

Special Publication No. BOF 2012-08

**Options for Amounts Reasonably Necessary for Subsistence
Uses of Salmon: Yukon Management Area**

Prepared for the January 2013 Anchorage Alaska Board of Fisheries Meeting

**By
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and
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December 2012

Alaska Department of Fish and Game



Symbols and Abbreviations

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Weights and measures (metric)

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

Weights and measures (English)

cubic feet per second	ft ³ /s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

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

Physics and chemistry

all atomic symbols

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

General

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 _A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics (F, t, � ² , etc.)	
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	�
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	log ₂ , etc.
minute (angular)	'
not significant	NS
null hypothesis	H ₀
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	�
probability of a type II error (acceptance of the null hypothesis when false)	�
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

SPECIAL PUBLICATION NO. BOF 2012-08

**OPTIONS FOR AMOUNTS REASONABLY NECESSARY FOR
SUBSISTENCE USES OF SALMON: YUKON MANAGEMENT AREA**

**PREPARED FOR THE JANUARY 2013 ANCHORAGE ALASKA BOARD OF FISHERIES
MEETING**

by

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December 2012

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ABSTRACT

This report provides options for amounts reasonably necessary for subsistence (ANS) for consideration by the Alaska Board of Fisheries as it discusses proposals addressing the subsistence salmon fisheries in the Yukon Area. The subsistence salmon fisheries are a critical component of the annual subsistence harvests of wild foods by residents of the entire Yukon Area. Changing harvest levels of summer chum and fall chum salmon, in particular, may warrant revisiting the current ANS ranges to evaluate how well they reflect contemporary subsistence practices.

Key words: Subsistence fishing, amount necessary for subsistence, customary and traditional uses, Yukon River drainage, Yukon Management Area, king salmon, summer chum salmon, fall chum salmon, coho salmon, pink salmon, Board of Fisheries.

INTRODUCTION

This report has been prepared for the Alaska Board of Fisheries (board) for reference when considering proposal 130, with implications for subsistence fisheries during its January 2013 meeting. This proposal provides an opportunity for the board and public to revisit the amounts reasonably necessary for subsistence findings (ANS) for salmon stocks in the Yukon Area. As described in greater detail below, the Alaska Department of Fish and Game (department) recommends adjusting the king salmon ANS, re-evaluating summer chum and fall chum salmon ANS levels, making no change to coho ANS levels, and establishing a pink salmon ANS range at this time.

The subsistence salmon fisheries in the Yukon Area are some of the largest in the State of Alaska in terms of the number of residents who participate and the number of salmon harvested (Fall et al. 2011). Since 1994, when the department began acquiring reasonably complete statewide coverage of subsistence harvest data, 30% of king salmon have been taken from the Yukon Area. Recent Division of Subsistence data suggest that salmon account for as much as 59% of the total annual harvest of fish and wildlife for subsistence in the Yukon Area (Brown et al. *In prep*). Residents of the Yukon Area harvest 4 species of Pacific salmon for subsistence purposes: king *Oncorhynchus tshawytscha*, summer and fall chum *O. keta*, coho *O. kisutch*, and pink *O. gorbuscha* salmon. Sockeye salmon *O. nerka* do not generally migrate up the Yukon River, but along with pink salmon, are locally important where they occur along the coast and in the lower river. Drift gillnetting, set gillnetting, and fish wheels are the primary gear types used when harvesting salmon, although additional gear types are allowed as specified in 5 AAC 01.220.

SUBSISTENCE SALMON HARVEST MONITORING PROGRAM

Since 1961, the department has collected information on subsistence salmon harvests in the Yukon Area. The monitoring program uses a combination of door-to-door household surveys and permits to estimate harvests by community for most of the drainage within Alaska's borders; harvest calendars provide additional information on the timing of harvests. In 1989, the survey methodology was redesigned by the Division of Subsistence utilizing comprehensive household lists and harvest groups for households which were classified by whether or not they usually fished for salmon. In 1990, households were further categorized as "Light," "Medium," or "Heavy" harvesters based on each household's harvest history. Surveys are conducted annually in 33 communities, and households are selected for the annual survey using random stratified selection: 100% of fishing households designated as heavy harvesters, medium harvesters, and unknown harvest levels are selected; and 30–50% of households that do not fish or are in the light harvester group are selected. Annually, 75–80% of selected households are surveyed. Responses from each harvest group are used to estimate the harvest of unsurveyed or unselected households and provide a total community harvest estimate.

