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Klukshu River Sockeye Salmon Stock Status and Action Plan, 2022

By

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and

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April 2022

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

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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

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
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)

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

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TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

In response to guidelines established in the *Policy for the management of sustainable salmon fisheries* (SSFP), the Alaska Department of Fish and Game (department) recommended that the Klukshu River sockeye salmon (*Oncorhynchus nerka*) be designated as a "stock of management concern" in October 2020. A management concern is defined as "a concern arising from a chronic inability, despite use of specific management measures, to maintain escapements for a salmon stock within the bounds of the SEG [sustainable escapement goal], BEG [biological escapement goal], OEG [optimum escapement goal], or other specified management objectives for the fishery." Klukshu River sockeye salmon escapements have been below the lower bound of the current BEG range in 4 of the last 5 years, 2016–2020. Klukshu River is a tributary of the Alsek River and is entirely within Yukon, Canada. Klukshu River sockeye salmon are harvested primarily in a commercial set gillnet fishery that operates in the lower portions of the Alsek River and in Dry Bay in the U.S. and in a Champagne–Aishihik First Nation Aboriginal fishery that takes place in or near the Klukshu River in Canada. Alsek River salmon fisheries are managed under the provisions of the Pacific Salmon Treaty (PST) and management actions since 2018 have been designed to reduce harvest of Klukshu River sockeye salmon.

Keywords: Klukshu River, sockeye salmon, *Oncorhynchus nerka*, stock of management concern, biological escapement goal, Alsek River, commercial fishery, Champagne–Aishihik First Nation Aboriginal fishery, Pacific Salmon Treaty.

INTRODUCTION

The *Policy for the management of sustainable salmon fisheries* (SSFP; 5 AAC 39.222) directs the Alaska Department of Fish and Game (department) to provide the Alaska Board of Fisheries (board) with reports on the status of salmon stocks and identify any salmon stocks that present a concern related to yield, management, or conservation during regularly scheduled board meetings.

In October 2020, the department recommended that the board designate Klukshu River sockeye salmon as a stock of "management concern" at the next regulatory board meeting for the Southeast Alaska (SEAK) and Yakutat Management Area. The stock of concern recommendation is based on guidelines established in the SSFP, which describes a management concern as "a concern arising from a chronic inability, despite use of specific management measures, to maintain escapements for a salmon stock within the bounds" of the established escapement goal whether it be a sustainable escapement goal (SEG), biological escapement goal (BEG), or optimal escapement goal (OEG), or other specified management objective. Chronic inability is further defined in the SSFP as the "continuing or anticipated inability to meet escapement thresholds over a 4 to 5 year period, which is approximately the generation time of most salmon species." The Klukshu River sockeye salmon run experienced a period of decline beginning in 2016 and escapements fell below the current BEG range of 7,500 to 11,000 sockeye salmon in 4 out of the last 5 years from 2016 to 2020 (Table 1). Herein, the Klukshu River and Alsek River stocks of sockeye (*Oncorhynchus nerka*) and Chinook (*O. tshawytscha*) salmon will be referred to as Klukshu River sockeye and Chinook salmon and Alsek River sockeye and Chinook salmon.

The Klukshu River originates in the Yukon Territory, Canada and flows into the Tatshenshini River, a large tributary of the Alsek River, which continues into British Columbia and the U.S. before terminating in Dry Bay and the Gulf of Alaska, approximately 50 miles southeast of Yakutat (Figure 1). Thus, the Klukshu River sockeye salmon BEG is for a salmon stock that spawns entirely within Canada. Klukshu River sockeye salmon contribute to U.S. commercial and subsistence fisheries, the Champagne–Aishihik First Nation (CAFN) aboriginal fishery and to a Canadian recreational fishery. Salmon runs in the Alsek River drainage have been managed under the auspices of the Pacific Salmon Comission (PSC) since the signing of the Pacific Salmon Treaty

(PST) in 1985. Management of transboundary rivers, including the Alsek River, is outlined in Chapter 1 of the PST. Included in the chapter are measures to be taken when established escapement goals are not met for 3 consecutive years. Management actions are outlined in annual management plans produced by the Transboundary Technical Committee (TTC) and approved by the Transboundary Rivers (TBR) Panel prior to the fishing season each year. The TTC is comprised of over 20 fishery managers and researchers, from the U.S. and Canada and the TBR Panel consists of 14 members—7 U.S. and 7 Canada. The TTC conducts 3 annual meetings and the TBR Panel conducts 2 annual meetings. In addition, U.S. and Canadian managers and researchers are in weekly contact throughout the salmon season.

This action plan provides the department's assessment of Klukshu River sockeye salmon as a stock of management concern, summarizes historical assessments of annual run sizes, and describes the existing regulations and emergency order (EO) authority that the department follows to manage the Alsek River and, in turn, the Klukshu River sockeye salmon stock. This plan lists the past and current fisheries and outlines research projects for the Alsek River.

STOCK ASSESSMENT BACKGROUND

ESCAPEMENT

Klukshu River sockeye salmon escapements are enumerated using a weir across the Klukshu River just upstream of the confluence with the Tatshenshini River and approximately 3 miles above the Dalton Post Road (Figure 1). Sockeye salmon pass above the Klukshu River weir from late June to early October (mid-point of weir counts occur September 1–15), and spawn from late September to mid-October (peak spawning activity typically occurs in late September). Fisheries and Oceans Canada (DFO) in cooperation with the CAFN have operated this weir since 1976 annually from June 15 through October 15 or until the river begins to freeze. Most of the Klukshu River sockeye salmon run is enumerated through this weir; however, a portion of the run spawns or is harvested in Canadian food and recreational fisheries below the weir. River characteristics include varied depths and pools over nearly the entire length of the stream, which is also relatively narrow and susceptible to flash floods. The substrate is excellent for spawning salmon, though most of the spawning occurs along the shoreline of Klukshu Lake.

