

**Technical Paper No. 332**

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**A Compilation of Traditional Knowledge about the  
Fisheries of Southeast Alaska**

**by**

**Mathew Brock**

**and**

**Philippa Coiley-Kenner**

**in collaboration with the**

**Sitka Tribe of Alaska**

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September 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

*all commonly-accepted abbreviations*  
e.g., Mr., Mrs., AM, PM, etc.

*all commonly-accepted professional titles* e.g., Dr., Ph.D., R.N., etc.

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, χ <sup>2</sup> , 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)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

***TECHNICAL PAPER NO.332***

**A COMPILATION OF TRADITIONAL KNOWLEDGE ABOUT THE  
FISHERIES OF SOUTHEAST ALASKA**

by

Mathew Brock

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

and

Philippa Coiley-Kenner

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

Alaska Department of Fish and Game  
Division of Subsistence  
PO Box 115526, Juneau, Alaska 99811-5526  
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Final Report to the U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries  
Resource Monitoring Program, to fulfill obligations for Study No. FIS 04-652 under agreement AG-0109-  
C-05-0008

The Division of Subsistence Technical Paper series was established in 1979 and represents the most complete collection of information about customary and traditional uses of fish and wildlife resources in Alaska. The papers cover all regions of the state. Some papers were written in response to specific fish and game management issues. Others provide detailed, basic information on the subsistence uses of particular communities which pertain to a large number of scientific and policy questions.

Technical Paper series reports are available through the Alaska State Library and on the Internet: <http://www.subsistence.adfg.state.ak.us>. This publication has undergone editorial and professional review.

*Mathew Brock, formerly of  
Alaska Department of Fish and Game, Division of Subsistence  
PO Box 115526, Juneau, Alaska 99811-5526, USA*

*and  
Philippa Coiley-Kenner, formerly of  
Alaska Department of Fish and Game, Division of Subsistence  
333 Raspberry Road, Anchorage, Alaska 99518, USA*

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## ABSTRACT

This study compiled and analyzed traditional ecological knowledge (TEK) for sockeye salmon *Oncorhynchus nerka*, coho salmon *O. kisutch*, Chinook salmon *O. tshawytscha*, pink salmon *O. gorbuscha*, and chum salmon *O. keta*, about subsistence fisheries in Southeast Alaska. Some TEK was also compiled and analyzed for Pacific herring *Clupea pallasii*, eulachon *Thaleichthys pacificus*, steelhead trout *O. mykiss*, and Dolly Varden *Salvelinus malma* about subsistence fisheries in Southeast Alaska. Previously collected and documented knowledge was organized and made accessible in a textual database. This documentation of traditional knowledge demonstrated the continuing importance of sharing and trade of wild resources, especially fish, and the traditional conservation practices employed by Alaska Native subsistence users.

Key words: Traditional ecological knowledge, TEK, Pacific salmon, *Oncorhynchus*, sockeye salmon, Chinook salmon, coho salmon, pink salmon, chum salmon, Dolly Varden, steelhead trout, Pacific herring, eulachon, Southeast Alaska.

## INTRODUCTION

The primary purpose of this project was to summarize and analyze traditional ecological knowledge (TEK) about subsistence fisheries for Pacific salmon *Oncorhynchus* in Southeast Alaska (Figure 1). The federal Southeast Regional Advisory Council (Council) identified collection and analysis of TEK as a priority information need at its fall 2002 meeting in Hoonah, Alaska. The Council requested that TEK for salmon, eulachon *Thaleichthys pacificus*, steelhead trout *O. mykiss*, and Dolly Varden *Salvelinus malma* be documented and analyzed. This project primarily concentrated on salmon TEK; there was a limited amount of TEK for eulachon, steelhead trout, and Dolly Varden. Some Southeast subsistence fisheries for these species were managed by the U. S. Forest Service, Tongass National Forest. The Federal Subsistence Board has recognized positive customary and traditional use determinations for salmon, Dolly Varden, rainbow/steelhead trout, and eulachon in most of the fishing districts in Southeast Alaska (Federal Register Vol. 68, No. 29, February 12, 2003, Rules and Regulations, 50 CFR Part 100 C24[a][2]).

TEK generally refers to “the knowledge collectively possessed by a people which has been accumulated through time and passed down from generation to generation” (Miraglia 1998). Several ADF&G studies have documented TEK about salmon fisheries and communities in Southeast Alaska, including Wrangell (Paige et al. *In prep*), Kake (Turek et al. *In prep*), Craig and Klawock (Ratner et al. 2006); Ratner and Dizard 2006), Hoonah (Ratner et al. 2006; Ratner and Dizard 2006), Haines and Klukwan (Smith 2003); Sitka (Thornton et al. 1990); and Hydaburg, Craig, and Klawock (Turek 2005).

The Alaska Department of Fish and Game Division of Subsistence (ADF&G) and the Sitka Tribe of Alaska (STA), a federally recognized Alaska Native tribal government, worked cooperatively on this project. Also, in 2004, 2005, and 2006, Thomas F. Thornton, Associate Professor, Department of Anthropology at Portland State University (OR), assisted with TEK documentation in the Southeast Region, and assisted ADF&G staff in formulation of the research and database design, methodology, and procedures for integrating existing ethnographic material on salmon knowledge provided by the Tlingit people. Thornton also edited and coded previously recorded interviews with Sitka Tribe of Alaska elders, and conducted an additional 6 hours of interviews with elders. This material was transcribed and converted into entries in a textual database program, askSam<sup>1</sup>. Key topics included salmon life cycles, anatomy, diet, predation, habitat productivity, ceremonial uses, management and regulation; customary and traditional harvest and processing techniques and their characteristics; stream characteristics, escapement, enhancement, and stock transfers; linguistic terms, such as Tlingit names and stories for salmon and other fish populations, observations of fish behaviors; Tlingit seasonal movements and wild

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1. Seaside Software, Inc. 2007 askSam [software]. Perry, Florida. Version 5.1. Product names used in this report are included for scientific completeness and do not constitute a product endorsement.

resource distribution and consumption practices; and the environmental impacts and cultural changes that Tlingits have observed.

## OBJECTIVES

The primary objective of this project was to summarize and analyze existing Division of Subsistence and Sitka Tribe of Alaska salmon TEK datasets. To facilitate analysis, datasets were organized and stored on a computer accessible CD-ROM, using askSam database software. This process included:

1. The labeling, organizing, and entering into the askSam database of field notes, trip reports, audio- and video-taped interviews, and published technical papers.
2. The training of STA researchers in professional data entry and in the askSam database application.
3. The labeling, organizing, and entering into the askSam database of STA archival materials, reports, field notes, interview transcripts, audio recordings, and video tapes.
4. The summarization of information in the database, and the addressing of themes in Southeast Alaska subsistence salmon fisheries, as they related to management issues.
5. The presentation of 2 public outreach workshops, 1 in Juneau and 1 in Sitka, which included a draft version of the database for interested public, tribal, state, and federal fisheries staff.

## METHODS

Objective 1 was achieved by identifying ADF&G Division of Subsistence information sources, shown in Table 1. For the purposes of this project, technical papers pertaining to Southeast Alaska salmon, Pacific herring *Clupea pallasii*, eulachon, steelhead trout, and Dolly Varden fisheries were reviewed and TEK was identified. Audio and visual recordings of interviews, and ADF&G researchers' notes and trip reports were reviewed for TEK. Pertinent information from these sources was entered into the textual database.

Objective 2 was met by training STA researchers in professional data entry and the askSam software. Over the course of the project, numerous meetings and training sessions were held with ADF&G and STA researchers. The first training session was held in November 2004. This preliminary meeting covered introductions, a database project update, and planning for future training and meetings. The training covered the basics of Microsoft Word; how to use askSam software; a detailed review of key words; how to divide text documents into database entries; and how to import entries from Microsoft Word into askSam. A discussion was held on how to identify TEK within the datasets and how to code that data with the appropriate key words. A second meeting was held in Sitka in May 2005 to review progress, discuss changes to the key word list, add instructions about how to handle location data, and the formatting of entries.

In July 2005 a meeting was held with the ADF&G staff, STA staff, Thornton, and STA elder Herman Kitka, Sr., to discuss progress and the status of the study. At this point, 2,000 entries had been identified and created. Entries had been coded with key words, but still required review for consistency in the use of key words. Topics discussed at this meeting included further adjustments to the key word list, geographical location entries, standardization of the appearance of entries, and the method of citation for published works within the database. The meeting included a lengthy discussion on the use of location names within the database, focusing on the specificity of the locations and how to organize the locations, in an effort to make using the database easier. The key word guide and location descriptions are included in Appendix A.

In November 2005, a meeting was held in Sitka to explain the database project to new STA staff, train them on askSam, review the coding process, discuss key words, and review the work already completed by STA staff. In February 2006, another meeting was held in Sitka. Over the course of a day and a half, a

timeline for completion of the entries from STA was finalized, staff reviewed earlier entries, and further training was completed on the key word process.

The last meeting between ADF&G and STA researchers occurred in May 2006. The primary focus of this meeting was to review work completed and check on the status of the timeline. In addition to these meetings, communication also occurred through correspondence, e-mail, and telephone throughout the project.

Objective 3 was achieved by identifying and categorizing information from STA archives, reports, field notes, interview transcripts, audio recordings, and video tapes, and entering it into the database. STA researchers reviewed and extracted information from reports published by the Tribe, as well as from audio- and video-recorded interviews, official testimony, and archived files. STA TEK data were formatted, coded, and included in the database.

This document constitutes Objective 4, and is the final report for this project.

Objective 5 was not met due to loss of staff and other staffing issues.

## **RESULTS**

Four main subsistence fishery themes emerged during the analysis of information from the sources listed in Table 1 are discussed below, and included:

1. Sharing and trade of wild resources.
2. Traditional conservation practices.
3. Increasing harvest efforts in fisheries that are becoming more difficult to participate in.
4. Salmon hatcheries in Southeast Alaska.

### **SHARING AND TRADE OF WILD RESOURCES**

Sharing and trading continued their significant roles in subsistence fisheries. According to respondents, sharing was one of the more important activities associated with harvesting salmon. For instance, an individual from Haines remarked that salmon were part of a circle of giving and receiving within and between communities. A respondent from Hoonah said that the act of sharing was part of her personal relationship with the local ecosystem. Her clan was Eagle Brown Bear, and she was familiar with members of the Coho Salmon, Sockeye, and Dog Salmon clans. She explained that because of her relationship with members of these clans, her relationship with salmon was deeper than it might be otherwise:

We are not merely thinking of fish. We feel a connection ... We look at a dog salmon, and we think "I know so and so who is of the Dog Salmon Clan." We don't say that to ourselves, but we have that respect. That also helps enable us to always be grateful for this salmon, because we are connected to them, we are related.

Another Hoonah individual commented on sharing: "It's important to share. We're blessed with what God gives us, and it's real important to share, and I truly believe that is why it [salmon] keeps coming."

Balance was a key concept in the salmon distribution, sharing, and trade network. A Sitka fisher explained this concept:

I'm really glad that I was able to catch some fish. I'm really glad that I'm able to prepare it, to store it. I'm really glad that I'm able to trade it to other people. It makes me feel good inside so that it helps me provide a balance that way.

In discussing balance, a Kake respondent said that the Tlingit word *Xla'gaas!* did not readily translate into English. He said it meant “to keep the balance, whether it’s with the things that you catch or ... who you share it with.”

Pride and respect also played key roles in the distribution network of wild resources. For a fisher from Klawock, it was important that he shared his catch with others: “They’re presented to the elders. I take very strong pride in what I do, in how I am these days ... especially with the elders, I will clean it. If they’re young and they can take care of themselves, I’ll just go get it for them, and then I’ll expect them to clean it. But if they’re elders, I give them respect, because when I’m an elder, I want respect.” A similar feeling was conveyed by a Sitka respondent, who stated, “I take great pride in the way I put up not only sockeye, but everything.”

In the community of Wrangell, respondents reported that it was not uncommon for a fisher to share his or her harvest by distributing whole, unprocessed fish. Wrangell respondents also reported that salmon were canned or “jarred” (preserved in glass jars) before sharing. One fisher said he supplied fish to 8 elders in the community because they could no longer harvest fish:

[If] I’m cleaning fish and some old people drive by, I’ll give them half a fish or whatever, and nothing ever goes to waste, and they even get the fish heads, and we used the backbones and the tails for the crab pot. Nothing ever goes to waste and I like that. I usually don’t take or get more than I can handle or give away.

## **TRADITIONAL CONSERVATION PRACTICES**

A customary rule mentioned by most respondents was a respect for the resources. Discussed below are 4 characteristics pertaining to this customary rule: 1) respect for territory; 2) respect for returning resources; 3) respect for the harvest; and 4) respect for the spirit. When these rules are followed, respondents believed that the resources will be sustained.

### **Respect for Territory**

Historically, many salmon bearing streams, and sockeye salmon *O. nerka* streams in particular, were monitored by local clans or house groups. A clan member was responsible for the management of a system, including monitoring the salmon runs and making harvest decisions based on run strength and timing. This individual also monitored the amount of fish harvested and had the authority to stop the harvest. Stream ownership and management were respected by all and one did not fish without permission in another clan’s stream.

### **Respect for Returning Resources**

Respect for wild resources also took the form of customary rules against abuse, either through neglect or ridicule. Throughout the region, parents and elders taught children to respect fish. One teaching prohibited the leaving of harvested fish to remain in the sun, and another encouraged fish processing in an appropriate amount of time. Several respondents said they were taught to have a positive frame of mind when handling salmon and they were never to handle or process salmon when in a bad or angry mood. According to 1 respondent, the moods of the fishers and processors could affect the flavor of the salmon.

### **Respect for the Harvest**

Another traditional conservation practice mentioned by respondents was a prohibition against taking more of a resource than was needed. When asked about customary rules taught by parents and elders, almost every interviewee stated a version of “take only what [is] needed, and don’t waste the resource.” Respect for the harvest of wild resources governed the individual harvester’s actions and awareness of harvest amounts, and was ideally expressed by the use of the entire fish. In addition to smoking or drying the flesh of the salmon, the heads, tails, fins, and, in some cases, entrails, could be used to make fermented salmon products, and the backbones could be boiled to make a dish similar to hash. Respondents also said

that if they accidentally harvested more than their family needed, they would share the extra fish with others.

## **Respect for the Spirit**

As discussed above, all of the harvested animal should be consumed; however, respondents recognized that this was not always practical. They explained that the proper procedures for disposition of unconsumed animal parts included burying them, or, for fish entrails, returning them to the stream or river from which they were harvested. It was believed that this allowed the “spirit,” or consciousness, of the fish to return to the water, and that it contributed to stream ecology by returning nutrients to the system.

Traditionally, these rules were transmitted orally and by example to generations of Southeast Alaska residents. Behind these beliefs and prohibitions was the understanding that consequences would occur if customary rules were not followed:

To respect the animal or the fish ... never to make fun of anything, you always respected it.  
Don't take any more than you need ... Don't waste it. I think that was their religion almost. If you took care of the animal, the animal would take care of you.

## **CHANGES IN TRAVEL AND HARVEST EFFORTS**

A third issue discussed in the interviews was the increase in time and travel required by a growing number of subsistence salmon harvesters in order to obtain a reasonable quantity of fish. Since the 1980s, key respondents related, travel from communities to traditional subsistence fishing sites has been increasingly difficult. The 2 main causes mentioned in the interviews were the reduced size of the commercial fishing fleet and the increase in costs.

Individuals, or groups of individuals, specializing in resource harvest activities, including salmon fishing, have been the primary sources of subsistence fish in most Southeast Alaska communities since the 1950s. Commercial fishing households, especially, had the equipment, personnel, and skills with which to fish and hunt efficiently, and generally harvested the most fish in the region. Commercial fishing boats, which were generally larger and more seaworthy than noncommercial boats, were preferred during inclement weather and rough seas, and for extended trips, since they could carry more people and gear, and bring larger harvests back to the community. Commercial fishing households often had greater quantities of equipment, such as nets, pots, longlines, trolling gear, firearms, and secondary skiffs. Members of most commercial fishing households were also familiar with traditional subsistence use areas and were skilled in efficient harvest techniques. On fishing and hunting trips, crews on the larger boats commonly harvested for several other households in addition to their own families, and distributed subsistence foods on their return to the community (Turek et al. *In prep*).

However, key respondents said that since the 1980s, fewer households have been commercial fishing in the region, and the decline of the commercial fishing fleet has led to fewer large commercial fishing boats based in small communities. Instead, more noncommercial boats, such as cabin cruisers and skiffs, were taking the place of the commercial boats in the subsistence fishery. The decline in commercial fisheries also led to more households being responsible for their own subsistence harvests (Turek et al. *In prep*).

Several key respondent interviews were conducted with high harvesters in Southeast Alaska. In Hoonah, 1 household supplied fish directly to at least 6 households, and there were indications that those households redistributed the fish. A fisher from Wrangell explained the practice: “I go with some of the highest harvesters here, and we share times, monies, and gas, and fish, and we all share in the work, the ethics of it. We have a lot of fun and it's a good way to get a good bunch of fish for yourself and your family and friends.”

Several respondents reported that the rising price of fuel was also affecting subsistence fishing patterns. In an effort to conserve fuel, harvesters were traveling shorter distances, concentrating harvests in fewer

areas, and fishing at different locations than they fished 20 years ago. Some respondents said they were fishing in systems not traditionally used by their clan.

## **REACTIONS TO HATCHERY FISH**

The presence of what respondents referred to as “hatchery fish,” that is, salmon reared in hatcheries and released to enhance existing populations of salmon, elicited mixed reactions from respondents. Some respondents said they believed that hatchery fish had either no effect or a positive effect on salmon populations. This group generally regarded hatchery produced fish as good.

Other respondents said that they believed hatchery fish were detrimental to wild salmon and expressed a preference for the taste of wild salmon. They also said that hatchery fish could not be processed as well as wild fish, as the flesh of hatchery fish had a tendency to become separated from the skin during the smoking process. Some in this group claimed that they could differentiate between wild and hatchery salmon by touch or taste. One respondent from Klawock said that he could tell the difference just by handling the fish: “... you know it’s hatchery fish just by picking it up. The meat is very soft. It is totally different than when it’s wild. Wild fish is much firmer, bigger.” One respondent summed up his feelings about hatchery fish by stating that his dislike of hatchery fish was so strong that he would not use it, even for dog food.