In areas of the Yukon River drainage accessible by road (e.g., communities of Manley, Eagle, Circle, Nenana, etc.), subsistence harvest information is collected from returned subsistence permits. Harvest

totals reported on returned permits are not expanded to estimate information from unreturned permits. The total number of salmon harvested for subsistence in the Yukon Area consists of survey community estimates, reported permit harvests, and the number of test fish distributed to communities. Prior to salmon fishing activities, subsistence harvest calendars are mailed out to all identified fishing households within the survey communities. The calendars provide space for fishers to record their daily subsistence catch of salmon, by species. On average, roughly 15% of calendars are returned each year. Calendars and properly filled-out permits provide harvest by day and therefore, provide harvest timing information not obtained by any other data collection method. Annual documentation of subsistence salmon harvest is used in conjunction with commercial, sport, and personal use harvests, and escapement estimates, to calculate total run size. Salmon harvested in the Fairbanks Nonsubsistence Area are reported on personal use permits.

BACKGROUND OF ANS DETERMINATION

Under AS 16.05.258(a), the board is charged with identifying fish stocks, or portions of stocks, that “are customarily taken or used for subsistence” (a “C&T” finding). If a portion of these stocks can be harvested consistent with sustained yield principles, the board “shall determine the amount of the harvestable portion that is reasonably necessary for subsistence uses” [AS 16.05.258(b)]. This is called the amount reasonably necessary for subsistence, or an “ANS finding.”

In 1987, the board found that salmon in the Yukon Area are customarily and traditionally taken or used for subsistence. In 1993, the board revisited C&T uses of salmon in the Yukon Area, reaffirmed the 1987 C&T finding for all salmon in the Yukon Area, and found that 348,000–503,000 salmon were necessary for subsistence uses, all salmon species combined. In 2001, the board again revisited the C&T finding of Yukon Area salmon and made species-specific ANS findings for king, summer chum, fall chum, and coho salmon for the Yukon-Northern Area, excluding pink salmon. The board set the ANS based upon the harvest history in the Yukon Area during the years 1990–1999 (5 AAC 01.236). Division of Subsistence provided options for determining the ANS to the board in 2001, and the board chose to utilize the low harvest and the high harvest over the 10-year period to determine the ANS for each salmon species, although years when there were subsistence fishing restrictions during the fall season were not included in the analysis (Table 1). No ANS determination was made for pink salmon.

Table 1.–Estimated harvests of Yukon Area salmon, 1990–1999.

Salmon species	Low	Average	High	ANS
King salmon	45,669	52,519	66,704	45,500–66,704
Summer chum	83,784	117,151	142,192	83,500–142,192
Fall chum	89,938	123,749	167,900	89,500–167,900
Coho salmon	20,885	34,777	51,980	20,500–51,980

Source Customary and Traditional Use Eight Criteria Worksheet prepared by ADF&G Division of Subsistence, 2001.

The Yukon Area includes communities along the mainstem and its tributaries, as well as the communities of Hooper Bay and Scammon Bay along the Bering Sea Coast. The Yukon Area also includes the community of Chevak, which is not part of the postseason subsistence salmon harvest monitoring program administered by the Division of Commercial Fisheries. Salmon harvested for personal use near the community of Fairbanks are not included in the ANS findings.

ANS OPTIONS IN 2013

Following are 3 options for the board to consider should it choose to update its 2001 actions and adopt ANS ranges in regulation during its January 2013 meeting. The options presented below were developed using estimates from the Yukon Area postseason subsistence salmon harvest monitoring program (tables 2 and 3). Historical harvest estimates for the Yukon Area by species and year are shown in Table 4.

The department recommends an adjustment to the king salmon ANS range; a 2004 alignment in expansion methods between divisions of Commercial Fisheries and Subsistence data sets may warrant adjustment to king salmon ANS range. The original species-specific ANS ranges were established by the board in 2001 based on Division of Subsistence data. After alignment in data analysis methods, the high harvest of 66,704 salmon was adjusted to 63,915 (1993). Except for recent years when restrictions to subsistence fishing have limited harvests, king salmon harvests have been stable through time. Although harvest levels of king salmon have fallen below the lower boundary of the ANS range for the last several years, this is likely due to fishing restrictions and poor abundance rather than changing C&T harvest patterns or levels. The department does not recommend changes to the coho salmon ANS range. Even if an alignment of expansion methods may also have affected earlier annual coho salmon harvest estimates, it does not affect the range of low and high harvest estimates. Because of overlapping run timing and similar fish morphology of coho and fall chum salmon, harvest of 1 species are affected by management of the other, with fall chum salmon being the primary targeted species in most years. Therefore, any changes in harvests of coho salmon do not necessarily reflect changes in harvesting coho salmon, but rather fall chum salmon management actions.