HARVEST

Commercial Fisheries

U.S. commercial fishing began on the Alsek River in the 1930s. Historically, the fishery started in late May to target Chinook salmon and proceeded through the sockeye and coho (*O. kisutch*) salmon seasons ending in mid- to late September. In the 1980s, the opening date of the U.S. fishery was pushed back to the first Sunday in June. Participation in the U.S. fishery increased from an average 20 permits (1963–1984) to an average 31 permits (1985–2000), then declined to an average 17 permits since 2001.[1] This increase in participation also occurred at surrounding systems on the Yakutat forelands. The sockeye salmon harvest at the Alsek River from 1963 to 2020 ranged from a low of 2,500 fish in 2020 to a high of 50,600 fish in 1978. Sockeye salmon harvest over the past 5 years (2016–2020) averaged 5,000 fish, well below that historical average of 18,500 fish (Table 2).

[1] The permit average (2015–2020) has been 13.

Klukshu River sockeye salmon immigrate into the Alsek River from the Gulf of Alaska through Dry Bay, and then move upriver into the Tatshenshini River and finally into the Klukshu River (Figure 1). Klukshu River sockeye salmon are harvested in mixed stock commercial and subsistence set gillnet fisheries below the border in the U.S. portion of the Alsek River and in U.S. surf waters near the terminus of the Alsek River. Harvests in the U.S. commercial fishery are tabulated using fish tickets and harvests in the subsistence fishery are enumerated from subsistence permits. However, because annual harvests in the subsistence fishery are small in comparison to the commercial harvests (Table 2), the overall harvest of sockeye salmon in the U.S. Alsek fisheries is known precisely on an annual basis. The proportion of Klukshu River sockeye salmon in the U.S. commercial harvest is determined using genetic stock identification (GSI) analysis. The department has conducted the GSI sampling project in conjunction with DFO Molecular Genetics Laboratory in Nanaimo since 2011, with the goal of determining the proportion and run timing of Klukshu River sockeye salmon (Table 3). The average proportion of Klukshu River sockeye salmon in the U.S. commercial fishery from 2011 to 2019 was 17.1% and proportions ranged from a low of 2.6% in 2017 to a high of 37.4% in 2018 (Table 3)[2].

U.S. Subsistence and Canadian Aboriginal Fisheries

Klukshu River sockeye salmon are harvested in a U.S. subsistence fishery that occurs in the lower reaches of the Alsek River (Figure 2) and in a Canadian aboriginal fishery in the Klukshu River (Figure 3). In the U.S. subsistence fishery, set gillnet gear is primarily used to harvest fish, whereas the CAFN employ a variety of methods such as small gillnets, fish traps, gaffs/spears, nets, angling, and snagging to harvest fish.

The first documented U.S. subsistence harvest from the Alsek River occurred in 1976 and harvest is monitored through state and federal permits. Any Alaska resident can fish state subsistence permits; however, only Yakutat area residents can fish federal subsistence permits. Subsistence fishermen are required to return permits with a record of their harvest before the end the year they were issued. If permits are not returned, a permit for the following year cannot be issued. The 2011 to 2020 average subsistence harvest was 186 sockeye salmon, with an average of 6 permits fished (Table 2). The stock composition of the subsistence harvest is likely similar to the commercial harvest; therefore, the Klukshu component of the subsistence harvest represents a very small portion of the total Klukshu River sockeye salmon run.

Canadian aboriginal fishery harvest is monitored by CAFN. The 2011 to 2020 average harvest for the Alsek River was 878 sockeye salmon (Table 2), about a third of which occurred in the Klukshu River.

Sport Fisheries

Alsek River sockeye salmon are not targeted in U.S. sport fisheries. In Canada, recreational fishery effort and harvest of Klukshu River sockeye salmon is low and occurs only when escapement is robust enough to trigger DFO to remove restrictions. Between 2011 and 2020, the recreational fishery was open to retention of sockeye salmon in 2011, 2012, 2017 and 2019, and during these years an average 38 sockeye salmon were harvested (Table 2).

[2] DFO Molecular Genetics Laboratory, Nanaimo, unpublished data.

ENHANCEMENT

There are no enhancement projects in the Alsek River drainage. In May of 2019, several members of the TTC and TBR Panel met in Haines Junction to discuss enhancement with members of the CAFN. Since that meeting, enhancement projects in the Alsek River drainage have not been discussed within the TTC or the TBR Panel.

ESCAPEMENT GOAL EVALUATION

ESCAPEMENT GOAL HISTORY

In 1984, the TTC established an interim Alsek River drainage-wide escapement goal range of 33,000 to 58,000 sockeye salmon, of which 12,000 to 35,000 were expected to enter the Klukshu River (TTC 1990). In 2000, a BEG of 7,500 to 15,000 sockeye salmon was established for the Klukshu River, based on a stock-recruit analysis (Clark and Etherton 2000). In 2013, the Klukshu River sockeye salmon goal was revised to a BEG of 7,500 to 11,000 fish, and an Alsek River drainage-wide BEG of 24,000 to 33,500 fish was established based on a run-reconstruction and stock-recruit analysis (Eggers and Bernard 2011; TTC 2014). The Klukshu River sockeye salmon BEG of 7,500 to 11,000 fish represents the range of spawners predicted to have a 79% to 90% probability of achieving at least 90% of maximum sustained yield.

ESCAPEMENT GOAL RECOMMENDATION

The U.S. and Canada have agreed to implement cooperative abundance-based management programs for Alsek River Chinook and sockeye salmon. As a result, additional research activities including detailed mark–recapture, radiotelemetry, and GSI stock composition analyses are anticipated to occur in the near future. Improved information provided by these programs could lead to future refinement of the Klukhsu River sockeye salmon escapement goal.

STOCK OF CONCERN RECOMMENDATION

Klukshu River sockeye salmon escapements were below the lower bound of the BEG range of 7,500 to 11,000 fish from 2016 to 2018 and in 2020 (Table 1). Conservative management actions have reduced U.S. and Canadian Alsek River sockeye salmon harvests since 2018; nevertheless, in October 2020, the department recommended the board designate the Klukshu River sockeye salmon run as a stock of management concern.