## **GENERAL TRADITIONAL AND ECOLOGICAL KNOWLEDGE OF SALMON**

Five Pacific salmon species are found in Southeast Alaska waters: sockeye, coho *O. kisutch*, Chinook *O. tshawytscha*, pink *O. gorbuscha*, and chum *O. keta* salmon. Salmon have been the primary subsistence resource in the southeast Alaska region, shown in Figure 1, for generations (Emmons 1991;Langdon 1977). In contemporary times, sockeye salmon were the most important subsistence salmon species in Southeast Alaska, comprising the largest share of all the salmon species harvested by subsistence fishers (Turek et al. *In prep*).

### **General Patterns of Salmon Subsistence Harvest and Uses**

#### ***Gear Types***

Some Southeast Alaska residents over the age of 70 recalled using gaffs, spears, and traps to harvest salmon. Haines and Klukwan elders recalled using gaff hooks and spears, with and without detachable points, to harvest Chinook and coho salmon on the Chilkat and Chilkoot rivers (Figure 2). Spears and gaffs were gradually replaced by driftnets and setnets, and, by the 1980s, rod and reel. A resident of Sitka recalled using rod and reel, dip nets, troll gear, beach seines, gillnets, and purse seines to harvest salmon. Residents of Klawock recalled that all species of salmon were harvested in the past by the use of weirs, traps, spears, stakes, clubs, and hooks; often a combination of these gear types was used. By 1900, these gear types were replaced by commercially made nets and factory made barbed hooks.

#### ***Timing of Harvests***

Respondents recalled harvesting all varieties of salmon in June, in the later months of summer, and in early fall. On the Chilkat River, coho salmon were reported as harvested as late as December.

#### ***Use Areas***

Respondents said that traps and weirs were placed at the mouths of rivers and streams so as to catch returning salmon. Chinook and coho were taken in marine waters from canoes and boats by using hand lines and, after about 1920, rod and reel.

#### ***Preservation and Preparation Methods***

Fresh and dried salmon, especially Chinook, sockeye, coho, and chum salmon, have been a staple commodity of Southeast Alaska residents for generations. Respondents said that one must be patient and

willing to invest long hours of work in order to successfully harvest and prepare fish. A Hoonah respondent said that his grandmother's smokehouse could hold 300 fish. After the fish were smoked they were stacked, tied into bundles of 25 to 35 fish, and stored in a box under the house, where it was cold and dark.

### ***Distribution and Exchange***

Sharing of salmon in Southeast Alaska communities was common. Household surveys conducted in Petersburg in the late 1980s revealed that almost 31% of the reported subsistence salmon harvest was given to members of the community (Smythe 1988). A fisher from Wrangell commented on the importance of sharing:

Most everybody I know ... shares. I was a recipient before I moved up here full time. I was a recipient of hundreds and hundreds of pounds of fish. [Now] it is kind of a payback time. Some people who have never given me any fish, I give to them, friends of my family, friends of my friends. [If] I'm cleaning fish and some old people drive by, I'll give them half a fish or whatever, and they even get the fish heads and used the backbones and the tails for the crab pot. Nothing ever goes to waste. I usually don't take or get more than I can handle or give away.

Knowledgeable fishers across Southeast Alaska reported that an increasing number of people were harvesting salmon and sharing with others in their communities. Several respondents mentioned that commercial seine boat captains still "took orders" and harvested salmon for the entire community, although, since the 1980s, fewer seine boats were operating in rural Southeast Alaska. A resident of Klawock described sharing activities:

People will call up and ask "Hey, we need 20 fish," and they'll give us their permit. We'll drop [fish] off, clean it for them. Mostly elders. I always try and make sure I bring some up to the Senior Center and [give it to] whoever else around here that's physically disabled. Family first, then the elders, then whoever else after that ... If there's five guys out there, we make sure we all have [a subsistence permit]. We just catch our limit and then we come back in.

With the decline in the commercial fishing fleet, more individuals were traveling to fishing sites in smaller vessels, usually open skiffs, and returning home with fish to keep, share and trade.

### ***Salmon Abundance***

An elderly resident of Klawock said that salmon abundance had declined in the Klawock area but he did not clarify his statement with dates. "A long time ago we'd make one or two sets and then give some away, you know. [Because] there was so much fish then that you could do that." A resident from Hoonah said he remembered when Excursion Inlet (Figure 3) used to be "just black with [salmon] ... You could see the schools coming in. Now there are just little sparse things here and there. Yeah, there is a big difference."

### ***Local Knowledge of Salmon Ecology***

When asked about local knowledge of salmon returns, a resident of Sitka said he was taught to note the arrival of eagles *Haliaeetus* or *Aquila* spp., which indicated that salmon would soon return. A respondent from Hoonah said that he learned to predict run strength by noting precipitation which affected river temperatures and depth. In the 3 to 5 years after exceptionally dry years, salmon runs were usually smaller due to shallow, warm water in spawning areas. Another Hoonah respondent said that members of her family watched the run strength, and if the run was small or weak, they would not harvest as many salmon. One respondent said that if there was a strong crop of salmonberries *Rubus spectabilis* there would be a lot of salmon returning to the local streams. An elderly resident from Wrangell reported that when salmon returned to streams, males were always the first to arrive.

## **SOCKEYE SALMON SUBSISTENCE HARVEST AND USE PATTERNS**

In Southeast Alaska, sockeye (red) salmon, or *gaat* in Tlingit, were a highly prized, valuable resource for both symbolic and economic reasons. Due to spawning habitat requirements, which include streams associated with freshwater lakes, sockeye are relatively rare and widely distributed throughout the Alexander Archipelago and the Southeast Alaska mainland, making them a valuable but limited resource. Historically, most prominent Southeast Alaska Native groups claimed rights to at least 1 sockeye stream (Emmons 1991;Langdon 1977;Thornton et al. 1990).

Sockeye were valuable for a variety of reasons. They were the most predictable and consistent (in numbers) of all salmon stocks in Southeast Alaska. Sockeye were available for the longest period of time, returning gradually over several months, unlike the short bursts and large numbers of coho, pink, and chum salmon. Key respondents said that, except for Chinook, the fat content of sockeye salmon was higher, and that sockeye retained their nutritional value better than other salmon (Langdon 1977).

Sockeye salmon typically spawn in freshwater streams flowing from lakes, where juvenile fish spend 1 to 4 years before migrating to salt waters. Growing quickly to 4 to 8 lb at adult size, sockeye salmon travel widely in the ocean before heading back to spawn and eventually die in the freshwater streams of their birth. Breeding males develop humped backs and elongated, hooked jaws filled with sharp teeth. Both sexes turn brilliant to dark red on the back and sides, pale to olive green on the head and upper jaw, and white on the lower jaw (Childerhose and Trim 1981).

Mature sockeye salmon return to freshwater systems in summer and most runs in this area show little variation in their arrival time on the spawning grounds from year to year. Freshwater systems with lakes produce the greatest number of sockeye salmon. Spawning usually occurs in rivers, streams, and areas of upwelling along lake shorelines. In Southeast systems with lakes, juveniles usually spend 1 to 3 years in fresh water before spring outmigration. However, in some Southeast systems without lakes, many juveniles outmigrate soon after emerging from the gravel.

### **Gear Types**

Prior to 1800, Alaska Natives in Southeast Alaska used stone weir traps, basket and reed traps, other weirs and fences, gaffs, and spears or leisters to harvest sockeye salmon (Langdon 2006). Stone traps, consisting of low stone walls or ridges, were built in intertidal areas near the mouths of sockeye streams. Remains of traps are present at many of the sockeye streams in the region. Today, subsistence sockeye salmon are harvested with set gillnets, beach seines, hand purse seines, gaffs, and dip nets. Set gillnets may also be used in Haines, Klukwan, and Yakutat. In addition to these harvests, sockeye salmon are removed from commercial harvests for home use.

In the Hoonah area, fishing for sockeye salmon, as well as chum and pink salmon, is usually done with beach seines, and occasionally, purse seines. Fishers from Angoon reported harvesting sockeye salmon with beach seines, purse seines, and hand troll gear. An Angoon respondent described 2 techniques for using a beach seine:

There are two basic ways to make a set. The first requires a minimum of two people and a skiff. One end [of the net] is held fast on the beach, while the other end is tied off to the skiff. The skiff tows the seine around the school of fish, and brings the skiff-end of the net to shore. The seine is pulled onto shore, the fish removed, and usually taken to Angoon to be processed. A second common method involves 2 skiffs. Each skiff carries one end of the seine, encircling the salmon. The skiffs return to shore, the net is hauled in, and the fish removed.

Several fishers from Sitka reported using dip nets and beach seines to harvest sockeye salmon, while others reported using rod and reel, gillnets, and hand held lines.

A resident of Kake said they used gillnets and beach seines, and that they operated the beach seines much like purse seines: “round hauling,” or trapping, salmon in the net. Subsistence beach seines are often made from discarded commercial fishing nets. The respondent said he remembered his grandfather making a beach seine out of an old commercial fishing net that was discarded by the local cannery. Although some individuals reported round hauling a beach seine by themselves, which this respondent did try, he found round hauling easier with more people. The respondent said he preferred 3 to 4 people working the net: 1 individual to tie the seine onto the beach, 1 individual to make the set, and others to help clean the fish.

A respondent from Wrangell reported using rocks and a net to harvest sockeye salmon. The net was strung across a bay, and then rocks were thrown into the water to herd the fish into the net. Other Wrangell respondents reported using drift and set gillnets, dip nets, and spears. A fisher from Klawock reported that he used to use spears, but that they were no longer used. He is now using a seine as well as rod and reel tackle to harvest sockeye salmon. Another Klawock respondent described the use of beach seines before motorized boats were widely available:

My dad said they used to get more when they rowed, because it went out quiet. It didn't make as much noise and it wouldn't spook the fish. He said he used to “just sink” the seines. He made one set and that was it, because you couldn't work on that much fish in a day. I heard back then that they hooked off onto the beach and just pulled everything to the beach, that's why it's called [a] beach seine.

## **Timing of Harvests**

Respondents from Klukwan and Haines said that the first run of sockeye salmon to the Chilkat River usually appeared in early June but occasionally arrived as early as mid May. Sockeye salmon fishing continued through the summer months, usually peaking in mid July to early August on the Chilkat River. Respondents from Angoon reported that sockeye salmon are the first salmon to return, beginning as early as mid June and lasting through July and August. A respondent from Kake reported that she harvests sockeye salmon between the end of June and the end of July.

A respondent from Wrangell explained how he knew when it was time for the sockeye to return:

It's the time of the year ... the eulachon, the kings, the sockeyes, they come back in that order ... the eulachon comes in April, then king salmon comes in May, in fact toward the end of April, and into May and June ... the sockeye come in about mid-June through July.

A respondent from Klawock reported that when he was younger, sockeye salmon used to arrive earlier, around mid June, but now the fish are arriving in July and August.

## **Use Areas**

Respondents from Haines and Klukwan reported that sockeye salmon are caught in both the Chilkat and Chilkoot rivers, with the majority of the harvest taking place on the Chilkat River along the Haines Highway. Other Haines and Klukwan fishing locations mentioned by respondents included the Chilkat, Chilkoot, and Mosquito lakes (Figure 2). Residents of Hoonah reported that sockeye are harvested in Icy Strait, Hoktaheen Cove, Hoktaheen Creek, Basket Bay, and in Excursion Inlet (Figure 3). Respondents from Sitka reported harvesting sockeye at Silver Bay, Nakwasina Sound, Klag Bay, Redoubt Bay, and Necker Bay (Figure 5). Sockeye salmon fishing sites mentioned by respondents from Kake included Falls Creek, Hamilton Bay, Gut Bay, and Bay of Pillars (Figures 5 and 6). Residents of Wrangell reported harvesting sockeye salmon at Pats Creek, Thoms Place, Mill Creek, the Stikine River, Salmon Bay, and Virginia Lake (Figure 6).

## Preservation and Preparation Methods

In Haines and Klukwan, sockeye salmon are eaten fresh, dried, and smoked. Summer sockeye salmon are usually eaten fresh or half dried. A later, fall run of sockeye, since they have less oil, are better for drying. In January, people gaff the “red,” or spawned out, sockeye salmon in Chilkat Lake, and these are roasted or boiled.

Fishers from Hoonah reported making “newspaper style” dried strips of salmon flesh, known in Tlingit as *náayadi*. *Náayadi* is made by slicing the fish from head to tail, gutting it, and leaving the backbone intact. The fish is opened, like a newspaper, and half dried so that the outer flesh forms a thick crust. The fish is then butchered and either canned or frozen.

Many Angoon residents prefer to eat the first sockeye salmon harvested fresh. Much of the remaining sockeye salmon are preserved for later consumption by smoking or drying. Angoon residents often combine drying and smoking with freezing and canning. A Sitka respondent reported that sockeye salmon are either eaten fresh or dried for later use. Another Sitka respondent commented on the importance of properly handling sockeye salmon:

So it maintains its ... nutritional values. [Proper handling] in a respectful manner [shows] that fish that it's not being wasted. And that's the important thing: to be able to harvest and to preserve it in a manner that allows for that resource ... to maintain its relationship. It's not just our relationship with that resource, it's the fish's relationship with us ... when we come down there to harvest, we ask forgiveness and we thank them for providing themselves.

A respondent from Kake discussed the activities at her family's Bay of Pillars seasonal camp in the 1940s. Chinook and ocean-caught sockeye salmon were preserved by drying or salting. The women filleted the salmon, threaded the fillets onto sticks, and smoked them. After filleting and smoking, the fish were rolled, and then placed into 1 lb cans for storage. The heads, backbones and tails were boiled. All of the food prepared and preserved at camp was for family use. The respondent said that her family canned salmon in half-gallon jars that had metal, screw top lids.

Several fishers from Wrangell reported that smoking, salting, and freezing are popular preservation methods for subsistence-caught sockeye salmon. A Klawock respondent reported that he prefers late fall sockeye salmon for boiling, especially those that were red from being upriver all summer. He added that the longer the sockeye salmon stayed upriver, the better they were for fish hash, dried fish, and boiled fish.

## Distribution and Exchange

A respondent from Haines reported that her family traded salmon with people in her community, with people throughout Southeast Alaska and with people in Canada's Yukon Territory. People from Haines said they traded sockeye salmon for several species of crabs, shrimps *Pandalus* and *Pandalopsis* spp, Pacific halibut *Hippoglossus stenolepis*, black seaweed *Porphyra* spp, herring roe and Sitka black-tailed deer *Odocoileus columbianus sitkensis*.

A respondent from Hoonah reported fishing for up to 7 households: 5 in Hoonah and 2 in Juneau. An active fisher from Sitka reported sending sockeye salmon to family members in Juneau, Hoonah, and Angoon. A respondent from Kake reported sharing fish with her family and friends, and donating fish to the Alaska Native Brotherhood and Alaska Native Sisterhood, food sales, raffles, 40 day parties<sup>2</sup>, conventions, weddings, and birthdays. The respondent explained that sharing is part of her Tlingit culture and that she learned the importance of sharing from her parents. She said neighbors would sometimes

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2. A celebration occurring on the fortieth day after a death, hosted by the family of the deceased. The family may host another party at the 1 year anniversary of the death.

give them deer, “gumboots” (chitons), and halibut, and her family would give them cash, a blanket, or another trade item.

A respondent from Wrangell said that he has given away as much as 90% of his sockeye salmon harvest, explaining that there were occasions when he “smoked 400 pounds of fish [in 1] year” and did not eat 2 lb of that harvest.

A respondent from Klawock explained sharing:

You take care of your family, your extended family, and then you got elders that don't have family to get fish for. That's one of our practices. We make sure that people who need it ... got their fish.

Many respondents said that sharing subsistence harvests is a core Tlingit value.

### **Historical Harvest and Use Patterns**

Several residents from Hoonah described declining sockeye salmon harvests. Opinions on the reasons for declining harvests vary, but the most common reason mentioned is the cost of fuel. High fuel costs have forced Hoonah residents to travel shorter distances and harvest fewer fish.

Respondents from Klukwan, Kake, and Hoonah said that sockeye salmon harvests were higher in the past, though they did not specify when. Several respondents commented that “years ago” it was common to harvest all of a family's subsistence salmon in 1 outing. Respondents gave several reasons for the declining harvests, including restrictive regulations, overharvesting of fish, and logging activities.

### **Sockeye Salmon Populations**

An elderly respondent from Haines recalled that, in his childhood, sockeye salmon in the Chilkoot River were bigger and the sockeye salmon in the Chilkat River were smaller. A resident of Hoonah said that there are 2 runs of sockeye salmon at Hoktaheen: a run of smaller fish and a run of larger fish. The run of smaller fish begins in early June and is followed by the run of larger fish in late June or early July.

A respondent from Sitka reported that sockeye salmon returns to Redfish Bay were strong, and the fish were large. Another Sitka respondent said that sockeye salmon are getting smaller each year. Another Sitka interviewee alluded to higher historical sockeye salmon abundance: “... the abundance of fish has gone down compared to the old days ... there use to be quite a few more streams ... in the Sitka area where you [could] harvest sockeye, but today there's no more sockeye left [in some streams].”

An active fisher from Kake reported that sockeye salmon are getting smaller and in some places the returns are “dying out.” Fishers in Wrangell reported that the numbers of sockeye salmon returning to spawn in the Stikine River are declining. Two possible reasons given are increased amounts harvested by Canadians, and more human activity on the river, which muddies the waters. An elderly fisher from Klawock reported that, when he was a child, Klawock River sockeye salmon returns were much stronger than they are now, saying, “You used to be able to walk across the jumping salmon.” Several other Klawock respondents reported that sockeye salmon returns were stronger in the past; however, no specific reason for the decline was given.

