests at this location varied from a low of 930 salmon in 1998 (6% of the total) to 4,104 salmon in 1996 (21% of the total).

In summary, as in other communities from 1996-2006, subsistence salmon harvests by Sitka residents tended to be concentrated in about 3 locations each year. However, harvests from particular streams varied widely from year to year as did the relative contribution of these streams to the overall harvest.

## Hoonah Case Study

Subsistence salmon fisheries in the waters traditionally used by Hoonah residents (Tlingit *Xunaa Kwáan* [Thornton 2008:45]) are under the management responsibility of the Juneau and Sitka area management offices of the Division of Commercial Fisheries. In 2000, Hoonah had a population of 860 in 300 households; the population was 852 in 2007 (ADLWD 2009). In 1989, the board adopted a positive C&T finding for salmon in District 12 waters of Basket Bay inside a line from 57°30.83' N. lat., 134°53.20' W. long., to 57°39.28' N. lat., 134°53.88' W. long.; in District 13 in waters along the western shore of Yakobi Island east of a line from Cape Spencer Light to Surge Bay Light; and in waters of sections 14B and 14C, (5 AAC 01.716 (4)). Goldschmidt and Haas (1998:53-60) describe the traditional areas used by Hoonah Tlingit for subsistence salmon fishing.

During the 11-year period from 1996 through 2006, Hoonah residents held an annual average of 142 subsistence salmon permits, with a range of 79 permits in 2006 to 169 permits in 1999 (Table 7). Hoonah residents averaged an annual subsistence salmon harvest of 2,260 fish, with a range from a low of 507 salmon in 2006 to a high of 3,824 salmon in 1997 (Table 14, Figure 25). Estimated harvests from 2000 through 2006 were lower than those from 1996 through 1999. A household survey in Hoonah pertaining to 1996 resulted in an estimated harvest of salmon for home use of 17,291 fish, including 6,629 salmon with subsistence nets (38%), 5,422 salmon with rod and reel (31%), and 5,240 salmon removed from commercial harvests (30%) (Table 3). According to the results of a household survey pertaining to 2001, Hoonah residents harvested 5,694 salmon, including 4,416 salmon with subsistence nets (78%) and 1,278 salmon with rod and reel (22%). Salmon removed from commercial harvests for home use were not recorded in this survey (Table 3).

In most years from 1996-2006, two or three streams contributed 80% or more of Hoonah's subsistence salmon harvest (Table 15, Figure 26). However, harvests in particular streams varied widely during this period. For example, Hoktaheen Cove provided the largest portion of the harvest, 43%, over the 11-year period, but as a percentage of the total harvest, its contribution ranged from 66% in 2002 (with a harvest of 988 salmon) and 60% in 2004 (with a harvest of 1,616 salmon), to 23% in 1999 (with a harvest of 782 salmon). The two other areas that provided most of the harvest during the 11 year period exhibited even more variability from year to year. Overall, harvests at Excursion Inlet provided 22% of the total harvest from 1996 to 2006, and in 4 years harvests at this location were greater than at any other place. However, no harvests were reported at Excursion Inlet in the other 7 years. Neva Creek ranked third over the 11-year period with 17% of the harvest; however, harvests ranged from 1,506 salmon and 39% of the total in 1997 and 1,281 salmon and 46% of the total in 1996, to 48 salmon in 2006 (10%), 38 salmon in 2002 (3%), 37 salmon in 1999(1%), and 6 salmon in 1998 (0.2%). A few other locations, such as Takanis Bay and Surge Bay, made notable contributions to the community harvest in a few years, but had low to no harvests in others.

In summary, as in other communities, subsistence salmon harvests by Hoonah residents tended to be concentrated in about 2 or 3 locations each year. However, harvests from particular streams varied widely from year to year as did the relative contribution of these streams to the overall harvest.

## IV. DISCUSSION

### SUMMARY

In summary, this review of data about the subsistence salmon fishery in the Southeastern and Yakutat areas supports several general conclusions.

- During the 11-year period, subsistence salmon harvests in the Southeast Alaska/Yakutat Region averaged 68,183 fish, with a range of 48,854 to 80,071. Overall, harvests appear to have declined over this time period.
- Most of the subsistence harvest (84% in the Southeast Alaska/Yakutat Region) consists of sockeye salmon, although smaller harvests of 4 other species also occur.
- Estimates based on returned subsistence permits may underestimate subsistence harvests, based upon comparisons with data from household surveys.
- In addition to subsistence nets and seines, salmon for home uses are also harvested by rod and reel or removed from commercial harvests.
- Subsistence harvests occur throughout the region and many water bodies are used for subsistence salmon harvests, including 144 water bodies from 1994 to 2004.
- However, each year, a relatively small number of locations account for 80% or more of the subsistence salmon harvests in each management area and for specific communities.
- The primary locations of subsistence harvests within permit areas often change from year to year.

### SPECIFICITY OF ANS FINDINGS FOR SALMON

Table 16 summarizes current ANS findings for salmon throughout the state as established by the board either in regulation or by administrative finding. Of the 13 subsistence finfish management areas in the state, 6 (54%) (including the Southeastern Alaska/Yakutat region) have ANS findings that combine all species of salmon into a single range (Figure 27). For 3 other management areas (23%), the ANS findings include ranges for multiple salmon species. For the remaining 3 management areas (23%), a species-specific finding is embedded within a more general ANS range for salmon. As also shown in Table 16 and Figure 27, the ANS findings for salmon in 6 management areas (46%) (including Yakutat) pertain to the entire area without any further geographic subdivision, while the findings for 5 areas (including Southeastern) have specific findings for separate geographic portions of the entire area. In the remaining 2 areas, a specific finding for one portion of the area is embedded in an area-wide finding. In no area does an ANS finding for salmon establish ranges for multiple streams, the level of detail proposed in Proposal 236.

### OPTIONS FOR ANS AND ACTIONS ON PROPOSAL 236

In determining ANS ranges, the board bases its finding on stocks that are “manageable as a unit” and upon subsistence use patterns, including levels of harvests over a specified period of time

and locations of harvests. Given the multiple locations of subsistence harvests in the Southeastern/Yakutat Region and variability from year to year in harvests at particular locations, ANS determinations at the stream and species level as suggested in Proposal 236 are not a viable alternative to the findings at the “management area” level currently in place. However, the board may want to consider more precise ANS findings that reflect the traditional uses of particular communities or groups of communities to develop a more useful tool for evaluating subsistence harvests, consistent with the intent of Proposal 236.

In responding to Proposal 236, the board might consider the following 3 options.

1. No action – leave current ANS findings for salmon in place.
2. No action, but with a directive to ADF&G and the public to develop comprehensive options for the next Southeast Alaska finfish meeting (in 2012) for more precise ANS findings for salmon.
3. Adopt an amended Proposal 236 to address appropriate modifications to ANS findings for salmon for one permit area; evaluate the ANS over the next 3-year period and invite proposals for other areas for the 2012 finfish meeting.

Another factor to consider in preparing a response to Proposal 236 is the source of the data used to formulate ANS ranges. As noted above, there are questions about the comprehensiveness of the permit database, especially when comparing between harvest estimates based on permit returns and those based on household surveys. An ANS range based solely on permit data has several potential disadvantages, including:

1. The permit database may significantly underestimate harvests due to underreporting or nonparticipation.
2. The subsistence permit program does not document all harvests for home uses, such as those occurring with rod and reel gear and fish removed from commercial harvests for home use.
3. For some fishers, the permit program is perceived to be an enforcement tool rather than a management tool, and this perception is a disincentive for full participation in the harvest monitoring program.

On the other hand, basing the ANS range on data from the permit program has several advantages, including:

1. The permit program is an ongoing, annual program with an established time series that covers the entire management region.
2. The program is backed by regulation; the board requires permits and harvest reporting as a key component of salmon management.
3. The permit program is already a part of the cost structure of ADF&G, in that it is built into ongoing ADF&G management programs and can be administered through area offices and partner communities and organizations.

There are also several advantages of using household survey data for establishing or revising ANS ranges, including:

1. Household surveys document harvests for home use with all gear types.

2. Surveys are confidential, and respondents know that, so estimates may be more complete than permit data both in terms of total harvests reported and the number of participants in the subsistence fishery.

There are also several disadvantages of relying on household survey data for establishing ANS ranges and subsequent tracking of subsistence harvests, including:

1. Survey data are available for a very limited number of years and are lacking for some communities.
2. The survey effort required to gather data for all Southeast Alaska is not generally part of the ADF&G cost structure and so data are relatively expensive and time-consuming to collect compared to permit data.
3. Because surveys are conducted at the end of the season, relying on recall may affect the precision of the data, especially daily harvests by species and location.

We recommend that the board continue to use permit data for any revisions to ANS primarily because the permit data are multiyear, detailed, and are collected in an ongoing program. However, regardless of the board's actions on Proposal 236, it will be necessary for ADF&G to improve participation and data accuracy for some communities.

As noted above, an option for the board in acting on Proposal 236 is to amend the proposal to address appropriate modifications to ANS findings for salmon for one management area, evaluate the new ANS finding over the next 3 years, and invite proposals for other areas for the 2012 Southeast Alaska finfish meeting. Because Proposal 236 was submitted by an organization (Kootznoowoo Inc.) representing subsistence fishers from Angoon, the following option focuses on a revised ANS range for the Juneau Management Area that includes a specific finding for locations traditionally fished by Angoon residents. As discussed in the Angoon case example above, from 1996 to 2006, most of Angoon's subsistence harvests occurred within District 12, and the remainder took place at Sitkoh Lake creek or bay within District 13. In this option, as shown in Table 17, estimated harvests in these areas from all years except 2002, 2005, and 2006 (when subsistence harvests fell below the established ANS) would be the basis for a revised ANS. In Option A, consistent with the approach the board used in 2006, the low annual estimate (2,317 salmon in 2004) and high annual estimate (4,209 salmon in 1996) during this period would be used to define the ANS range. In Option B, consistent with more recent board procedures for defining ANS ranges, the range is defined as  $\pm 25\%$  of the annual mean of 3,065 salmon and rounded to the nearest 100 salmon. If a separate ANS finding for District 12 and Sitkoh Bay were established, adjustments to some of the other ANS findings for the remainder of the Southeastern Management Area would be necessary. The revised regulation would be as follows, using Option B in Table 17.

#### 5 AAC 01.716. CUSTOMARY AND TRADITIONAL USES OF FISH STOCKS AND AMOUNT NECESSARY FOR SUBSISTENCE USES

(c) The board finds that the following numbers of salmon are reasonably necessary for subsistence uses in the Southeastern Alaska Area:

- (1) [no change];
- (2) [no change];

(3) Section 9-A and District 13, except those waters draining into and including Sitkoh Bay: 10,187 – 19,725;

(4) Districts 11, 14, and 16: 1,878 – 6,333;

(5) District 12 and that portion of District 13 draining into and including Sitkoh Bay: 2,300 – 3,800;

(6) District 15: 7,174 – 10,414.

We are providing this option for discussion purposes. During these discussions, other preferred options could be developed based on input from the public and further data analysis.

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## **TABLES AND FIGURES**

Table 1.–Customary and traditional use findings and amounts reasonably necessary for subsistence, salmon, Southeastern/Yakutat region.

Management area	Stock with positive customary and traditional use (C&T) findings	Amount reasonably necessary for subsistence (ANS) findings	Regulation
Ketchikan	Salmon, districts 1-4	9,068 - 17,503 salmon	5 AAC 01.716(c)(1)
Petersburg/ Wrangell	Salmon, districts 5-8, District 10, and Section 9B	4,120 - 7,345 salmon	5 AAC 01.716(c)(2)
Sitka	Salmon, Section 9A and District 13	10,487 - 20,225 salmon	5 AAC 01.716(c)(3)
Juneau	Salmon, districts 11, 12, 14, and 16	4,178 - 10,133 salmon	5 AAC 01.716(c)(4)
Haines	Salmon, District 15	7,174 - 10,414 salmon	5 AAC 01.716(c)(5)
Yakutat	Salmon	5,800 - 7,832 salmon	5 AAC 01.666(b)

Table 2.-Overall subsistence/personal use salmon harvest in Southeast Alaska/Yakutat region by year, permit data 1996-2006.

Year	Number of permits				Subsistence/personal use estimated harvest <sup>a</sup>					
	Issued	Returned	Fished returned	Fished estimated <sup>a</sup>	Chinook	Sockeye	Coho	Pink	Chum	Total
1996	4,171	3,342	2,085	2,587	1,165	67,741	2,884	5,178	3,102	80,071
1997	4,211	3,529	2,060	2,460	781	58,316	2,580	4,329	3,994	70,000
1998	4,272	3,651	2,197	2,568	1,085	62,139	3,101	6,002	3,927	76,254
1999	4,308	3,709	2,144	2,468	1,402	56,363	1,915	5,173	3,255	68,108
2000	3,771	3,198	1,870	2,184	1,367	52,624	2,121	3,443	2,590	62,144
2001	3,609	3,122	1,838	2,111	1,459	54,549	3,106	3,935	4,408	67,457
2002	3,328	2,785	1,697	2,008	1,901	55,448	3,260	2,152	3,269	66,030
2003	3,595	2,956	1,922	2,312	1,533	65,427	2,856	4,056	3,890	77,762
2004	3,703	3,294	1,999	2,232	1,581	60,331	2,465	3,158	3,127	70,662
2005	3,315	2,798	1,481	1,735	869	39,033	2,231	1,817	4,904	48,854
2006	3,406	2,808	1,696	2,026	1,362	54,075	1,891	1,752	3,593	62,673
Average 1996-2000	4,147	3,486	2,071	2,453	1,160	59,437	2,520	4,825	3,374	71,315
Standard deviation 1996-2000	217	214	124	161	250	5,775	500	973	590	7,021
Average 2001-2006	3,493	2,961	1,772	2,071	1,451	54,811	2,635	2,812	3,865	65,573
Standard deviation 2001-2006	164	209	187	202	338	8,867	530	1,047	685	9,656
Average 1996-2006	3,790	3,199	1,908	2,245	1,319	56,913	2,583	3,727	3,642	68,183
Standard deviation 1996-2006	386	340	219	266	325	7,648	494	1,425	663	8,679

Source ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

a. Expansion from reported numbers based on the number of permits issued, returned, and non-returned.

Table 3.—Comparison of salmon harvest estimates by household survey and permit data, 1996-2006.