OUTLOOK

Forecasts of Klukshu River sockeye salmon run strength are developed by DFO. The 2021 forecast is for 10,000 sockeye salmon, which is below average (TTC in prep.). The forecast is based on a stock-recruit model using 25+ years of data; however, survival rates of Klukshu River sockeye salmon have been highly variable in recent years, which has reduced accuracy of forecasts.

HABITAT ASSESSMENT

The Klukshu River is a mainland lake system that lies entirely within Canada and the habitat in the Klukshu River watershed is considered pristine and highly influenced by glacial rebound. Although this is a natural phenomenon, river channels are constantly changing affecting salmon runs.

FISHERY MANAGEMENT OVERVIEW AND BACKGROUND

COMMERCIAL FISHERIES OVERVIEW

The Alsek River commercial set gillnet fishery occurs in the surf zone just outside Dry Bay, inside Dry Bay, and in the first 14 miles of the Alsek River (Figure 2). The commercial fishery may open by regulation on the first Sunday of June at 12:01 p.m. (Table 4). Weekly openings begin with a 24-hour open period until the end of July when coho salmon management begins. The fishery is managed using sockeye salmon catch-per-unit-effort (CPUE) information, and when CPUE exceeds the historical average for a given week (indicating high abundance), the fishery is extended for a day. In recent years, the start of the commercial fishery has been delayed or fishing time in initial openings has been reduced (12-hour openings), primarily due to concerns for the Alsek River Chinook salmon run (TTC 2018, 2019), which overlaps the early portion of the sockeye salmon run and Klukshu River sockeye salmon. In 2020, concerns over the Chinook salmon run were lessened due to a promising forecast; the sockeye salmon commercial fishery opened the first Sunday in June but was limited to 12 hours (TTC 2020).

PAST COMMERCIAL FISHERY MANAGEMENT ACTIONS

The Klukshu River is one of many tributaries that contribute to sockeye salmon production in the Alsek River drainage. Commercial fisheries harvest Alsek River sockeye salmon and do not specifically target Klukshu River sockeye salmon. Management of Alsek River sockeye salmon is further complicated by lack of detailed inseason stock assessment information necessary to accurately gauge run strength and take effective management actions. Moreover, specifics on the strength of the Klukshu River sockeye salmon run (e.g., Klukshu weir counts) are not known until well after the stock has passed the lower river and the U.S. commercial fishery. As a result, managers rely on CPUE information gathered in the U.S. commercial fishery and historical GSI stock compositions for inseason management and these tools are less certain, resulting in more conservative management actions overtime.

PAST SUBSISTENCE FISHERY MANAGEMENT ACTIONS

Fishery restrictions have not been implemented in the Alsek River sockeye salmon subsistence fishery. In recent years, sockeye salmon harvests in the U.S. subsistence fishery have been minimal, and the only effort has been from a small number of local users who spend their summers in Dry Bay primarily commercial fishing (Table 2).

The CAFN have traditionally harvested sockeye salmon in the Klukshu River, and its members have only harvested as many sockeye salmon needed to support the community's food needs (Table 2). In most years, the CAFN have not put restrictions on their aboriginal fishery; however, in recent years, when sockeye salmon runs to the Klukshu River were low, they asked members not to fish.

ACTION PLAN MANAGEMENT OPTIONS FOR ADDRESSING STOCK OF CONCERN

ACTION PLAN GOAL

The primary goal of this action plan is to rebuild the Klukshu River sockeye salmon run to consistently achieve the BEG range while providing historical levels of fishing opportunity.

ACTION PLAN RECOMMENDATIONS

A draft action plan was presented to the Board of Fisheries at the March, 2022 meeting in Anchorage as Record Comment 5. The board adopted the department's recommend action which was to take no additional management actions and allow the department to continue managing per the PST. Alsek River fisheries, in both the U.S. and Canada, are managed under provisions of the PST and United States–Canada Salmon Management Plan (5 AAC 33.361). Management actions are included in annual management plans produced by the TTC and reviewed by the TBR Panel in accordance with the PST. There are two U.S. fisheries that harvest Alsek River sockeye salmon: a commercial set gillnet fishery and a subsistence fishery, both of which take place in the lower Alsek River and in and near Dry Bay. The U.S. subsistence fishery has priority, the subsistence harvest has been and is expected to continue to be minimal, and no management actions have been taken nor are recommended to be taken to reduce harvest in the subsistence fishery. Management actions have been taken and will continue to be taken in the U.S. commercial fishery to reduce harvest of Alsek River sockeye salmon and by default Klukshu River sockeye salmon.

CONDITIONS FOR REDUCING MANAGEMENT RESCTRICTIONS OR DELISTING STOCK OF CONCERN

Criteria for removing the stock of concern designation or reducing management restrictions include:

1) If the lower bound of the BEG range is met or exceeded in 3 consecutive years or is met or exceeded in 4 of 6 consecutive years, the department may recommend removing the Klukshu River sockeye salmon run as a stock of management concern at the first Southeast and Yakutat board meeting after this condition is met.

Stock status and action plan performance (including information on harvest rate, distribution, and timing in commercial fisheries) will be updated in a report to the board at the 2024 Southeast and Yakutat meeting.

RESEARCH PLAN

The 2019 Annex of the PST directed the parties to develop and implement a stock assessment project for Alsek River Chinook and sockeye salmon. Funding from the Northern Endowment Fund of the PSC was received in the spring of 2020 to purchase capital for a stock assessment project on the Alsek River. Stock assessment information essential for escapement goal review and management will continue to be collected.

Current Research Projects

1. Commercial Harvest Estimates: Commercial harvest is estimated annually in conjunction with U.S.-Canada GSI studies. This information provides assessment of harvest rates and run timing of Klukshu river sockeye salmon in the commercial fisheries.
2. Klukshu River Weir: The DFO and CAFN will continue to operate the weir annually from approximately June 15 through October 15. Information gathered from this effort, coupled with lower river GSI samples, will be used to estimate Klukshu River and Alsek River sockeye salmon runs on a post season basis.