### **Sockeye Salmon Ecology**

Recent research by Thornton (Turek 2007:12) indicates that a distinct population or subspecies of sockeye salmon may exist in the Sitka area. Elders recall, and contemporary fishers confirm, the existence of several populations of smaller sockeye salmon, distinct from the more common, larger sockeye salmon. These smaller sockeye have different run timings, seasonal movements, and spawning habits than the more common sockeye salmon.

A Sitka respondent described the small sockeye salmon found in some areas of Southeast Alaska:

Up in Sitka we have the little sockeyes we call the “*dagák*.” They are the only salmon in Southeast that originated in the Sitka area. At one time, we had [them] at Green Lake, Silver Bay, and also Shamrock Bay and Crawfish, and also at Whale Bay. The only ones that are existing today [are] in Necker Bay ... those little sockeye salmon like little lakes that have gradual falls all the way ... in all those areas that they used to be in, the drainage system falls on a slope.

Several respondents said that Sitka “small sockeye” are sensitive to disturbance, and are no longer found in some of the streams where they used to occur in the Sitka area.

A respondent from Kake recalled that the sockeye salmon Gut Bay (Figure 5) and Falls Creek (Figure 1) used to be larger than the salmon at Bay of Pillars (Figure 6). The sockeye salmon were much smaller at Bay of Pillars, about the size of a “trout.”

A respondent from Klawock commented on the sockeye salmon returns to the Prince of Wales Island:

Oh, everything was affecting the sockeye: the cannery, the traps, the fisherman. After they took the traps out, it never did recover like it used to be. Hetta [Figure 4] was a great place for sockeyes. And that twiddled down.

Another Klawock respondent stated that after the Klawock River hatchery was built (Figure 4), all of the salmon returns declined.

## **COHO SALMON SUBSISTENCE HARVEST AND USE PATTERNS**

Coho, or silver salmon and *l'ook* in Tlingit, are found in the coastal waters of Southeast Alaska from Yakutat Bay to Dixon Entrance. Coho salmon are quick to colonize a new area and are tolerant of a wide range of stream conditions. Adults are bright silver with small black spots on their dorsal side, as well as on the upper lobe of their caudal fins. Spawning adults of both sexes have dark backs and heads and maroon or red sides, and males develop a prominent hooked snout with large teeth. Coho enter streams from July to November, and adults often hold in pools until they ripen, after which they move onto spawning grounds. Females deposit between 2,400 and 4,500 eggs, which hatch in the early spring. Juvenile coho live in freshwater ponds, lakes, rivers, and streams, sometimes spending up to 5 winters in fresh waters before migrating to the sea as smolts. Time at sea varies: some return as small, but mature “jacks,” which are typically males that have return after only 6 months at sea. Most coho are at sea for 18 months before returning as full sized adults (Childerhose and Trim 1981).

### **Gear Types**

On the Chilkat and Chilkoot rivers, rod and reel tackle has replaced the gaff hook for harvesting coho salmon. A fisher from Klukwan recalled using a spear that had a detachable point. The point had 2 barbs and was lashed to the shaft with strips of moose hide. Several fishers from Hoonah reported using troll gear or rod and reel tackle for coho salmon. Research conducted in Angoon during the late 1980s found that beach seines and rod and reel tackle were the 2 primary means of harvesting coho salmon, followed by purse seines, troll gear, and gaff hooks (George and Bosworth 1988).

A Sitka fisher reported catching coho, as well as pink and sockeye salmon with a seine net. A resident of Wrangell reported that gillnets were used to harvest salmon on the Stikine River (Figure 6). A respondent from Klawock recalled using a beach seine from a row boat at the mouth of the Klawock River (Figure 4) during the summer and a spear during the winter on ice covered streams. Another Klawock respondent commented on regulations restricting the use of spears: “That’s part of life, you know, spearing fish. Can’t do it anymore.”

Respondents reported harvesting most coho salmon with troll gear and rod and reel tackle.

## Timing of Harvests

Prior to World War II, Southeast Alaska families moved to fish camps shortly before the summer salmon runs began. Sockeye salmon were caught in late spring and early summer, and coho and chum salmon were caught later in the summer and in early fall.

Spear fishing on the Chilkat River for coho salmon occurred during fall and early winter. Spears were used in November and December because it was too cold for nets. Coho taken at this time of year were eaten fresh or buried in snow until spring. When the weather warmed and the fish began to thaw, they were removed from the snow and lightly smoked. These fish had a distinct flavor, different from other types of preserved salmon.

A respondent from Sitka explained contemporary salmon harvest timing: “During June and the later months of summer, on into early fall, people from Sitka harvest salmon. As late as October and November, chum salmon and coho salmon [are] harvested.” In Angoon, coho salmon are the last salmon to arrive, in late July or early August, and they remain until late September or November. In the Klawock area, coho salmon runs begin in June and continue through October. Several respondents from Klawock also reported harvesting coho salmon in December and January.

## Use Areas

Coho salmon are harvested near their spawning streams and in marine waters. In the Haines and Klukwan areas, coho salmon are also harvested at Mosquito Lake (Figure 2), where coho gather in early winter. A respondent from Klukwan said he preferred fishing for coho salmon after the ice had formed on the Chilkat River. Hoonah respondents reported harvesting coho salmon at Hoktaheen (Figure 3).

Fishers from Angoon reported harvesting coho salmon at Salt Lake at the north end of Mitchell Bay (Figure 3). Several fishers from Sitka reported harvesting coho salmon in Katlian Bay, the Indian River, Salmon Lake, Deep Bay, and Sawmill Creek (Figure 5). Falls Creek (Figure 1), Gut Bay (Figure 5), and Bay of Pillars (Figure 6) are the primary coho salmon harvest locations for Kake residents. A respondent from Wrangell reported that Wrangell residents often fish for coho salmon at Salmon Bay, Thoms Place, and Crittenden Creek (Figure 6). Fishers from Klawock reported harvesting coho salmon at Klawock River, Klawock Lake, Crab Creek, Karta Bay, and the Sarkar River (Figure 4).

## Preservation and Preparation Methods

Coho salmon, when smoked and dried, preserves well and retains its natural oils. A respondent from Sitka commented on the versatility of coho salmon: “Cohos are so versatile: they’re good for baking, frying, smoking, fresh packing, [and] strips.” A respondent from Hoonah described a recipe for cooking coho salmon roe with seal oil and seaweed. Another respondent recalled that during World War II, the U.S. military purchased smoked salmon strips as well as a “cheese” made from smoked coho salmon roe.

## Distribution and Exchange

Smoked, canned, and dried coho salmon are traded and shared throughout the region. A Wrangell respondent said she hard smokes<sup>3</sup> and then cans her coho salmon and shares it with relatives outside of Alaska.

## Historical Harvest and Use Patterns

A resident of Klukwan described taking coho salmon with spears and gaffs. A “good” fisher would gaff the fish on the head, thus preventing damage to the body. A respondent from Kake recalled being taught that salmon should be cleaned and processed immediately after catching.

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<sup>3</sup> A fish that has been smoked so long that it has become hard.

## **Coho Salmon Populations**

A resident of Tenakee Springs on northeast Chichagof Island reported that the abundance of Chinook and coho salmon appears to have declined, due to increased commercial salmon fishing in the area.

## **Coho Salmon Ecology**

A respondent from Klawock said that coho salmon require lakes to spawn, explaining that creek or river water can be too warm, threatening their survival, so a lake offers the salmon the cool, deep water they need. A respondent from Wrangell said that coho salmon school at the mouth of a stream at low tide and wait for high tide so that they can swim upstream. Rain can assist the coho upstream migration because it increases the volume and freshness of the water. Several respondents claimed that they could distinguish coho salmon from other salmon by the way the coho jump out of the water and land on their side. A Hoonah respondent explained: “Cohos leap ‘way out of the water, and they land sideways.”

A fisher from Klawock said that there were multiple returns of several species of salmon to the Klawock River and each species spawned at different times and locations along the river. Respondents commented on the resiliency of coho salmon. A Klawock respondent, comparing coho to sockeye salmon, said that natural or human-made obstacles do not disturb coho as easily as they do sockeye salmon. A Haines respondent said that coho salmon are more adaptable than other species, further explaining that they will find somewhere else to spawn if their natal streams are not available.

A Sitka fisher said that streams as small as 2 to 3 ft wide are used by spawning coho salmon. The respondent also described what he believed to be behavior unique to coho salmon: coho will force other coho salmon out of a stream if there are too many fish trying to spawn.

## **CHINOOK SALMON SUBSISTENCE HARVEST AND USE PATTERNS**

Chinook, or king salmon and *T'á* in Tlingit, are native to the Pacific coast of North America. In terms of fish size, they are the largest of the Pacific salmon, commonly exceeding 30 lb. Chinook are targeted by sport, commercial and subsistence fisheries. In Southeast Alaska, the major Chinook returns are to the Alsek River southeast of Yakutat Bay, the Taku River near Juneau, and the Stikine River near Wrangell. Chinook salmon also return to some of the smaller streams in the region (Childerhose and Trim 1981).

Adult Chinook are distinguished by the black, irregular spots on the back, dorsal and adipose fins, and on both lobes of the caudal fin. In the ocean, Chinook salmon are bluish-green fading to silver on the sides and white on the belly. The color of spawning Chinook salmon ranges from red to copper to almost black, depending on location and degree of maturation. Spawning males are typically more deeply colored than spawning females, and often develop a hooked nose or upper jaw (Childerhose and Trim 1981).

## **Gear Types**

Prior to the 1970s, gaff hooks were the primary means of harvesting Chinook on the Chilkat River. Today, Chinook salmon are caught in set gillnets and with rod and reel tackle.

A respondent from Sitka described spear fishing for Chinook salmon. The spear had a detachable point attached to a line. Once a salmon was speared, “the hook [came] off and the guys [ran] the salmon right up on the beach. After the salmon [was] hooked, the hook [fell] off the end of the poke [spear].” Currently, most Chinook salmon fishing in the Sitka area is done with rod and reel or hand and power troll gear with spinners or with herring for bait. Respondents from Angoon said that Chinook salmon are harvested with hand and power troll gear, rod and reel, and purse seines.

A Petersburg fisher said that people from his community troll for Chinook salmon in Frederick Sound and in the Wrangell Narrows. A respondent from Wrangell recalled harvesting Chinook salmon on the Stikine River (Figure 6) using a method called “pewing.” The fisher used a long stick, often a broom handle, sharpened at one end, to direct Chinook salmon into a large basket which was then lifted out of the water.

Two other Wrangell respondents reported using a short net that had large mesh to harvest Chinook salmon.

### **Timing of Harvests**

Respondents from Haines and Klukwan said that fishing for Chilkat River Chinook salmon, the first salmon available in the river, occurs in late May and in June, after the eulachon fishery on the Chilkat River. Chinook are eaten fresh as well as preserved. In the Hoonah area, Chinook salmon are available year round; however, the majority are taken between June and September. A Wrangell respondent commented on the seasonal timing of Chinook: “The eulachon comes in April, then king salmon comes in May, in fact toward the end of April, and into May and June.”

### **Use Areas**

In the late 1800s, Big Boulder Creek, northwest of the village of Klukwan (Figure 2), was reportedly a good location for harvesting Chinook salmon, though little fishing occurs there today.

A respondent in Petersburg reported trolling for Chinook salmon in Frederick Sound (Figure 6) and in the Wrangell Narrows. A respondent from Wrangell described Bradfield River Chinook salmon: “They were short and chunky ... big around. You could just look at them and tell, boy, those are Bradfield kings.” Residents of Sitka said they have been trolling for Chinook salmon in Silver Bay (Figure 5) for many years.

### **Preservation and Preparation Methods**

Chinook salmon are prized for their high oil content, large size, good flavor, and quality after preservation. In the early 1980s, residents of Haines and Klukwan described their preparation methods for salmon, including Chinook salmon:

Methods used to clean, cut, and preserve the salmon varied depending on individual tastes and methods learned. Common salmon products preferred by residents included: 1) sockeye brined with salt and brown sugar and lightly smoked, or “kippered,” and later canned; 2) king salmon dried as brine strips and salted bellies; 3) plain, canned salmon; 4) salmon strips and backs, hard dried without brine; 5) frozen coho salmon and king salmon; c) boiled fresh salmon; 7) fermented salmon heads (*g'ink*); and 8) fermented salmon eggs (*kahaak*). (Mills 1983)

A respondent from Klukwan recalled his mother's recipe for *g'ink*: “She took Chinook salmon heads, blood, and entrails, everything that was left over, and buried it in the sand to age, or ferment.” The respondent did not say how long the salmon was buried.

A fisher from Wrangell reported that Chinook salmon are good for smoking: “Kings, I normally smoke ... I smoke some for a few hours and then I can them. And I can them [un]smoked. I don't hard smoke them.” Another Wrangell respondent recalled that his grandfather salted Chinook salmon for winter, and that it was best to brine Chinook longer than other salmon.

Another respondent described preparing Chinook salmon heads:

I take a pan and I take the head and cut it in half, and wash it out so it's nice and clean. And I take salt and pepper and a little bit of garlic salt, and slide it in the oven, and bake it for maybe an hour or so and it's done.

A respondent from Klawock said that people “liked the sockeye heads for boiling ... the king salmon heads and the coho salmon heads for eating. Some dry or smoke [them]. They like the smoke flavor in [them]. They'll cut [them] in half, like a butterfly.”

## **Chinook Salmon Populations**

A respondent from Wrangell commenting on Chinook salmon populations said, “It seemed to me that when I was growing up there was a lot of king salmon around ... Humpback Bay used to be just ‘black’ with fish down there. Now you are lucky to see one or two jumps a day down there. It’s really depleted.” Another Wrangell respondent linked the decline in Chinook salmon abundance to the declining herring runs on the Stikine River. North of Wrangell, in Petersburg, research conducted in 1987 reported that “king salmon have become more scarce in this area in recent years” (Smythe 1988).

## **Chinook Salmon Ecology**

A Sitka respondent commented on the feeding habits of Chinook salmon during the 1940s:

Back in the ‘40s, when I use to troll with my dad ... during World War II, you could see big pools of herring [and] the king salmon ... swimming underneath them. They’d come up and you’d see big pools all over the Sound out here. Then the ducks and the king salmon are all underneath them and they swim up. Now it’s not that way any more.

A resident of Wrangell said that Chinook salmon “head out to sea for between 4 or 5 years. And they return to spawn pretty consistently. Sometime they are a little late, but most of the time they are on time.”

## **PINK SALMON SUBSISTENCE HARVEST AND USE PATTERNS**

Pink salmon, also known as “humpies,” or *cháas* in Tlingit, have a very pronounced, laterally flattened hump on the dorsal side, especially apparent in spawning males. Pink salmon are native to Pacific and Arctic coastal waters and are taken in the commercial, sport, and subsistence salmon fisheries in Southeast Alaska. Pink salmon are among the smallest Pacific salmon and typically have a 2 year lifecycle. An adult fish in marine waters is a bright, steely blue with silver sides and many large, black spots on the back and on the caudal tail fin. As the fish approaches its spawning stream, the male typically turns brown to black with a white belly. Females typically become olive green with dusky bars or patches above a light colored belly. In Southeast Alaska, by the time the male enters the spawning stream it has developed the characteristic hump and hooked jaws (Kingsbury 1994).

In Southeast, adult pink salmon enter spawning streams between late June and mid October. Most pink salmon spawn within a few miles of the coast, often within the intertidal zone or at the mouth of the stream. The female pink salmon carries 1,500 to 2,000 eggs, depending on her size. Sometime during early to mid winter, eggs hatch into alevin, which feed on their attached yolk sac before emerging from the gravel as fry. Soon after emergence, pink salmon fry migrate into salt waters, where they typically stay in nearshore areas in dense schools near the surface, feeding on plankton, larval fishes, and occasional insects. Predation is heavy on pink salmon fry, but growth is rapid. By fall, at an age of about 1 year, juvenile pink salmon from Southeast streams are moving into ocean feeding grounds in the Gulf of Alaska and the Aleutian Islands (Kingsbury 1994).

## **Gear Types**

According to respondents from Hoonah, pink salmon are harvested with beach seines. Research on subsistence fisheries in Angoon showed that purse seines accounted for one-quarter of the pink salmon harvest, indicating these were commercially-caught fish that were kept for home use. Other means used to harvest pink salmon included beach seines, hand and power troll gear, and rod and reel (George and Bosworth 1988).

A respondent from Wrangell reported that stone traps were historically used to harvest pink salmon. “I know there were traps there, but it was long before my time, long before my uncle and grandfather’s time too. They’re ancient ... The rocks are still there, but the trap isn’t. Just like up in Bradfield Canal, there are pole traps there, they’re probably 3,500 years old.” A Wrangell respondent reported that he used to gaff pink salmon in Burnett Inlet (Figure 6).

## Use Areas

Respondents from Haines and Klukwan reported that pink salmon were harvested from the Chilkat River, Lutak Inlet, and Chilkoot Inlet. A Kake respondent stated that the community's primary pink salmon harvest areas were Falls Creek (Figure 1), Gut Bay (Figure 5), and Bay of Pillars (Figure 6). Respondents from Petersburg and Wrangell said that pink salmon were harvested on Petersburg Creek (Figure 1), Falls Creek, (Figure 6), and Bear and Ohmar creeks. In the Wrangell area, pink salmon were harvested from Olive Cove, Burnett Inlet, Pat and Anan creeks, and the Eagle and Harding rivers (Figure 6).

## Preservation and Preparation Methods

Respondents from several communities reported that the taste of pink salmon varies depending on where it was harvested. The biggest difference in taste was between fish caught in salt waters and fish caught in fresh waters.

A Sitka respondent described 1 method of preservation for pink salmon:

Though called the lowly humpy, it is a quality fish. For example, Indian River humpies [were] famous for boiled fish but [are] little used [today] as smoked or dried fish due to [their] tendency to mold. On the other hand, Nakwasina humpies [are] highly prized [for] smoking.

A Wrangell respondent reported that his family filleted and smoked pink salmon. Salt-cured pink salmon bellies are popular in Southeast Alaska.

## Historical Harvest and Use Patterns

A respondent from Wrangell recalled that Anan Creek (Figure 6) once had the biggest pink salmon run in Alaska: "There used to be seine boats coming here from all over ... Ketchikan, Juneau, and all the different towns. You don't see that anymore."