Year	Community	Number harvested, household survey				Total number harvested, permit	Difference between permit and HH survey, subsistence gear only	Percentage of difference between permit and HH survey, subsistence gear only	Difference between permit and HH survey, all gear types	Percentage of difference between permit and HH survey, all gear types	Percentage of difference between permit and HH survey, rod and reel only	Percentage of difference between permit and HH survey, commercial removals only
		Subsistence gear <sup>a</sup>	Rod and reel	Removed from commercial catch	Total, all gear types							
1996	Angoon	3,646	1,456	2,794	7,896	2,894	-752	79.4%	-5,002	36.7%	18.4%	35.4%
2001	Angoon	2,319	138	-	-	2,020	-299	87.1%	-	-	-	-
1998	Coffman Cove	818	2,042	69	2,928	188	-630	23.0%	-2,740	6.4%	69.7%	2.4%
1997	Craig	10,202	6,966	2,864	20,032	4,359	-5,843	42.7%	-15,673	21.8%	34.8%	14.3%
1998	Edna Bay	0	398	278	676	0	0	-	-676	0.0%	58.9%	41.1%
1996	Game Creek CDP	215	188	8	408	-	-	-	-	-	46.0%	2.0%
1996	Haines	18,107	3,482	1,347	22,937	9,311	-8,796	51.4%	-13,626	40.6%	15.2%	5.9%
2002	Haines	9,368	1,614	-	-	7,775	-1,593	83.0%	-	-	-	-
1998	Hollis	394	1,116	6	1,516	98	-296	24.9%	-1,418	6.5%	73.6%	0.4%
1996	Hoonah	6,629	5,422	5,240	17,291	2,794	-3,835	42.1%	-14,497	16.2%	31.4%	30.3%
2001	Hoonah	4,416	1,278	-	-	2,169	-2,247	49.1%	-	-	-	-
1997	Hydaburg	8,790	645	295	9,730	1,101	-7,689	12.5%	-8,629	11.3%	6.6%	3.0%
1996	Kake	4,564	771	996	6,331	2,969	-1,595	65.1%	-3,362	46.9%	12.2%	15.7%
2001	Kake	4,665	637	-	-	2,297	-2,368	49.2%	-	-	-	-
1998	Kasaan	755	40	14	886	112	-643	14.8%	-774	12.6%	4.5%	1.6%
1997	Klawock	9,670	4,419	1,215	15,304	4,429	-5,241	45.8%	-10,875	28.9%	28.9%	7.9%
1996	Klukwan	5,215	196	49	5,460	-	-	-	-	-	3.6%	0.9%
1998	Naukati Bay	261	1,328	0	1,589	-	-	-	-	-	83.6%	0.0%
2000	Petersburg	377	7,473	9,356	17,206	718	341	190.6%	-16,488	4.2%	43.4%	54.4%
1996	Point Baker	0	133	651	784	34	34	-	-750	4.3%	17.0%	83.0%
1996	Port Protection	254	530	319	1,103	-	-	-	-	-	48.0%	28.9%

-continued-

**Table 3. Page 2. of 2.**

Year	Community	Number harvested, household survey				Total number harvested, permit	Difference between permit and HH survey, subsistence gear only	Percentage of difference between permit and HH survey, subsistence gear only	Difference between permit and HH survey, all gear types	Percentage of difference between permit and HH survey, all gear types	Percentage of difference between permit and HH survey, rod and reel only	Percentage of difference between permit and HH survey, commercial removals only
		Subsistence gear <sup>a</sup>	Rod and reel	Removed from commercial catch	Total, all gear types							
1999	Saxman	3,751	1,682	1,008	6,440	-	-	-	-	-	26.1%	15.7%
1996	Sitka	32,829	35,788	15,577	84,194	19,178	-13,651	58.4%	-65,016	22.8%	42.5%	18.5%
2005	Sitka	15,304	1,934	-	-	12,031	-3,273	78.6%	-	-	-	-
1998	Thorne Bay	1,467	5,506	147	7,119	1,072	-395	73.1%	-6,047	15.1%	77.3%	2.1%
1998	Whale Pass	47	272	0	319	0	-47	0.0%	-319	0.0%	85.4%	0.0%
1996	Whitestone Logging Camp	17	486	-	-	-	-	-	-	-	-	-
2000	Wrangell	1,418	846	2,729	4,993	1,213	-205	85.6%	-3,780	24.3%	16.9%	54.7%
2000	Yakutat	12,548	1,574	1,959	16,081	6,171	-6,377	49.2%	-9,910	38.4%	9.8%	12.2%

Sources ADF&G Community Subsistence Information System (CSIS). [www.subsistence.adfg.state.ak.us/CSIS](http://www.subsistence.adfg.state.ak.us/CSIS); Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

a. Subsistence gear includes gear used in personal use fisheries.

A dash "-" indicates no data.

Table 4.–Number of water bodies fished for salmon, by community, 1996-2006.

Community of residence	Mean number fished	Minimum number fished	Maximum number fished	Standard deviation	Number of years a water body was fished between 1996-2006
Angoon	5.6	4	9	1.4	11
Auke Bay	3.1	2	5	1.0	11
Coffman Cove	2.1	1	5	1.5	8
Craig	11.6	9	15	2.0	11
Douglas	5.1	2	9	1.8	11
Edna Bay	1.0	1	1	-	1
Elfin Cove	1.2	1	2	0.4	9
Excursion Inlet	1.0	1	1	-	1
Gustavus	3.9	2	7	1.4	11
Haines	5.3	4	7	0.8	11
Hollis	3.0	1	6	1.7	10
Hoonah	10.5	6	16	3.3	11
Hydaburg	3.4	3	5	0.7	11
Hyder	1.5	1	2	0.7	2
Juneau	22.5	17	28	3.3	11
Kake	8.4	6	12	2.1	11
Kasaan	2.2	1	3	0.9	11
Ketchikan	16.1	11	20	2.9	11
Klawock	6.0	4	8	1.3	11
Klukwan	1.0	1	1	0.0	3
Loring	1.0	1	1	-	1
Metlakatla	1.6	1	3	0.7	11
Meyers Chuck	1.0	1	1	0.0	4
Naukati	1.4	1	3	0.9	5
Pelican	1.7	1	3	0.6	11
Petersburg	7.9	6	11	1.4	11
Point Baker	1.8	1	5	1.4	9
Port Alexander	1.0	1	1	0.0	4
Port Protection	2.0	2	2	-	1
Saxman	3.3	1	6	1.8	8
Sitka	18.3	14	21	2.4	11
Skagway	2.6	1	4	1.3	11
Tenakee Springs	2.0	1	3	0.7	9
Thorne Bay	5.6	3	8	1.6	11
Ward Cove	3.4	1	7	2.3	11
Whale Pass	1.3	1	2	0.5	4
Wrangell	6.0	3	9	2.1	11
Yakutat	9.6	6	12	1.9	11

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 5.—Number of water bodies fished for salmon by management area, 1996-2006.

Management area	Mean	Minimum	Maximum	Standard deviation	Number of years a region was fished between 1996-2006
Haines	5.7	4	7	0.8	11
Juneau	19.5	13	29	4.5	11
Ketchikan	18.5	15	22	1.9	11
Petersburg	14.7	12	18	2.1	11
Sitka	15.9	13	18	1.4	11
Wrangell	5.7	3	9	1.7	11
Yakutat	10.2	7	13	1.9	11

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 6.—Salmon ANS achievement by management area, 1996-2006.

	<b>Haines</b> (District 15)	<b>Juneau</b> (districts 11, 12, 14, 16)	<b>Ketchikan</b> (districts 1-4)	<b>Petersburg- Wrangell</b> (districts 5-8, 10, Section 9B)	<b>Sitka</b> (Section 9A, District 13)	<b>Yakutat</b>
ANS range	7,174-10,414	4,178-10,133	9,068-17,503	4,120-7,345	10,487-20,225	5,800-7,832
Year	Estimated <sup>a</sup> number of subsistence salmon harvested					
1996	10,398	7,836	14,220	5,574	20,351	6,506
1997	8,312	7,294	12,562	4,514	10,843	5,834
1998	8,178	6,937	10,409	5,469	17,169	6,686
1999	8,048	6,817	10,121	5,292	16,137	6,109
2000	7,178	4,476	9,121	4,139	13,402	6,955
2001	8,129	5,180	<b><u>8,943</u></b>	4,746	15,617	7,791
2002	8,488	<b><u>3,639</u></b>	<b><u>7,608</u></b>	5,693	19,739	7,828
2003	9,533	5,784	<b><u>8,740</u></b>	7,269	22,218	6,869
2004	9,507	5,485	<b><u>7,427</u></b>	8,403	19,663	7,521
2005	7,681	<b><u>2,715</u></b>	<b><u>4,637</u></b>	<b><u>3,861</u></b>	12,398	<b><u>4,668</u></b>
2006	8,825	<b><u>2,502</u></b>	<b><u>7,583</u></b>	<b><u>4,107</u></b>	20,976	<b><u>5,751</u></b>

Source ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

a. Expansion from reported numbers based on the number of permits issued, returned, and non-returned.

ANS from 5 AAC 01.716(c) for Southeast Area and 5 AAC 01.666 (b) for the Yakutat Area.

**Bold underline** = estimated harvest fell below the ANS range.

Personal use streams excluded.

Table 7.—Number of subsistence salmon permits issued, returned, and fished, Angoon, Hoonah, Kake, and Sitka, 1996-2006.

Year	Angoon				Hoonah				Kake				Sitka			
	Number of subsistence permits		Percentage Estimated		Number of subsistence permits		Percentage Estimated		Number of subsistence permits		Percentage Estimated		Number of subsistence permits		Percentage Estimated	
	Issued	Returned	returned	fished												
1996	120	61	50.8%	69	164	91	55.5%	73	180	152	84.4%	132	787	639	81.2%	543
1997	99	63	63.6%	58	152	113	74.3%	75	211	176	83.4%	138	708	615	86.9%	374
1998	134	77	57.5%	71	152	98	64.5%	49	212	189	89.2%	142	801	706	88.1%	506
1999	110	82	74.5%	66	169	114	67.5%	56	214	191	89.3%	138	840	754	89.8%	530
2000	115	72	62.6%	63	118	75	63.6%	54	180	176	97.8%	109	601	583	97.0%	310
2001	115	58	50.4%	46	150	99	66.0%	46	191	183	95.8%	123	519	504	97.1%	301
2002	91	58	63.7%	51	141	71	50.4%	48	156	143	91.7%	80	563	528	93.8%	325
2003	102	55	53.9%	61	150	37	24.7%	29	175	165	94.3%	102	749	715	95.5%	528
2004	106	86	81.1%	48	162	134	82.7%	72	155	131	84.5%	103	778	745	95.8%	516
2005	90	35	38.9%	20	130	61	46.9%	40	142	135	95.1%	77	680	669	98.4%	357
2006	96	44	45.8%	31	79	29	36.7%	19	133	118	88.7%	70	814	782	96.1%	562
Average	107	63	58.7%	53	142	84	58.8%	51	177	160	90.3%	110	713	658	92.3%	441

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 8.–Subsistence salmon harvests by residents of Angoon, number of fish by water body, 1996-2006.

Year	Estimated number of salmon harvested						Total
	Kanalku Bay	Hasselborg Creek	Kook Lake Outlet	Sitkoh Lake Creek	Little Basket Bay	All other water bodies	
1996	1,825	533	137	350	0	49	2,894
1997	1,841	606	63	0	0	326	2,837
1998	1,886	496	101	0	0	126	2,609
1999	2,125	189	19	69	0	31	2,432
2000	1,902	182	14	0	0	69	2,167
2001	1,261	139	174	200	0	245	2,020
2002	21	165	830	273	0	30	1,320
2003	101	62	1,160	939	0	132	2,394
2004	46	69	560	1,248	0	86	2,008
2005	43	21	98	226	0	67	455
2006	0	0	87	203	491	290	1,071
Average	1,005	224	295	319	45	132	2,019

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 9.–Subsistence salmon harvests by residents of Angoon, water body contribution to total harvest, 1996-2006.

Year	Percentage of total harvest estimate						Total
	Kanalku Bay	Hasselborg Creek	Kook Lake Outlet	Sitkoh Lake Creek	Little Basket Bay	All other water bodies	
1996	63.0%	18.4%	4.7%	12.1%	0.0%	1.7%	100.0%
1997	64.9%	21.4%	2.2%	0.0%	0.0%	11.5%	100.0%
1998	72.3%	19.0%	3.9%	0.0%	0.0%	4.8%	100.0%
1999	87.4%	7.8%	0.8%	2.8%	0.0%	1.3%	100.0%
2000	87.8%	8.4%	0.6%	0.0%	0.0%	3.2%	100.0%
2001	62.4%	6.9%	8.6%	9.9%	0.0%	12.1%	100.0%
2002	1.6%	12.5%	62.9%	20.7%	0.0%	2.3%	100.0%
2003	4.2%	2.6%	48.5%	39.2%	0.0%	5.5%	100.0%
2004	2.3%	3.4%	27.9%	62.1%	0.0%	4.3%	100.0%
2005	9.4%	4.7%	21.5%	49.6%	0.0%	14.8%	100.0%
2006	0.0%	0.0%	8.2%	18.9%	45.8%	27.1%	100.0%
Average	49.8%	11.1%	14.6%	15.8%	2.2%	6.5%	100.0%

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 10.–Subsistence salmon harvests by residents of Kake, number of fish by water body, 1996-2006.

Year	Estimated number of salmon harvested						Total
	Falls Creek Baranof Island	Kutlaku Creek	Gut Bay Head	Salt Chuck - Security	Alecks Creek	All other water bodies	
1996	1,273	918	545	182	29	22	2,969
1997	1,134	705	345	375	29	150	2,739
1998	1,272	687	760	172	83	173	3,148
1999	1,100	982	268	137	172	182	2,842
2000	821	225	408	230	227	97	2,008
2001	1,391	97	583	21	154	50	2,297
2002	1,815	207	135	85	59	129	2,429
2003	2,374	407	270	331	154	135	3,672
2004	2,285	431	508	99	0	139	3,461
2005	1,247	134	510	58	0	58	2,007
2006	1,605	13	616	168	0	45	2,448
Average	1,483	437	450	169	82	107	2,729

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 11.–Subsistence salmon harvests by residents of Kake, water body contribution to total harvest, 1996-2006.

Year	Percentage of total harvest estimate						Total
	Falls Creek Baranof Island	Kutlaku Creek	Gut Bay Head	Salt Chuck - Security	Alecks Creek	All other water bodies	
1996	42.9%	30.9%	18.4%	6.1%	1.0%	0.8%	100.0%
1997	41.4%	25.8%	12.6%	13.7%	1.1%	5.5%	100.0%
1998	40.4%	21.8%	24.1%	5.5%	2.7%	5.5%	100.0%
1999	38.7%	34.6%	9.4%	4.8%	6.0%	6.4%	100.0%
2000	40.9%	11.2%	20.3%	11.5%	11.3%	4.8%	100.0%
2001	60.6%	4.2%	25.4%	0.9%	6.7%	2.2%	100.0%
2002	74.7%	8.5%	5.6%	3.5%	2.4%	5.3%	100.0%
2003	64.7%	11.1%	7.4%	9.0%	4.2%	3.7%	100.0%
2004	66.0%	12.4%	14.7%	2.9%	0.0%	4.0%	100.0%
2005	62.1%	6.7%	25.4%	2.9%	0.0%	2.9%	100.0%
2006	65.6%	0.5%	25.2%	6.9%	0.0%	1.8%	100.0%
Average	54.4%	16.0%	16.5%	6.2%	3.0%	3.9%	100.0%

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 12.–Subsistence salmon harvests by residents of Sitka, number of fish by water body, 1996-2006.

Year	Estimated number of salmon harvested						Total
	Redoubt Lake Outlet	Necker Bay Lake	Fish Camp - Klag Bay	Redfish Bay Head	Lake Stream Ford Arm	All other water bodies	
1996	4,130	8,826	4,104	709	104	1,305	19,178
1997	2,565	4,332	1,306	1,146	313	1,050	10,711
1998	4,942	7,582	930	1,047	1,326	1,060	16,887
1999	7,372	5,339	1,095	657	370	793	15,626
2000	35	9,837	1,054	296	769	775	12,766
2001	16	11,291	1,389	471	1,073	1,112	15,352
2002	1,343	10,388	3,992	1,185	1,200	756	18,865
2003	10,991	6,157	2,337	826	607	697	21,614
2004	9,466	4,708	3,195	485	276	751	18,882
2005	5,467	3,600	2,354	226	56	329	12,031
2006	13,864	3,009	2,008	967	101	436	20,385
Average	5,472	6,824	2,160	729	563	824	16,572

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 13.–Subsistence salmon harvests by residents of Sitka, water body contribution to total harvest, 1996-2006.

Year	Percentage of total harvest estimate						Total
	Redoubt Lake Outlet	Necker Bay Lake	Fish Camp - Klag Bay	Redfish Bay Head	Lake Stream Ford Arm	All other water bodies	
1996	21.5%	46.0%	21.4%	3.7%	0.5%	6.8%	100.0%
1997	23.9%	40.4%	12.2%	10.7%	2.9%	9.8%	100.0%
1998	29.3%	44.9%	5.5%	6.2%	7.9%	6.3%	100.0%
1999	47.2%	34.2%	7.0%	4.2%	2.4%	5.1%	100.0%
2000	0.3%	77.1%	8.3%	2.3%	6.0%	6.1%	100.0%
2001	0.1%	73.6%	9.0%	3.1%	7.0%	7.2%	100.0%
2002	7.1%	55.1%	21.2%	6.3%	6.4%	4.0%	100.0%
2003	50.8%	28.5%	10.8%	3.8%	2.8%	3.2%	100.0%
2004	50.1%	24.9%	16.9%	2.6%	1.5%	4.0%	100.0%
2005	45.4%	29.9%	19.6%	1.9%	0.5%	2.7%	100.0%
2006	68.0%	14.8%	9.9%	4.7%	0.5%	2.1%	100.0%
Average	33.0%	41.2%	13.0%	4.4%	3.4%	5.0%	100.0%

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 14.–Subsistence salmon harvests by residents of Hoonah, number of fish by water body, 1996-2006.