Future Research Projects

1. Improved Inseason Assessment: Funding was received in the spring of 2020 through Northern Endowment Fund for a pilot project that will set the groundwork to reinstate the Alsek River Chinook and sockeye salmon stock assessment projects that were suspended in 2005. The Alsek River Chinook and sockeye salmon stock assessment project will provide direct measures of inriver abundance, escapement, stock composition (using GSI). and spawning distribution of Chinook and sockeye salmon within the drainage. Benefits of this program will be the manager will have direct estimates of inriver runs size and escapement. Harvest could be maximized while still allowing for escapement and subsistence needs of both the U.S. and Canada.

2. Escapement Goal Review: An escapement goal review would be performed based on new stock assessment information. Information provided by new stock assessment programs could lead to review future refinement of the Klukhsu River sockeye salmon escapement goal.

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TABLES

Table 1.–Klukshu River and Alsek River sockeye salmon escapements, 1976–2020.

Year	Klukshu River			Alsek River Escapement[a]
	Weir Count	Inriver Harvest	Spawning Escapement	
1976	11,691	3,750	7,941	N/A
1977	26,791	11,350	15,441	N/A
1978	26,867	7,850	19,017	N/A
1979	12,311	5,260	7,051	N/A
1980	11,750	900	10,850	N/A
1981	20,348	1,900	18,448	N/A
1982	33,699	4,800	28,899	N/A
1983	20,492	2,475	18,017	N/A
1984	12,727	2,500	10,227	N/A
1985	18,620	1,361	17,259	N/A
1986	24,850	1,914	22,936	N/A
1987	10,504	1,158	9,346	N/A
1988	9,341	1,604	7,737	N/A
1989	23,542	1,906	21,636	N/A
1990	25,995	1,388	24,607	N/A
1991	18,977	1,332	17,645	N/A
1992	19,767	1,498	18,269	N/A
1993	16,740	1,819	14,921	N/A
1994	15,038	1,146	13,892	N/A
1995	20,696	879	19,817	N/A
1996	8,320	429	7,891	N/A
1997	11,496	193	11,303	N/A
1998	13,591	11	13,580	N/A
1999	5,381	280	5,101	N/A
2000	5,551	129	5,422	37,142
2001	10,290	961	9,329	29,987
2002	25,711	2,124	23,587	93,172
2003	34,362	2,242	32,120	100,712
2004	15,348	1,627	13,721	81,581
2005	3,373	206	3,167	57,223
2006	13,455	565	12,890	47,574
2007	8,956	646	8,310	N/A
2008	2,741	0	2,741	N/A
2009	5,731	203	5,528	N/A
2010	18,960	414	18,546	N/A
2011	21,402	620	20,782	83,899
2012	17,694	518	17,176	76,598
2013	3,893	101	3,792	83,771
2014	12,384	236	12,148	87,093
2015	11,588	225	11,363	63,709
2016	7,584	193	7,391	58,836
2017	3,889	178	3,711	101,564
2018	7,143	0	7,143	N/A
2019	19,073	324	18,749	81,883
2020	4,396	109	4,287	13,071

[a] Alsek River sockeye salmon escapement estimates based on abundance estimates generated from mark–recapture studies (2000–2004) and GSI studies (2005–2006, and 2011–2020) and expansions based on abundance of Kluksh River sockeye salmon. Not enough tissue samples were collected to generate an estimate in 2018, and 2020 estimate not yet available.

Table 2.–Alsek River U.S. commercial set gillnet fishery effort (permits fished) and days open, and U.S. and Canadian sockeye salmon harvest, 1963–2020.

Year	U.S. Commercial Permits	U.S. Fishing Days	U.S. Commercial Harvest	U.S. Subsistence Harvest	Canadian Aboriginal fishery	Canadian Recreational Fishery
1963	14	N/A	6,055	N/A	N/A	N/A
1964	14	68	14,127	N/A	N/A	N/A
1965	19	72	28,487	N/A	N/A	N/A
1966	13	68	29,091	N/A	N/A	N/A
1967	14	68	11,108	N/A	N/A	N/A
1968	13	68	26,918	N/A	N/A	N/A
1969	19	60	29,259	N/A	N/A	N/A
1970	16	55	22,654	N/A	N/A	N/A
1971	15	61	25,314	N/A	N/A	N/A
1972	12	62	18,717	N/A	N/A	N/A
1973	27	51	26,523	N/A	N/A	N/A
1974	36	46	16,747	N/A	N/A	N/A
1975	14	58	13,842	N/A	N/A	N/A
1976	14	57	19,741	51	4,000	600
1977	14	55	40,780	113	10,000	500
1978	22	57	50,580	N/A	8,000	500
1979	30	49	41,449	35	7,000	750
1980	40	42	25,522	41	800	600
1981	21	40	23,641	50	2,000	808
1982	25	34	27,443	75	5,000	755
1983	14	40	18,293	25	2,550	732
1984	N/A	N/A	14,326	N/A	2,600	289
1985	26	32	5,792	95	1,361	100
1986	43	34	24,791	241	1,914	307
1987	32	41	11,393	173	1,158	383
1988	31	34	6,286	148	1,604	322
1989	31	38	13,513	131	1,851	319
1990	33	38	17,013	144	2,314	392
1991	32	49	17,542	104	2,111	303
1992	30	46	19,298	37	2,592	582
1993	36	40	20,043	96	2,361	329
1994	32	61	19,716	47	1,745	261
1995	40	54	33,112	167	1,745	682
1996	31	52	15,182	67	1,204	157
1997	33	59	25,879	273	484	36
1998	26	41	15,007	158	567	18
1999	20	44	11,441	152	554	0
2000	19	11	9,522	146	745	0

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Table 2.–Page 2 of 2.

