Special Publication No. BOF 2009-04

RC 13

Customary and Traditional Use Worksheet: Salmon and Eulachon in Section 15A, Southeast Alaska

Prepared by

Michael F. Turek

for the February 2009 Sitka Board of Fisheries meeting

February 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^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

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
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

SPECIAL PUBLICATION NO. BOF 2009-04

CUSTOMARY AND TRADITIONAL USE WORKSHEET: SALMON AND EULACHON IN SECTION 15A, SOUTHEAST ALASKA

by

Michael F. Turek,
Alaska Department of Fish and Game, Division of Subsistence, Juneau

Alaska Department of Fish and Game
Division of Subsistence
P.O. Box 115526, Juneau, Alaska, 99811

February 2009

The Division of Subsistence Special Publications series was established for the publication of techniques and procedure manuals, informational pamphlets, special subject reports to decision-making bodies, symposia and workshop proceedings, application software documentation, in-house lectures, and other documents that do not fit in another publications series of the Division of Subsistence. Most Special Publications are intended for readers generally interested in fisheries, wildlife, and the social sciences; for natural resource technical professionals and managers; and for readers generally interested the subsistence uses of fish and wildlife resources in Alaska.

Special Publications 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.

Michael F. Turek
Alaska Department of Fish and Game, Division of Subsistence,
P.O. Box 115526, Juneau, AK 99811, USA

This document should be cited as:
Turek, M. F. 2009. Customary and traditional use worksheet: salmon and eulachon in Section 15A, Southeast Alaska. Alaska Department of Fish and Game Division of Subsistence Special Publication No. BOF 2009-04, Juneau.

TABLE OF CONTENTS

Page

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

INTRODUCTION

This worksheet provides background information on the uses of Pacific salmon *Oncorhynchus* and eulachon (eulachon) *Thaleichthys pacificus* in waters of Section 15A, Southeast Alaska. These species are not currently included in the prior (1989) Alaska Board of Fisheries (BOF) customary and traditional use (C&T) findings in waters of Section 15A (5 AAC 01.716 (1)) (Figure 1). Under the Alaska subsistence law (AS 16.05.258 (a)), the Board of Fisheries is required to identify the fish stocks or portions of stocks that are customarily and traditionally taken or used for subsistence (a "C&T finding"). The information is organized according to the 8 criteria for identifying customary and traditional uses as defined in the Joint Board of Fisheries and Game Subsistence Procedures (5 AAC 99.010).

Salmon is defined in regulation as any or all of the following species: Chinook salmon *O. tshawytscha*, sockeye salmon *O. nerka*, coho salmon *O. kisutch*, chum salmon *O. keta*, and pink salmon *O. gorbuscha* (5 AAC 75.995).

A salmon and eulachon C&T finding in waters of Section 15A would be necessary in order to adopt Proposal 237, submitted to the Alaska Board of Fisheries for their consideration during their February 2009 meeting in Sitka, Alaska. The Board of Fisheries requires this information in order to determine whether there are customary and traditional uses of salmon and eulachon in this area. It is intended that the information in this worksheet be supplemented by written and oral public testimony, if any, delivered during Board of Fisheries February 2009 meeting.

The quantitative harvest data presented in this report are estimations based on the results of Alaska Department of Fish and Game (ADF&G) Division of Subsistence surveys administered to randomly-sampled households in Haines and Klukwan in 1996. The 1996 harvest data presented here have been expanded from the sampled households to generate per capita estimates for all individuals in each community. In 1996, the survey instrument included questions about all resources brought into the house, including salmon and eulachon. The ADF&G Division of Commercial Fisheries subsistence/personal use harvest permit data from their 1996-2006 Integrated Fisheries Database are also included in the subsistence salmon harvest data presented in this report.

The communities of Haines and Klukwan show a history of using salmon and eulachon in this area.

PROPOSAL NUMBER: 237

FISHING DISTRICTS: Section 15A

SPECIES/STOCK: Salmon and eulachon.