Harvest data suggest that harvest levels of Yukon Area summer chum and fall chum salmon stocks have fluctuated over the last decade. In the 11 years since 2001, when the board made species-specific ANS ranges, subsistence harvests of summer chum salmon have fallen below the lower bound of the ANS range 4 times (see Table 4); 3 of those years are excluded from the ANS reevaluation because of subsistence restrictions resulting from low run abundance or summer-season restrictions to conserve king salmon. The most recent 10-year (all years included between 2002–2011) average of summer chum subsistence harvests is 89,997, which is still within the 2001 ANS range. Prior to 1997, when the salmon roe market declined, subsistence harvests of summer chum salmon were regularly estimated between 115,000 and 140,000 fish. Fishers harvested summer chum salmon for roe and kept most of the carcasses primarily for dog food; these fish were counted in the subsistence harvest. After the disappearance of the salmon roe market in 1998, and a series of poor runs from 1998 through 2001, subsistence harvests appear to have restabilized at lower levels, ranging from 77,934 (2004) to 115,078 fish (2006), though these levels have largely fallen within the existing ANS range, especially within recent years. Summer chum salmon may play a larger role in subsistence salmon harvests if king salmon continue to decline, as subsistence users attempt to adapt to changes in king salmon availability.

Fall chum salmon harvests have shown similar declines, though they are not linked to a commercial market. Fall chum salmon are used as both human food and dog food, depending on quality and timing of harvests within the run. Between 1990 and 1999, fall chum salmon subsistence harvests ranged from 89,940 to 167,900 fish (except for 1993 and 1998 when runs were very poor). Excluding the years 2000 through 2003, 2009, and 2010, when subsistence restrictions were in place, subsistence harvests since 2000 have ranged from 62,526 (2004) to 101,221 (2007). The most recent 10-year (all years included between 2002–2011) average of fall chum subsistence harvests is 72,021 and the most recent 5-year (all years included between 2007–2011) harvest average is 81,109 fish, both below the lower end of the 2001 ANS range of 89,500 fish. Declines in the maintenance of dog teams along the Yukon River likely account for this change in harvest levels.

Finally, data and options are provided to assist the board in considering an ANS range for pink salmon. The board made a positive C&T use determination for Yukon Area pink salmon in 1987, which was reaffirmed in 1993 and 2001 (5 AAC 01.236). Harvest data have been estimated only since 2000. Now

that the department has subsistence harvest estimates of pink salmon harvests since 2000, the board may choose to establish an ANS for pink salmon in the Yukon Area. Only small harvests of pink salmon are documented. Pink salmon are harvested incidentally to other fisheries inriver and are not typically targeted for harvest by subsistence fishers, except perhaps in Hooper Bay. Fluctuations in harvest are likely due to the effect of pink salmon abundance on incidental harvest while fishing for other salmon. There is no commercial fishery targeting pink salmon in the Yukon Area at this time and pink salmon are not actively managed. The options below include data from 2002 through 2011, excluding 2000–2001. These years appear anomalous, although it is unknown why.

Table 2.–OPTION A: Range based upon low and high harvests in the Yukon Area, 2002–2011, except king salmon [1990–1999].

	Low	Average	High	ANS (current)	ANS (revised, low/high)
King salmon	45,500	52,109	63,915 ^a	45,500–66,704	45,500–63,900
Summer chum	77,934	92,145 ^b	115,078	83,500–142,192	77,900–115,000
Fall chum	62,526	84,807 ^c	101,221	89,500–167,900	62,500–101,200
Coho	12,344	19,429 ^d	27,250	20,500–51,980	no change
Pink	2,118	4,558	9,697	none	2,100–9,700

- a. Low and high harvests reflect the year range used by the board to determine the original ANS; the department is not recommending a reevaluation of the ANS range, so these harvest estimates represent the same years used to establish the original ANS range.
- b. Excludes 2001, 2003, and 2009.
- c. Excludes 2002–2003 and 2009–2010.
- d. Excludes 2002–2003 and 2009–2010.