Year	U.S. Commercial Permits	U.S. Fishing Days	U.S. Commercial Harvest	U.S. Subsistence Harvest	Canadian Aboriginal fishery	Canadian Recreational Fishery
2001	14	17	13,995	72	1,173	4
2002	16	17	16,918	232	2,194	61
2003	15	27	39,698	176	2,734	61
2004	24	16	18,030	224	1,875	247
2005	19	12	7,572	63	581	13
2006	19	17	9,842	272	1,321	6
2007	21	20	19,795	298	1,330	10
2008	19	8	2,815	200	0	0
2009	17	14	12,906	252	715	2
2010	19	9	12,668	259	1,704	12
2011	17	18	24,169	230	2,053	57
2012	16	15	18,217	275	1,734	52
2013	15	13	7,517	147	508	0
2014	15	20	33,668	179	1,140	0
2015	19	15	16,104	163	1,084	0
2016	18	10	6,709	181	815	0
2017	13	13	4,883	125	584	38
2018	10	5.5	1,363	142	0	0
2019	12	13.5	9,787	229	648	5
2020	13	8.5	2,518	188	218	0
1963–2020 Avg.	22	37	18,540	151	1,970	229
2011–2020 Avg.	15	13	12,494	186	878	15

Table 3.–Estimated weekly proportions of Klukshu River sockeye salmon in the U.S. commercial set gillnet fishery harvests in the lower Alsek River, 2011–2019 (DFO Molecular Genetics Laboratory, Nanaimo, unpublished data).

Year	Statistical Week	Total U.S. Commercial Harvest	Sample Size	Estimated Klukshu Proportion	Standard Deviation	Estimated Klukshu Harvest	Lower Estimate	Upper Estimate
2011	23	0	0	0.0%	0	0	0	0
2011	24	998	85	1.5%	1.9	15	13	17
2011	25	589	84	1.5%	1.9	9	7	11
2011	26	498	84	1.5%	1.9	7	5	9
2011	27	2,171	84	1.5%	1.9	33	30	34
2011	28	6,467	100	24.5%	5.4	1,585	1,568	1,579
2011	29	7,167	80	48.8%	7.1	3,498	3,466	3,481
2011	30	4,604	80	40.4%	6.3	1,860	1,841	1,853
2011	31	1,373	80	40.4%	3.7	555	547	555
2011	32	301	71	40.4%	3.7	122	117	124
	Total	24,169		31.8%		7,682		
2012	23	122	69	1.8%	3.3	2	0	5
2012	24	1,533	91	2.4%	2.9	37	33	39
2012	25	2,495	80	4.1%	4.9	102	96	106
2012	26	2,594	100	17.3%	5.6	449	438	449
2012	27	4,214	100	15.2%	5.3	640	627	638
2012	28	4,813	80	35.0%	7.5	1,685	1,657	1,672
2012	29	991	80	35.4%	6.4	351	340	353
2012	30	1,095	39	46.4%	9.1	508	493	511
2012	31	213	40	20.0%	9.3	43	33	51
2012	32	147	38	2.0%	2.9	3	0	6
	Total	18,216		21.0%		3,819		
2013	23	163	80	0.1%	0.4	0	0	1
2013	24	680	100	0.1%	0.4	1	0	1
2013	25	511	80	0.6%	1.6	3	1	5
2013	26	457	84	1.6%	2.2	7	5	9
2013	27	667	96	0.9%	1.5	6	4	7
2013	28	727	80	2.2%	3.1	16	13	19
2013	29	1,021	80	5.5%	6.2	56	49	62
2013	30	930	39	12.7%	7.1	118	109	124
2013	31	144	23	1.0%	1.2	1	0	3
2013	32	2,216	23	1.0%	1.2	22	21	23
	Total	7,516		3.1%		231		

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Table 3.–Page 2 of 3.

Year	Statistical Week	Total U.S. Commercial Harvest	Sample Size	Estimated Klukshu Proportion	Standard Deviation	Estimated Klukshu Harvest	Lower Estimate	Upper Estimate
2014	23	2,534	80	0.2%	0.9	5	4	6
2014	24	3,193	74	0.2%	1	6	5	7
2014	25	6,963	76	0.7%	1.8	49	47	51
2014	26	1,371	100	3.6%	3.2	49	46	53
2014	27	6,077	75	23.4%	6.9	1,422	1,415	1,429
2014	28	1,036	0	ND	ND	ND	ND	ND
2014	29	1,157	80	35.9%	6.5	415	409	422
2014	30	6,968	57	15.5%	3.1	1,080	1,073	1,080
2014	31	4,145	57	15.5%	3.1	643	637	644
2014	32	241	0	ND	ND	ND	ND	ND
	Total	33,685		10.9%		3,669		
2015	23	0	0	0.0%	0	0	0	0
2015	24	382	0	ND	ND	ND	ND	ND
2015	25	822	0	ND	ND	ND	ND	ND
2015	26	2,434	0	ND	ND	ND	ND	ND
2015	27	1,727	0	ND	ND	ND	ND	ND
2015	28	5,160	77	11.7%	5.8	604	596	608
2015	29	747	80	16.4%	6.2	122	116	128
2015	30	695	68	30.2%	7.1	210	202	216
2015	31	2,128	80	39.5%	7.5	841	831	846
2015	32	2,008	60	8.6%	4.5	173	168	177
	Total	16,104		12.1%		1,949		
2016	23	0	0	0.0%	0	0	0	0
2016	24	140	12	0.4%	3.9	1	0	4
2016	25	825	40	0.2%	1.4	2	0	3
2016	26	1,101	80	1.1%	2.3	12	9	14
2016	27	835	80	14.5%	4.7	121	113	122
2016	28	1,234	120	10.1%	4.3	125	116	125
2016	29	1,198	79	24.8%	6.1	297	282	294
2016	30	377	80	22.8%	6.2	86	77	89
2016	31	706	80	24.3%	5.9	172	160	172
2016	32	293	40	39.6%	10	116	102	122
	Total	6,709		13.9%		931		

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Table 3.–Page 3 of 3.