MAIN COMMUNITIES USING THE SPECIES Haines and Klukwan

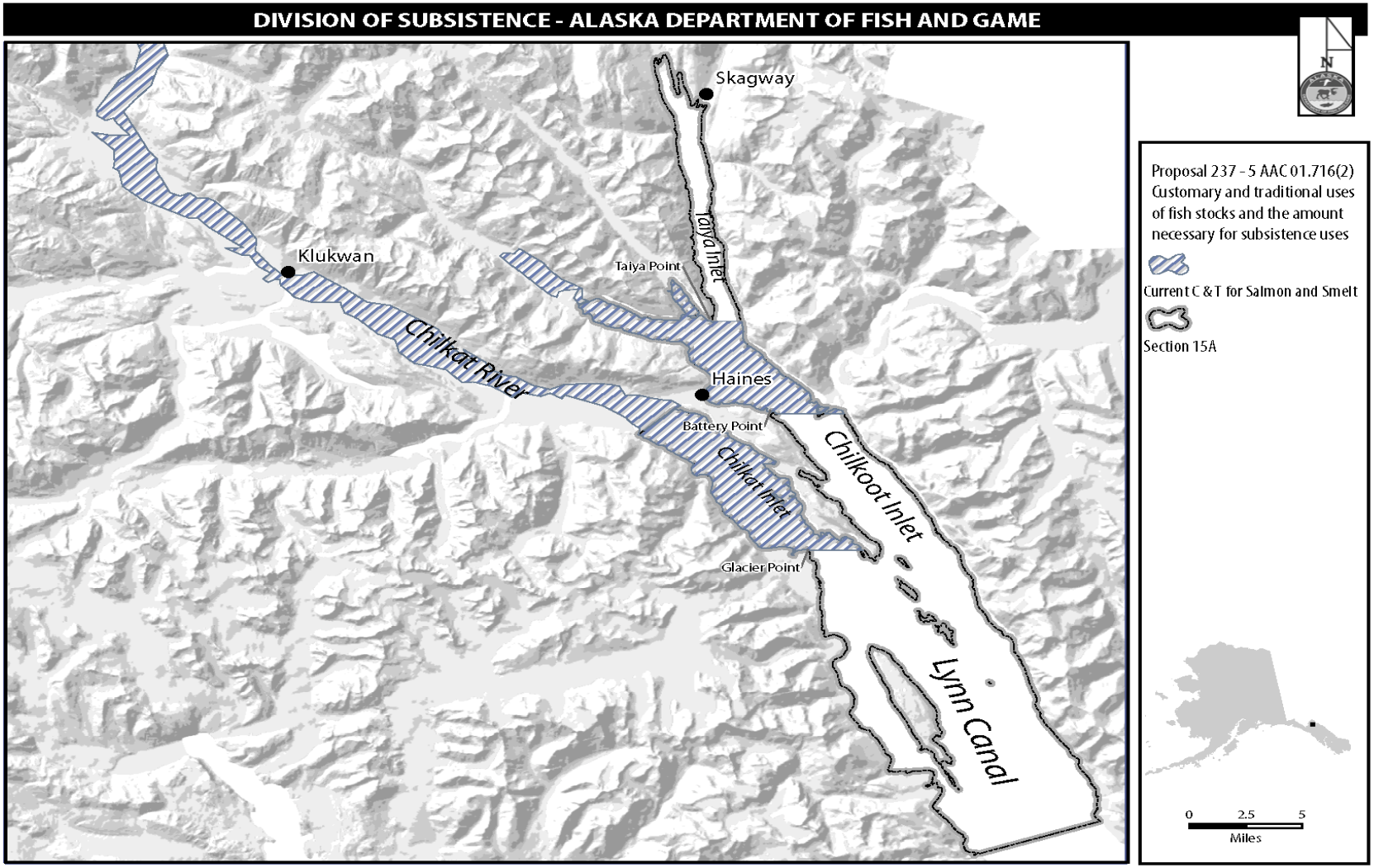

Figure 1.–Customary and traditional use finding, salmon and eulachon.

THE EIGHT CRITERIA

CRITERION 1: LENGTH AND CONSISTENCY OF USE

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

The use of salmon in Southeast Alaska began with the region's earliest inhabitants and continues to the present day. Archaeological excavations have found the bones of salmon in prehistoric village sites (De Laguna 1960:92) and early reports describing Native life in Southeast Alaska frequently discuss the harvest and use of salmon species by the area's residents (De Laguna 1960:116; Krause 1956:60, 120-124; Niblack 1890). Specialized gear, harvest methods, and preparation were developed by the Tlingit, Haida, and Tsimshian for harvesting and preserving salmon (see below) (Stewart 1977). Many of the specialized harvest methods, gear, and preparation techniques developed by the original Native inhabitants are used today by both Natives and non-Natives.

