

RC7 Report to the Alaska Board of Fisheries

DRAFT–Stikine River and Andrew Creek King Salmon Stock Status and Action Plan, 2021

By

Paul G. Salomone

Kristin R. Courtney

Grant T. Hagerman

Patrick A. Fowler

and

Philip J. Richards

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics <i>all standard mathematical signs, symbols and abbreviations</i>	
meter	m	at	@		
milliliter	mL				
millimeter	mm	compass directions:			
		east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	e
		south	S	catch per unit effort	CPUE
		west	W	coefficient of variation	CV
		copyright	©	common test statistics	(F, t, χ^2 , etc.)
		corporate suffixes:		confidence interval	CI
		Company	Co.	correlation coefficient	
		Corporation	Corp.	(multiple)	R
		Incorporated	Inc.	correlation coefficient	
		Limited	Ltd.	(simple)	r
		District of Columbia	D.C.	covariance	cov
		et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia		expected value	E
		(for example)	e.g.	greater than	>
		Federal Information		greater than or equal to	≥
		Code	FIC	harvest per unit effort	HPUE
		id est (that is)	i.e.	less than	<
		latitude or longitude	lat. or long.	less than or equal to	≤
		monetary symbols		logarithm (natural)	ln
		(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
		figures): first three		minute (angular)	'
		letters	Jan,...,Dec	not significant	NS
		registered trademark	®	null hypothesis	H ₀
		trademark	™	percent	%
		United States		probability	P
		(adjective)	U.S.	probability of a type I error	
		United States of		(rejection of the null	
		America (noun)	USA	hypothesis when true)	α
		U.S.C.	United States	probability of a type II error	
			Code	(acceptance of the null	
		U.S. state	use two-letter	hypothesis when false)	β
			abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
				standard error	SE
				variance	
				population	Var
				sample	var
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	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

REPORT TO THE ALASKA BOARD OF FISHERIES

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By

Paul G. Salomone

Alaska Department of Fish and Game, Division of Commercial Fisheries, Petersburg

Grant T. Hagerman

Alaska Department of Fish and Game, Division of Commercial Fisheries, Sitka

Phillip J. Richards and Kristin R. Courtney

Alaska Department of Fish and Game, Division of Sport Fish, Douglas

and

Patrick A. Fowler

Alaska Department of Fish and Game, Division of Sport Fish, Petersburg

Alaska Department of Fish and Game
Division of Commercial Fisheries, Publications Section
802 3rd, Douglas, Alaska, 99824-0020

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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 Stikine River and Andrew Creek stocks of king salmon (*Oncorhynchus tshawytscha*) be designated as stocks of “management concern.” 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.” Escapements of Stikine River king salmon have fallen below the lower bound of the existing BEG (14,000 to 28,000 fish) each of the last 5 years (2016 to 2020). Since 2016, the department has implemented conservative management measures that have been effective in reducing the harvest of Stikine River king salmon. Andrew Creek is a tributary to the Stikine River located entirely within Alaska. King salmon escapements to Andrew Creek have been below the BEG (650 to 1,500 fish) in 4 of the previous 5 years. It is assumed actions that have reduced the harvest of Stikine River king salmon have also reduced harvest of Andrew Creek king salmon.

Key words: king salmon, *Oncorhynchus tshawytscha*, Stikine River, Andrew Creek, Southeast Alaska, stock of concern, fishing, sustainable salmon fisheries policy, Alaska Board of Fisheries.

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. Herein, the Stikine River and Andrew Creek stocks of king salmon *Oncorhynchus tshawytscha* will be referred to as Stikine River king salmon and Andrew Creek king salmon, respectively.

In October 2020, the department recommended that the board designate Stikine River and Andrew Creek king salmon as stocks of “management concern” at the 2021 cycle regulatory meeting for the Southeast Alaska (SEAK) and Yakutat Management Area. The Stikine River escapement goal was established for fish that spawn entirely in Canada. Andrew Creek is a major king salmon producing tributary to the Stikine River located entirely within Alaska. Andrew Creek and Stikine River king salmon are genetically distinct and are designated as separate stocks. The stock of concern recommendations were 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.” Stikine River king salmon escapements were below the lower bound of the BEG range of 14,000 to 28,000 large fish (king salmon ≥ 660 mm mid eye to tail fork length; primarily fish age 1.3 and older) for the past 5 consecutive years (2016 to 2020). Andrew Creek king salmon escapements were below the lower bound of the BEG range of 650 to 1,500 large fish for 4 out of the past 5 years (2016, 2017, 2018, and 2020). In 2019, the Andrew Creek king salmon escapement of 698 fish was within the escapement goal range.

The Stikine River originates in Canada and only 2% of the drainage is located within Alaska (Beak Consultants Limited 1981). Management of shared fishery stocks is conducted on a cooperative basis under the auspices of the Pacific Salmon Treaty (PST) negotiated between the 2 countries. The latest treaty agreement was finalized in 2018 and implemented in 2019, and it will be in effect through 2028. Stikine River and Andrew Creek king salmon runs are managed as an aggregate due

to their close proximity and similar terminal migration routes and run timing, with Andrew Creek fish arriving slightly later than Stikine River fish.