Year	Estimated number of salmon harvested						Total
	Hokatheen Cove	Neva Creek	Excursion Inlet	Takanis Bay	Surge Bay	All other water bodies	
1996	1,249	1,281	0	0	0	264	2,794
1997	2,056	1,506	0	0	0	262	3,824
1998	1,005	6	1,764	13	0	233	3,021
1999	782	37	1,875	0	25	644	3,363
2000	607	190	0	0	28	499	1,324
2001	676	230	774	0	64	426	2,169
2002	988	38	0	0	33	435	1,494
2003	826	152	1,166	0	0	139	2,283
2004	1,616	301	0	115	409	272	2,712
2005	711	307	0	237	0	120	1,374
2006	287	48	0	78	36	58	507
Average	982	372	507	40	54	305	2,260

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 15.–Subsistence salmon harvests by residents of Hoonah, water body contribution to total harvest, 1996-2006.

Year	Percentage of total harvest estimate						Total
	Hokatheen Cove	Neva Creek	Excursion Inlet	Takanis Bay	Surge Bay	All other water bodies	
1996	44.7%	45.9%	0.0%	0.0%	0.0%	9.4%	100.0%
1997	53.8%	39.4%	0.0%	0.0%	0.0%	6.9%	100.0%
1998	33.3%	0.2%	58.4%	0.4%	0.0%	7.7%	100.0%
1999	23.3%	1.1%	55.7%	0.0%	0.7%	19.1%	100.0%
2000	45.8%	14.4%	0.0%	0.0%	2.1%	37.7%	100.0%
2001	31.2%	10.6%	35.7%	0.0%	3.0%	19.6%	100.0%
2002	66.1%	2.5%	0.0%	0.0%	2.2%	29.1%	100.0%
2003	36.2%	6.7%	51.1%	0.0%	0.0%	6.1%	100.0%
2004	59.6%	11.1%	0.0%	4.2%	15.1%	10.0%	100.0%
2005	51.8%	22.3%	0.0%	17.2%	0.0%	8.7%	100.0%
2006	56.6%	9.5%	0.0%	15.4%	7.1%	11.4%	100.0%
Average	43.4%	16.5%	22.4%	1.8%	2.4%	13.5%	100.0%

Source Permit data, ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB).

Table 16.—Amount necessary for subsistence (ANS) findings for salmon.

Area	Stock with positive C&T finding	ANS finding	AAC Citation	Notes
<b>Kotzebue Area</b>	Salmon, sheefish, char, and all other finfish (except herring and herring roe)	None [Administrative finding: 43,500 salmon]		No stocks with C&T findings in this area have an ANS finding in regulation
<b>Norton Sound - Port Clarence</b>	Salmon	96,000 - 160,000 salmon	5 AAC 01.186(b)(1)	
	Chum salmon, Subdistrict 1, Norton Sound District	3,430 - 5,716 chum salmon	5 AAC 01.186(b)(2)	
<b>Yukon - Northern Area</b>	Chinook salmon	45,500 - 66,704 Chinook salmon	5 AAC 01.236(b)(1)	
	Summer chum salmon	83,500 - 142,192 summer chum salmon	5 AAC 01.236(b)(2)	
	Fall chum salmon	89,500 - 167,900 fall chum salmon	5 AAC 01.236(b)(3)	
	Coho salmon	20,500 - 51,980 coho salmon	5 AAC 01.236(b)(4)	
	Pink salmon	None		
<b>Kuskokwim</b>	Chinook salmon, Kuskokwim River drainage	64,500 - 83,000 Chinook salmon	5 AAC 01.286(b)(1)	
	Chum salmon, Kuskokwim River drainage	39,500 - 75,500 chum salmon	5 AAC 01.286(b)(2)	
	Sockeye salmon, Kuskokwim River drainage	27,500 - 39,500 sockeye salmon	5 AAC 01.286(b)(3)	
	Coho salmon, Kuskokwim River drainage	24,500 - 35,000 coho salmon	5 AAC 01.286(b)(4)	
	Pink salmon, Kuskokwim River drainage	None		
	Salmon, remainder of the Kuskokwim Area	7,500 - 13,500 salmon	5 AAC 01.286(b)(5)	
<b>Bristol Bay</b>	Salmon	157,000 - 172,171 salmon	5 AAC 01.336(b)(1)	Includes Kvichak River sockeye Also included in finding for “salmon” for the entire area
	Kvichak River drainage sockeye salmon, excluding Alagnak River stocks	55,000 - 65,000 sockeye salmon	5 AAC 01.336(b)(1)	
<b>Aleutian Islands</b>	Salmon	13,500 - 23,000 salmon	5 AAC 01.366(b)(1)	
<b>Alaska Peninsula Area</b>	Salmon	34,000 - 56,000 salmon	5 AAC 01.416(b)(1)	
<b>Chignik Area</b>	Perryville and Western districts coho salmon	1,400 - 2,600 coho salmon	5 AAC 01.466(b)(1)(A)	

-continued-

**Table 16. Page 2 of 3.**

Area	Stock with positive C&T finding	ANS finding	AAC Citation	Notes
<b>Chignik Area, continued</b>	Perryville and Western districts salmon other than coho salmon	1,400 - 2,600 salmon other than coho salmon	5 AAC 01.466(b)(1)(B)	
	Chignik Bay, Central, and Eastern districts early run sockeye	5,200 - 9,600 early run sockeye salmon	5 AAC 01.466(b)(2)(A)	
	Chignik Bay, Central, and Eastern districts late run sockeye	2,000 - 3,800 late run sockeye salmon	5 AAC 01.466(b)(2)(B)	
	Chignik Bay, Central, and Eastern districts Chinook salmon	100 - 150 Chinook salmon	5 AAC 01.466(b)(2)(C)	
	Chignik Bay, Central, and Eastern districts salmon other than sockeye and Chinook salmon	400 - 700 salmon other than sockeye and Chinook salmon	5 AAC 01.466(b)(2)(D)	
<b>Kodiak Area</b>	Salmon	26,800 - 44,700 salmon	5 AAC 01.536(b)(1)	
<b>Cook Inlet</b>	Salmon, Port Graham, Koyuktolik, port Chatham, and Windy Bay subdistricts Seldovia area (defined at 5 AAC 01.566(a)(1)(B))	4,800 - 7,200 salmon	5 AAC 01.566(d)	The guideline harvest level for Chinook salmon for this fishery is 100 fish (5 AAC 01.560(b)(8)(C))
	Salmon, Tyonek Subdistrict	None [Administrative finding: 750 - 2,750 Chinook; 100 - 275 sockeye; 50 - 100 chum; 50 - 100 pink; 100 - 375 coho.]		The fishery closes when 4,200 Chinook salmon have been harvested (5 AAC 1.560(b)(1)(c))
	Salmon, Yentna River	None [Uncertain if administrative finding exists]		The fishery closes when 2,500 salmon have been harvested (5 AAC 01.593(5))
<b>Prince William Sound</b>	Salmon: Glennallen Subdistrict of Upper Copper River District: that portion at the downstream edge of the Chitina-McCarthy bridge to the mouth of the Tonsina River	25,500 - 39,000 salmon	5 AAC 01.616(b)(1)(A)	

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**Table 16. Page 3 of 3.**

Area	Stock with positive C&T finding	ANS finding	AAC Citation	Notes
<b>Prince William Sound, continued</b>	Salmon: Glennallen Subdistrict of Upper Copper River District: that portion from the mouth of the Tonsina River upstream to the mouth of the Gakona River	23,500 - 31,000 salmon	5 AAC 01.616(b)(1)(B)	
	Salmon: Glennallen Subdistrict of Upper Copper River District: that portion from the mouth of the Gakona River upstream to the mouth of the Slana River, and the area described in 5 AAC 01.647(i)(3) (the Batzulnetas area)	12,000 - 12,500 salmon	5 AAC 01.616(b)(1)(C)	
	Copper River District salmon	3,000 - 5,000 salmon in a year with a commercial fishery; 19,000 - 32,000 salmon in a year without a commercial fishery	5 AAC 01.616(b)(2)(A), 5 AAC 01.616(b)(2)(B)	
	Salmon: Southwestern District and northwest Green Island	2,100 - 3,500 salmon	5 AAC 01.616(b)(3)	
	Salmon: waters from Porcupine Point to Granite Point and from Point Lowe to Tongue Point	1,800 - 3,000 salmon	5 AAC 01.616(b)(4)	
	Salmon: remaining marine waters			
	<b>Yakutat Area</b>	Salmon	5,800 - 7,832 salmon	5 AAC 01.666(b)
<b>Southeastern Alaska Area</b>	Salmon, Districts 1 - 4	9,068 - 17,503 salmon	5 AAC 01.716(c)(1)	
	Salmon, Districts 5 -8, District 10, and Section 9-B	4,120 - 7,345 salmon	5 AAC 01.716(c)(2)	
	Salmon: Section 9-A and District 13	10,487 - 20,225 salmon	5 AAC 01.716(c)(3)	
	Districts 11, 12, 14, and 16	4,178 - 10,133 salmon	5 AAC 01.716(c)(4)	
	District 15	7,174 - 10,414 salmon	5 AAC 01.716(c)(5)	

Table 17.—Options for modifying salmon ANS findings for Southeast Alaska.

Year	Estimated subsistence harvests of salmon		
	District 12	Sitkoh Lake Creek	Total
1996	3,909	300	4,209
1997	3,199	68	3,267
1998	3,154	72	3,225
1999	3,101	80	3,181
2000	2,939	78	3,017
2001	2,278	469	2,747
2002	1,264	225	1,489
2003	1,877	680	2,558
2004	1,096	1,221	2,317
2005	411	303	714
2006	895	211	1,106
Annual mean	2,193	337	2,530
Adjusted mean <sup>a</sup>	2,694	371	3,065

ANS Option A 2,317 to 4,209 salmon (low [2004] and high [1996] define range)

ANS Option B 2,300 to 3,800 salmon (adjusted mean  $\pm$  25%)

Low 2298.82159

High 3831.369317

a. Excludes 2002, 2005, and 2006.

**DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME**

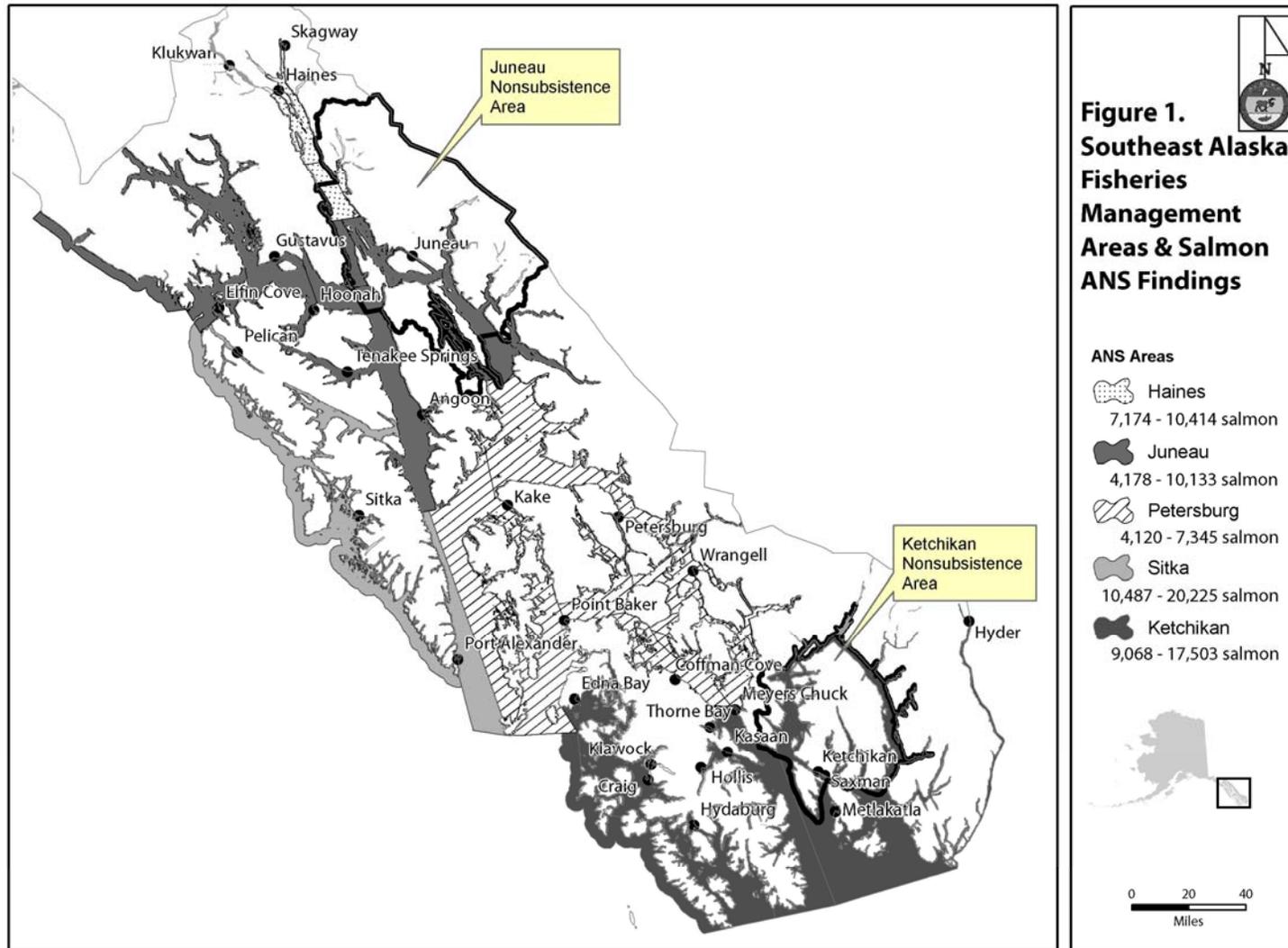


Figure 1.-Map 1. Boundaries of the 6 management areas, 2 nonsubsistence areas, and locations of C&T findings.

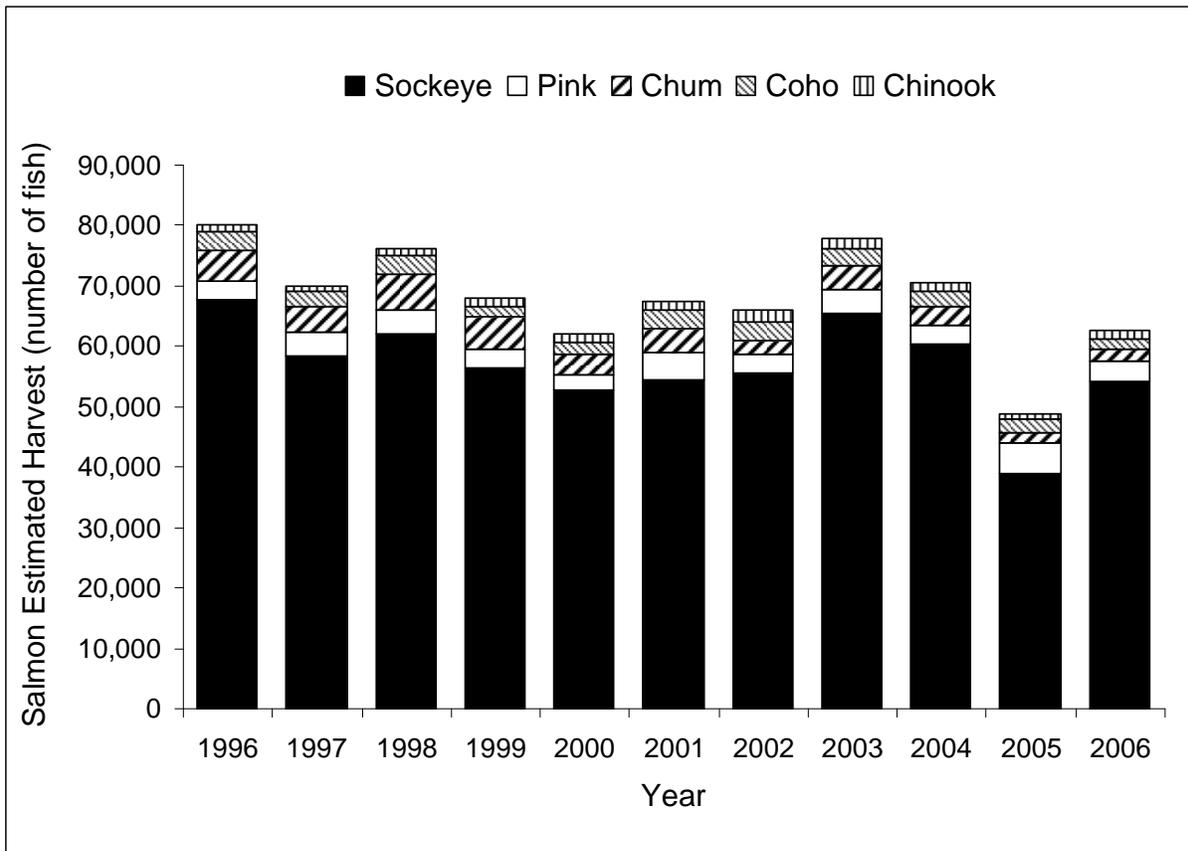


Figure 2.-Estimated salmon harvest (number of fish) in subsistence/personal use fisheries by species, Southeastern/Yakutat Region, 1996-2006.