Year	Statistical Week	Total U.S. Commercial Harvest	Sample Size	Estimated Klukshu Contribution	Standard Deviation	Estimated Klukshu Harvest	Lower Estimate	Upper Estimate
2017	23	271	20	0.6%	3.2	2	0	5
2017	24	287	20	0.6%	3.2	2	0	5
2017	25	643	40	0.2%	1.6	1	0	3
2017	26	938	156	1.7%	1.7	16	0	17
2017	27	743	0	0.0%	0	0	0	0
2017	28	313	81	6.5%	3.8	20	0	24
2017	29	341	80	18.6%	6.3	63	0	69
2017	30	394	0	0.0%	0	0	0	0
2017	31	876	74	2.5%	2.7	22	0	24
2017	32	76	0	0.0%	0	0	0	0
	Total	4,882		2.6%		126		
2018	23	0	0	0.0%	0	0	0	0
2018	24	0	0	0.0%	0	0	0	0
2018	25	59	10	23.2%	15.4	14	0	29
2018	26	323	50	10.8%	5.9	35	29	41
2018	27	0	0	0.0%	0	0	0	0
2018	28	399	120	48.4%	5.5	193	187	198
2018	29	0	0	0.0%	0	0	0	0
2018	30	473	110	52.0%	5.8	246	239	251
2018	31	86	28	23.9%	9.4	21	11	30
2018	32	22	12	1.7%	5.2	0	0	6
	Total	1,363		37.4%		509		
2019	23	0	0	0.0%	0	0	0	0
2019	24	0	0	0.0%	0	0	0	0
2019	25	507	98	24.7%	7.6	125	117	132
2019	26	2,115	120	7.4%	3.8	157	152	159
2019	27	1,622	117	20.3%	5.4	329	322	333
2019	28	2,749	119	11.5%	3.6	316	311	318
2019	29	2,414	116	38.8%	4.9	937	927	936
2019	30	315	80	53.9%	6.3	170	162	175
2019	31	12	0	0.0%	0	0	0	0
2019	32	54	53	8.4%	4	5	1	9
	Total	9,787		20.8%		2,038		

Table 4.–Alsek River commercial set gillnet fishery days open during sockeye salmon season by statistical week, 2011–2020.

Year	Statistical Week	Opening date	Closing date	Days Open
2011	24	5-Jun	7-Jun	2
	25	12-Jun	13-Jun	1
	26	19-Jun	20-Jun	1
	27	26-Jun	28-Jun	2
	28	3-Jul	6-Jul	3
	29	10-Jul	13-Jul	3
	30	17-Jul	20-Jul	3
	31	24-Jul	26-Jul	2
	32	31-Jul	1-Aug	1
2012	23	3-Jun	4-Jun	1
	24	10-Jun	12-Jun	2
	25	17-Jun	19-Jun	2
	26	24-Jun	26-Jun	2
	27	1-Jul	3-Jul	2
	28	8-Jul	10-Jul	2
	29	15-Jul	16-Jul	1
	30	22-Jul	23-Jul	1
	31	29-Jul	30-Jul	1
	32	5-Aug	6-Aug	1
2013	23	2-Jun	3-Jun	1
	24	9-Jun	10-Jun	1
	25	16-Jun	17-Jun	1
	26	23-Jun	24-Jun	1
	27	30-Jun	1-Jul	1
	28	7-Jul	8-Jul	1
	29	14-Jul	15-Jul	1
	30	21-Jul	22-Jul	1
	31	28-Jul	30-Jul	2
	32	4-Aug	7-Aug	3

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Table 4.–Page 2 of 3.

Year	Statistical Week	Opening date	Closing date	Days Open
2014	23	1-Jun	3-Jun	2
	24	8-Jun	10-Jun	2
	25	15-Jun	18-Jun	3
	26	22-Jun	23-Jun	1
	27	29-Jun	2-Jul	3
	28	6-Jul	7-Jul	1
	29	13-Jul	14-Jul	1
	30	20-Jul	23-Jul	3
	31	27-Jul	30-Jul	3
	32	3-Aug	4-Aug	1
2015	24	7-Jun	8-Jun	1
	25	14-Jun	15-Jun	1
	26	21-Jun	23-Jun	2
	27	28-Jun	29-Jun	1
	28	5-Jul	8-Jul	3
	29	12-Jul	13-Jul	1
	30	19-Jul	20-Jul	1
	31	26-Jul	29-Jul	3
	32	2-Aug	4-Aug	2
2016	24	5-Jun	6-Jun	1
	25	12-Jun	13-Jun	1
	26	19-Jun	20-Jun	1
	27	26-Jun	27-Jun	1
	28	3-Jul	4-Jul	1
	29	10-Jul	11-Jul	1
	30	17-Jul	18-Jul	1
	31	24-Jul	26-Jul	2
	32	31-Jul	1-Aug	1
2017	23	4-Jun	5-Jun	1
	24	11-Jun	12-Jun	1
	25	18-Jun	19-Jun	1
	26	25-Jun	26-Jun	1
	27	2-Jul	3-Jul	1
	28	9-Jul	10-Jul	1
	29	16-Jul	17-Jul	1
	30	23-Jul	25-Jul	2
	31	30-Jul	1-Aug	2
	32	6-Aug	8-Aug	2

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Table 4.–Page 3 of 3.

Year	Statistical Week	Opening date	Closing date	Days Open
2018	23	Fishery Delayed		0
	24	Fishery Delayed		0
	25	17-Jun	18-Jun	1
	26	24-Jun	25-Jun	1
	27	Closed		0
	28	8-Jul	8-Jul	0.5
	29	Closed		0
	30	22-Jul	23-Jul	1
	31	29-Jul	30-Jul	1
	32	5-Aug	6-Aug	1
2019	23	Fishery Delayed		0
	24	Fishery Delayed		0
	25	16-Jun	17-Jun	1
	26	23-Jun	24-Jun	1
	26B	25-Jun	25-Jun	0.5
	27	30-Jun	2-Jul	2
	28	7-Jul	8-Jul	1
	28B	9-Jul	10-Jul	1
	29	14-Jul	16-Jul	2
	30	21-Jul	22-Jul	1
	31	28-Jul	30-Jul	2
	32	4-Aug	6-Aug	2
2020	24	7-Jun	7-Jun	0.5
	25	13-Jun	13-Jun	1
	26	21-Jun	21-Jun	1
	27	28-Jun	28-Jun	1
	28	5-Jul	5-Jul	1
	29	12-Jul	12-Jul	1
	30	19-Jul	19-Jul	1
	31	26-Jul	26-Jul	1
	32	2-Aug	2-Aug	1

Note: Fishery delayed means that fishery was closed for Chinook salmon conservation.