The territories of the Chilkat (Klukwan) Tlingits and Chilkoot (Haines) Tlingits included most of the northern Lynn Canal region to just north of Berner's Bay, the western shores of Sullivan Island, the Chilkat River, Chilkoot lake and river, Lutak Inlet, Taiyasanka Harbor, and the area around Dyea (Figure 2). There were historical settlements at Tanani Point (nearly wiped out by an epidemic), at Deishú (the present-day site of Haines), as well as mixed seasonal and year-round settlements at Pyramid Point. Residents of these communities fished the entire river drainage, processing salmon at camps and in the villages. The Chilkoot Tlingit fished both the lower reaches of the Chilkat River and the Chilkoot river and lake, harvesting from large seasonal fish camps along Lutak Inlet and the Chilkoot River, as well as from permanent settlements on Chilkoot Lake. Camps and settlements on the upper reaches of the Chilkat River were historically used by the Chilkat Tlingit. Those downriver and in estuarine and salt waters historically belonged to the Chilkoot, although nearly all harvest areas were shared by the mid-1940s (Goldschmidt and Haas 1998:28). The residents of these villages, unlike those of many other Southeast Alaska villages, conducted a largely in-river fish harvest. Harvesting in or closer to the village, rather than at distant fish camps, also enabled them to process a portion of their catch in the village and its smokehouses. There were fish camps located along the Chilkat River at productive fishing locations, including camps at 4-Mile, 6-Mile, 7-Mile, 9-Mile, and 19-Mile; around Klukwan; on Chilkat Lake; on Mosquito Lake; at the confluence of the Klehini and Chilkat rivers; and at 2 known locations above Mosquito Lake, which are known as *Yeilhéeni*, where Bear Creek comes into the Chilkat, and *Tsekhéeni* (Goldschmidt and Haas 1998:99, 102).

Residents of Klukwan have been the main subsistence fishers on the Chilkat River above 7-Mile, although many residents of Haines have also used these traditional upriver harvest sites. Likewise, the lower river has been traditionally used by members of both communities (Oberg 1973).