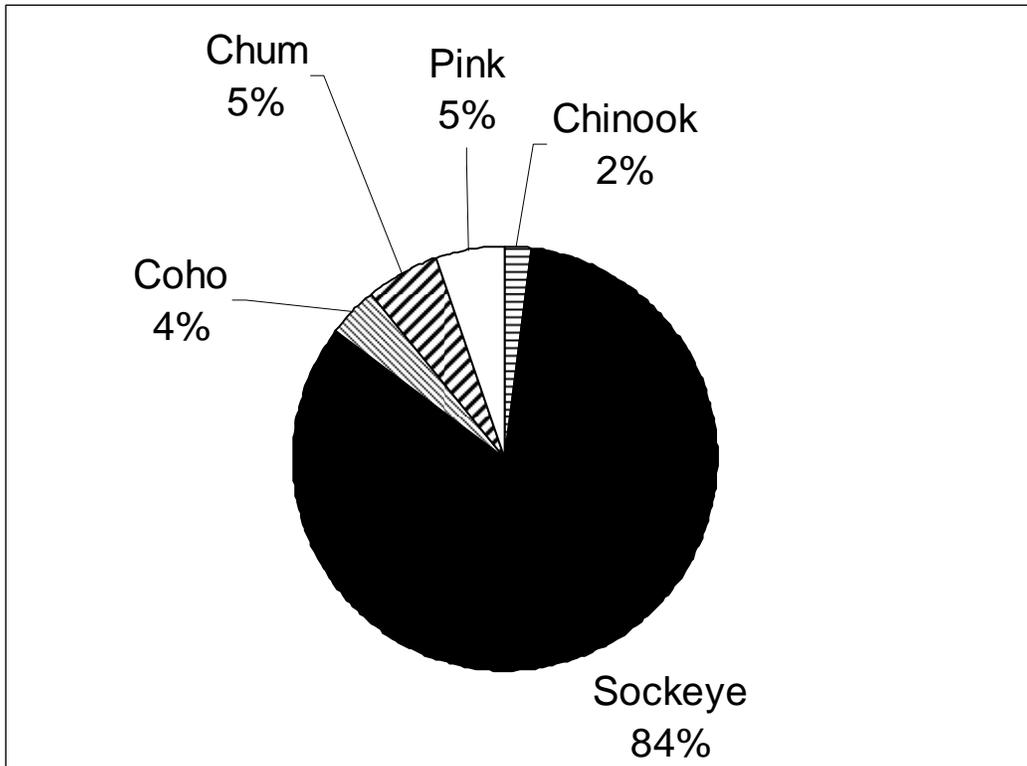


Figure 3.-Composition (proportion of number of fish) of subsistence/personal use salmon harvest by species, Southeastern/Yakutat Region, 1996-2006.

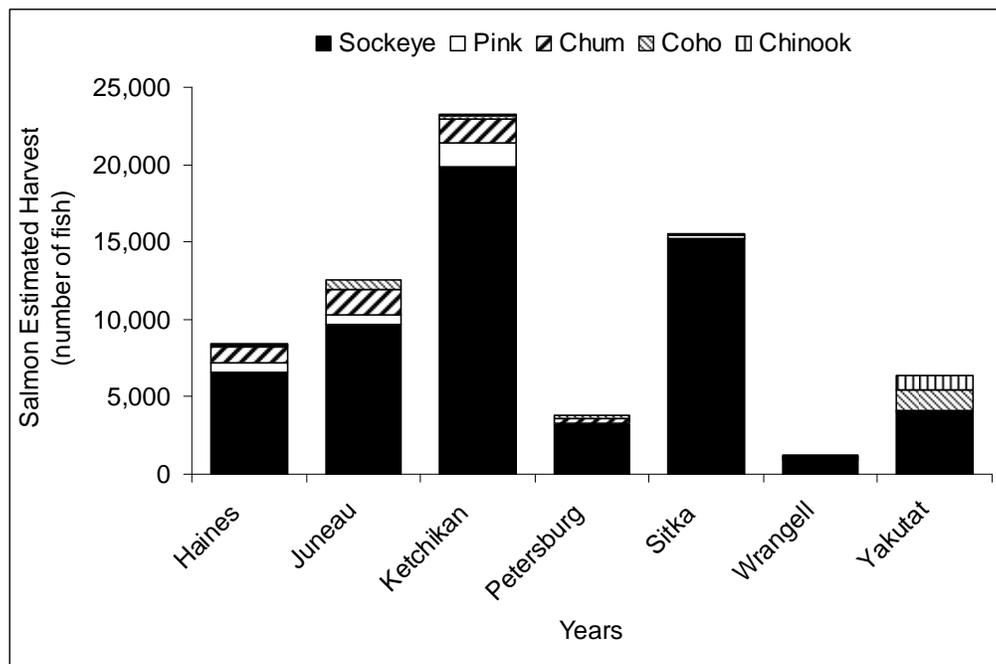


Figure 4.-Average annual subsistence/personal use salmon harvest (number of fish) by management area and species, 1996-2006.

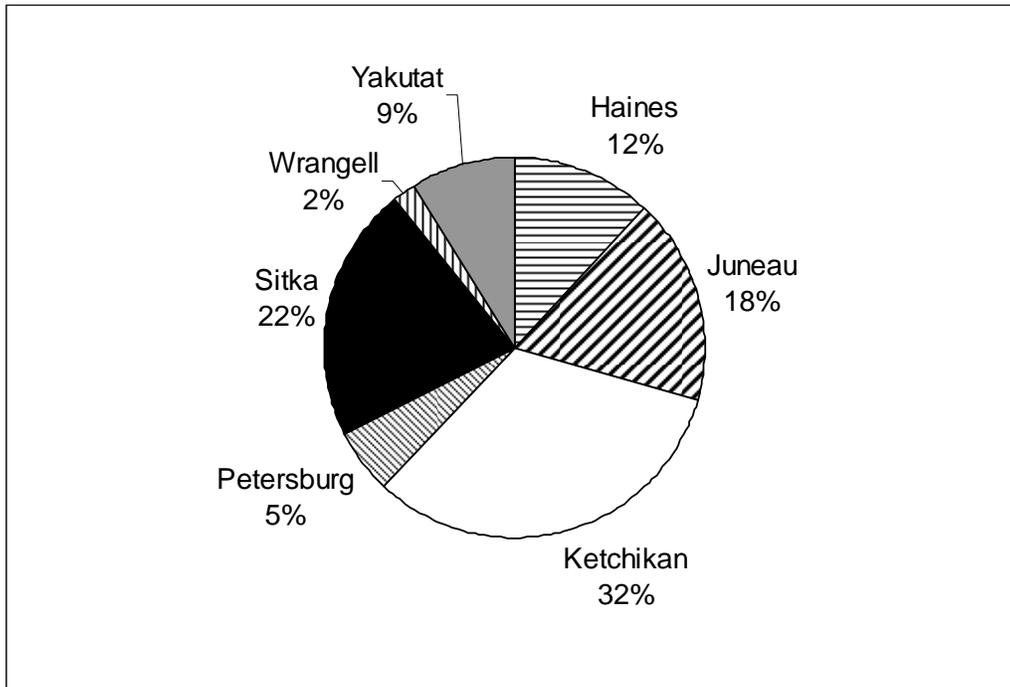


Figure 5.-Percentage of total subsistence/personal use salmon harvest by management area, 1996-2006.

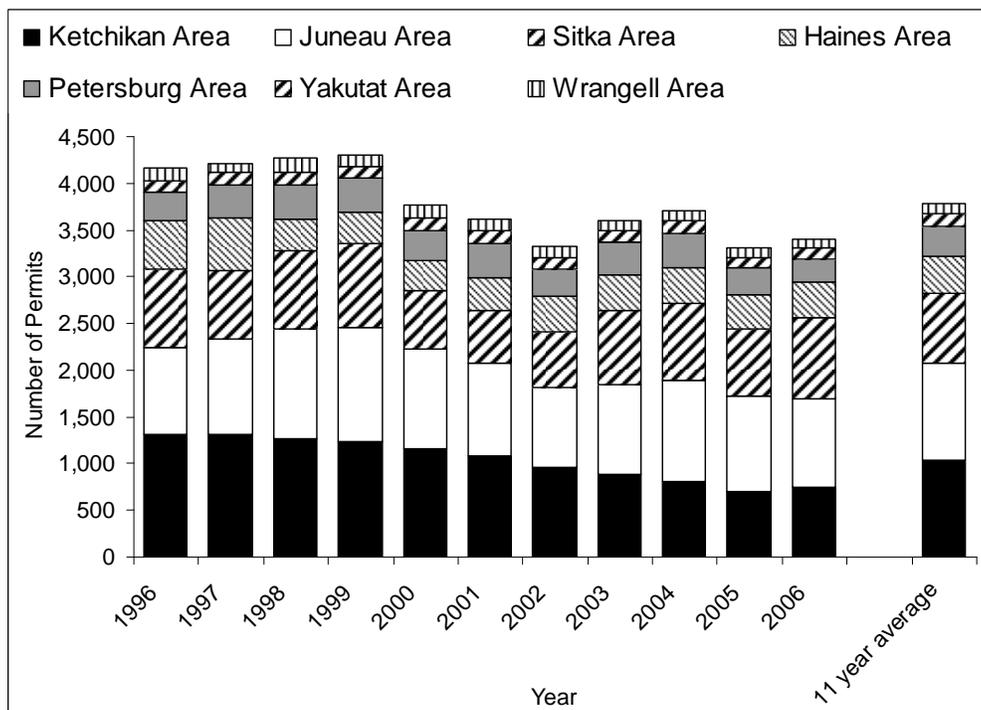


Figure 6.-Number of subsistence/personal use permits issued by management area and year, Southeastern/Yakutat Region, 1996-2006.

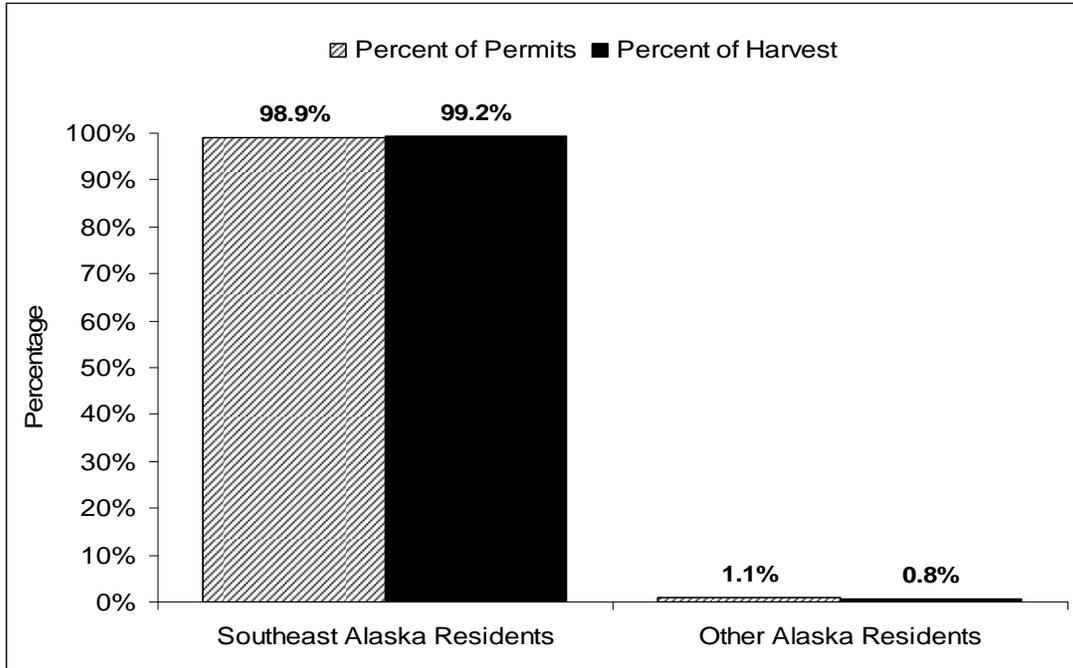


Figure 7.-Percentage of permits issued and estimated salmon subsistence/personal use harvest by area of residence, Southeastern and Yakutat areas, 1996-2006.

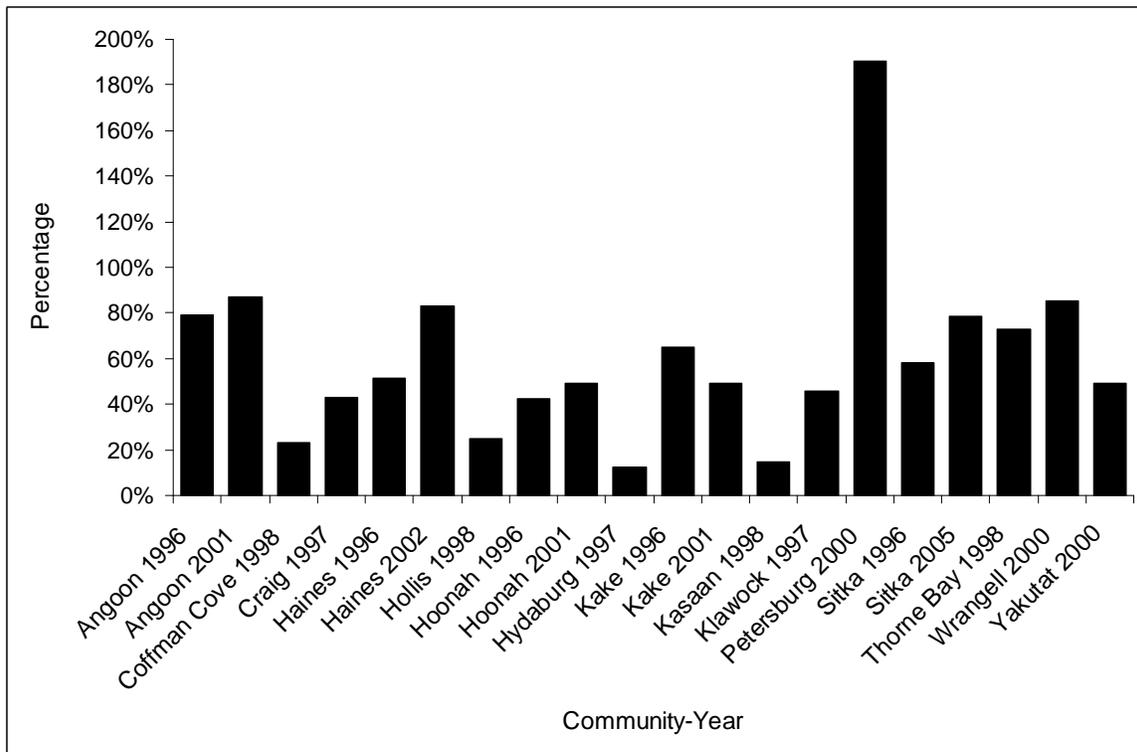


Figure 8.-Salmon subsistence/personal use harvest estimates based on permit data as a percentage of estimates based on household surveys.