FIGURES

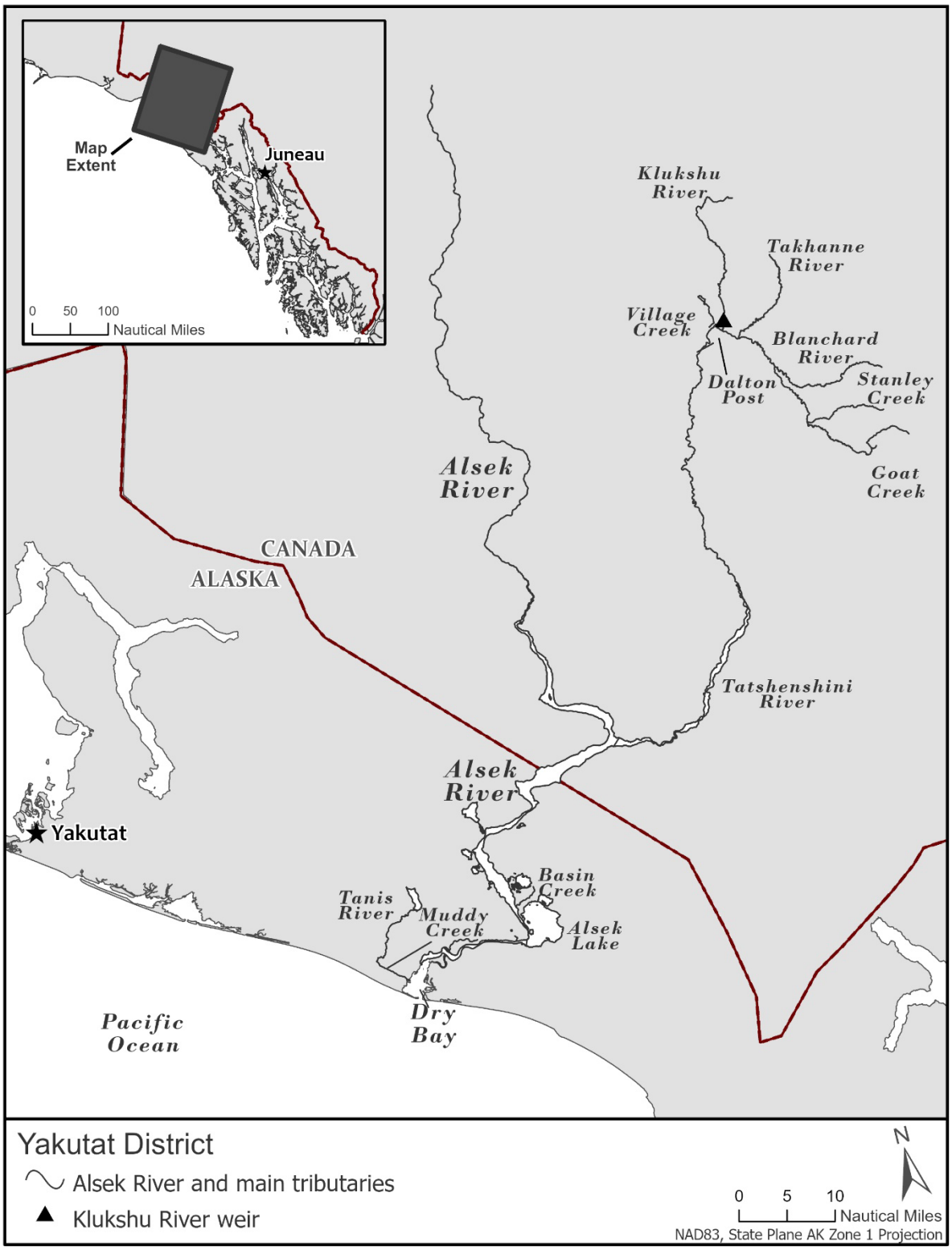

Figure 1.–Alsek River Drainage.