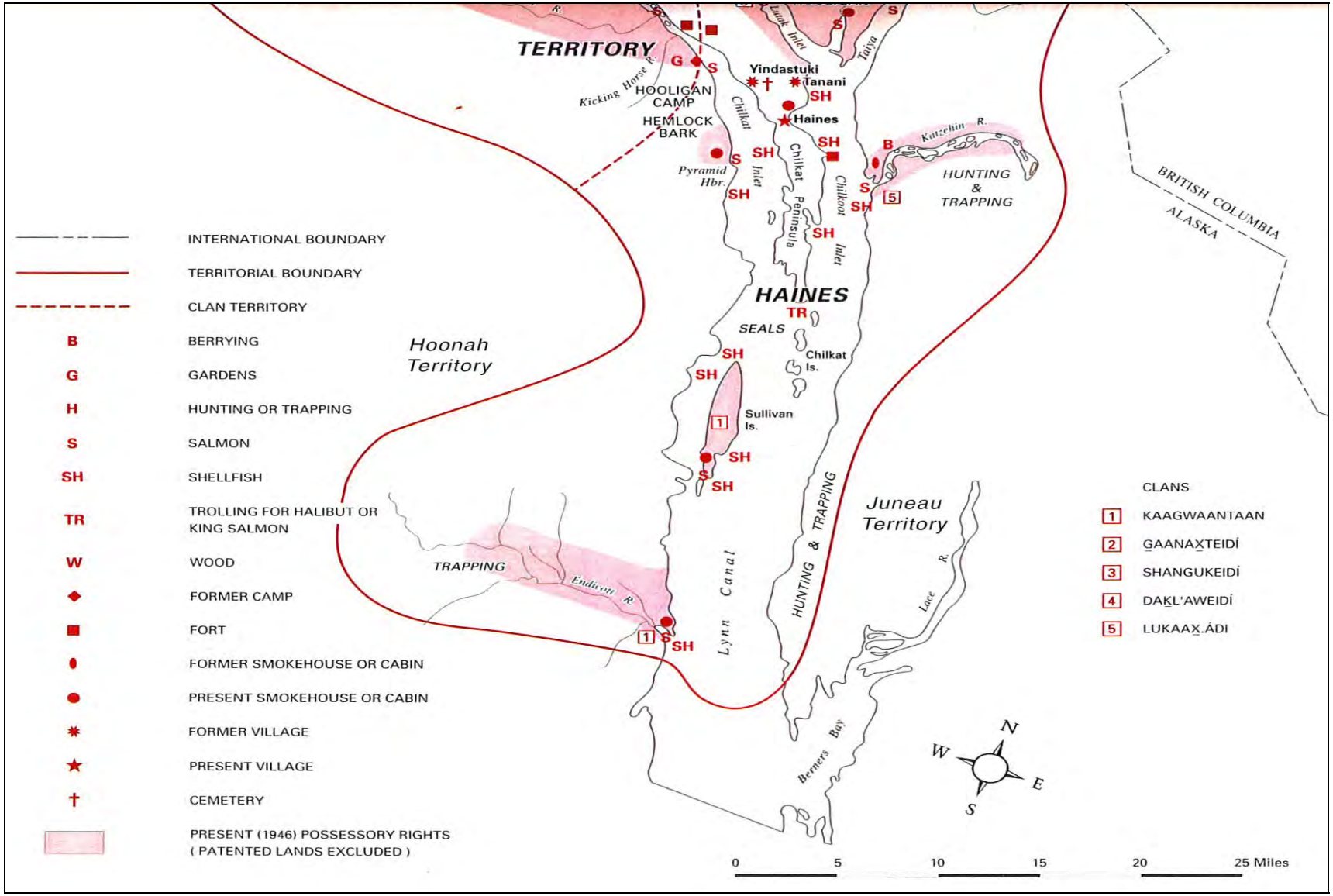

Figure 2.–Chilkoot (Haines) Tlingit territory.
Source Goldschmidt and Haas 1998.

Harvest of salmon for home use continues in Haines and Klukwan (Table 1). Salmon and eulachon are harvested in large quantities in both communities (Tables 2 and 3).

In 1996, based on household surveys, an estimated 89% of Haines households reported using salmon, 61% harvested salmon, and 40% of these households shared some of their catch with other households (Table 2). The total salmon harvest for Haines households in 1996 was 22,937 salmon with a mean household harvest of 29 salmon. Sockeye salmon were the highest reported species harvested with a total of 13,548 fish, followed by 3,754 coho, 2,957 chum, 1,398 Chinook and 1,279 pink salmon (Table 2). In 1996, based on household surveys, an estimated 100% of Klukwan households reported using salmon, 71% harvested salmon, and 68% of these households shared some of their catch with other households (Table 3). The total salmon harvest for Klukwan households in 1996 was 5,460 salmon with a mean household harvest of 152 salmon. Sockeye salmon were the highest reported species harvested with a total of 3,579 fish, followed by 1,008 chum, 690 coho, 154 Chinook and 29 pink salmon (Table 3).

Table 1.–Salmon subsistence/personal use harvest, Haines Management Area, 1996-2006.

	Number of permits				Estimated harvest[a] (number of fish)					
Year	Issued	Returned	Fished returned	Fished estimated[a]	Chinook	Sockeye	Coho	Pink	Chum	Total
1996	505	487	313	325	71	8,774	213	406	934	10,398
1997	567	532	304	324	31	6,237	146	946	952	8,312
1998	337	277	212	258	58	6,388	217	708	807	8,178
1999	349	311	229	257	57	6,033	129	744	1,085	8,048
2000	326	296	221	243	53	5,372	243	453	1,056	7,178
2001	360	325	252	279	84	6,570	143	570	762	8,129
2002	376	341	270	298	98	6,328	641	850	571	8,488
2003	380	360	264	279	111	7,041	539	1,140	702	9,533
2004	375	358	289	303	191	6,595	477	1,501	744	9,507
2005	378	365	270	280	97	4,981	353	1,595	655	7,681
2006	379	354	273	292	135	6,216	409	1,454	611	8,825
Average 1996-2000	417	381	256	281	54	6,561	190	652	967	8,423
SD 1996-2000	111	119	49	40	14	1,296	49	223	111	1,190
Average 2001-2006	375	351	270	288	119	6,288	427	1,185	674	8,694
SD 2001-2006	7	15	12	11	39	701	172	408	75	744
Average 1996-2006	394	364	263	285	90	6,412	319	943	807	8,571
SD 1996-2006	74	78	33	26	45	968	176	425	176	929

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

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

SD = Standard deviation.

Table 2.–Estimated harvest and use of salmon and eulachon, Haines, 1996.