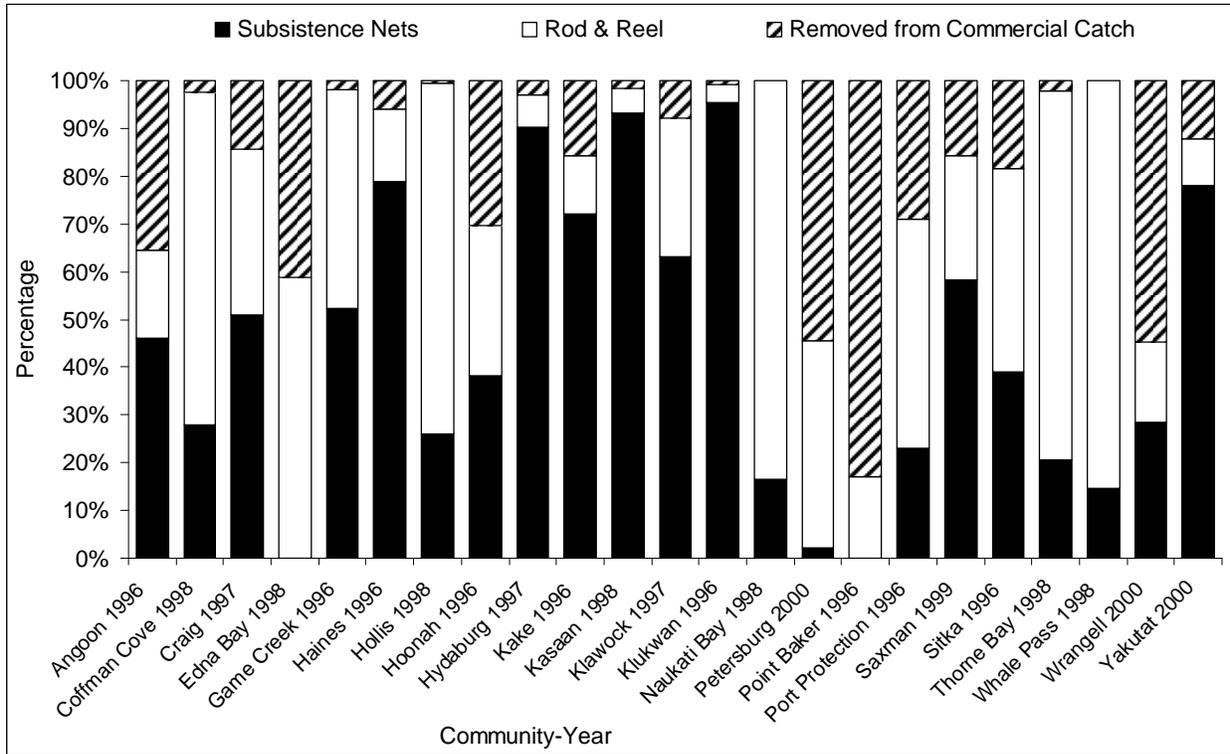


Figure 9.-Percentage of salmon harvest for home use by gear type, Southeast Alaska communities.

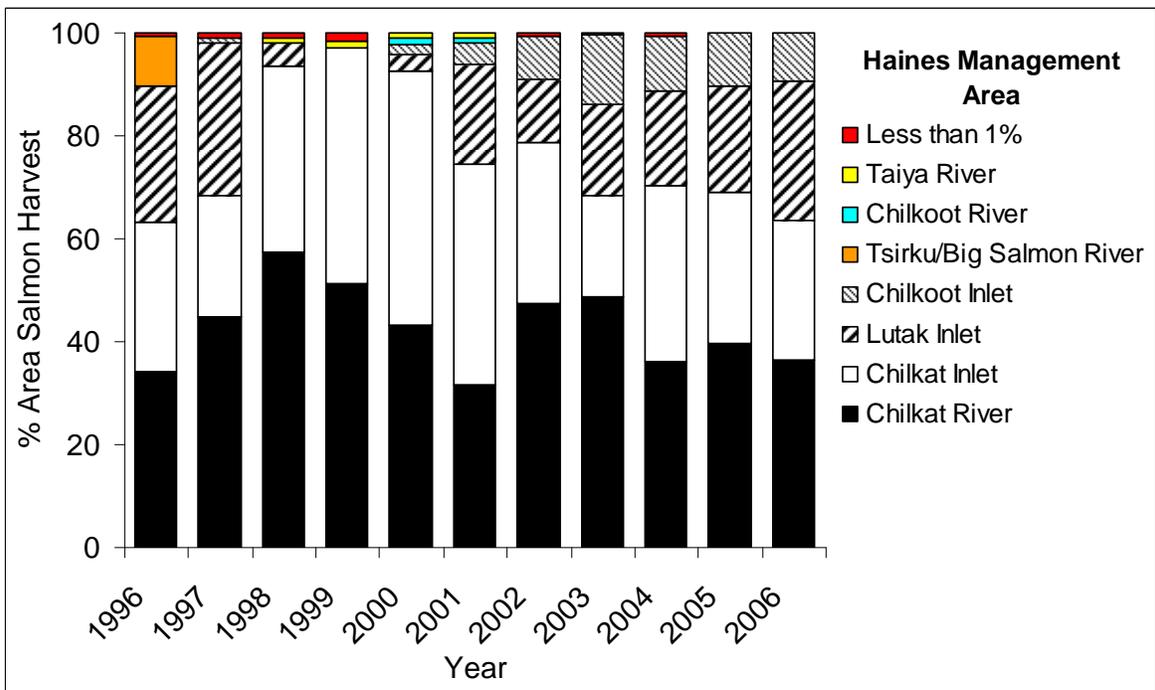


Figure 10.-Proportional contributions of water bodies to yearly estimated salmon harvest, Haines Management Area, 1996-2006.

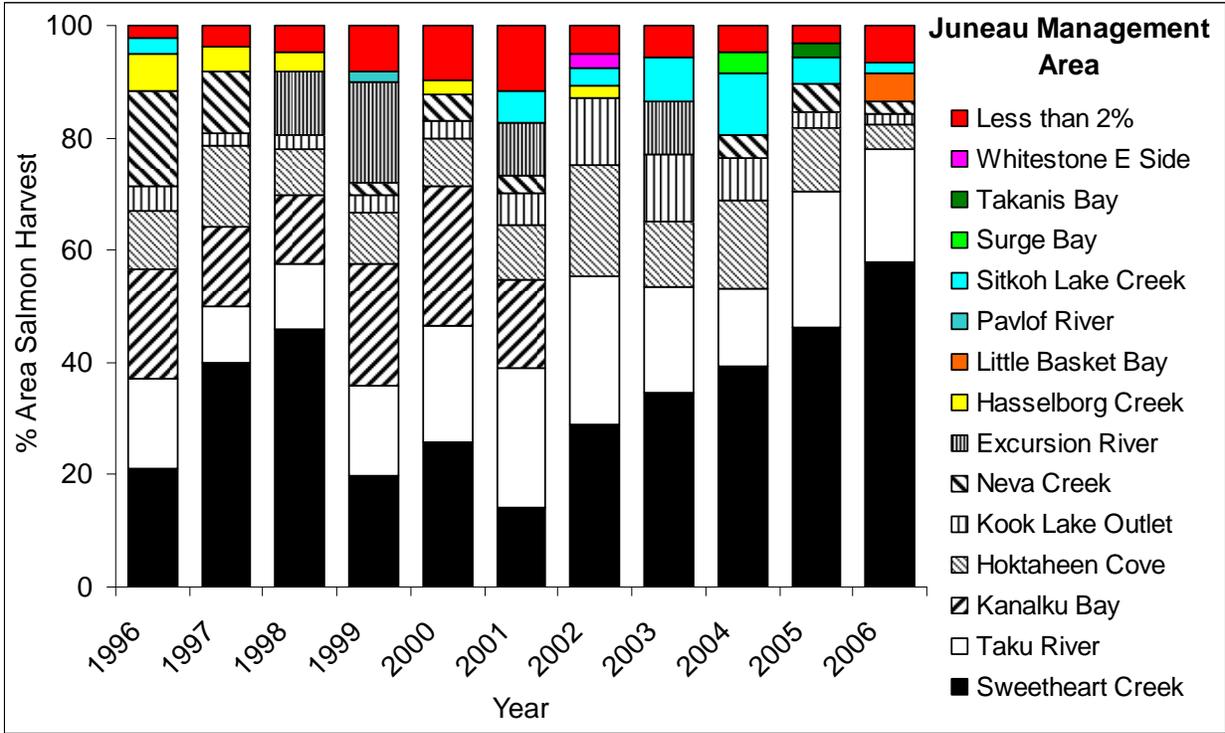


Figure 11.-Proportional contributions of water bodies to yearly estimated salmon harvest, Juneau Management Area, 1996-2006.

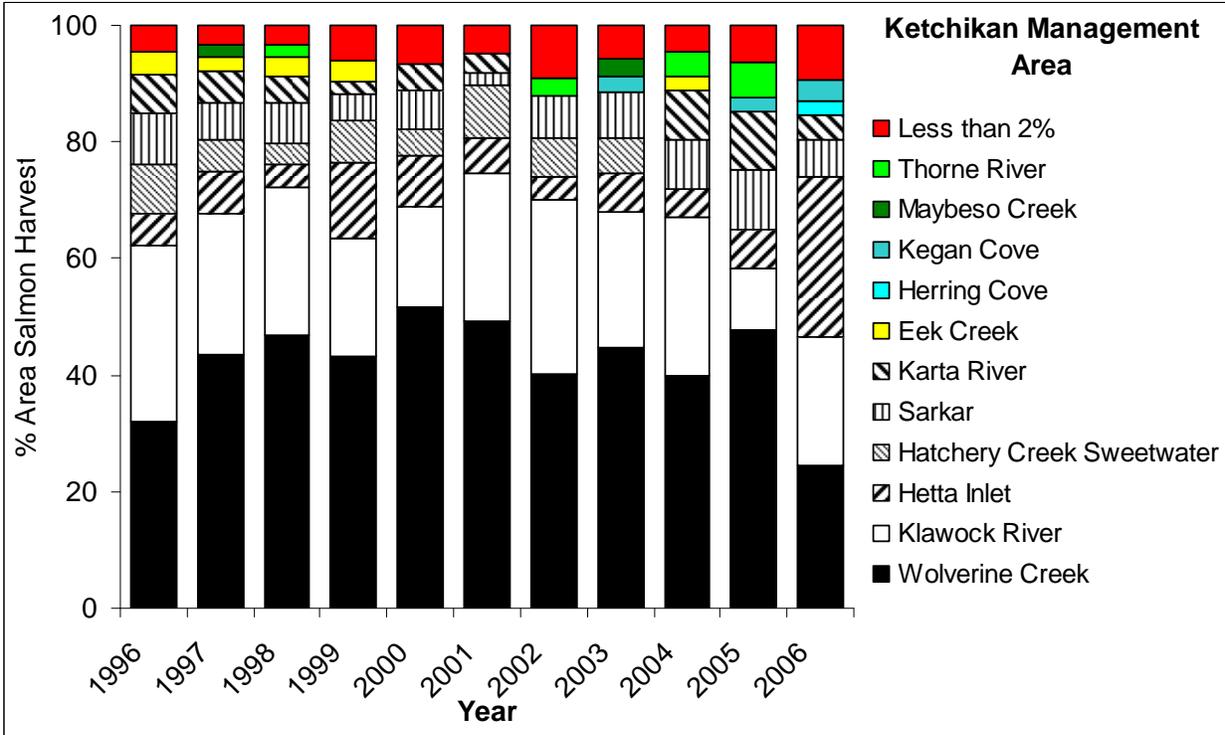


Figure 12.-Proportional contributions of water bodies to yearly estimated salmon harvest, Ketchikan Management Area, 1996-2006.

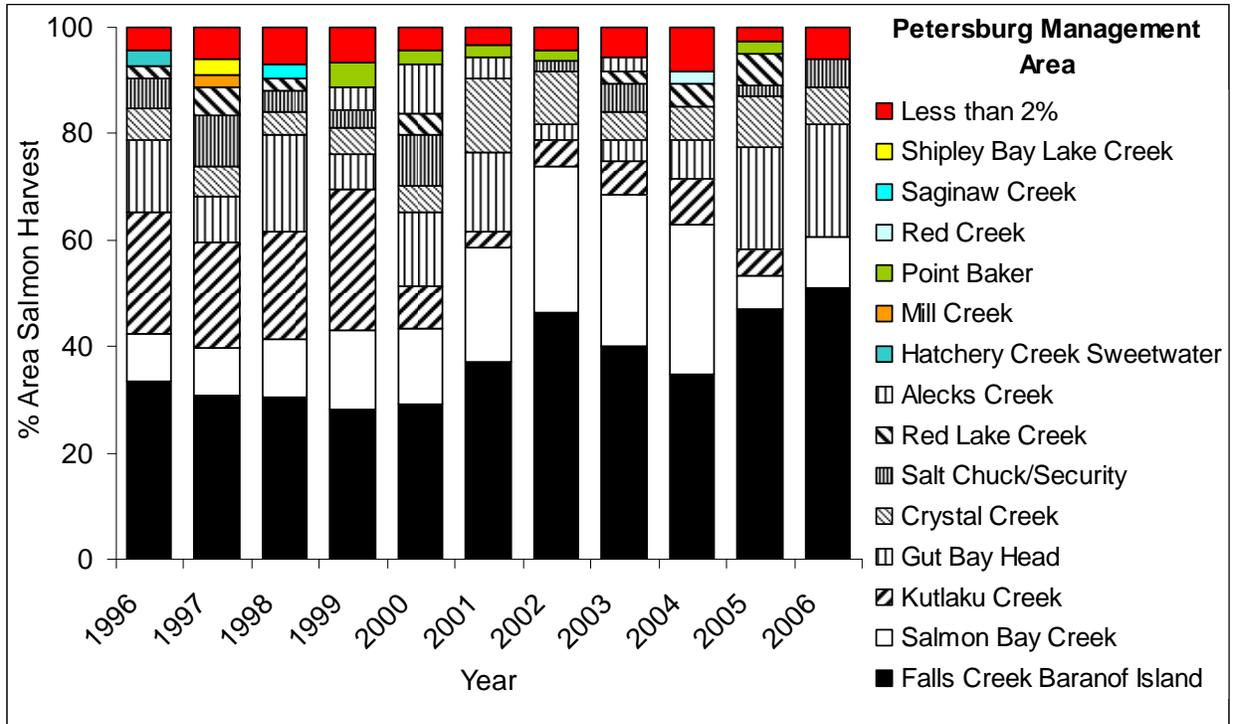


Figure 13.-Proportional contributions of water bodies to yearly estimated salmon harvest, Petersburg Management Area, 1996-2006.