Table 3.–OPTION B: Range based upon low and high harvests in the Yukon Area, 1990–2011, except king salmon [1990–1999].

	Low	Average	High	ANS (current)	ANS (revised, low/high)
King salmon	45,500	52,109	63,915 ^a	45,500–66,704	45,500–63,900
Summer chum	77,934	104,566 ^b	142,192	83,500–142,192	77,900–142,200
Fall chum	62,526	107,060 ^c	167,900	89,500–167,900	62,500–167,900
Coho	12,344	28,199 ^d	51,980	20,500–51,980	no change
Pink	2,118	4,558 ^e	9,697	none	2,100–9,700

- a. Low and high harvests reflect the year range used by the board to determine the original ANS; the department is not recommending a reevaluation of the ANS range, so these harvest estimates represent the same years used to establish the original ANS range.
- b. Excludes 2001, 2003, and 2009.
- c. Excludes 2002–2003 and 2009–2010.
- d. Excludes 2002–2003 and 2009–2010.
- e. Excludes 2000–2001.

OPTION C: No change to any or all of the species-specific ranges.

Table 4.–Historical subsistence harvest estimates for 4 species of salmon in the Yukon Area, 1990–2011 (shaded cells indicate years excluded from ANS reevaluation; outlined cells indicate those years when the harvest fell below the ANS range).

Year	King	Summer chum	Fall chum	Coho	Pink	Total salmon
1990	48,587	115,609	167,900	43,460	ND	375,556
1991	46,773	118,540	145,524	37,388	ND	348,225
1992	47,077	142,192	107,808	51,980	ND	349,057
1993	63,915	125,574	76,882	15,812	ND	282,183
1994	53,902	124,807	123,565	41,775	ND	344,049
1995	50,620	136,083	130,860	28,377	ND	345,940
1996	45,671	124,738	129,258	30,404	ND	330,071
1997	57,117	112,820	95,141	23,945	ND	289,023
1998	54,124	87,366	62,901	18,121	ND	222,512
1999	53,305	83,784	89,940	20,885	ND	247,914
2000	36,404	78,072	19,395	14,939	1,591	148,810
new 2001	55,819	72,155	35,703	22,122	403	185,799
ANS 2002	43,742	87,056	19,674	15,489	8,425	165,961
2003	56,959	82,272	56,930	23,872	2,167	220,033
2004	55,713	77,934	62,526	20,795	9,697	216,968
2005	53,409	93,259	91,534	27,250	3,132	265,452
2006	48,593	115,078	84,002	19,706	4,854	267,379
2007	55,174	92,926	101,221	19,624	2,118	268,945
2008	45,186	86,514	89,357	16,855	9,529	237,912
2009	33,805	80,539	66,119	16,006	2,300	196,469
2010	44,559	88,373	68,645	13,045	4,199	214,622
2011	40,980	96,020	80,202	12,344	2,291	229,546
5-year average (2007–2011)	43,941	88,874	81,109	15,575	4,087	ND
10-year average (2002–2011)	47,812	89,997	72,021	18,499	4,558	ND
Historical average (1990–2011)	49,611	100,987	86,595	24,282	3,965	261,474

Sources Brase and Hamner 2002; Jallen et al. 2012.

ND = Data not available.