	Percentage of households					Pounds harvested			Amount harvested		95% confidence limit
Resource	Use	Att	Harv	Recd	Give	Total	Mean HH	Per capita	Total	Mean HH	(+/-) harvest
Salmon											
Chum salmon	29.0	20.4	19.4	15.1	11.8	20,463.26	25.97	9.51	2,957.12	3.75	67.38%
Coho salmon	54.8	38.7	38.7	20.4	14.0	20,419.54	25.91	9.49	3,753.59	4.76	61.32%
Chinook salmon	50.5	33.3	31.2	30.1	14.0	17,727.46	22.50	8.24	1,398.06	1.77	74.34%
Pink salmon	21.5	17.2	17.2	6.5	3.2	2,789.18	3.54	1.30	1,279.44	1.62	67.36%
Sockeye salmon	80.6	47.3	47.3	53.8	28.0	64,219.97	81.50	29.84	13,548.52	17.19	31.49%
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%
Subtotal, all salmon	89.2	61.3	61.3	67.7	39.8	125,619.40	159.42	58.37	22,936.73	29.11	36.30%
Forage fishes											
Capelin	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00			0.00%
Eulachon	39.8	29.0	29.0	14.0	16.1	107,371.35	136.26	49.89	11,930.15[a]	15.14	133.75%
Subtotal, all forage fishes	39.8	29.0	29.0	14.0	16.1	107,371.35	136.26	49.89			133.75%
Subtotal, all fishes	95.7	69.9	69.9	84.9	53.8	299,566.59		139.19			60.45%
Total, all resources	97.8	92.5	91.4	96.8	72.0	421,429.65		195.81			46.09%

Source Alaska Department of Fish and Game Division of Subsistence CSIS, 2008

a. In this cell, amount harvested is in gallons, not pounds.

Table 3.–Estimated harvest and use of salmon and eulachon, Klukwan, 1996.

	Percentage of households					Pounds harvested			Amount harvested		95% confidence limit
Resource	Use	Att	Harv	Recd	Give	Total	Mean HH	Per capita	Total	Mean HH	(+/-) harvest
Salmon											
Chum salmon	41.9	32.3	32.3	19.4	19.4	6,975.36	193.76	62.57	1,008.00	28.00	46.61%
Coho salmon	77.4	51.6	51.6	45.2	45.2	3,752.55	104.24	33.66	689.81	19.16	19.07%
Chinook salmon	83.9	54.8	48.4	54.8	32.3	1,958.45	54.40	17.57	154.45	4.29	22.86%
Pink salmon	9.7	9.7	9.7	6.5	6.5	63.29	1.76	0.57	29.03	0.81	44.29%
Sockeye salmon	100.0	54.8	54.8	77.4	58.1	16,964.92	471.25	152.17	3,579.10	99.42	24.70%
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%
Subtotal, salmon	100.0	74.2	71.0	80.6	67.7	29,714.56	825.40	266.54	5,460.39	151.68	21.94%
Forage fishes											
Capelin	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00			0.00%
Eulachon	80.6	71.0	61.3	58.1	58.1	26,390.32	733.06	236.72	2,932.26[a]	81.45	20.84%
Subtotal, forage fishes	80.6	71.0	61.3	58.1	58.1	26,390.32	733.06	236.72			20.84%
Subtotal, all fishes	100.0	87.1	80.6	100.0	80.6	57,809.66	1,605.82	518.55			19.33%
Total, all resources	100.0	93.5	93.5	100.0	90.3	67,745.94	1,881.83	608.27			17.87%

Source Alaska Department of Fish and Game Division of Subsistence CSIS, 2008.

a. In this cell, amount harvested is in gallons, not pounds.

CRITERION 2: SEASONALITY

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

Historically, salmon were harvested according to seasonal availability and need (Stewart 1977; Oberg 1973). Permanent seasonal camps established on rivers and streams were inhabited at various months of the year according to the arrival of the various species. The size and nature of the camps was directly influenced by the quantity and movements of salmon. The Chilkat and Chilkoot rivers provide spawning beds for 5 species of salmon. The timing of the salmon runs provide residents with a supply of fresh salmon almost year-round (Mills et al. 1984; Oberg 1973).