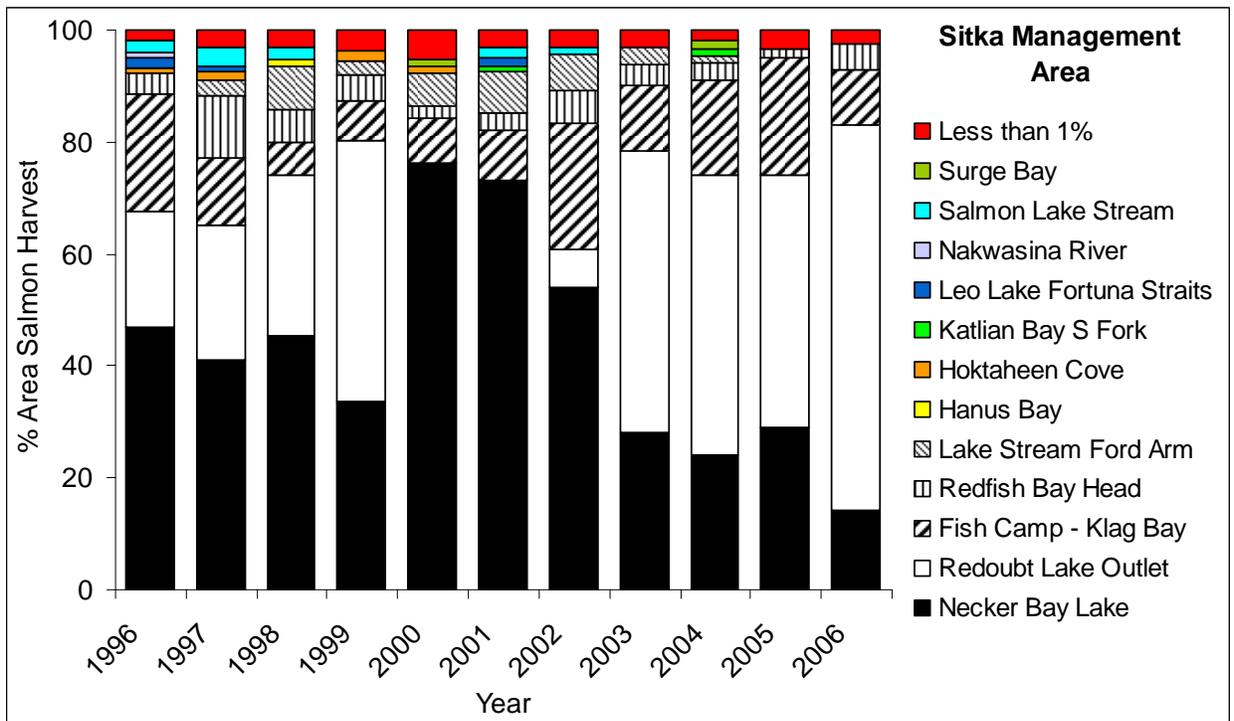


Figure 14.-Proportional contributions of water bodies to yearly estimated salmon harvest, Sitka Management Area, 1996-2006.

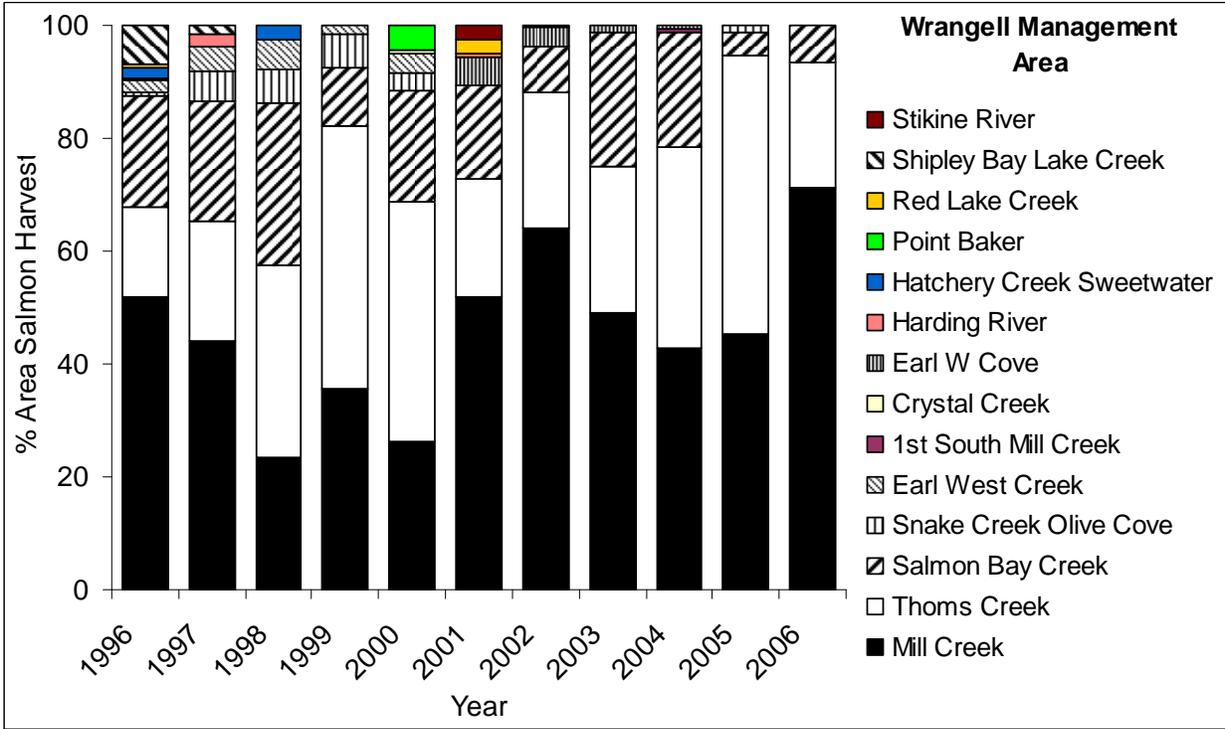


Figure 15.-Proportional contributions of water bodies to yearly estimated salmon harvest, Wrangell Management Area, 1996-2006.

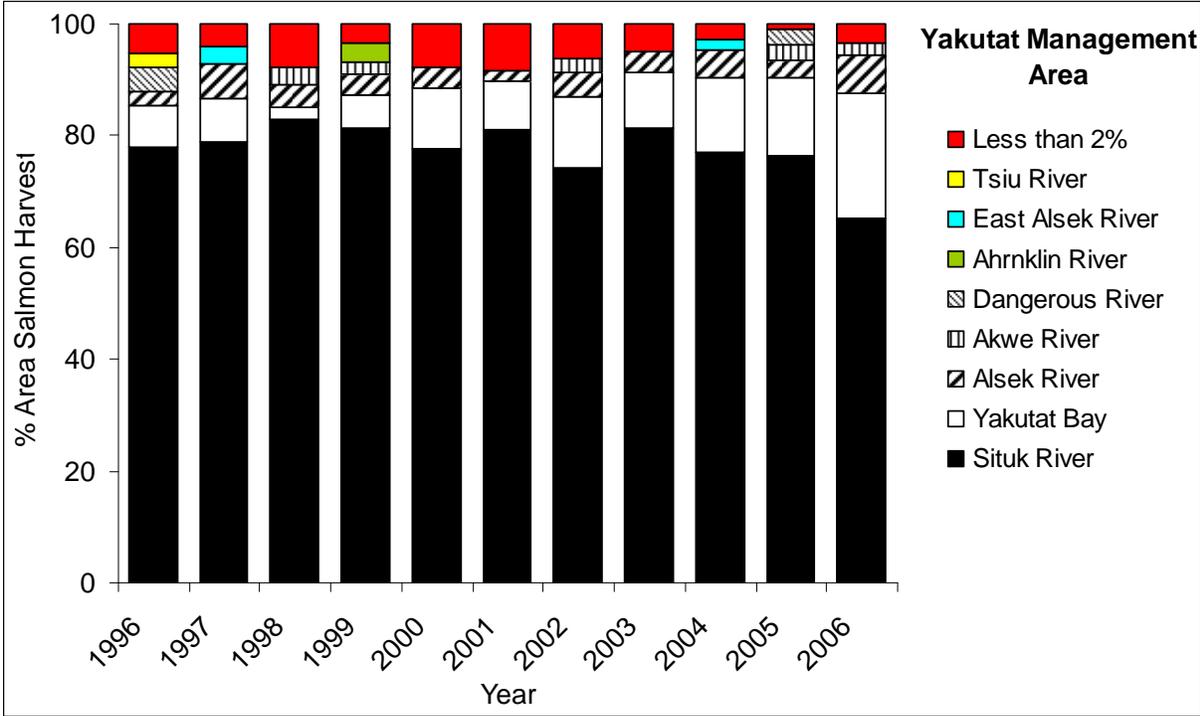


Figure 16.-Proportional contributions of water bodies to yearly estimated salmon harvest, Yakutat Management Area, 1996-2006.

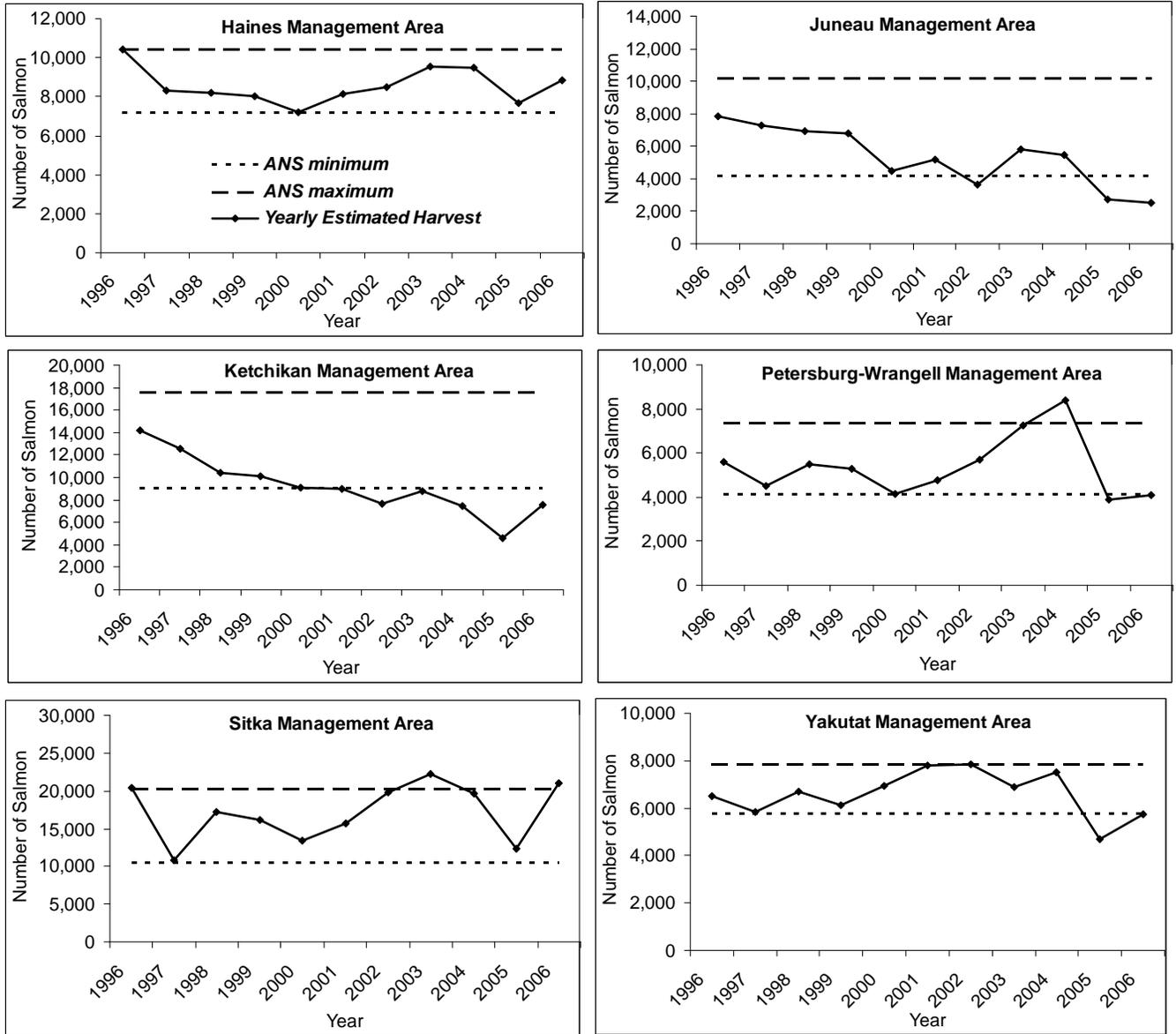
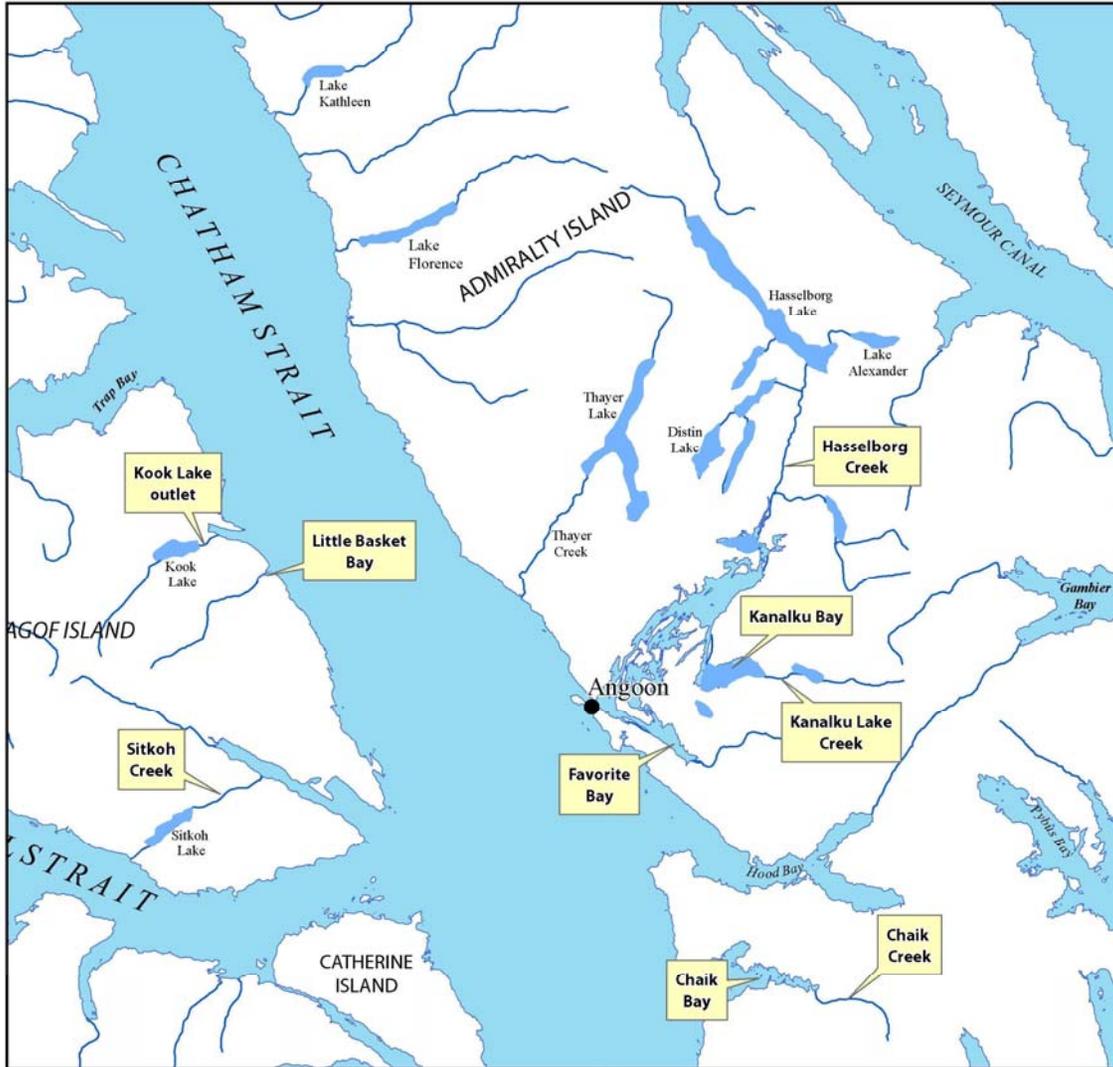


Figure 17.-Salmon ANS achievement by management area, 1996-2006.

Source ADF&G Division of Commercial Fisheries - Region I, Integrated Fisheries Database (IFDB). Personal use streams excluded.



**Figure 18.**  
**Primary Angoon**  
**Subsistence Salmon**  
**Fishing Locations**  
**1996 - 2006**



Locations derived from permit information. For more details, please refer to tables in accompanying report. This map is for general representation purposes; features and locations are based on the most current data available.