## Pink Salmon Populations

When discussing the pink salmon population on the Katlian River (Figure 5), a Sitka respondent said that the population is thriving in 1 fork of the river, but since the course of the river changed, the pink salmon have declined in the other fork. Another Sitka respondent reported that following intensive logging in the area around Starrigavan Creek (Figure 5), the returns died out. The respondent believed this was due to the removal of the trees that shaded the creek from the sun. A respondent from Wrangell recalled that during the late 1930s there was a run of pink salmon to Andrews Slough (Figure 6) that was so strong "they were pushing themselves up on the bank. In places they were six feet deep, just rotting."

## Pink Salmon Ecology

A Sitka respondent explained that the health of pink salmon is dependent on the status of zooplankton and phytoplankton in intertidal areas. A Wrangell respondent noted that pink and chum salmon cannot share the same stream: "They can't 'co-environment' together. The dogs [chum] are so much stronger. They dig up the humpies." A fisher from Sitka noted that pink salmon are more rugged than other species: "Doesn't take any water at all for them to go from one pond to another. They run up there on their bellies with everything else sticking out. Make it to another one and rest."

## CHUM SALMON SUBSISTENCE HARVEST AND USE PATTERNS

Chum salmon are also known as "dog salmon and, in Tlingit as *teelth* or *téel'*. Chum salmon are abundant in Southeast Alaska and are a traditional source of fish dried for use in winter. Ocean fresh chum salmon are a metallic greenish-blue and have fine black speckles. Spawning chum salmon have particularly noticeable vertical bars of green and purple. The males develop a hooked snout and very large teeth. Females have a dark horizontal band along the lateral line; the green and purple vertical bars are not so obvious. Chum salmon often spawn in the smaller side channels and upwelling areas in large rivers, both

of which are excellent conditions for egg survival. They also spawn in many of the same places as do pink salmon: small streams and intertidal zones (Buklis 1994).

Chum salmon typically do not have a period of freshwater residence after fry emergence, similar to pink salmon. Chum salmon fry feed on small insects at stream mouths and in estuaries before forming into schools in saltwater and feeding on zooplankton. By fall, Southeast populations move into the Bering Sea and Gulf of Alaska, where they spend 1 or more winters of their 3 to 6 year ocean phases. In Southeast Alaska, most chum salmon mature at 4 years of age, although there is considerable variation in age at maturity between streams (Buklis 1994).

## **Gear Types**

In the Haines and Klukwan area, chum salmon were harvested with gaffs until the 1970s. In the Hoonah area, fishing for chum salmon was done with beach seines and purse seines. At Angoon, chum salmon were typically taken with beach seines, but some were also taken with purse seines and gaffs. An elderly respondent from Sitka recalled using row boats to deploy nets for harvesting chum salmon. Several fishers from Klawock said that beach seines or other nets were used because gaffs and spears were inefficient: “By spearing the fish it would take a week to get enough fish and with a net it would take maybe a couple of days.”

## **Timing of Harvests**

In most of Southeast Alaska, chum salmon are harvested in the late summer and early fall; however, on the Chilkat River the chum run can last into December. A respondent explained that chum salmon were harvested on the Chilkat starting in October, after the streams began to clear of glacial silt:

The Chilkat chum salmon (are) very late. The water ... clears up in the fall after the hillsides start freezing. And then you get the springs in the bottom, and then the salmon come up there. It must be one of the latest. They run into November ... but the ones in Klukwan, they spawn and then end up on the sandbar and the snow would cover them. They'd be eating them in April when the snow melts.

A fisher from Hoonah reported that he used to harvest chum salmon in September. Sitka respondents reported harvesting chum salmon from mid summer into November.

## **Use Areas**

Subsistence net fishing for chum salmon takes place near the mouths of streams. Trollers targeting Chinook and coho salmon often also harvest chum salmon. A respondent from Haines recalled going upriver to a pond on Porcupine Creek (Figure 2), a drainage of the Klehini River on the Chilkat River, to harvest chum salmon. Basket Bay, on the east side of Chichagof Island (Figure 1), has a strong chum salmon return utilized by people from Angoon. Sitka fishers reported catching chum salmon at Fish Bay, Silver Bay, and Indian River (Figure 5).

## **Preservation and Preparation Methods**

Chum salmon are boiled (producing *teeyee*, in Tlingit), baked, roasted, or dried. Respondents from Haines and Klukwan recalled Chilkat River chum salmon being harvested during the winter months, eaten fresh as boiled fish, or packed in snow until spring, when they were removed and smoked. Although not as desirable today as other species of salmon, cured chum salmon can complement supplies of dried and smoked sockeye and coho salmon.

A Sitka respondent discussed the traditional uses of chum salmon:

I guess the dog [chum] salmon has always kind of been the mainstay food source around here. It dries rock hard, and it keeps indefinitely. Once you get that river dog salmon, it dries hard, and

you got to soak it, or boil it, to eat it. But ah! it keeps forever, never gets moldy, and it never gets rancid.

An elderly Kake respondent recalled chum salmon harvests from her childhood:

I remember dog salmon a lot because we used lots. The salmon we smoked ... was always dog salmon. But you never took the first run. You always waited for it to spawn ... They smoked more fish than they dried with salt ... because it was preferred. You never smoked the first run because it was still too rich. You always waited 'til it went up in the [fresh] water for awhile. Then you caught those because it didn't have as much fat content.

A resident of Klawock recalled that chum salmon roe was smoked and then ground to make "Indian cheese." Another use of chum salmon roe was for "Indian jam." Indian jam was made by mixing boiled fresh berries with smoked roe. Another respondent recalled that dried chum salmon was so hard that it often required soaking for up to 3 days in salt water prior to boiling and eating.

## **Distribution and Exchange**

A respondent from Klawock discussed his experience sharing chum salmon in his community:

You take care of your family, and your extended family, and then you got elders, you know, that don't have family to get the fish for them. And we're still doing that now ... A lot of the elders like the *kahaak*, which is that fermented eggs from the dog salmon. They like the heads for *g'ink*, the fermented heads.

## **Historical Harvest and Use Patterns**

An active fisher at Sitka reported that it has become harder to harvest chum salmon from the Katlian River and Fish Bay (Figure 5) because of climate change and logging activity.

## **Chum Salmon Populations**

An elder from Sitka discussed fishing for chum salmon in Black Bay (Figure 5): "There use to be lots of dog salmon there. You go up there fall fishing. We'd anchor up, and there were so many dog salmon there, they'd jump up against the boat. When you're anchored up at night you couldn't sleep, the dog fish hitting the boat, you know." Another Sitka fisher, discussing chum salmon populations on the Katlian River (Figure 5), stated that the populations are thriving on 1 fork of the river, but not on the other. According to this respondent, the river changed its course, which resulted in the collapse of part of the run. And as noted earlier, a resident from Wrangell noted that pink and chum salmon cannot share the same stream.

## **Chum Salmon Ecology**

A respondent from Sitka said that chum salmon are known as dog salmon "... [because] they have dog's teeth." Two Sitka respondents reported that they could distinguish chum salmon from other salmon by the way they jumped: chum salmon "skate" across the surface of the water. A fisher from Klawock reported that in 2000 there were 3 runs of chum salmon to the Klawock River. The respondent said that the first 2 runs were stronger than the third, adding that this situation could lead to poor runs in several years:

[The] first bunch went up ... the second bunch came up and then they start laying their eggs. What they're doing is, they're digging their nests and it washed the eggs away. That's Mother Nature's way, too, because that creates a lot of food for other species of fish. You've got two strong runs and then you get a weak run, all in the same year, that weak run is going to be the last one to lay its eggs. That's the majority of the eggs that's gonna spawn.

## **HERRING SUBSISTENCE HARVEST AND USE PATTERNS**

The Pacific herring is 1 of more than 200 species in the Clupeidae family, which also contains some of the world's most abundant and commercially important fishes such as sardines, shads, and pilchards. Known as a “keystone” species, herring are important primary food sources for a wide variety of fishes, mammals, and birds (Funk 1994).

In Southeast Alaska, herring spawn is first observed in the southeastern archipelago during mid March and is confined to shallow, vegetated areas in the intertidal and subtidal areas. The eggs are adhesive, and survival is better for those eggs sticking to intertidal vegetation than for those falling to the bottom. The eggs hatch in about 2 weeks, depending on the temperature of the water. In Southeast Alaska, herring typically spawn every year after reaching sexual maturity at 3 or 4 years of age. The number of eggs varies with the age of the fish and averages 20,000 annually. Average life span for these fish is about 8 years in Southeast Alaska (Funk 1994).

Although herring and herring spawn were harvested by native peoples throughout the Pacific Northwest, early European and American visitors reported that Sitka was considered the “herring egg capital” of the Pacific Northwest. Herring spawn was collected throughout Southeast Alaska, but the sheer abundance of spawn and the length of the spawning period made the Sitka Sound harvest unique both in the historical and contemporary periods. Historically, members of many Southeast communities came to Sitka during the spawning period to harvest the spawn. Today, Sitka Sound herring spawn is traded throughout Alaska and the Pacific Northwest (Schroeder and Kookesh 1990; Turek *Unpublished*).

### **Gear Types**

Traditionally herring were harvested with a rake-like tool pulled through the water, which impaled the herring and the spawn. Herring spawn was also taken from the branches of the Western hemlock *Tsuga heterophylla* submerged for the purpose of capturing spawn, from hair seaweed *Desmarestia* spp, and from macrocystis kelp *Macrocystis integrifolia*. Currently, herring are harvested with nets, and the spawn is still taken on Western hemlock branches, hair seaweed, and macrocystis kelp (Schroeder and Kookesh 1990; Turek *Unpublished*).

### **Timing of Harvests**

Sitka elders recall the herring spawning event occurring early in the year, between February and March. Over the past 10 years (1997–2007) the herring spawning event in Sitka Sound has occurred in late March or early April (Brock and Turek 2007).

### **Use Areas**

Sitka Sound continues to be the herring spawn “capital” of Southeast Alaska (Brock and Turek 2007 ).

### **Preservation and Preparation Methods**

Historically herring and herring spawn were eaten both as fresh and dried products. Herring and their spawn continue to be eaten fresh in present times. Since the 1980s, it has been common to preserve herring and herring spawn by freezing (Brock and Turek 2007).

### **Distribution and Exchange**

A respondent from Klawock discussed the distribution, or sharing, of herring spawn:

[T]hey used it for trade ... [with] people from outlying areas ... people from up north wanted dried herring eggs. We wanted eulachon grease. We had seaweed. They wanted our seaweed. They had eulachon grease or dried, smoked eulachon. So food was traded ... there was no money exchanged. It was just a trade of food, because it was valuable to them and their grease is valuable to us.

A fisher from Klukwan recalled that her family used to send fish to her uncle and other relatives living in Southeast Alaska, and they would send dried herring spawn.

## **Herring Populations**

A resident of Sitka discussed herring populations:

Well, I know that herring is crucial to the survival of the king salmon. I know from my experience out there trolling. I know from my experience longlining. The herring stocks kept going down year after year, compared to what it was years ago—let's say, I had experienced years ago in Ketchikan in 1946 and 1947. I recall the herring spawn. The king salmon fishing that took place there. Compared to what it is here in Sitka [today], it almost borders on being a joke.

Another respondent from Sitka discussed herring in the Point Baker area (Figure 4):

It was a very vital part of all of our fisheries out there, both for commercial and subsistence. That [herring] stock is no longer in existence as it was at that time ... the fish were available year-round. They attracted [predatory] fish to the area year round—king [salmon], halibut, codfish were all present because of those herring. All of those associated fisheries have just about dried up in the winter, with the loss of that stock that used to be available in the winter. We have herring that move through the area. I would characterize them as migratory. They do not appear to be the same stock of herring that used to be there.

## **Herring Ecology**

A Sitka tribal elder discussed herring ecology and biology:

Old Tlingits claimed that the herring, when it's spawning, only spawns one time. One tide, they will leave, and another stock comes in. If it is 10 days, that is 10 different stocks spawning in that area. In different areas away from Sitka, because the herring that spawn in different areas [spawn] only one time, they never had time to collect the herring roe. Only in Sitka [where they spawn] continued for a week or 10 days. It was the only place where they would get them for years.

A fisher interviewed in Sitka said that when it comes to herring, “The spawn is what brings the halibut, it brings the king salmon. The birds eat [it], the whales eat [it], everything is feeding on it.”

## **EULACHON SUBSISTENCE HARVEST AND USE PATTERNS**

Eulachon, a species of smelt found in Alaska, are also known as candlefish due to their historical use as a candle when dried and fitted with a wick. Eulachon are generally blue silver in color, turning to gray brown at spawning time. Eulachon hatch in fresh waters, then migrate and grow in salt waters, where they typically feed on krill. After 3 to 4 years at sea, Southeast eulachon return as adults to spawn, gathering in large schools off the mouths of their natal rivers and streams. The spawn generally occurs in the lower reaches of these rivers and stream. The upstream migration is closely keyed to the water temperature of the stream. In Southeast Alaska, migration can occur as early as April. Some streams have 2 separate but overlapping migrations. Males usually outnumber the females during the spawning migration. Southeast Alaska eulachon eggs hatch in 21 to 40 days, depending on the water temperature, and after spawning the majority of eulachon die (Bartlett 1994).

## **Gear Types**

Dip nets and seines have been used for harvesting eulachon.

## Timing of Harvests

On the Chilkat River (Figure 5) eulachon arrive just after the migration of “needlefish” (Pacific sand lance *Ammodytes hexapterus*) but before spring Chinook salmon runs in April and May (Betts 1994; Mills 1982).

## Use Areas

The rivers in Southeast Alaska that are fished for eulachon include the Situk, Chilkat, Taku, Stikine and Unuk rivers. Since the 1980s, the Chilkat River has been the river most consistently fished for eulachon in Southeast Alaska (Betts 1994). Eulachon fishing continues to occur on the Unuk, Stikine, and Situk rivers, but not at the level conducted on the Chilkat River.

## Preservation and Preparation Methods

Eulachon are harvested and processed for their oil, or “grease,” and are used as a preservative and condiment for other foods, including seal meat, fish, venison, fruits, and vegetables.

## Distribution and Exchange

Respondents from Wrangell, Haines and Klukwan reported that their families traded eulachon oil for other wild resources. Resources traded for eulachon oil included black seaweed, gumboot chitons *Cryptochiton stelleri*, Washington butter clams *Saxidomus gigantean*, Nuttall cockles *Clinocardium nuttallii*, crabs *Paralithodes*, *Lithodes*, *Cancer*, and *Chionoecetes* spp, herring roe, salmonberries, Sitka black-tailed deer, moose *Alces alces*, and harbor seal *Phoca vitulina* meat and oil, halibut, and salmon.

## Eulachon Ecology

A respondent from Haines said he uses eulachon oil to predict the weather. When the oil is clear it’s going to be sunny and when the oil is “kind of murky” the weather is going to be cloudy.

## STEELHEAD TROUT SUBSISTENCE HARVEST AND USE PATTERNS

Steelhead are rainbow trout that spend part of their lifecycle at sea. There are no major physiological differences between rainbow and steelhead trout; however, the nature of their differing lifestyles has resulted in subtle differences in color, shape, and general appearance. Juvenile steelhead are identical to rainbow trout until the period prior to their ocean migrations. Adult steelhead may be more silvery in color than rainbow trout. Steelhead are found in the coastal streams of Alaska from Dixon Entrance through the Gulf of Alaska to the Cold Bay area on the Alaska Peninsula. Unlike Pacific salmon, steelhead commonly spawn more than once, and in Southeast Alaska, fish over 28 in are almost always repeat spawners. On rare occasions, a Southeast fish will return to a stream within a few months, but most repeat spawners spend at least 1 winter at sea between spawning migrations. Spawning migrations may be problematic due to summer run, spring run, and fall run fish spawning at the same time and in the same stream. One source speculates that steelhead life history is thus complicated so that a harsh flood, winter, or drought does not destroy all of a given population (Van Hulle n.d.).

Steelhead, *tayang* in Haida and *Aasha’t* in Tlingit, were harvested by Alaskan Tlingits and Haidas long before European contact and continue to be harvested for subsistence uses by residents of Southeast Alaska. The most productive steelhead systems in Southeast Alaska are in the southern half of the region, especially on Prince of Wales Island. Historically, steelhead were harvested by a variety of means, including incidental catch by salmon weirs, and directed harvest with gaffs, spears, and hand held lines. More recently, in approximately the last 50 years, steelhead have been taken for subsistence with rod and reel. Steelhead were traditionally harvested in the winter as a source of fresh fish. Steelhead continue to be a source of fresh fish in the winter and early spring when salmon are not in the rivers and fresh fish can be difficult to obtain (Turek 2005).

## **Gear Types**

Historically, steelhead were harvested using gaffs, spears, and traps. Currently, rod and reel and “snaggers” (Figure 8) are the most common gear used (Turek 2005). A respondent from Prince of Wales Island described the “snagger” during interviews collected for another project:

Snagging gear—locally-made treble hooks, consisting of three halibut hooks bound together with line and secured to a hand line—has been used for at least 75 years on the island. Known in Hydaburg [Figure 1] as the “Hydaburg Snagger,” these treble hooks are also used in Klawock, and at one time marketed in a local store as the “Klawock Spinner.” The snagging gear (hand line and treble hook) can be thrown or used in conjunction with a pole of various lengths. The pole is often made in the field from a limb or branch of a tree or bush. The pole, held by the fisher, has the hand line running down the pole and through a forked end with treble hooks hanging off the forked end of the pole. By using a pole the fisher can place the hook close to a fish before setting the hook. When hand line, treble hook and pole are used in this fashion, the gear functions as a gaff. Spears, gaffs and snagging gear are the preferred gear for fishers fishing the small, brushy creeks on Prince of Wales Island.