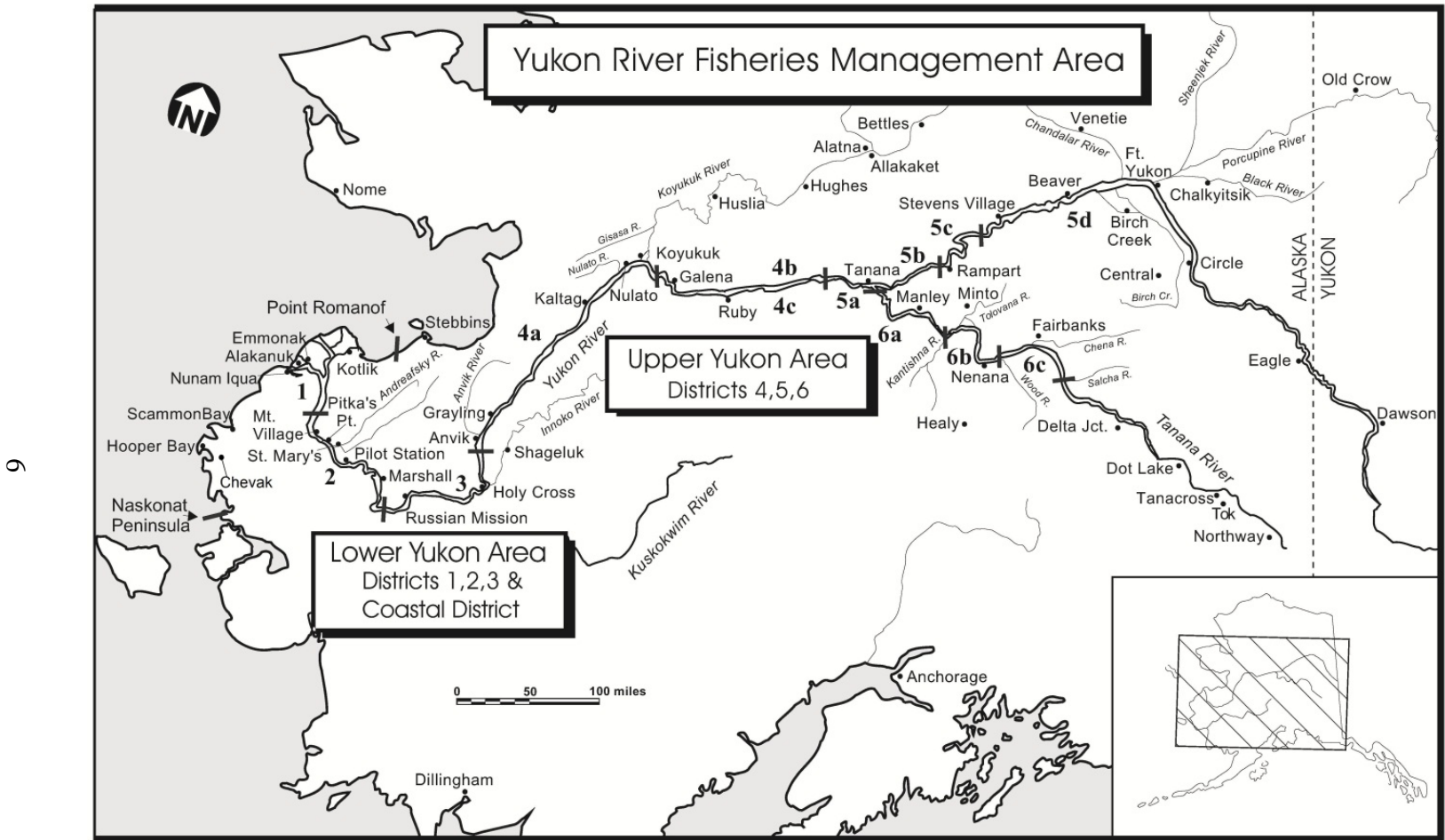


Figure 1.-Yukon area.

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**APPENDIX A: CUSTOMARY AND TRADITIONAL USE EIGHT
CRITERIA WORKSHEET, YUKON AREA SALMON: KING,
SUMMER CHUM, FALL CHUM, COHO, AND PINK**

RC411

(also RC70 from Jan 2004 BoF mtg.)

CUSTOMARY AND TRADITIONAL USE EIGHT CRITERIA WORKSHEET

YUKON AREA SALMON: CHINOOK, SUMMER CHUM, FALL CHUM, COHO, AND PINK

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

January 2001

In 1987 the Alaska Board of Fisheries reviewed information on uses of salmon and made a finding that there are customary and traditional uses of salmon in the Yukon area. The Board reviewed and reaffirmed these findings in 1993.

1. A long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock 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.

Salmon is by far the most important fish in Yukon River fisheries. Their use predates recorded history. Early explorers documented salmon fishing activity and use of dried salmon for human food as well as for dogs used for transportation (Nelson 1979; Zagoskin 1957). Harvest and use of salmon have been documented throughout this century by federal and state fishery management agencies.

Salmon continue to be a mainstay of the Yukon River economy in Alaska. Subsistence-caught salmon account for more pounds of food than any other single resource in many Yukon communities. Chinook is a major salmon species used for subsistence purposes along the entire river. The use of subsistence-caught chinook salmon is for human consumption in all communities, although entrails, scraps, and poor quality fish are at times fed to dogs. Chinook are cut into strips and are dried for later use as a highly prized food. Salmon heads are often split and dried for use in soups.