Figure 18.-Map 2. Angoon detail

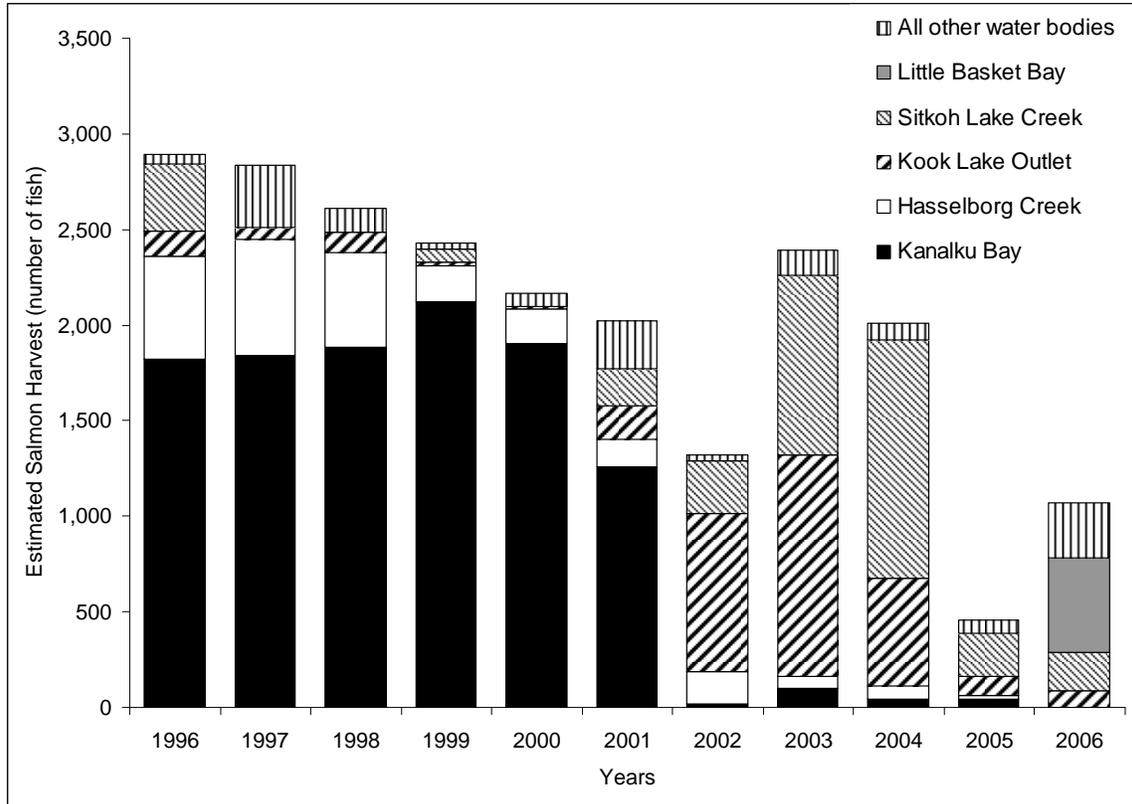


Figure 19.-Estimated salmon subsistence/personal use harvest by water body, Angoon, 1996-2006.

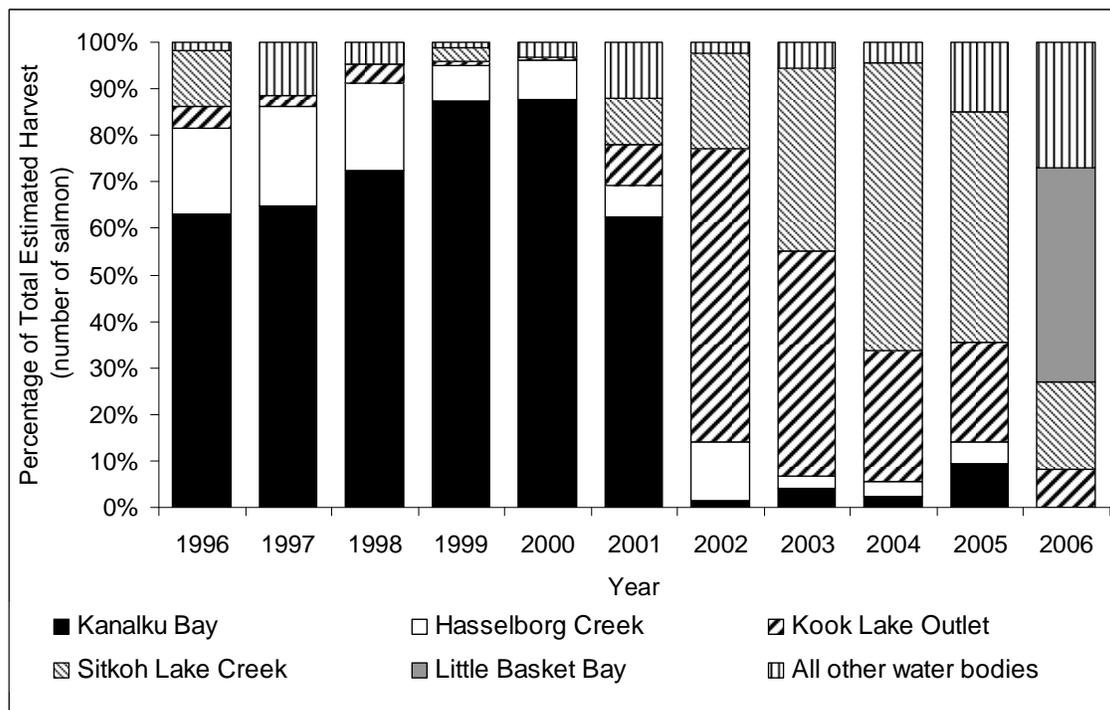


Figure 20.-Percentage of subsistence/personal use salmon harvest by water body, Angoon, 1996-2006.

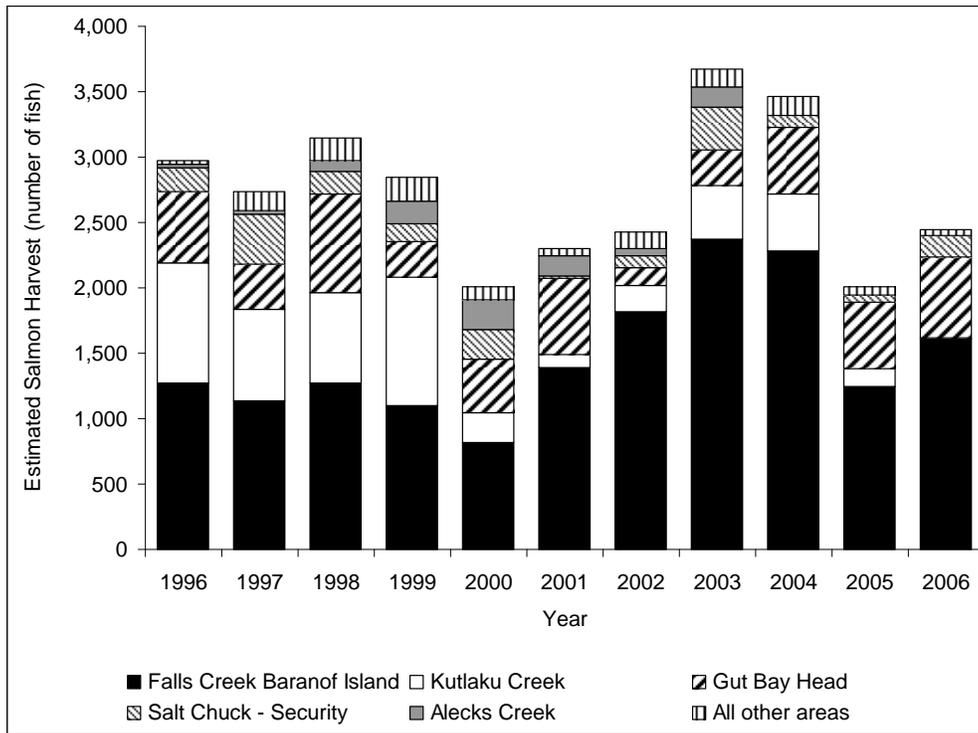


Figure 21.-Estimated subsistence/personal use salmon harvest by water body, Kake, 1996-2006.

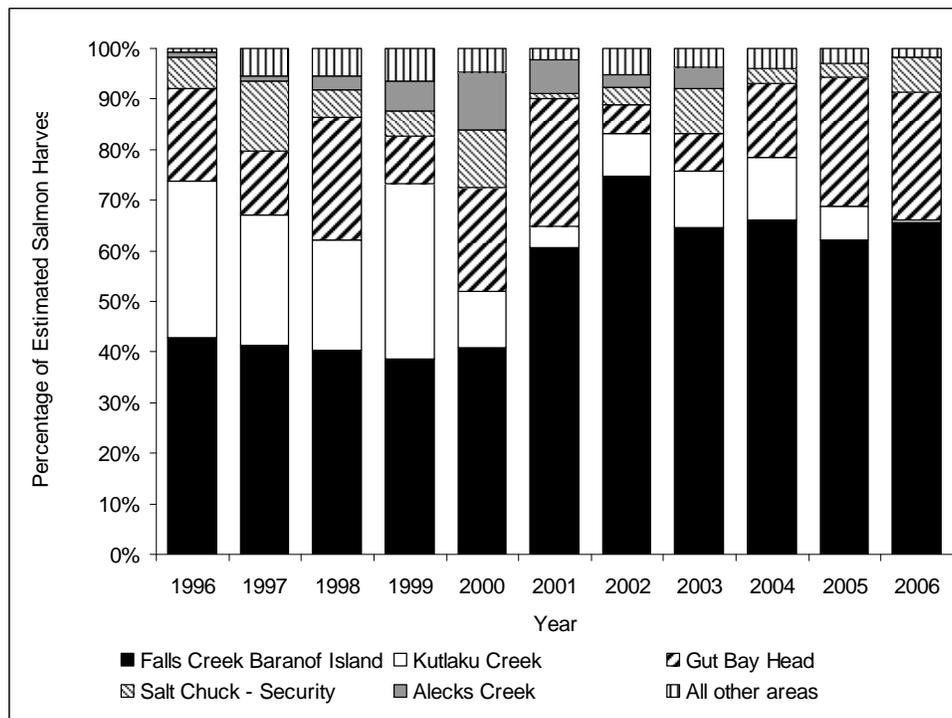


Figure 22.-Percentage of subsistence/personal use salmon harvest by water body, Kake, 1996-2006.

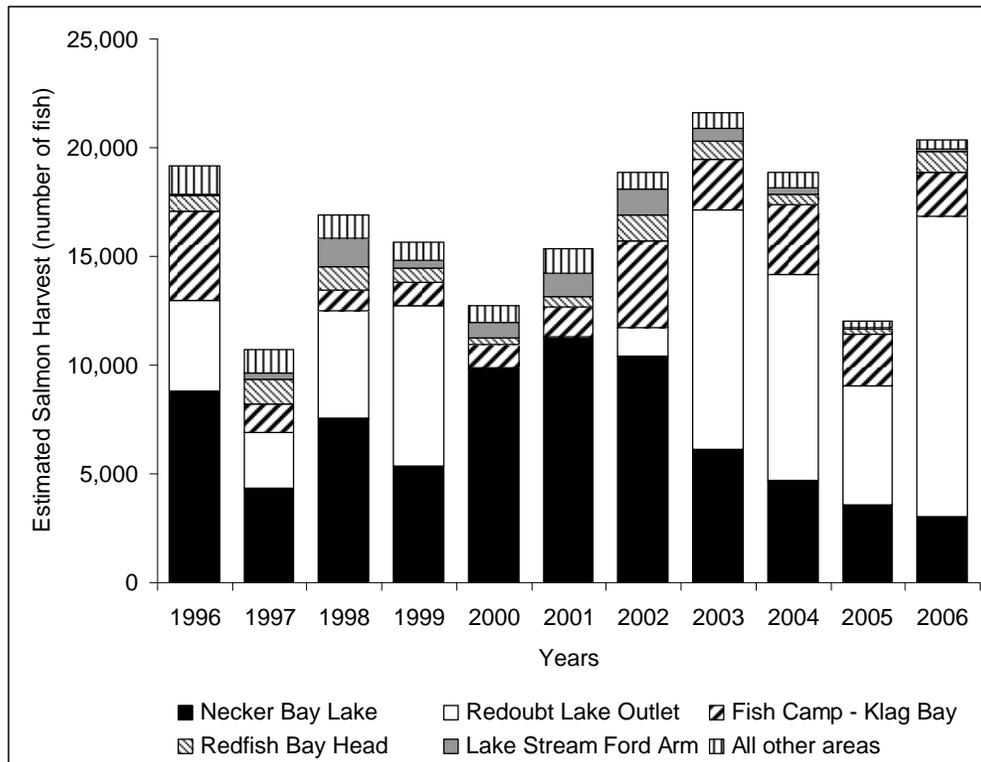


Figure 23.-Estimated subsistence/personal use salmon harvest by water body, Sitka, 1996-2006.

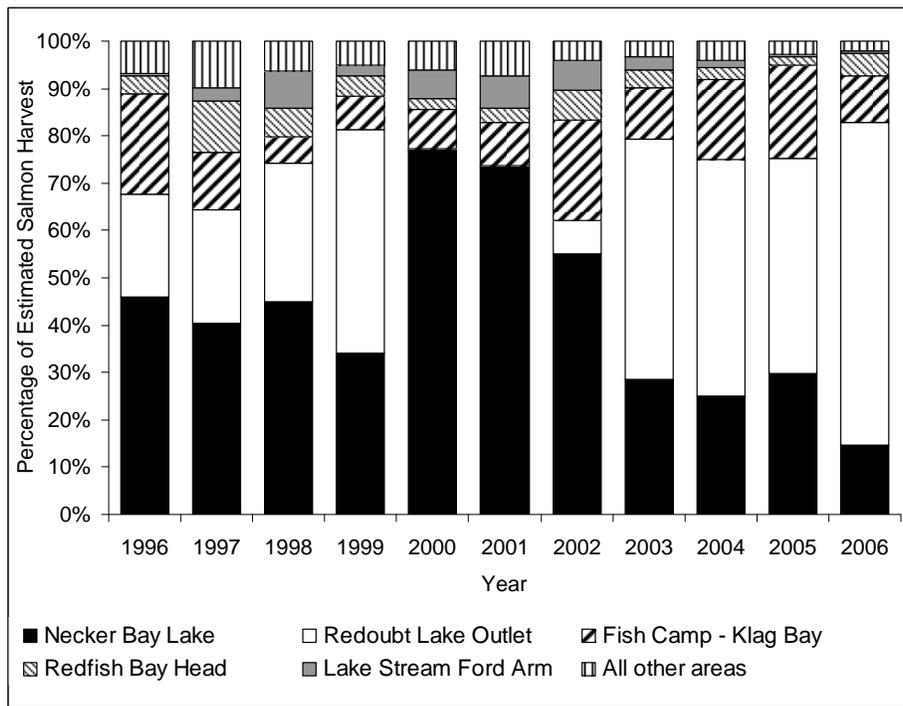


Figure 24.-Percentage of subsistence/personal use Salmon harvest by water body, Sitka, 1996-2006.