When using the gaff, spear or snagging gear, the harvester’s approach to taking steelhead differs from that of an angler. Steelhead are stalked, a technique more like hunting than fishing. A successful harvester must have knowledge of the area he or she is fishing and the behavior of steelhead. The fisher has to know where the fish hide along the stream banks and under logs and should be able to predict where the fish will go when spooked. The harvester or a partner will sometimes get into the creek and force the fish into a preferred area. The spear/gaff or pole is often used to probe under logs and stream banks to move the fish. The harvester must be able to get close to the fish to use the spear, or set the snagger. (Turek 2005:15)

A fisher from Hydaburg described using a “snagger” to harvest steelhead: “[Steelhead] are very skittish. I sneak up on them on a log, where they are lying under the log, drop the snagger, let it drift against him, and then give it a jerk. You have to jerk pretty hard because their skin is so god-awful tough. I know it is two to three times as tough as dog salmon.”

Another Hydaburg fisher describes the spear used to harvest steelhead:

It has a certain hook on it that has a line tied about a foot and a half back. Kind of wrapped and secured to the pole, and on the other end there is a leather washer ... It is shaped like a spear. Like a present-day salmon hook ... there is no barb, and it is maybe about a quarter of an inch thick, or even thinner. And it is made out of pretty decent steel and sharpened to a point. It can be used either as ... you put the shank in there like that and then just take a spear like that, or else put the shank backwards and gaff them that way.

## **Timing of Harvests**

A fisher from Sitka reported that steelhead at Sawmill Creek (Figure 5) begin to run when the salmonberries are blooming, in mid to late May. A subsistence fisher from Hydaburg reported that he fishes for steelhead in the spring, mostly during May. Another fisher from Craig said he fishes almost year round, from September through June, but more so in the spring months of March through April. A respondent from Hydaburg commented on the timing of steelhead harvesting: “A few in March, the bulk in April and May.”

## **Use Areas**

Respondents on Prince of Wales Island reported that steelhead are harvested at Crab, Flicker, Alder, Buster and Red creeks; on the Klawock River near the community of Klawock; Sal Creek; on the Thorne and Harris rivers; on Big Creek near Thorne Bay; on the Hydaburg River and Saltery Creek near

Hydaburg; and at Eek Lake southeast of Hydaburg (Figure 4). In the Petersburg area, steelhead, as well as other trout and salmon, are taken on Petersburg Creek.

### **Preservation and Preparation Methods**

A fisher from Wrangell reported that his grandfather used to salt steelhead to preserve it. A fisher from Sitka reported that while at fish camp, steelhead were always cooked fresh and never smoked or dried because the bones were too hard. A fisher interviewed in Klawock recalled that while working on a commercial fishing boat, people canned steelhead for home use because there was no market for the fish. A fisher interviewed in Hydaburg reported that the best way to cook steelhead is to bake it.

A fisher from Craig commented on his preference for steelhead:

Steelhead is a very healthy variety to anyone who eats a lot of fish. It is a specialty food, a delicacy, in that it is best for “pickled fish.” It is pickled in glass jars and eaten in small portions throughout the year. It takes at least two steelhead to have enough for processing. Smoked, pickled, and jarred are the preferred methods. Fresh-fried is hard to beat. A steelhead caught at sea can be hung in the sun for two days, then cooked and eaten. It is very good done this way.

### **Distribution and Exchange**

Steelhead is primarily harvested for personal consumption, but is also given to family and friends. Respondents in Hydaburg said that young men or boys harvested steelhead and shared it with other community members, elders in particular.

### **Steelhead Populations**

A steelhead fisher from Craig reported that, unlike salmon, steelhead tend to have small runs of “perhaps a hundred pair of steelhead” in many small streams. A fisher from Hydaburg said that getting an estimation of steelhead populations is a lot harder than it is for salmon. Steelhead are dispersed, skittish, and often hide under logs or stream banks, making counting difficult.

### **Steelhead Ecology**

A Hydaburg respondent reported that the average size of a steelhead is comparable to that of a coho salmon, 6 to 10 lb. Steelhead “look like real bright rainbows, and you can mistake a silver salmon for steelhead. They have that bar that looks just like a rainbow trout.” A fisher from Hydaburg said he thinks steelhead abundance is declining in the waters of Prince of Wales Island due to increasing numbers of river otters *Lutra canadensis*.

## **DOLLY VARDEN SUBSISTENCE HARVEST AND USE PATTERNS**

Dolly Varden are locally abundant in many coastal waters of Alaska. The light spots on their sides distinguish them from most rainbow/steelhead trout and salmon. Two forms of Dolly Varden occur in Alaskan waters. The southern form ranges from lower Southeast Alaska to the tip of the Aleutian chain, and the northern form is distributed from the north slope drainages of the Aleutian Range northward along Alaska’s coast to the Canadian border. Little is known of the habits of Alaskan nonmigratory Dolly Varden.

Dolly Varden spawn in streams, usually during fall, from mid August to November. The female, depending on her size, may deposit from 600 to 6,000 eggs (2,500 to 10,000 in the northern form) in depressions. The eggs develop slowly in the cold water temperatures usually present during the incubation period. Hatching of the eggs may occur in March, 4 to 5 months after fertilization. Emergence usually occurs in April, or May for the southern form. Young Dolly Varden rear in streams before beginning their first migration to sea. Most migrate in their third or fourth year, though some wait as long as their sixth year. Migration usually occurs in May or June, although significant but smaller numbers

have been recorded migrating to sea in September and October. After their first seaward migration, Dolly Varden usually spend the rest of their lives wintering in and migrating to and from fresh water. The southern form typically overwinters in lakes, while most northern Dolly Varden overwinter in rivers. At maturity, Dolly Varden return to spawn in the stream from which they originated (Hubartt 1994).

### **Timing of Harvests**

Respondents said that harvesting Dolly Varden occurs in late February and early March, and is an activity that predominantly involves young people. Dolly Varden arrive at the mouths of salmon streams at this time of year to feed on outmigrating pink and chum salmon fry.

### **Use Areas**

A resident of Wrangell reported harvesting Dolly Varden from Virginia Lake (Figure 6). Respondents from Angoon reported that Dolly Varden are commonly caught in Kootznahoo Inlet.

### **Preservation and Preparation Methods**

An elderly respondent from Sitka commented on the use of Dolly Varden: “The old folks say the Dolly Varden was too wormy. For that reason they didn't utilize it that much.”

### **Dolly Varden Ecology**

Several respondents reported that Dolly Varden feed on salmon eggs and fry.

## **DISCUSSION**

The importance of salmon to the indigenous people of the Pacific Northwest, including the Tlingit, Haida, and Tsimshians of Southeast Alaska, has been documented by scholars (De Laguna 1972;Emmons 1991). The Division of Subsistence research on Southeast Alaska subsistence salmon fisheries has reaffirmed the importance of salmon to residents of the region. Our research has shown that sockeye salmon is the primary salmon species harvested at Wrangell (Paige et al. *In prep*), Kake (Turek 2005), Craig and Klawock (Ratner et al. 2006;Turek 2005), Hoonah (Ratner and Dizard 2006), Haines and Klukwan (Smith 2003), and Hydaburg (Turek 2005).

Pacific Northwest indigenous peoples' traditional conservation practices are centered on respect for resources and moderation in use (Taylor 1999). Traditional conservation practices in Southeast Alaska are illustrated by a series of ethical and moral principles stressing respect and moderation. These principles vary little from Klukwan in the north to Hydaburg in the south: people interviewed for this project told us that they were taught to “take only what [was] needed” and “don't waste.” These traditions continue to be handed down through family, clan and community.

Sharing and trade of wild resources is a traditional practice which continues across the region. Traditional trading networks continue to function and households who do not fish for salmon are often given fish by family and friends. The pattern of high harvesters contributing to subsistence production also continues, although this is changing due to fewer numbers of commercial fishing families in the smaller communities.

Changes in the commercial fisheries in Southeast Alaska have affected the way salmon are being harvested for home use. Since the 1980s, fewer households have been involved in commercial fishing. The decline of the commercial fishing fleet has led to fewer large commercial fishing boats and crews home ported in the smaller rural Southeast communities. In response to this loss of commercial boats, noncommercial boats, such as cabin cruisers and skiffs, have taken the place of larger commercial boats in the subsistence fisheries. This has led to less fish being retained from commercial harvests and more individual households becoming responsible for their subsistence harvests.

Hatchery salmon elicited mixed reactions from respondents. Some respondents said they believed that hatchery fish either had no effect or a positive effect on salmon populations. Other respondents said that they believed hatchery fish were detrimental to wild salmon and expressed a preference for wild salmon because of its taste. Respondents also said that hatchery fish could not be processed as well as wild fish.

Interview narratives and other items in the database contain valuable local traditional knowledge about fish species, harvest and use patterns, and individual streams. This traditional knowledge spans, in some cases, several generations. Individual streams and systems were once considered the property of clans (De Laguna 1972; Emmons 1991; Goldschmidt and Haas 1998) and a form of clan ownership of streams and systems still exists in some Southeast Alaska communities. Streams are referred to by traditional clan ownership and associations, as in “that’s a *Kiks.ádi* stream,” or “that’s always been *Kaagwaantaan* territory.” Long term knowledge of these systems has been preserved in the teaching and transfer of knowledge within clans.

There are 2 areas where the database is lacking local knowledge: in geography and in demography. The database is lacking geographic information for the area around the confluence of Stevens Passage and Frederick Sound. The database is also lacking local knowledge on demography from non Native, rural residents of Southeast Alaska. Future research should be tailored to include this rural population.

## CONCLUSION AND RECOMMENDATIONS

The nature of subsistence fisheries in Southeast Alaska is changing due to social, environmental, and economic factors. In spite of these changes, contemporary fishers still adhere to long held, traditional practices passed down from previous generations. The more than 3,000 entries in the database “*Xáat to Náayadi*” provides access to local traditional knowledge of subsistence fisheries in Southeast Alaska. The information in the database demonstrates that salmon have been, and will likely continue to be, an important resource for residents of Southeast Alaska.

We offer the following recommendations for improving the database:

1. More research is needed to address data gaps for nonsalmon species; e.g., halibut, rockfish, herring, steelhead, Dolly Varden, and eulachon. There are also geographical areas where little or no information is provided in the database, including the Juneau and Ketchikan areas; the convergence of Stephens Passage and Frederick Sound; the south end of Admiralty Island; the north end of Kupreanof Island; and the mainland around Port Houghton.
2. If funding is available, the database should be periodically updated, as well as posted to the Internet.

Access to subsistence fishing will continue to be important issues for Alaska residents as economic and social pressures increase competition for wild resources. Fisheries managers and policymakers can benefit from the database by using it to access local traditional knowledge of subsistence fisheries.

## ACKNOWLEDGEMENTS

The Division of Subsistence would like to thank the many people producing the 85 separate resources that are part of the database. We are indebted to elders and subsistence harvesters who shared their time, thoughts, and expertise. Their wealth of local knowledge is invaluable and their willingness to share that knowledge will help it survive.

From the Sitka Tribe of Alaska, Peter Williams, Manuel Trujillo, and Robi Craig were instrumental in gathering, identifying, coding, and formatting the over 1,100 entries in the database from the STA archives and files. Without their hard work and diligence, this project would not have been completed.

Amy Paige helped initiate the project and laid the ground work for the database construction. Dr. Thomas Thornton helped design and develop the database and documented traditional knowledge with elders in Sitka. Michael Turek supervised the project and was one of the authors of the report. Nancy Ratner reviewed database entries for consistency. Pippa Coiley-Kenner reviewed, edited, and contributed to the final report and database.

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## **TABLES AND FIGURES**

Table 1.–Sources of information on subsistence fisheries in the database “Xáat to Náayadi” on CD-ROM, Southeast Alaska.

Source	Communities/ study area	Study year	Data type	Reference
Salmon subsistence fishery, FIS <sup>a</sup> 02-049	Wrangell and Stikine River area	2003	14 audio-taped and transcribed interviews	Paige et al. In prep
Published monograph	Hoonah, Juneau, Angoon, Kake, and Petersburg	1983	Excerpts from 23 interviews	Newton and Moss 2005
ADF&G	Southeast Alaska	unknown	Hand written account of Alaska Native food use and importance	Kookesh <i>Unpublished</i>
Salmon subsistence fishery, FIS 01-105.	Klawock	2001	13 audio-taped and transcribed interviews	Ratner and Dizard 2006
Salmon subsistence fishery, FIS 01-104.	Kake	2001	9 audio-taped and transcribed interviews	Turek et al. In prep
Salmon subsistence fishery Sustainable Salmon Fund; ADF&G	Haines, Klukwan, and Chilkat River areas	2002	8 audio-taped and transcribed interviews; field notes	Morgan Smith, ADF&G, Juneau, personal communication
Customary and traditional determination worksheets, customary trade, ADF&G.	Southeast Alaska	1991	Worksheets presented to the Alaska Board of Fisheries	ADF&G <i>Unpublished</i>
Salmon subsistence fishery, FIS 02-104.	Hoonah and Excursion Inlet area	2003	4 audio-taped, 1 video-recorded and transcribed	Ratner et al. 2006
Traditional ecological knowledge of salmon, University of Alaska-Southeast	Sitka	1996	Excerpts of conversations	Thornton <i>unpublished</i> <sup>b</sup>
Traditional ecological knowledge of salmon, Sitka Tribe of Alaska.	Sitka and Southeast Alaska	1997, 1996, 2006 and 1998	Research notes, Alaska Board of Fisheries testimonies, and interviews	STA <i>unpublished</i> <sup>c</sup>
Steelhead caught for subsistence, Prince of Wales, FIS 01-105 and 03-651.	Hydaburg, Craig, Klawock, and Prince of Wales Island	2004	4 audio-taped and transcribed interviews, field notes	Turek 2005c

–continued–

**Table 1.**–Page 2 of 2.

Source	Communities/ study area	Study year	Data type	Reference
ADF&G Division of Subsistence Technical Paper No. 39	Angoon	1981	Excerpts from report	Hall 1981
ADF&G Division of Subsistence Technical Paper No. 70	Angoon	1982	Excerpts from report	George and Kookesh 1982
ADF&G Division of Subsistence Technical Paper No. 69	Haines and Klukwan	1982	Excerpts from report	Mills 1982
ADF&G Division of Subsistence Technical Paper No. 95	Haines and Klukwan	1983	Excerpts from report	Mills et al. 1984
ADF&G Division of Subsistence Technical Paper No. 126	Klawock	1986	Excerpts from report	Ellanna and Sherrod 1987
ADF&G Division of Subsistence Technical Paper No. 138	Tenakee Springs	1986	Excerpts from report	Leghorn and Kookesh 1987
ADF&G Division of Subsistence Technical Paper No. 142	Hoonah	1987	Excerpts from report	Schroeder and Kookesh 1990
ADF&G Division of Subsistence Technical Paper No. 159	Angoon	1988	Excerpts from report	George and Bosworth 1988
ADF&G Division of Subsistence Technical Paper No. 164	Petersburg	1988	Excerpts from report	Smythe 1988
ADF&G Division of Subsistence Technical Paper No. 174	Angoon, Sitka	1990	Excerpts from report	Thornton et al. 1990
ADF&G Division of Subsistence Technical Paper No. 213	Haines and Klukwan	1994	Excerpts from report	Betts 1994

a. USFWS Fisheries Information Services.

b. Research notes, Alaska Board of Fisheries testimonies, and transcribed interviews, Sitka, Alaska.

c. Unpublished report – Traditional ecological knowledge of salmon, Sitka. University of Alaska-Southeast, Juneau.

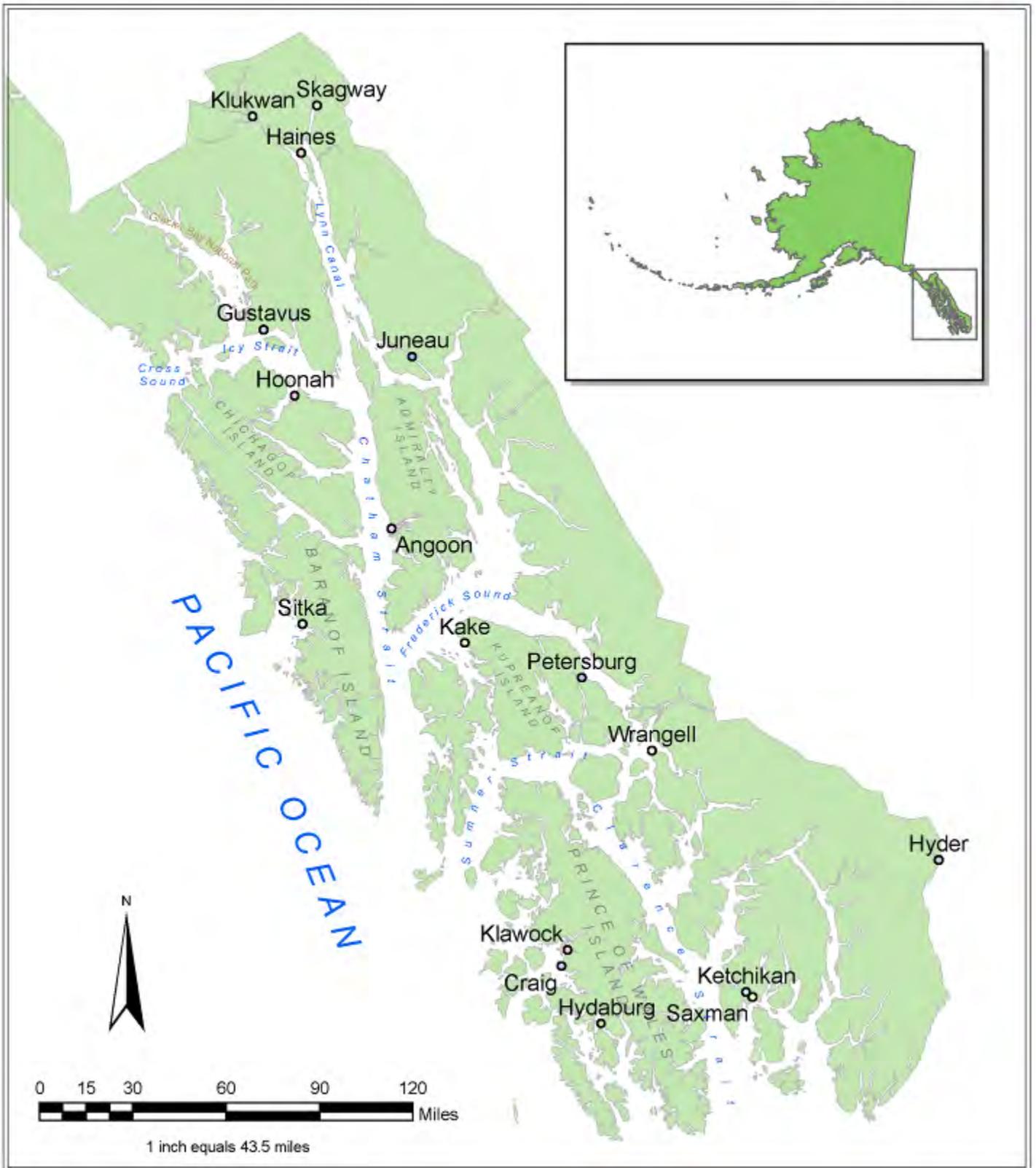


Figure 1.-Map of Southeast Alaska.