Today, salmon are typically harvested according to seasonal availability and regulatory constraints. Chinook salmon are taken in the marine waters year-round with hook and line tackle and in May, following the eulachon harvest, in the Chilkat River with set gillnets. Sockeye salmon fishing begins in the Chilkat River in late May or early June and continues through the summer months, usually peaking in mid-July or early August (Mills et al. 1984). Chum salmon fishing peaks in late summer and pink salmon are harvested in July, August, and September (Mills et al. 1984). Due to warm water in the Chilkat River, chum and coho salmon fishing continues into early winter. Fresh salmon can be harvested from the Chilkat River as late as December (Mills et al. 1984).

Permits have generally allowed salmon harvest June 15-September 30. The combination of area, species, timing, and gear regulations on the Chilkat and Chilkoot systems have effectively confined the in-river set gillnet subsistence fisheries to the harvest of sockeye, pink, and chum salmon on the mainstem Chilkat River below Wells Bridge. Drift gillnets may be used anywhere on the river or in Lutak or Chilkat inlets. The retention of incidentally-harvested Chinook and coho salmon is allowed.

Eulachon are harvested in May when they return to the Chilkat and Chilkoot rivers to spawn. Because these fish spawn close to tidally-influenced waters, most of them are harvested at several locations: along the lower Chilkat River, at Jones Point, approximately 1 mile below the airport, and at the 6-, 7-, and 9-mile markers. They are also harvested at Lutak Inlet near the mouth of the Chilkoot River (Mills et al. 1984; Betts 1994).

CRITERION 3: MEANS AND METHODS OF HARVEST

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

The gear historically used for harvesting salmon in Southeast Alaska includes spears, harpoons, gaffs, nets, traps, weirs, hook and line, gigs, and fish wheels (Krause 1956; Oberg 1973; De Laguna 1972; Stewart 1977). These gear types were recorded as being used for fishing in the Chilkat River, although there was a particular emphasis on spears, harpoons, gaffs, and, in later years, nets. Several types of spears and harpoons were used in the Chilkat River system, especially when harvesting Chinook salmon (Oberg 1973). Weirs and basket traps were also used to harvest both sockeye and Chinook salmon, although these gear types were later replaced by nets.

Today, salmon are harvested using set gillnets on the mainstem Chilkat and Chilkoot rivers; drift gillnets are used in Lutak and Chilkat inlets. Although gaffs were common in the past, since the 1980s, hook and line (rod and reel) tackle has replaced gaffs.

Eulachon were traditionally harvested with dip nets, basket traps and fish hooks. Fishing by dip net was done both from shore and from canoes. Dip nets continue to be used in the contemporary harvest of eulachon (Betts 1994).

CRITERION 4: GEOGRAPHIC AREAS

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

Residents of Haines and Klukwan have traditionally fished for salmon and eulachon along the Chilkoot and Chilkat rivers and they traditionally processed fish at camps and in the riverside villages. The Chilkoot Tlingit fished both the lower reaches of the Chilkat and Chilkoot rivers and Chilkoot Lake. They harvested from large seasonal fish camps along the Lutak Inlet and Chilkoot River, as well as from permanent settlements on Chilkoot Lake. The camps and settlements located on the upper reaches of the Chilkat River were historically used by the Chilkat Tlingit. The camps located downriver and in estuarine and salt waters historically belonged to the Chilkoot, although nearly all harvest areas were shared by the mid-1940s (Goldschmidt and Haas 1998:28).

Information on contemporary harvest locations for residents of Haines is limited. Based on the most recent subsistence harvest location data (1987), the highest intensity of use by Haines households (15% to 25% and 10% to 15% of households) was shown to have occurred in Chilkat Inlet between Letnikof Cove and approximately Kochu Island, and in the Chilkoot River below the lake outlet. Fewer households (5% to 10%) used a broader expanse of Chilkat Inlet, from its entrance to its head, as well as portions of Lutak Inlet and the Chilkat River. The remainder of Lutak Inlet, as well as the lower Chilkat River and portions of the Chilkat River, the Kelsall River, the outlet of Chilkat Lake, and a location near the northern end of Sullivan Island, were used by 1% to 5% of households. The lowest level of use (less than 1%) was shown to occur in portions of the Chilkat River, Chilkoot Lake, Chilkoot River above the lake, Chilkoot Inlet, and upper Lynn Canal (Betts et al. *In prep*).