Summer chum salmon are used especially in Districts 1-4, with smaller numbers in Districts 5 and 6. The use of subsistence-caught summer chum salmon varies between and within communities, generally depending upon the distance from the mouth of the Yukon River. Summer chum salmon are a major eating fish for many households, particularly in Districts 1-3. By the time the fish have reached the vicinity of Kaltag (450 miles upriver) their flesh is commonly of poor quality and the fish are less likely to be used for human consumption. Upriver communities commonly process and use summer chum for dog food.

Fall chum is a major eating fish, particularly in upriver communities. Fall chum salmon carry large reserves of oil to travel great distances from the ocean. They are so bright in appearance that many residents called them "silvers". Also, in upriver districts, large numbers of fall chum are harvested for dog food. They are the principal species of salmon feed to dogs in Districts 5 and 6.

Coho salmon run timing is similar to that of fall chum salmon. Sockeye and pink salmon are of lesser significance overall, although are locally important where occurring in the lower river.

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

Each species has its unique time of arrival and peak of abundance resulting in different harvest periods along the 1,900 mile length of the river. Chinook salmon fishing in the lower river begins immediately after breakup of the Yukon River in May and concludes after the first week in July. Chinook salmon fishing in the upper districts (4, 5, 6) fishing takes place mostly during the month of July, but it can begin as early as late June in district 4 and can extend into August in the upper river. Summer chum salmon fishing in the lower river takes place from May to mid-July. Summer chum salmon fishing in the upriver districts generally occurs from early July through mid-August. Fall chum salmon fishing in the lower river generally begins mid-July and concludes by the first week of September. In District 4 fishing for fall chum salmon takes place in August and extends into September. In Districts 5 and 6 fishing begins in mid-August and continues until freeze-up, generally in late October to mid-November.

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

Historical methods of harvest include the use of traps, wooden fences, stone tidal fences, dip nets, gill nets, seine nets, hoop nets, spears, hooks, gaffs, and fish arrows. The first Euro-Americans at the Yukon River delta found local residents using wooden traps made of split spruce or willow up to 20 feet long and with a mouth of four to six feet in diameter. These traps, placed underwater 20 to 40 feet from the river's edge, were highly productive producing up to 400 salmon a day. Nets were constructed of seal skin or baleen (in lower river), sinew, or willow bast. After arrival of Euro-American traders in the 19th century, linen or cotton twine replaced local material for nets; and by 1920, set gill nets had replaced traps and dip nets in the lower river. Gill nets were fished from shore or from boats drifting down river. Dip nets made with smaller mesh were used to scoop salmon out of shallow water, from fish traps, and near fish fences. The fish wheel, introduced about 1910 along the upper Yukon and Tanana rivers, represented a rapid change in fishing technology. By 1920, they were used almost exclusively along the Yukon River above the vicinity of Holy Cross. The following decade was also a period of innovation with the widespread acceptance of skiffs and outboards motors which allowed for more rapid river travel.

Set gill nets, drift gill nets, fish wheels are the common gear used today. In the lower river and district 4A, drift or set gill nets are commonly used while in the upper river districts set gill nets and fish wheels are the predominate gear used. Rod and reel gear is of minor importance except in particular settings where other gear is ineffective. Most set gill nets, under 150 feet (25 fathoms) in length, are placed in eddy sites. They are used effectively in both the lower and upper river and for several salmon species. Drift gill nets up to 300 feet in length (50 fathoms) are commonly used in the lower river. Subsistence fishing regulations also allow the use of drift gill nets in District 4A where many fishermen prefer their use due to the limited number of eddy sites suitable for the effective use of set gill nets. In subdistrict 4A drift gill nets are limited to 150 feet (25 fathoms) in length and may only be used from June 21 to July 14, during the chinook salmon run, and again after August 2 during the migration of fall chum salmon. Drift gill nets are not permitted in subdistricts farther upriver. Fish wheels, used in the upper river districts, can be very effective during the peak of chum salmon runs yielding several hundred salmon each day. Fish wheels require considerable effort to build, maintain, and correctly locate along the riverbank. They are generally fished cooperatively by members of several different households.

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

Harvest areas used today are the same as those used in the past, although specific sites utilized may differ and fishing patterns may reflect changes in community settlement or developments in river transportation. In the past travel time to sites was longer, and people tended to remain at fish camp continuously for the duration of the summer salmon fishing season.