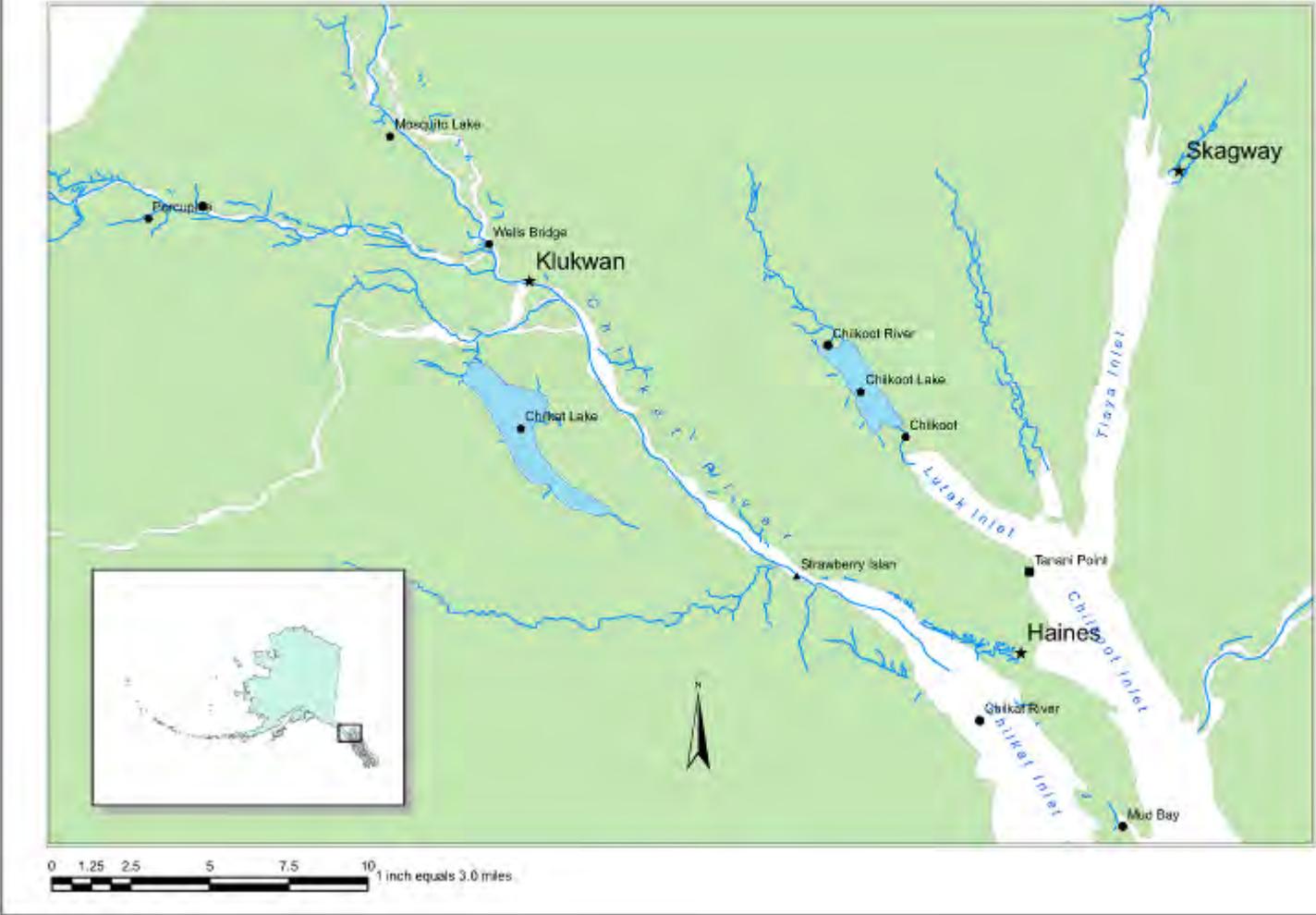


This map was created as part of the  
Southwest Alaska Subsistence  
Local Knowledge Database Project.



**Legend**

- bay
- cape
- ▲ island
- lake
- locale
- stream



35

Figure 2.-Map of Klukwan, Haines, Chilkat River, and Chilkoot River areas.



This map was created as part of the Southeast Alaska Subsistence Local Knowledge Database Project



**Legend**

- bay
- cape
- ▲ island
- lake
- locale
- stream

0 3.75 7.5 15 22.5 30 Miles 1 inch equals 10.4 miles

Figure 3.—Map of Hoonah and Angoon areas.



This map was created as part of the Southeast Alaska Subsistence Local Knowledge Database Project.

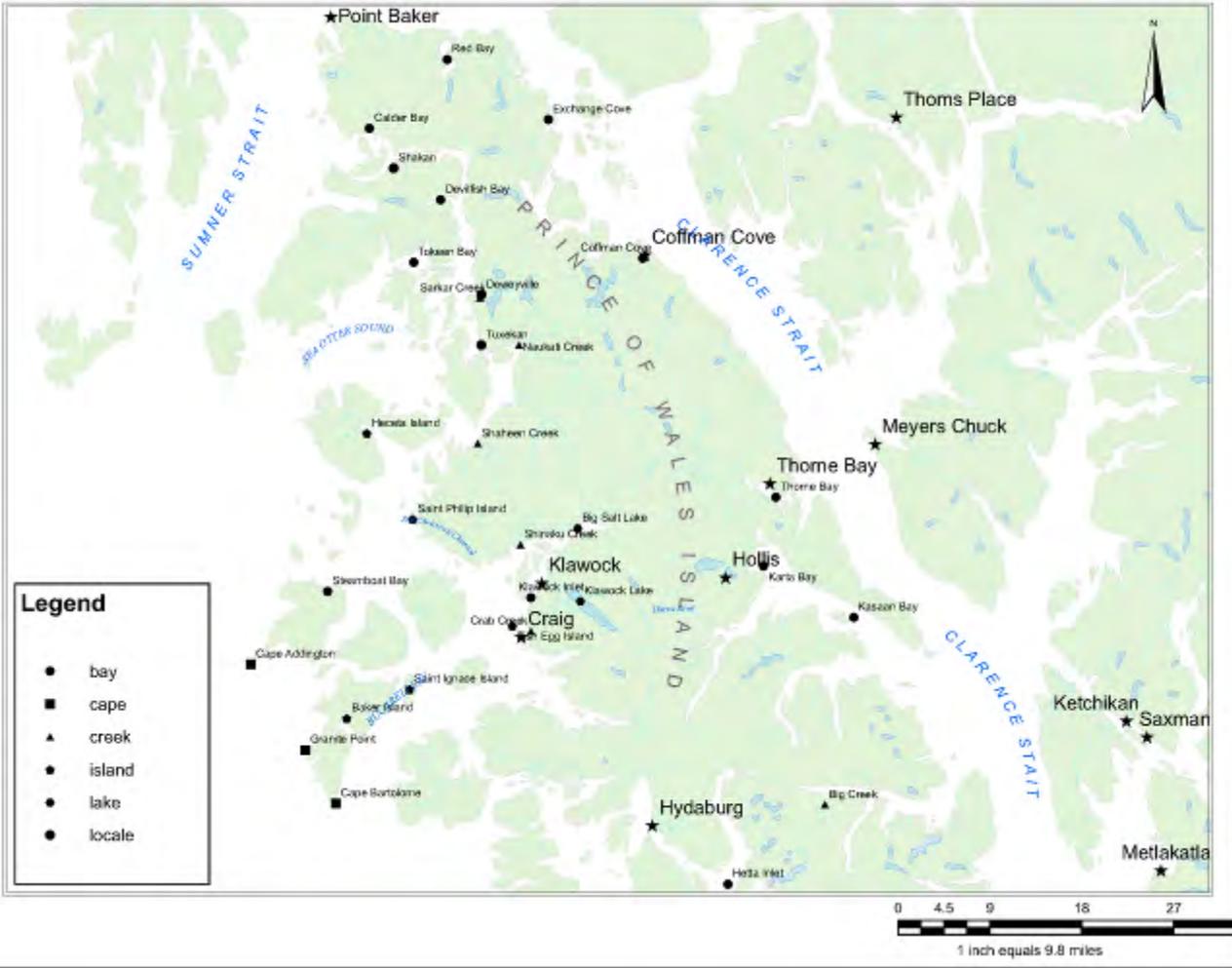


Figure 4.–Map of Craig, Klawock, and Hydaburg areas.



This map was created as part of the Southeast Alaska Subsistence Local Knowledge Database Project.

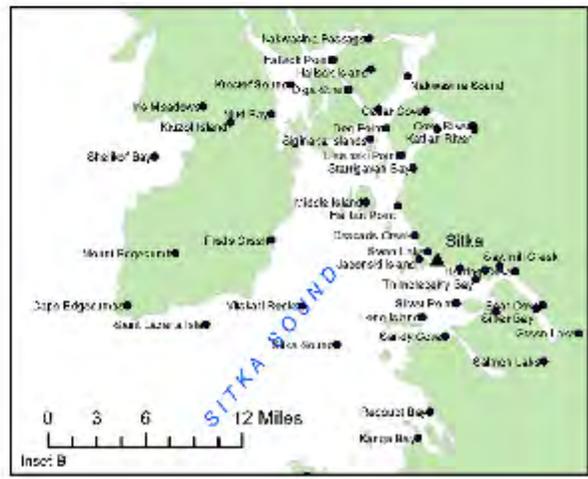
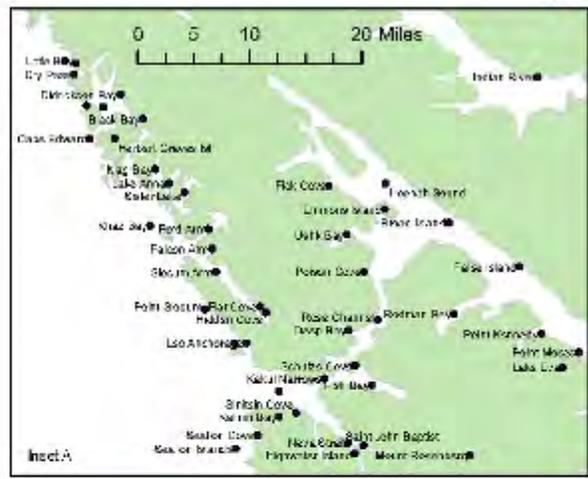
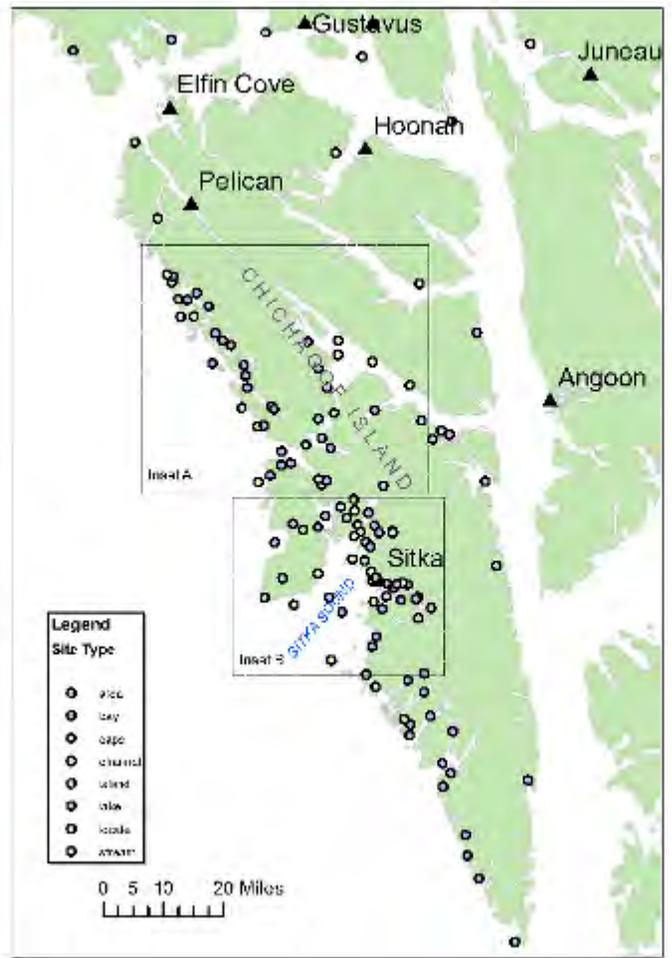
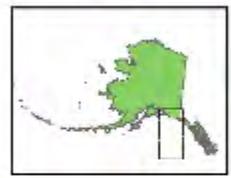


Figure 5.-Map of the Sitka area.



This map was created as part of the Southeast Alaska Subsistence Local Knowledge Database Project.

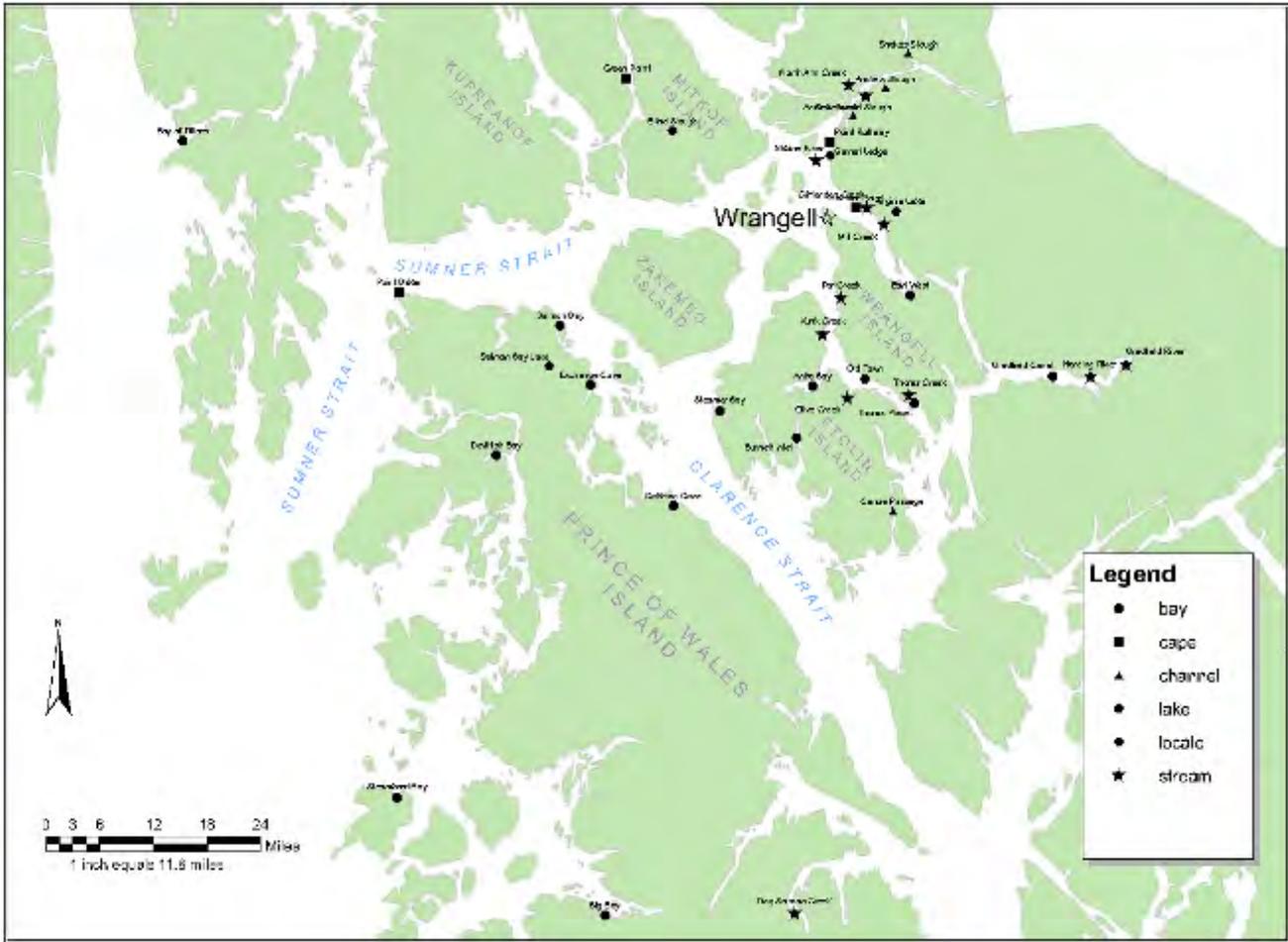
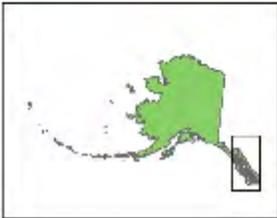


Figure 6.—Map of the Wrangell area.