CRITERION 5: MEANS OF HANDLING, PREPARING, PRESERVING, AND STORING

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

Historically, salmon were hung in wooden smokehouses or left to dry on racks and then stored in baskets and bentwood boxes. Late fall runs of salmon were left to freeze in log cabins or caches (Stewart 1977). Salmon were roasted, boiled, steamed, and baked. Wooden boxes, waterproof baskets, heated rocks, earth pits, rock ovens, hot ashes, and roasting tongs and sticks were the means used to prepare salmon. Fish, once dried, could be toasted over the fire until hot and crisp, or soaked overnight and then boiled. Freshly-caught fish were roasted. Salmon heads were fermented by burying them so that they were not exposed to air for up to a week. Niblack (1890) and Krause (1956) describe a method of converting salmon into oil. The fish were allowed to age

and then boiled in wooden boxes into which hot stones were dropped. The grease or oil was skimmed from the surface and stored in boxes or in the hollow stalks of specially-prepared giant kelp. Salmon oil, as well as oil made from other fishes, or from seals, was used as a sauce for a variety of foods.

Salmon roe was collected from captured fish and eaten fresh, fermented, or dried so that it was preserved for winter use. Salmon roe was buried in boxes below high tide and left to age and ferment. According to Niblack (1890), dried roe was prepared for eating in 2 ways. It was pounded between 2 stones, diluted with water, and then beaten with wooden spoons into a creamy consistency, or it was boiled with dried berries and molded in wooden frames into cakes about 12 in square and 1 in thick.

Today, salmon are cut and scored for efficient drying in ways similar to the past. The fish are smoked in wooden smokehouses or in metal smokers, or they are dried, canned, frozen, refrigerated, or cooked freshly-caught. A combination of preservation methods is also used, such as half-smoking (light smoking) and then canning. Although the use of fermented salmon heads and roe ("stink heads" and "stink eggs") is not as common as it once was, salmon heads and roe are still aged and fermented in some communities, often by the traditional method of burying the roe or heads in jars on the beach below high tide.

Eulachon are eaten fresh, or are often smoked, dried, salted, or made into grease. Eulachon were cured for winter use, but only in limited quantities: their importance as oil producers was paramount, and only the surplus was preserved for winter food (Betts 1994).

Today, eulachon are prepared in ways similar to the past; the oil continues to be rendered following traditional methods. After the eulachon are caught, they are allowed to decompose in chests or pits for 1 to 2 weeks. The fish are then placed in hot water and heated for half an hour, after which the entire mixture is stirred and the fish "bounced" on large forks to release their oil. The oil is skimmed off, strained, cooled, and heated again until it turns clear. The oil is then ready for storage. Historically, the grease was often stored in containers made from bull kelp or in 25 gal wooden boxes (Betts 1994).

CRITERION 6: INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE, SKILLS, VALUES, AND LORE

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

Generations of Tlingits have lived in the Klukwan and the Haines areas for centuries. American settlers with interests in the commercial fishing, logging, and mining industries arrived in the late 19th century. The learning of skills associated with salmon and eulachon harvest and preparation generally derives from observation and participation with elder relatives or community residents, as well as by listening to stories describing fishing lore and skills. In traditional Tlingit culture, young boys learn virtually all lore and economic skills from their mother's brothers (Oberg 1973:32). Today, fishing skills and locations continue to be learned from uncles, as well as other relatives and elders. Family fish camps were common salmon and eulachon processing sites where fish were cut and smoked. The acquisition of salmon and eulachon harvest and preservation skills took place in fish camp.

CRITERION 7: DISTRIBUTION AND EXCHANGE

A pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving.

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

Since eulachon were available in the quantity necessary for oil production in a limited number of rivers, the oil rendered from these fish was a highly-valued trade item. Prior to European contact, the Tlingit traded extensively with coastal and interior peoples. Items such as dried fish, dried mountain goat meat, and eulachon oil were traded for furs, caribou skins, leather armor, lichen dye, sharks' teeth and mother-of-pearl (Magdanz 1988:6). The Tlingit exchange of eulachon oil was so significant that their trade routes into the interior of Alaska and Canada became known as "grease trails" (De Laguna 1972:350; Stewart 1977:150). Today, eulachon and their oil remain highly prized and widely shared through giving, bartering[1], and cash sale. The value of eulachon oil remains high due to its relative scarcity and desirability (Betts 1994). Tables 2 and 3 present data on harvesting, receiving, and giving (sharing) of species in Haines and Klukwan.