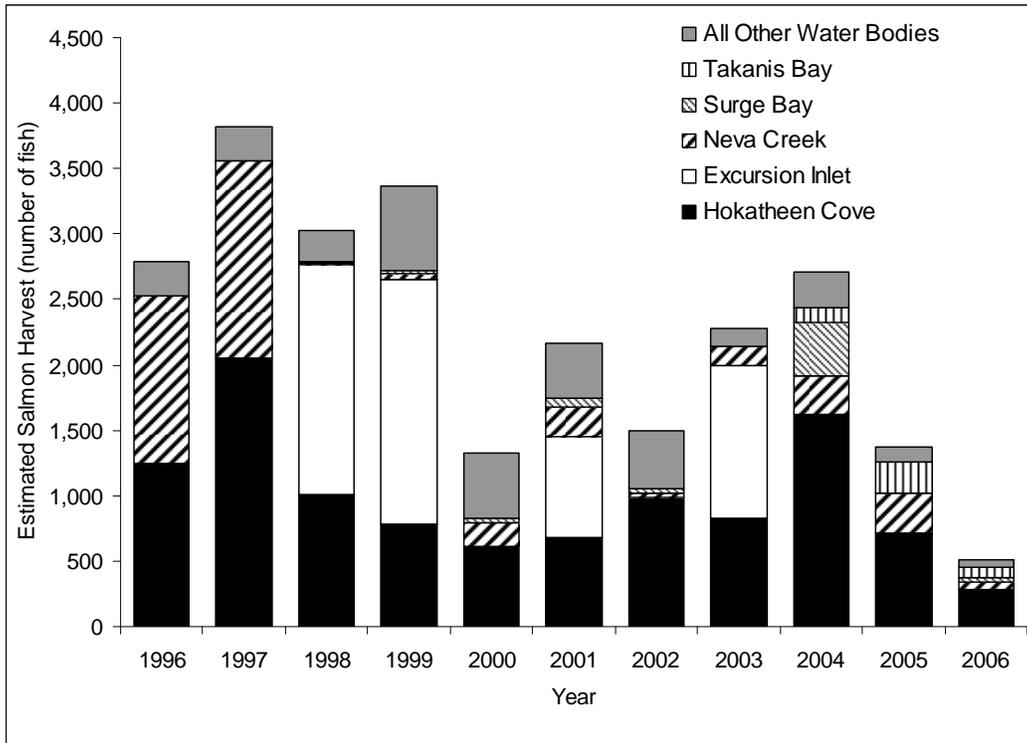


Figure 25.-Estimated subsistence/personal use salmon harvest by water body, Hoonah, 1996-2006.

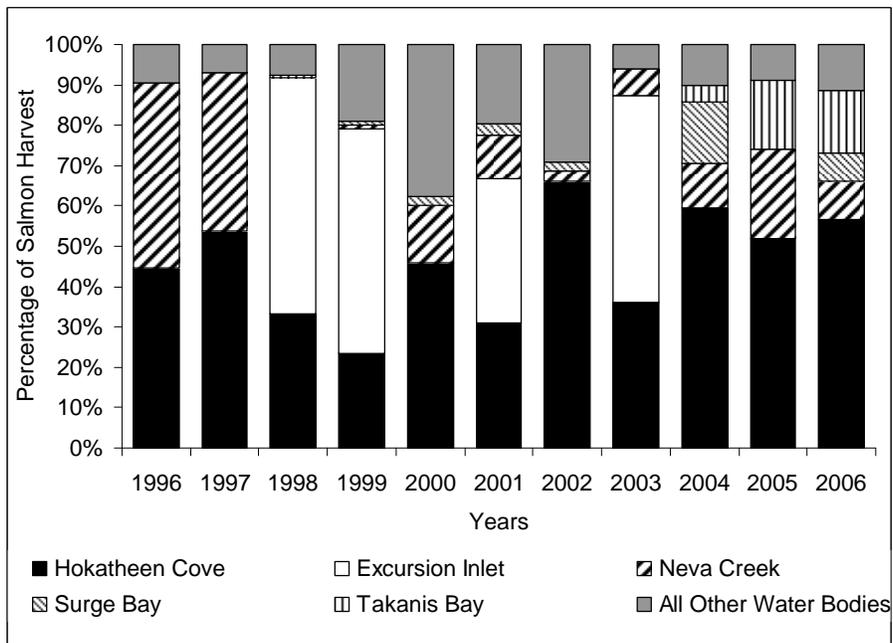


Figure 26.-Percentage of subsistence/personal use salmon harvest by water body, Hoonah, 1996-2006.

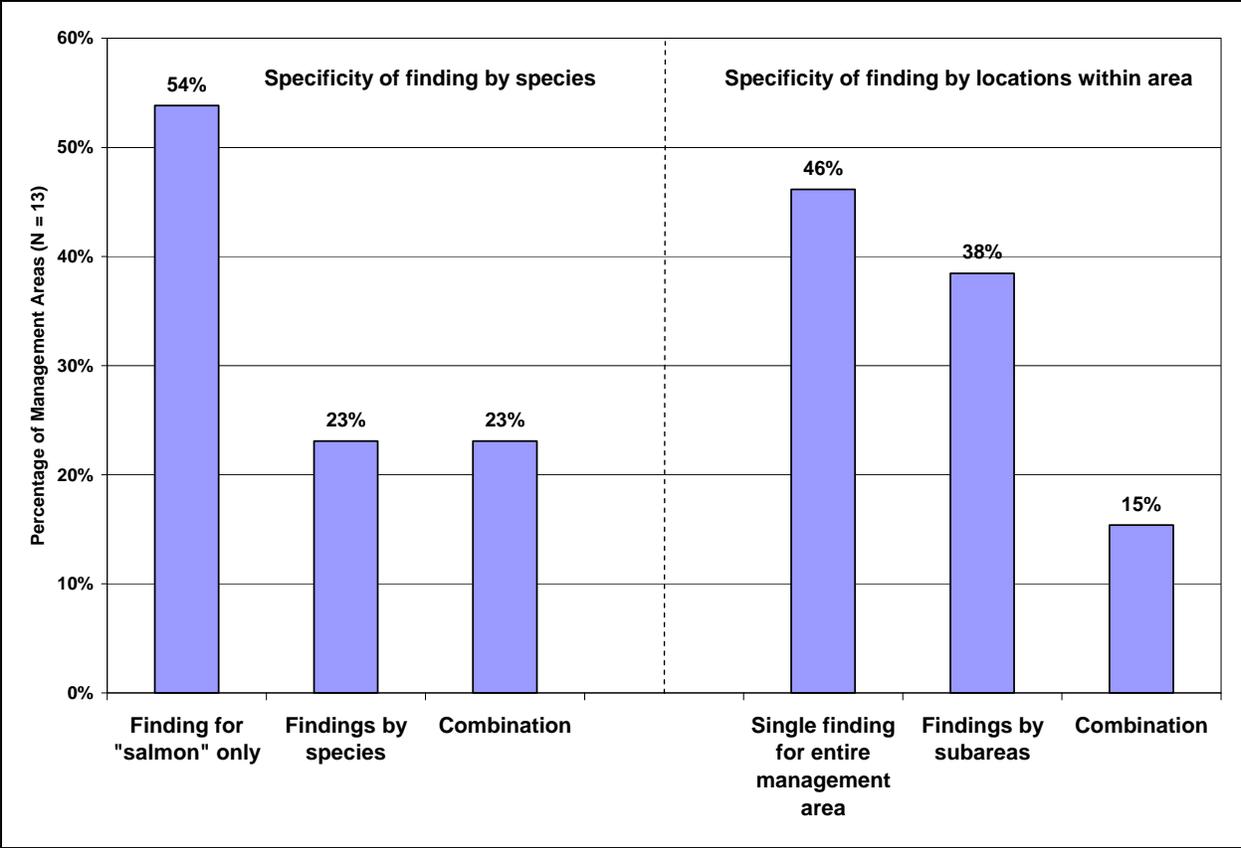


Figure 27.—Amount necessary for subsistence (ANS) findings for salmon by specificity of finding and management area.

## **APPENDICES**

Appendix 1.-ANS calculation table from 2003 “Amounts Necessary for Subsistence Uses of Salmon in Southeast Alaska and Yakutat Management Areas”.

**Table 1. Estimated Southeastern Alaska and Yakutat Management Areas, Subsistence Salmon Harvests 1996-2003**

	Estimated Harvests, All Salmon 1996-2003									1993 Admin.		Possible ANS Range	
	1996	1997	1998	1999	2000	2001	2002	2003	1996-2003 Average	min	max		ANS Range
<b>Yakutat Permit Area</b>	<b>6,385</b>	<b>5,800</b>	<b>6,624</b>	<b>6,036</b>	<b>6,869</b>	<b>7,832</b>	<b>7,629</b>	<b>6,872</b>	<b>6,756</b>	<b>5,800</b>	<b>7,832</b>	<b>1,200 to 3,000</b>	<b>5,800 to 7,832</b>
<b>Southeastern Alaska</b>	<b>21,000-34,0000</b>												
<b>Haines Permit Area</b>	<b>10,414</b>	<b>8,474</b>	<b>8,213</b>	<b>8,051</b>	<b>7,174</b>	<b>8,140</b>	<b>8,394</b>	<b>9,493</b>	<b>8,544</b>	<b>7,174</b>	<b>10,414</b>		<b>7,174 to 10,414</b>
<b>Juneau Permit Area</b>	<b>9,790</b>	<b>8,348</b>	<b>8,650</b>	<b>7,605</b>	<b>5,045</b>	<b>6,265</b>	<b>4,178</b>	<b>10,133</b>	<b>7,502</b>	<b>4,178</b>	<b>10,133</b>		<b>4,178 to 10,133</b>
Angoon Area	5,345	3,841	4,154	3,295	3,219	3,549	1,532	3,240	3,522	1,532	5,345		1,532 to 5,345
Hoonah Area	4,445	4,506	4,496	4,311	1,826	2,716	2,646	6,893	3,980	1,826	6,893		1,826 to 6,893
<b>Sitka Permit Area</b>	<b>20,108</b>	<b>10,487</b>	<b>16,876</b>	<b>15,604</b>	<b>12,933</b>	<b>15,278</b>	<b>20,225</b>	<b>19,382</b>	<b>16,362</b>	<b>10,487</b>	<b>20,225</b>		<b>10,487 to 20,225</b>
<b>Petersburg Permit Area</b>	<b>5,841</b>	<b>4,583</b>	<b>5,506</b>	<b>5,325</b>	<b>4,120</b>	<b>4,798</b>	<b>5,905</b>	<b>7,345</b>	<b>5,428</b>	<b>4,120</b>	<b>7,345</b>		<b>4,120 to 7,345</b>
Petersburg Area	942	914	1,129	1,165	1,061	1,614	1,725	2,558	1,389	914	2,558		914 to 2,558
Wrangell Area	1,289	659	875	1,146	924	753	1,507	668	978	659	1,507		659 to 1,507
Kake Area	3,610	3,010	3,501	3,014	2,134	2,431	2,672	4,118	3,061	2,134	4,118		2,134 to 4,118
<b>Ketchikan Permit Area</b>	<b>17,503</b>	<b>14,469</b>	<b>11,641</b>	<b>12,014</b>	<b>10,684</b>	<b>11,473</b>	<b>9,068</b>	<b>11,773</b>	<b>12,328</b>	<b>9,068</b>	<b>17,503</b>		<b>9,068 to 17,503</b>
Kasaan Area	3,944	3,381	2,448	2,343	2,429	3,134	1,526	2,161	2,671	1,526	3,944		1,526 to 3,944
Craig/Klawock/ Hydaburg Area	13,559	11,088	9,193	9,671	8,255	8,339	7,542	9,612	9,657	7,542	13,559		7,542 to 13,559
<b>Totals</b>	<b>70,041</b>	<b>52,162</b>	<b>57,510</b>	<b>54,635</b>	<b>46,824</b>	<b>53,787</b>	<b>55,399</b>	<b>64,998</b>	<b>56,919</b>	<b>46,824</b>	<b>70,041</b>	<b>22,200-37,000</b>	<b>46,824 to 70,041</b>

Source: Alaska Subsistence Fisheries Database. Version 3.4 for Microsoft Access. Alaska Department of Fish and Game, Division of Subsistence

1. Source of permit data: Alaska Department of Fish and Game, Commercial Fisheries Division, Alexander: The Integrated Fisheries Database for Southeast Alaska and Yakutat.
2. Description of method for harvest estimates see: Alaska Subsistence Fisheries 2003 Annual Report, Alaska Department of Fish and Game, Division of Subsistence, Juneau, Alaska, December 2004.

Appendix 2.-Community-year, household survey data, sampling information, and information available in each dataset regarding subsistence and personal use harvest of salmon in Southeast Alaska, 1996-2006.

Year	Community	Sampling method	Period of harvest	Number of HH in sampling universe <sup>a</sup>	Number of HH surveyed	Location of harvest indicated?	Fish removed from commercial catch?	Rod and reel harvest?
2000	Petersburg	SRS	1 Jan- 1 Dec 2000	1070	125	Yes	Yes	Yes
2000	Yakutat	SRS	1 Oct 1999- 31 Sep 2000	234	139	Yes	Yes	Yes
2000	Wrangell	SRS	1 Jan- 1 Dec 2000	747	98	Yes	Yes	Yes
2001	Angoon	Harvesters only, census attempted	1 Nov 2000- 1 Oct 2001	58 fishing HH	47	Yes	No	Yes
2001	Hoonah	Harvesters only, census attempted	1 Nov 2000- 1 Oct 2001	127 fishing HH	96	Yes	No	Yes
2001	Kake	Harvesters only, census attempted	??	111 fishing HH	73	Yes	No	Yes
2002	Haines	SRS of permit holders	1 Dec 2001- 30 Nov 2002	316 HH with permit holders	175	Yes	No	Yes
2005	Sitka	Census attempted	1 Nov 2004- 31 Oct 2005	426 fishing HH with permit holders	310	Yes	No	Yes
1996	Angoon	SRS	Feb 1996- Jan 1997	161	74	No	Yes	Yes
1998	Coffman Cove	SRS	Oct 1998- Sep 1999	75	50	No	Yes	Yes
1997	Craig	SRS	Feb 1997- Jan 1998	608	173	No	Yes	Yes
1998	Edna Bay	Census attempted	Oct 1998- Sep 1999	17	12	No	Yes	Yes

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Year	Community	Sampling method	Period of harvest	Number of HH in sampling universe <sup>a</sup>	Number of HH surveyed	Location of harvest indicated?	Fish removed from commercial catch?	Rod and reel harvest?
1996	Game Creek	????	Feb 1996-Jan 1997	15	12	No	Yes	Yes
1996	Haines	SRS	Feb 1996-Jan 1997	787	93	No	Yes	Yes
1998	Hollis	Census attempted	Oct 1998-Sep 1999	59	46	No	Yes	Yes
1996	Hoonah	SRS	Feb 1996-Jan 1997	280	77	No	Yes	Yes
1997	Hydaburg	SRS	Feb 1997-Jan 1998	131	51	No	Yes	Yes
1996	Kake	SRS	Feb 1996-Jan 1997	249	73	No	Yes	Yes
1998	Kasaan	Census attempted	Oct 1998-Sep 1999	18	14	No	Yes	Yes
1997	Klawock	SRS	Feb 1997-Jan 1998	303	106	No	Yes	Yes
1996	Klukwan	Census attempted	Feb 1996-Jan 1997	36	31	No	Yes	Yes
1996	Point Baker	Census attempted	Feb 1996-Jan 1997	19	16	No	Yes	Yes
1998	Naukati Bay	Census attempted	Oct 1998-Sep 1999	66	50	No	Yes	Yes
1996	Port Protection	Census attempted	Feb 1996-Jan 1997	40	25	No	Yes	Yes
1999	Saxman	Census attempted		110	73	No	Yes	Yes
1996	Sitka	Two-level stratification <sup>b</sup>	Feb 1996-Jan 1997	2389 <sup>a</sup> ; 664	92 <sup>a</sup> ; 58	No	Yes	Yes

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**Appendix 2. Page 3 of 3.**

Year	Community	Sampling method	Period of harvest	Number of HH in sampling universe <sup>a</sup>	Number of HH surveyed	Location of harvest indicated?	Fish removed from commercial catch?	Rod and reel harvest?
1998	Thorne Bay	SRS	Oct 1998- Sep 1999	204	89	No	Yes	Yes
1996	Whitestone Logging Camp	Census attempted	Feb 1996- Jan 1997	41	24	No	Yes	Yes
1998	Whale Pass	Census attempted	Oct 1998- Sep 1999	20	15	No	Yes	Yes

SRS: Simple random sampling.

a In simple random sampling designs, the sampling universe is the total number of households in the community. In stratified sampling designs, the sampling universe is the total number of households in each stratum (harvesters and non-harvesters, tribal members and non-tribal members).

b Two complementary household lists were developed.