Most fishers use harvest sites and fish camps close to home communities, while some residing away from the major river corridors seasonally relocate to the fish camps during periods of salmon runs. The same camp location is used year to year, particularly when near good fishing sites which produce fish consistently over time. Sites near communities are always in use, so some people must travel to more distant sites. Since gear needs to be checked up to several times a day, people camp close to their fishing site. Most fish camps are strategically located to take advantage of consistently good fishing sites such as an eddy where the river current slackens or reverses near the bank. Other prime fishing sites are located near a narrowing of stream channels where fish are restricted, near submerged sand bars which also direct fish movements, or near a coastal river mouth where fish school. If the river channel changes, fish camp locations can lose their strategic value and may be abandoned, but some have been continuously occupied for generations. Wherever fish camps are founded, they are maintained primarily by extended families. Fishing activities are based either from a fish camp or the home community. Subsistence closures were enacted for certain road-accessible areas east of Fairbanks and near the Dalton Highway.

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

The primary methods of preserving salmon are drying and smoking, although specific methods of processing varies up and downriver according to local customs and other factors. Many households own or share in the use of a smokehouse and other processing equipment. Some people used canning (cooked or smoked fish), salting (bellies or chunks), or freezing to preserve salmon. Freezing includes the use of freezers, used when drying conditions are unfavorable, and letting fish freeze outdoors in late September and October. Dried salmon, a lightweight high-energy food, is a regular component of the diet in many households throughout the year. Fish used as feed for dogs are dried, bundled, stored for later use or frozen whole just before freeze-up. Fresh fish are eaten regularly throughout the summer fishing season.

Several steps are required in the processing of salmon. Fish must be transported to the processing site, usually at the family fish camp, gutted and cut according to their intended use, then placed on drying racks in open air or in a smokehouse. Smoke fires must be continually tended during the smoking process, and once dried fish must be moved to a storage location such as a cache. Chinook and other salmon are cut into strips and are dried for later use as a highly prized food. Salmon heads are often split and dried for use in soup.

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

Knowledge of fishing skills, values, and lore are taught through participation in fishing activities. Older family members often direct camp activities such as building and maintaining gear, picking gear effectively, processing fish, and displaying proper care and respect towards the resource. Younger family members cooperatively share in these production tasks and acquire fishing skills in this educational context. Fish camps are a Yukon River tradition. In addition to use for fish

processing, fish camps serve to reinforce family ties, continue cultural traditions, and identify family or community fishing areas. Relationships vary, but often the group at fish camp includes three generations: an older couple, their children, and their children's children. Children frequently accompany their grandparents, parents, older brothers, or sisters as they do their camp chores. As they grow older children help catch and process fish, learning by watching and doing.

Even after commercial fishing purposes were incorporated into fish camps, the seasonal round and the purpose of fish camps remained the same: to feed local people using local resources and local labor. Salmon fishing on the Yukon River is based on families, working together to produce fish for themselves (and for sale). They operate with a minimum of capital investment and are labor intensive. Each member of the family, from the oldest to the youngest, has a place at fish camp.

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

Households and extended family groups share fishing camps as well as harvesting and processing responsibilities. Family members who are unable to actively participate in harvest or processing activities provide assistance in the form of fishing gear, fuel, processing equipment, or other necessary items. Distribution of salmon generally occurs along the same kinship lines. This serves to affiliate salmon production groups. Salmon are also shared with friends, elders, and relatives living in other communities strengthening the social fabric in communities.

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

Households active in harvesting salmon for subsistence generally harvest a wide variety of resources throughout the year. Freshwater fish, large and small game, waterfowl, and furbearers are also harvested and relied upon. Examples of per capita harvests of all resources in the Yukon Drainage area are: 1,062 pounds in Huslia (1983), 998 pounds in Fort Yukon (1987), 1,015 pounds in Minto (1984), 1,138 pounds in Stevens (1984), and 2,157 pounds in Tanana (1987). Per capita harvests of subsistence resources by residents of five lower Yukon River communities and Stebbins ranged between 510 to 1,397 pounds (Wolfe 1981).

In many Yukon River area communities salmon represent a majority of the total amount (by weight) of subsistence resources harvested. Examples of per capita harvests of salmon in the Yukon Drainage area are 232 pounds in Russian Mission (1985), 544 pounds in Huslia (1983), 607 pounds in Fort Yukon (1987), 686 pounds in Minto (1984), 921 pounds in Stevens (1984), and 1,800 pounds in Tanana (1987).

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