CRITERION 8: DIVERSITY OF RESOURCES IN AN AREA; ECONOMIC, CULTURAL, SOCIAL, AND NUTRITIONAL ELEMENTS

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

Salmon and eulachon continue to be part of a wide range of resources used in Haines and Klukwan, including other finfishes, deer, moose, harbor seals, and shellfish. Table 4 lists the 10 most commonly used species reported by Haines households in 1996. Some Haines households reported using as many as 47 animal or plant species, while other households used none. The average number of wild resources used by households was 15 out of a possible 196 species listed on the survey (Paige 2002).

Table 5 lists the 10 most commonly used species reported by Klukwan households in 1996 (Paige 2002). Some Klukwan households used as many as 55 animal or plant species. The average number of wild resources used by households was 21 out of a possible 196 species listed on the survey (Paige 2002).

1 Bartering involves exchange for other resources as well as for services.

Table 4.–Top 10 species used by the most households in Haines, 1996.

Rank	Species	Percentage of HH
1.	Sockeye salmon	80.6%
2.	Halibut	69.9%
3.	Moose	66.7%
4.	Dungeness crab	65.6%
5.	Coho salmon	54.8%
6.	Chinook salmon	50.5%
7.	Shrimp	49.5%
8.	Deer	48.4%
9.	Dolly Varden	47.3%
10.	Eulachon	39.8%

Source Paige 2002.

Table 5.–Top 10 species used by the most households in Klukwan, 1996.

Rank	Species	Percentage of HH
1.	Sockeye salmon	100.0%
2.	Herring spawn on hemlock branches	96.8%
3.	Black seaweed	87.1%
4.	Chinook salmon	83.9%
5.	Eulachon	80.6%
6.	Coho salmon	77.4%
7.	Deer	77.4%
8.	Halibut	74.2%
9.	Sea ribbons	74.2%
10.	Harbor seal	71.0%

Source Paige 2002.

REFERENCES CITED

Betts, M. F. 1994. The subsistence hooligan fishery of the Chilkat and Chilkoot rivers. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 213, Juneau. http://www.subsistence.adfg.state.ak.us/TechPap/tp213.pdf

Betts, M. F., M. Kookesh, R. F. Schroeder, T. F. Thornton, and A.-M. Victor. *In prep*. Subsistence resource use patterns in Southeast Alaska: Summaries of thirty communities Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 216, Juneau. http://www.subsistence.adfg.state.ak.us/TechPap/tp216.pdf

De Laguna, F. 1960. The story of a Tlingit community: a problem in the relationship between archeological, ethnological, and historical methods. U.S. Govt. Print. Off., Washington, D.C.

De Laguna, F. 1972. Under Mount St. Elias: The history and culture of the Yakutat Tlingit. Smithsonian Contributions to Anthropology Vol. 7 (in 3 parts). U.S. Government Printing Office, Washington D.C.

Goldschmidt, W. R. and T. H. Haas. 1998. *Haa Aani*, Our Land: Tlingit and Haida land rights and use. Editor, T. F. Thornton. University of Washington Press , Seattle; and Sealaska Heritage Foundation, Juneau.

Krause, A. 1956. The Tlingit Indians; Results of a trip to the northwest coast of America and the Bering Straits. American Ethnological Society, University of Washington Press, Seattle.

Magdanz, J. 1988. Harvest and exchange of eulachon from the Chilkat and Chilkoot rivers, Alaska Department of Fish and Game Division of Subsistence, Juneau.

Mills, D., V. Sumida, G. George, and M. Kookesh. 1984. Salmon use by the residents of the Chilkat and Chilkoot river drainages, 1983. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 95, Juneau. http://www.subsistence.adfg.state.ak.us/TechPap/tp095.pdf

Niblack, A. P. 1890. The coast Indians of southern Alaska and British Columbia. By Ensign Albert P. Niblack. Based on the collections in the U.S. National Museum, and on the personal observation of the writer in connection with the survey of Alaska in the seasons of 1885, 1886, and 1887 U.S. National Museum, Washington D.C.

Oberg, K. 1973. The social economy of the Tlingit Indians. University of Washington Press, Seattle.

Oswalt, W. H. 1966. This land was theirs; a study of the North American Indian [by] Wendell H. Oswalt. Wiley, New York.

Paige, A. 2002. Customary and traditional use determinations for fish in the Southeast Alaska region: A report prepared for the U.S. Forest Service of the U.S. Department of Agriculture. Alaksa Department of Fish and Game Division of Subsistence, Juneau.

Stewart, H. 1977. Indian fishing: Early methods on the Northwest Coast. University of Washington Press, Seattle.