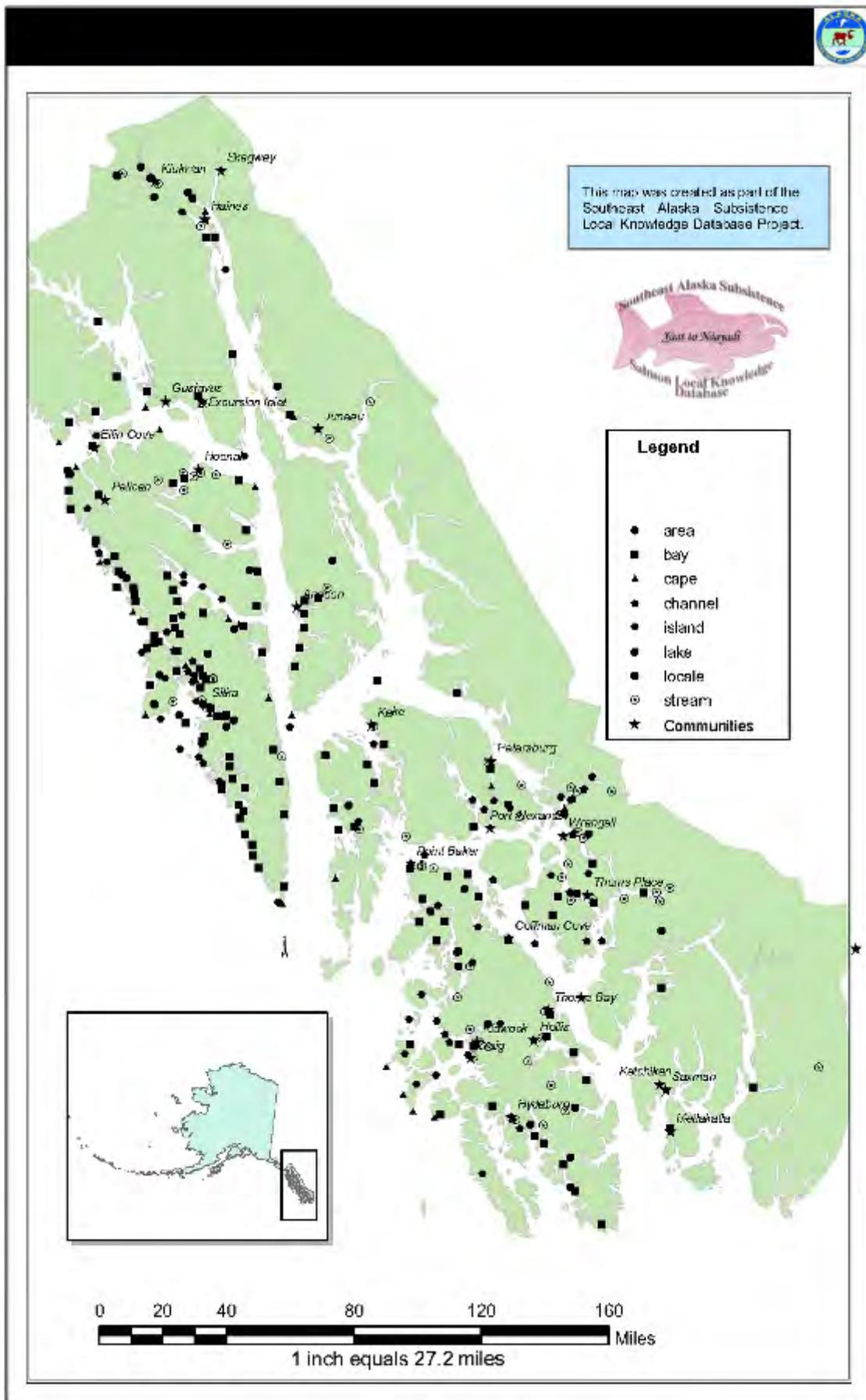


Figure 7.—Map of harvest and use areas, subsistence fisheries, Southeast Alaska.



Figure 8.–Snagging gear that is of locally made treble hooks, for harvesting halibut, bound together with cotton line (photograph by M. Turek).

## **APPENDIX. KEY WORDS**

**“Xáat to Náayadi”  
Salmon to Dried Salmon**

A description of each key respondent or source of information should be included as a discrete entry. This document should be identified by using “interview\_note” in the KEYWORD field. The information about the type of respondent (elder, biologist, commercial fisher, subsistence fisher, processor, hatchery manager, etc.), how the information was obtained (interview, questionnaire, field note, personal communication, technical paper), ethnicity (Alaska Native, Non-Native, Other, Tlingit, Haida, Tsimshian, Norwegian, etc., also clan and house if known), age, sex, length of residence in the community, region, state, etc. could be included also.

The bracket at the end of each field will always be followed by a manual paragraph mark. Each discrete entry (or document) should be prepared as a page in a WORD file, and then imported into askSam, with Page Break set as the document delimiter. See askSam menu for importing documents.

<b>FIELDS*</b>	<b>EXPLANATION</b>
PROJECT[ ]	= Name of project e.g. Wrangell Salmon LEK, Klawock Salmon TEK, Hoonah Salmon TEK, Kake Salmon TEK, Sitka Salmon TEK
LOCATION[ ]	= Geographical names of general areas associated with places cited in text. i.e. Zimovia_Strait; Thoms_Place. See below.
KEYWORDS[ ]	= Word(s) that characterize and help identify and categorize the information. May include general and specific. See below for detailed discussion of keywords
TEXT[ ]	= Information. Words of respondents in quotes if necessary to clarify source; words of interviewer, or other words are placed in brackets [ ] This is the substance of the database. Include name of respondent if permission has been given to use it.
CODE[ ]	= Project under which data was collected (ProjectYY), key respondent code (XX), date (ddmmyy), and initials of person collecting the information – e.g. Hoonah02-03-110402-NR

\* The askSam database recognizes fields by the use of the square bracket [ following a word, with no space separating the word and the bracket. If any field entry is longer than one line, a closing bracket ] followed by a manual paragraph mark should be used to identify end of the field.

#### **TEXT**

This is the substance of the database. Source material is organized into discreet paragraphs, keeping information on a topic together as much as possible. It is preferable that each entry be short enough to fit the length of the computer screen. Avoid very short entries by including contextual text either before or after the principal text of interest. Verbatim transcription of respondent interviews, or other quoted word should be clear, either by use of quotation marks, or other wording of the entry. Usually, questions or remarks by researcher or other notes, descriptive comments etc. should be identified by use of brackets [ ], and should appear in italics. askSam will understand that these are not fields since there will always be a space before such a bracket. Also all fields longer than one line will have a terminal manual paragraph mark after the closing bracket.

## LOCATION KEYWORDS BY GEOGRAPHIC SITE

Locations listed in Orange are also Steelhead locations  
 Locations listed in Sea Green are also Herring locations  
 Locations listed in Grey are colloquial terms for fishing sites

### *Locations by ADFG Regulatory Districts*

#### **District 16 & North**

(Outside waters)..... Cape\_Fairweather, Lituya\_Bay, Yakutat,

#### **District 15**

(Lynn Canal N. of Lincoln Is.) ..... Boat\_Harbor, Skagway

- Chilkat Valley ..... Big\_Boulder\_Creek, Chilkat\_Inlet,  
 Chilkat\_Lake, Chilkat\_River, Haines\_Highway,  
 Kataguni\_Island, Klehini\_River, Klukwan,  
 Mosquito\_Lake, Porcupine, Strawberry\_Island,  
 Wells\_Bridge, Zimovia\_Point,
- Chilkoot Valley ..... Chilkoot\_Inlet, Chilkoot\_Lake, Chilkoot\_River,  
 Haines, Mud\_Bay, Tanani\_Point,

#### **District 14**

(Ley Strait, Glacier Bay, & Cross Sound) ..... Bartlett\_Cove, Beartrack\_River, Berg\_Bay,  
 Carolus\_River, Dundas\_Bay, Eagle\_Point,  
 Excursion\_River, Game\_Creek, Gartina\_Creek,  
 Geikie\_Inlet, Groundhog\_Bay, Homeshore\_Creek,  
 Inian\_Islands, Neka\_River, Neva\_Creek, Neva\_Lake,  
 Pinta\_Cove, Point\_Adolphus, Point\_Gustavus,  
 Point\_Sophia, Port\_Frederick, Rocky\_Island,  
 Salt\_Lake\_Bay, Sandy\_Cove, Seagull\_Creek,  
 Sockeye\_Creek, South\_Inian\_Passage, Spasski\_Creek,  
 Tall\_Grass\_Creek, Taylor\_Bay, Three\_Hill\_Island

#### **District 13**

(Outside waters from Cross Sound to Chatham Strait) ..... Apple\_Islands, Bear\_Cove,  
 Beehive\_Island, Biorka\_Island, Black\_Bay,  
 Branch\_Bay, Broad\_Island, Byron\_Bay,  
 Camp\_Coogan\_Bay, Cape\_Edgecumbe, Cape\_Edward,  
 Cape\_Spencer, Cascade\_Creek, Cedar\_Cove,  
 Cookie\_Jar, Crawfish\_Inlet, Deadman\_Reach,  
 Deep\_Bay, Dicks\_Arm, Dog\_Point, Dorothy\_Narrows,  
 Dry\_Pass, Eagle\_Rocks, Emmons\_Island, Falcon\_Arm,  
 False\_Island, Fick\_Cove, Fish\_Bay, Ford\_Arm,  
 Fortuna\_Strait, Freds\_Creek, Green\_Lake, Hanus\_Bay,  
 Herbert\_Graves\_Island, Hoktaheen\_Creek,  
 Hoktaheen\_Cove, Hoktaheen\_Lake, Hoonah\_Sound,  
 Imperial\_Passage, Iris\_Meadows, Jamboree\_Bay,  
 Jamestown\_Bay, Kakul\_Narrows, Kanga\_Bay,  
 Katlian\_Bay, Katlian\_River, Khaz\_Bay, Klag\_Bay,  
 Krestof\_Sound, Krestof\_Sound, Kruzof\_Island, Lake-  
 \_Anna, Lake\_Eva, Leo\_Anchorage, Lisianski\_Inlet,  
 Lisianski\_River, Lisianski\_Strait, Little\_Bay,  
 Middle\_Island, Mount\_Edgecumbe, Mount\_Rosenberg,  
 Nakwasina\_Passage, Nakwasina\_Sound, Necker\_Bay,

North\_Arm\_Hoonah\_Sound, North\_Arm,  
Phonograph\_Creek, Point\_Kennedy, Point\_Moses,  
Point\_Slocum, Poison\_Cove, Porcupine\_Islands,  
Port\_Banks, Portlock\_Harbor, Red\_Bay, Redfish\_Bay,  
Redoubt\_Bay, Rodman\_Bay, Rose\_Channel,  
Saint\_John\_Baptist\_Bay, Saint\_Lazaria\_Island,  
Salisbury\_Sound, Salmon\_Bay, Salmon\_Lake,  
Sandy\_Bay, Saook\_Bay, Schulze\_Cove, Sealion\_Cove,  
Sealion\_Islands, Shamrock\_Bay, Shelikof\_Bay,  
Siginaka\_Islands, Silver\_Bay, Sinitzin\_Cove,  
Sister\_Lake, Situk\_River, Slocum\_Arm, Small\_Arm,  
Snipe\_Bay, Soapstone\_Cove, Soapstone\_Point,  
South\_Arm, Stag\_Bay, Starrigavan\_Bay, Still\_Harbor,  
Sukoi\_Islet, Surge\_Bay, Surveyor\_Passage, Swan\_Lake,  
Takanis\_Bay, The\_Cove, Ushk\_Bay, Vitskari\_Rocks,  
Walker\_Channel, Whale\_Bay, Windy\_Passage,  
Yakobi\_Rock, Yamani\_Cove,

**District 12**

(Chatham Strait from Lincoln Is. S. to Pt. Gardner).....Basket\_Bay, Chaik\_Bay, Distant\_Point, Favorite\_Bay,  
Fishery\_Creek, Freshwater\_Bay, Hasselborg\_Creek,  
Hasselborg\_Lake, Hood\_Bay, Howard\_Bay,  
Indian\_River, Kanalku\_Bay, Kelp\_Bay, Kook\_Lake,  
Kootznahoo\_Inlet, Little\_Basket\_Bay, Mitchell\_Bay,  
Parker\_Point, Pavlof\_Harbor, Pavlof\_Harbor,  
Point\_Augusta, Point\_Marsden, Sitkoh\_Bay,  
Tenakee\_Inlet, Whitewater\_Bay,

**District 11**

(Stephens Passage S. from Lincoln Is. to Glass Penn.) .....Auk\_Bay, Hasselborg\_Creek, Juneau, Salt\_Lake

**District 10**

(Stephens Passage S. from Glass Penn, Frederick Sound) ....Farragut\_Lake

**District 9**

(Frederick Sound W. of Pt. McCarthy, S. of Pt Gardner) ....Alecks\_Creek, Bay\_of\_Pillars, Cape\_Ommaney,  
Cornwallis\_Point, Elena\_Bay, Falls\_Creek,  
Gunnuck\_Creek, Gut\_Bay, Hamilton\_Bay,  
Kadake\_Bay, Keku\_Strait, Kingsmill\_Point,  
Kutlaku\_Lake, Patterson\_Bay, Port\_Alexander,  
Point\_Gardner, Port\_Camden, Port\_Malmesbury,  
Red\_Bluff\_Bay, Security\_Bay, Tebenkof\_Bay

**District 8**

(Summer Strait, Stikine Strait, Stikine River outwash).....11\_Mile, Andrew\_Creek, Andrew\_Slough,  
Andrew's\_Lake, Babbler\_Point, Cottonwood\_Slough,  
Cottonwood\_Island, Farm\_Island, Garnet\_Ledge,  
Goat\_Creek, North\_Arm\_Creek, Pat\_Creek,  
Point\_Rothesay, Sergief\_Island, Shakes\_Creek,  
Shakes\_Slough, Stikine\_River, Telegraph\_Creek,  
Woronkofski\_Island,

**District 7**

(Ernest Sound, Bradfield Canal, Eastern Passage).....Anan\_Creek, Anita\_Bay, Anita\_Creek,  
Bradfield\_Canal, Bradfield\_River, Canoe\_Passage,  
Crittenden\_Creek, Earl\_West, Ernest\_Sound,  
Etolin\_Island, Kunk\_Creek, Mill\_Creek, Old\_Town,

Olive\_Cove, Snake\_Creek, Thoms\_Creek,  
Thoms\_Place, Wrangell\_Island, Woronkofski\_Island,  
Virginia\_Lake, Zimovia\_Strait

**District 6**

(Sumner Strait & Clarence Strait S. to Lemesurier Pt.).....Beacher\_Pass, Blind\_Slough, Burnett\_Inlet,  
Buster\_Creek, Coffman\_Cove, Eagle\_Creek,  
Exchange\_Cove, Green\_Point, Kah\_Sheets\_Bay,  
Lake\_Bay, Petersburg\_Creek, Point\_Baker, Red\_Bay,  
Sal\_Creek, Salmon\_Bay, Salmon\_Bay\_Lake,  
Snow\_Passage, Steamer\_Bay, Whale\_Passage,  
Wrangell\_Narrows,

**District 5**

(Sumner Strait W. and S. of Pt. Baker) .....Calder\_Bay, Dry\_Pass, Kushneahin\_Creek,  
Point\_Baker, Port\_Protection, Shakan, Shakan\_Creek,  
Shipley\_Bay,

**District 4**

(Outside waters Helm Pt to Cape Muzon) .....Arena\_Cove, Baker\_Island, Cape\_Addington,  
Cape\_Bartolome, Cape\_Felix, Dall\_Island,  
Granite\_Point, Noyse\_Island, Steamboat\_Bay,

**District 3**

(Inside waters from Cape Pole to Pt. Marsh).....Big\_Salt\_Lake, Cordova\_Bay, Crab\_Creek,  
Cruz\_Passage, Deweyville, Devilfish\_Bay, Eek\_Lake,  
Fish\_Egg\_Island, Hetta\_Creek, Hetta\_Inlet,  
Hunter\_Bay, Hydaburg\_River, Klakas\_Inlet,  
Klakas\_Lake, Klawock\_Inlet, Klawock\_Lake,  
Klawock\_River, Klinkwan, Maurelle\_Islands,  
Naukati\_Creek, Nutkwa\_Inlet, Saltery\_Creek,  
San\_Alberto\_Bay, Sarkar\_River, Shaheen\_Creek,  
Shinaku\_Creek, Shinaku\_Inlet, Soda\_Bay,  
St\_Philip\_Island, Steamboat\_Bay, Sukkwan\_Strait,  
Tokeen\_Bay, Tokeen\_Cove, Tuxekan,  
Warmchuck\_Inlet,

**District 2**

(Clarence Strait S of Lemesurier Pt to Dixon Entrance) ...Baker\_Point, Dog\_Salmon\_Creek, Harris\_River,  
Karta\_Bay, Karta\_River, Kassan\_Bay, Nichols\_Bay,  
Sprial\_Cove, Thorne\_River

**District 1**

(Revillagiedo Channel, Behm Canal, & surrounding waters)..... Ketchikan, Port\_Chester, Neets\_Bay,  
Reflection\_Lake, Smeaton\_Bay,

**Other areas** .....Canada, California,

## KEYWORDS

As a field, KEYWORDS will provide the database user with some tools to group bits of information into useful descriptive categories of subjects, while still allowing access to very specific information. The designation of keywords by the researcher or person doing the data entry will allow the substance of the interviews, (or other source material) to be entered without having to add those words to the text of the entry.

<u>Keywords</u>	<u>Expanded meaning &amp; examples</u>
interview note.....	Description of each key respondent or source of information, including type of respondent, how information obtained, ethnicity, age, sex, length of residence in the community, region, state, etc. if available. If the source gave permission to be acknowledged, that identity is included here, as well as in each individual entry from this source.