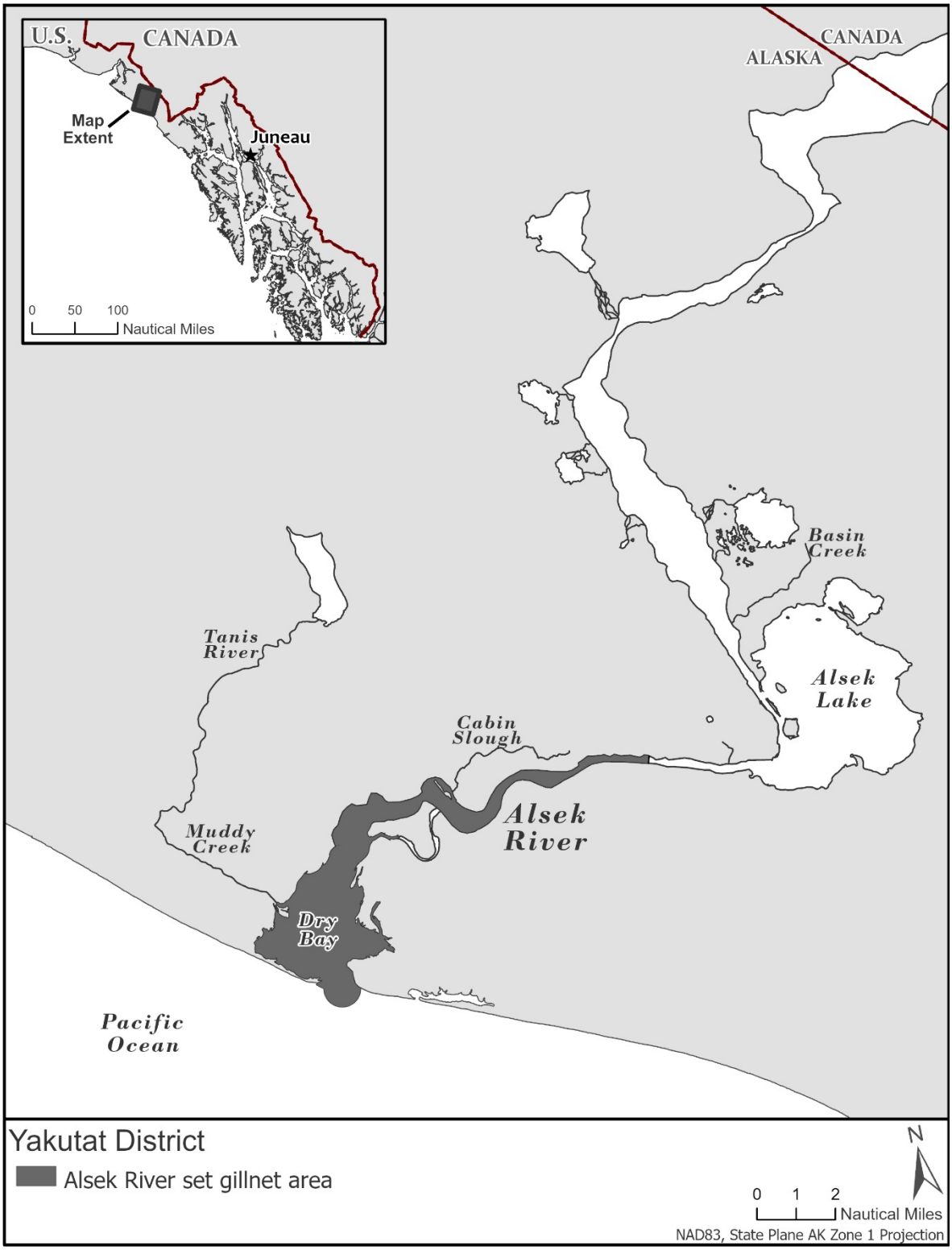

Figure 2.–U.S. portion of Alsek River and set gillnet fishery location.

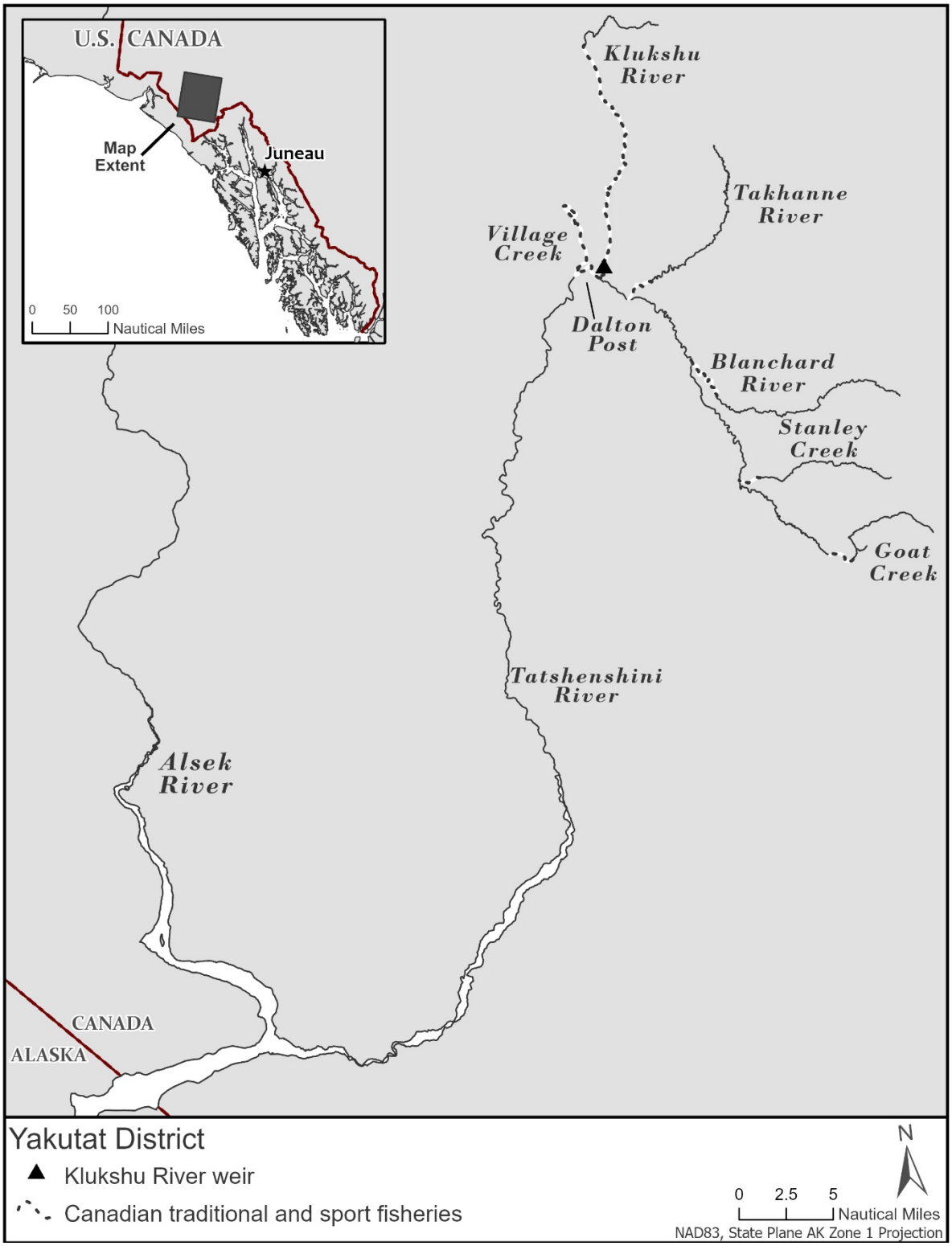

Figure 3.–Canadian portion of Alsek River and traditional food and sport fishing locations.