### Ecological Keywords

fish .....	fish in general and/or other than salmon, i.e. halibut, cod
salmon .....	salmon, oncorhynchus, <i>Xáat</i>
• sockeye.....	sockeye, red, oncorhynchus nerka specifically, <i>Gáat, Gaut</i>
• chinook.....	Chinook, King, oncorhynchus tshawytscha specifically, <i>T'á, d'uh</i>
• coho.....	coho, silver, oncorhynchus kisutch specifically, <i>L'ook, L'uk, Glook</i>
• pink .....	pink, humpy, oncorhynchus gorbuscha specifically, <i>Cháas, Chaas, Chawz</i>
• chum.....	chum, dog, oncorhynchus keta specifically, <i>Téel, T'il, Teelth</i>
other species.....	non-fish species, i.e. seal, moose, crab
physiology .....	body function, health, body condition, size, quality of
population .....	trends, abundance, decline, increase
environment .....	habitat, environmental and species interaction, weather, competition, pollution, predator, prey, diet, spawning area
life_cycle.....	reproductive cycle
seasonal_movement.....	timing of run
fish_behavior.....	jumping, feeding behavior, spawning behavior
taxonomy .....	ways of categorizing - traditional, colloquial, scientific name
ecological_change.....	changes in weather, habitat

### Sociological and cultural keywords

history .....	events occurring in the past
lexicon.....	language related entries
personal_history.....	personal background, family history, military service, education
experience .....	fishing, working
clan.....	ownership, territory,
story .....	traditional, humorous,
ceremony.....	potlatches, memorials, parties,
beliefs.....	opinion, ideas of truth not needing proof
values .....	opinion as to the worth of something
social_change.....	culture change
enculturation .....	training, education from elders

distribution	general distribution, exchange, ceremonial giving, reciprocity
trade	non-commercial exchanges involving money
barter	exchange of one good for another
processing	cleaning, cutting, general preservation, canning, smoking, pickling, freezing, boiling, fermenting, meal preparation, fresh, smoked, boiled, fried
preference	preferences for specific foods, specific species
products	non-food salmon products, dog food, bait, skins, tools, garden fertilizer
pre-contact	time immemorial, prior to Spanish/Russian period
early_contact	Spanish/Russian period
1800s	time period between 1800 and 1899(aka “colonial era”)
1900s-1950s	time period between 1900 and 1959 (aka “cannery era”)
1960s-1980s	time period between 1960 and 1989 (aka “hatchery era”)
1990s	time period between 1990 and 1999
2000s	time period between 2000 and present

#### **Stewardship and management of salmon**

management	allocation of resource among users, control of habitat or factors affecting habitat
<ul style="list-style-type: none"> <li>○ regulation</li> <li>○ research</li> <li>○ monitoring</li> </ul>	<ul style="list-style-type: none"> <li>aspect of management; subsistence, commercial and sport catch limits, openings, closures</li> <li>aspect of management; scientific study</li> <li>aspect of management; of stocks, of harvest, escapement counts, enhancement, aspect of management; hatchery programs; fish ladders; fish passes, fertilization programs</li> </ul>
traditional	pre-contact period indigenous authority
community	responsible authority
state	responsible authority
federal	responsible authority
Canadian	responsible authority
user_interaction	includes competition and conflict between user groups
customary_rule	aspect of management; common practice learned from community

#### **Market economy keywords**

costs	monetary, social
infrastructure	such as canneries, sawmills, harbors, etc.
employment	wage employment
market_factors	sales, demand, prices
economic_change	changes in the economy, employment, and/or the market

#### **Harvest keywords**

fishing	general harvesting of fish
subsistence	harvesting for home use; also refers to regulations and management
sport	harvesting for recreation; also refers to regulations and management
commercial	harvesting for commercial sale; also refers to regulations and management
other_activities	hunting, gathering, gardening, ‘living off the land’, fur farming, trapping
timing	when fishing or other activity takes place and factors influencing

harvested ..... volume of resource harvested  
 needed ..... amount of resource needed for subsistence purpose  
 catch\_allocation ..... bringing a portion of commercial catch home for home use

**Gear Type**

means ..... transportation including navigation and craft used and methods employed  
 gear\_modification ..... changes to gear over time  
 gear ..... fishing gear in general

- purse\_seine ..... a floating net designed to surround fish and which can be closed at the bottom by means of a free-running line through one or more rings attached to the lead line
- beach\_seine ..... a floating net designed to surround fish which is set from and hauled to the beach
- troll ..... consists of a line or lines with lures or baited hooks which are drawn through the water from a vessel by hand trolling, strip fishing, or other types of trolling.
- gillnet ..... a net primarily designed to catch fish by entanglement in the mesh and consisting of a single sheet of webbing hung between cork line and lead line, and fished from the surface of the water
- drift\_gillnet ..... a drifting gillnet that has not been intentionally staked, anchored, or otherwise fixed
- set\_net ..... a drifting gillnet that has been intentionally staked, anchored, or otherwise fixed
- rod\_and\_reel .....
- hook\_and\_line .....
- spear ..... a shaft with a sharp point of fork-like implement attached to one end which is used to thrust through the water to impale or retrieve fish and which is operated by hand
- gaff ..... a shaft with a curved hook attached to one end used by jerking upward to catch fish
- longline ..... a stationary buoyed or anchored line or a floating, free drifting line with lures or baited hooks attached
- handline ..... a hand held line, with one or more hooks attached, which may only be operated manually
- dip\_net ..... a bag-shaped net supported on all sides by a rigid frame
- snag ..... hooking or attempting to hook a fish elsewhere than in the mouth
- weir ..... fence or enclosure set in a waterway for taking fish
- trap ..... enclosed structure with small opening through which fish enter but are unable to exit
- fish\_wheel ..... a fixed, rotating device for catching fish, with baskets attached to a single axle driven by river current or other means

other\_equipment ..... other fishing equipment, such as plungers, smokehouse  
 gear\_selection ..... factors affecting gear selection  
 fishing\_site ..... specific fishing sites and situations such as bays, stream mouth, beach, tide land, salt chuck, river, shoreline, eddies, camp, home site  
 use\_area ..... general area used or territory claimed covered in clan  
 division\_of\_labor ..... work arrangements based on gender, clan, family, friendship roles etc. in harvesting or processing

work\_group ..... fishing crew, fishing partner, other  
equipment\_sharing ..... sharing of fishing equipment  
transportation ..... skiffs, scows, riverboats, cabin cruiser, any other craft  
logistics ..... navigation, travel, arrangements for fishing effort

### Standards:

**Italics:** Italics should be used

- To highlight or differentiate between the interviewer and the interviewee, i.e. [*When did you first learn to fish?*]
- To highlight Tlingit or Haida words or phrases
- any added material contained in brackets [ ]

**Spaces after a period:** two spaces after a period before the beginning of the next sentence.

**Ellipses:** Ellipses are used for the omission of a word, phrase, line, paragraph, or more from a quoted passage. In addition it can also be used to show a pause in a verbatim transcription, drop outs, cut material, or when the interviewee “trails off...” If the ellipses are used at the end of a sentence, be sure to add two spaces before the next sentence.

**Brackets:** are used to enclose added material, dropped material, edits by the author, transcriber, or editor.

- For material that is unclear use [*unintelligible*]
- For nonverbal information use [*laughter*] or [*sound*]

**Capitalization and Use of Proper Names:**

- Unless the interviewee has given explicit permission to use their name, all personal names should be removed and replaced with [*name*], i.e. “my Uncle [*name*].” This included the names of fishing vessels and fishing sites.
- Capitalize: Elder, except when followed by proper name, i.e., “my elder Herman Kitka”
- Do not capitalize: family members when referred specifically or in the general sense, i.e., “I went fishing with my uncle [*name*].”
- Names in the public record (i.e. court cases), elected officials, and public figures should be left in (i.e. McDowell Decision, Katie John, etc.)

**More than one respondent:** When more than one respondent is transcribed, the primary interviewee should be recognized as R<sub>1</sub>, other respondents within the same interview should be recognized as R<sub>2</sub>, R<sub>3</sub>, etc.

*Locations by Research Project, listed alphabetically*

- Angoon.....Basket\_Bay, Chaik\_Bay, Deadman\_Reach, Distant\_Point, Fishery\_Creek,  
Freshwater\_Bay, Hasselborg\_Creek, hood\_Bay, Kelp\_Bay, Kootznahoo\_Inlet,  
Little\_Basket\_Bay, Mitchell\_Bay, Parker\_Point, Point\_Gardner, Point\_Marsden,  
Rodman\_Bay, Salt\_Lake\_Bay, Saook\_Bay, Sitkoh\_Bay, Tenakee\_Inlet,  
Whitewater\_Bay,
- Haines / Klukwan      Big\_Boulder\_Creek, Boat\_Harbor, Chilkat\_Inlet, Chilkat\_Lake, Chilkat\_River,  
Chilkoot\_Inlet, Chilkoot\_Lake, Chilkoot\_River, Haines\_Highway, Hoonah,  
Kataguni\_Island, Kluane\_Lake, Klukshu, Mosquito\_Lake, Mud\_Bay, Procupine,  
Skagway, Strawberry\_Island, Tanani\_Point, Wells\_Bridge, Yakutat, Yukon
- Hoonah.....Basket\_Bay, Beartrack\_River, Berg\_Bay,  
Cape\_Sencer, Carlous\_River, Dicks\_Arm, Dundas\_Bay, Eagle\_Point, Excursion\_Inlet,  
Excursion\_River, Game\_Creek, Gartina\_Creek, Glacier\_Bay, Groundhog\_Bay,  
Hasselborg\_Creek, Hasselborg\_Lake, Hoktaheen\_Cove, Hoktaheen\_Creek,  
Hoktaheen\_Lake, Homeshore\_Creek, Howard\_Bay, Inian\_Islands, Kanalku\_Bay,  
Kook\_Lake, Lisianski\_Inlet, Lisianski\_River, Mitchell\_Bay, Neka\_River, Neva\_Creek,  
Neva\_Lake, Noyes\_Island, Pavlof\_Harbor, Phonograph\_Creek, Pinta\_Cove,  
Point\_Adolphus, Point\_Augusta, Point\_Sophia, Porcupine\_Islands, Port\_Chester,  
Port\_Frederick, Sandy\_Cove, Seagull\_Creek, Sitkoh\_Bay, Soapstone\_Cove,  
Sockeye\_Creek, South\_Inian\_Passage, Spasski\_Creek, Stag\_Bay, Surge\_Bay,  
Takanis\_Bay, Tall\_Grass\_Creek, Taylor\_Bay, Three\_Hill\_Island, Yakobi\_Island,  
Yakobi\_Rock,
- Kake.....Alecks\_Creek, Baranof\_Island, Basket\_Bay,  
Bay\_of\_Pillars, Cape\_Ommaney, Cornwallis\_Point, Elena\_Bay, Falls\_Creek,  
Falls\_Lake, Gunnuck\_Creek, Gut\_Bay, Hamilton\_Bay, Hood\_Bay, Hydaburg,  
Kadake\_Bay, Keku\_Strait, Kingsmill\_Point, Kook\_Lake, Kushneahin\_Creek,  
Kutlaku\_Lake, Massett, Necker\_Bay, Point\_Barry, Point\_Gardner, Port\_Alexander,  
Port\_Camden, Port\_Malmesbury, Red\_Bluff\_Bay, Redfish\_Bay, Security\_Bay,  
Sheep\_Creek, Tebenkof\_Bay
- Klawock .....11\_Mile, Baker\_Island, Big\_Harbor,  
Big\_Salt\_Lake, Calder\_Bay, Canoe\_Pass, Cape\_Addington, Cape\_Bartolome,  
Chuck's\_Island, Coffman\_Cove, Crab\_Creek, Craig, Cruz\_Pass, Devilfish\_Bay,  
Deweyville, Dry\_Pass, False\_Pass, Fish\_Egg\_Island, Grainte\_Point, Harris\_River,  
Hetta\_Inlet, Hoonah, Hydaburg, Karta\_Bay, Klawock\_Inlet  
Klawock\_Lake, Klawock\_River, Klukwan, Logjam, Naukati\_Creek, Red\_Bay,  
San\_Alberto\_Bay, Sarkar\_River, Shaheen\_Creek, Shakan, Shinaku\_Inlet,  
Shinaku\_Creek, Small\_Salt\_Lake, St\_Phillip\_Island, Steamboat\_Bay,  
Sukkwan\_Strait, Tokeen\_Bay, Tokeen\_Cove, Tuxekan, Warm\_Chuck\_Inlet,
- Sitka .....Apple\_Islands, Bartlett\_Cove, Basket\_Bay,  
Bear\_Cove, Beehive\_Island, Biorka\_Island, Black\_Bay, Branch\_Bay, Broad\_Island,  
Byron\_Bay, Calder\_Bay, Camp\_Coogan\_Bay, Cape\_Edgecumbe, Cape\_Edward,  
Cape\_Fairweather, Cape\_Spencer, Cascade\_Creek, Cedar\_Cove, Cookie\_Jar,  
Crawfish\_Inlet, Deep\_Bay, Dog\_Point, Dorothy\_Narrows, Dry\_Pass, Eagle\_Rocks,  
Emmons\_Island, Falcon\_Arm, False\_Island, Fick\_Cove, Fish\_Bay, Fish\_Egg\_Island,  
Ford\_Arm, Fortuna\_Strait, Freds\_Creek, Green\_Lake, Hanus\_Bay,  
Herbert\_Graves\_Island, Hood\_Bay, Hoonah\_Sound, Imperial\_Passage, Indian\_River,

Inian\_Islands, Iris\_Meadows, Jamboree\_Bay, Jamestown\_Bay, Kakul\_Narrows, Kanga\_Bay, Katlian\_Bay, Katlian\_River, Kelp\_Bay, Khaz\_Bay, Klag\_Bay, Krestof\_Sound, Krestof\_Sound, Kruzof\_Island, Lake\_Anna, Lake\_Eva, Leo\_Anchorage, Lisianski\_Strait, Little\_Bay, Lituya\_Bay, Middle\_Island, Mount\_Edgecumb, Mount\_Rosenberg, Nakwasina\_Passage, Nakwasina\_Sound, Necker\_Bay, North\_Arm\_Hoonah\_Sound, North\_Arm, Patterson\_Bay, Point\_Gustavus, Point\_Kennedy, Point\_Moses, Point\_Slocum, Poison\_Cove, Port\_Alexander, Port\_Banks, Port\_Protection, Portlock\_Harbor, Red\_Bay, Redfish\_Bay, Redoubt\_Bay, Rocky\_Island, Rodman\_Bay, Rose\_Channel, Saint\_John\_Baptist\_Bay, Saint\_Lazaria\_Island, Salisbury\_Sound, Salmon\_Bay, Salmon\_Lake, Schulze\_Cove, Sealion\_Cove, Sealion\_Islands, Shamrock\_Bay, Shelikof\_Bay, Shipley\_Bay, Siginaka\_Islands, Silver\_Bay, Sinitzin\_Cove, Sister\_Lake, Sitkoh\_Bay, Situk\_River, Situk\_River, Slocum\_Arm, Small\_Arm, Snipe\_Bay, Soapstone\_Point, South\_Arm, Starrigavan\_Bay, Still\_Harbor, Sukoi\_Islet, Surveyor\_Passage, Swan\_Lake, The\_Cove, Ushk\_Bay, Vitskari\_Rocks, Walker\_Channel, Whale\_Bay, Windy\_Passage, Yamani\_Cove, Zimovia\_Point,

Technical Papers      Angoon, Basket\_Bay, Bay\_of\_Pillars, , Bayview\_Island, Beecher\_Pass, Big\_Boulder\_Creek, Blind\_Slough, Chaik\_Bay, Chatham\_Strait, Chilkat\_Lake, Chilkat\_River, Crystal\_Lake\_Hatchery, Deweyville, Douglas, Duncan\_Canal, Fall\_Creek, Farragut\_Bay, Favorite\_Bay, Frederick\_Sound, Game\_Creek, Gartina\_Creek, Gut\_Bay, Haines, Haines\_Highway, Hasselborg\_Lake, Hood\_Bay, Hoonah, Humpback\_Creek, Jones\_Point, Juneau, Kah\_Sheets\_Bay, Kaskulu\_Point, Klehini\_River, Klukwan, Kootznahoo\_Inlet, Lynn\_Canal, Maurelle\_Islands, Mitchell\_Bay, Mitkof\_Island, Neka\_River, Pavlof\_River, Petersburg, Petersburg\_Creek, Point\_Frederick, Salt\_Lake, Sitkoh\_Bay, Spasski\_Creek, Tenakee\_Inlet, Tenakee\_Springs, Tsirku\_River, Wells\_Bridge, Wrangell\_Narrows, Whitewater\_Bay, Zimovia\_Point

P.O.W. Steelhead      Arena\_Cove, Bristol\_Bay, British\_Columbia, Buster\_Creek, Cape\_Felix, Chilkat\_River, Copper\_River, Crab\_Creek, Craig, Dall\_Island, Eek\_Lake, Fraser\_River, Harris\_River, Hetta\_Creek, Hetta\_Inlet, Hunter\_Bay, Hydaburg, Hydaburg\_River, Karta\_River, Klakas\_Inlet, Klakas\_Lake, Klawock\_Lake, Klawock\_River, Klinkwan, Lynn\_Canal, Neets\_Bay, Nichols\_Bay, Noyes\_Island, Nutkwa\_Inlet, Petersburg, Reflection\_Lake, Russia, Sal\_Creek, Saltery\_Creek, Sandy\_Bay, Seinery\_Creek, Smeaton\_Bay, Soda\_Bay, Sprial\_Cove, Stikine\_River, Thorne\_River, Western\_Alaska, Wrangell, Yakutat, Yukon\_River

Wrangell .....Anan\_Creek, Andrew\_Creek, Andrew\_Lake, Andrew\_Slough, Anita\_Bay, Anita\_Creek, Babbler\_Point, Baker\_Point, Bay\_of\_Pillars, Beecher\_Pass, Blind\_Slough, Bradfield\_Canal, Bradfield\_River, Burnett\_Inlet, Canoe\_Passage, Cottonwood\_Island, Cottonwood\_Slough, Crittenden\_Creek, Dog\_Salmon\_Creek, Eagle\_Creek, Ernest\_Sound, Etolin\_Island, Farm\_Island, Garnet\_Ledge, Goat\_Creek, Green\_Point, Kuiu\_Island, Kunk\_Creek, Lake\_Bay, Mill\_Creek, North\_Arm\_Creek, Old\_Town, Olive\_Creek, Pat\_Creek, Point\_Baker, Point\_Rothsay, Red\_Bay, Salmon\_Bay, Salmon\_Bay\_Lake, Sergief\_Island, Shakes\_Creek, Shakes\_Slough, Snake\_Creek, Snow\_Passage, Steamer\_Bay, Stikine\_River, Telegraph\_Creek, Thoms\_Creek, Thoms\_Place, Virginia\_Lake, Whale\_Passage, Woronkofski\_Island,