Poor production and declines of king salmon runs over at least the past decade have been well documented throughout much of the species' range (ADFG 2013). Declines in survival rates and abundance of SEAK stocks have persisted since 2007. Although freshwater factors may be contributing to these declines, the wide geographic scope of the effect suggests poor production stems from factors in the ocean. This idea is supported by information produced through the department's SEAK king salmon stock assessment program, which includes estimating both freshwater and marine survival rates for 4 wild king salmon stocks originating in the Chilkat, Taku, Stikine, and Unuk rivers. The long times series of detailed stock assessment information available for these stocks, including survival rates, is unique to the SEAK program, and is not available for wild king salmon stocks found elsewhere along the coast. Freshwater survival rates of these 4 SEAK king salmon indicator stocks have fluctuated similarly over time and do not show long-term trends; however, marine survival rates for these same stocks have severely declined and are currently far below prior long-term averages.

This action plan provides the department's assessment of Stikine River and Andrew Creek king salmon as stocks 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 for king salmon escapement goals in these systems. The plan outlines potential management actions for sport, commercial, and personal use fisheries, as well as research projects for these stocks. Criteria that must be met for future removal of the stock of concern designation are also described.

This action plan is being presented to the board and public as a final review draft at the 2022 Alaska Board of Fisheries meeting on Southeast and Yakutat Finfish and Shellfish. Immediately following the meeting, the department will finalize this report and include descriptions of management measures or recommendations from the board related to the Stikine River and Andrew Creek king salmon stocks of concern. The final action plan will be published in the ADF&G Regional Informational Report series in 2022.

STOCK ASSESSMENT BACKGROUND

STIKINE RIVER

The Stikine River is a glacial, transboundary river system that supports an outside rearing stock of king salmon (i.e., the ocean phase is spent in waters outside of SEAK). The Stikine River originates in British Columbia and drains over 52,000 km² (~20,000 mi²) (Bigelow et al. 1995), much of which is inaccessible to anadromous fish because of natural barriers. The lower portion of the Stikine River flows approximately 56 km (~35 mi) through Alaska, and the Alaska portion of the drainage represents only 2% of the total drainage (Beak Consultants Limited 1981). The Stikine River enters the ocean in District 8, at the easternmost extreme of Sumner Straits and Frederick Sound, near Wrangell and Petersburg, Alaska (Figure 1). Stikine River king salmon spawn entirely in Canada and are managed through provisions of Chapter 1 of the PST. The department manages Stikine River king salmon in accordance with the PST and as required by the *United States-Canada Salmon Management Plan* (5 AAC 33.361). Per the PST, annual run size and terminal harvest estimates of Stikine River king salmon are developed from inriver escapement surveys, mark-recapture projects, and genetic stock identification analyses. Stikine River king salmon begin to enter SEAK waters in late March/early April; reach District 8 in late April/early May, and the run

continues through mid-July. Per the PST, the king salmon accounting period is through statistical week (SW) 29 (approximately mid-July) in the District 8 terminal area.

The Stikine River king salmon run is 1 of 4 SEAK king salmon stocks for which a full stock assessment program is conducted annually. Full stock assessment programs include coded-wire-tagging of juveniles, which, in combination with adult monitoring and sampling programs, provides estimates of smolt abundance, parr to smolt overwinter survival rates, marine survival rates (smolt-adult), total annual run size (escapement plus harvest by age), and total return, along with estimates of harvest (calendar year) and exploitation (brood year) rates. Coded-wire-tagging of juvenile Stikine River king salmon (1978–1981 and 2000 to present) is conducted jointly by the department and Fisheries and Oceans Canada (DFO).

Escapement

The Stikine River is 1 of 11 king salmon indicator stocks in SEAK that are monitored annually to estimate escapements of large fish. Total escapement was estimated using mark–recapture techniques from 1996 to present. In all prior years, Stikine River king salmon escapements were estimated from expanded peak aerial survey index counts or expanded king salmon counts at the Little Tahltan River weir (the Little Tahltan River is a Canadian tributary of the Stikine River). Since 1996, Stikine River king salmon escapements averaged 24,450 large fish; however, the recent 10-average escapement of 15,000 fish and recent 5-year average escapement of 10,000 fish are substantially lower than the long-term average, and escapements have been below the BEG range for 5 consecutive years since 2016 (Table 1).

From 1996 to 2020, king salmon escapements at the Little Tahltan weir averaged 6,200 large fish and represented 1% to 34% of the total Stikine River king salmon escapement. Over the past 10 years, king salmon escapement at the Little Tahltan weir averaged only 900 fish (an average 6% of the total Stikine River king salmon escapement), and escapements have been below the Canadian Little Tahltan River escapement goal of 2,700 to 5,300 large fish for 14 consecutive years.

Harvest

Wild king salmon juveniles (smolt 1978, and parr 1979–1981) were coded-wire-tagged from 1978 to 1981 and smolt from 2000 to present. Coded wire tag (CWT) recoveries of adult Stikine River king salmon show that they are harvested throughout SEAK in commercial and sport fisheries during their spawning migration in late winter and spring (March to June), though most of the fish enter SEAK waters through Chatham and Sumner Straits (Figure 1). Small numbers are also harvested in federally managed subsistence fisheries in the freshwaters of the U.S. portion of the Stikine River. In addition, Stikine River king salmon are harvested in Canadian inriver commercial, recreational (sport), and First Nation food (subsistence) fisheries.

Beginning in 2005, in years when a surplus of Stikine River king salmon production existed, directed king salmon fisheries were allowed in the marine waters in District 8 near Petersburg and Wrangell. Directed commercial and liberalized sport fisheries were implemented between 2005 and 2009; directed subsistence fishing for king salmon under state regulations is prohibited in SEAK. Limited directed king salmon fisheries also occurred in District 8 in 2011, 2012, 2015, and 2016. Total harvest rates during these years averaged about 50%, whereas harvest rates in other years averaged about 20%, and most of that harvest occurred in the late winter and spring commercial troll fisheries (mid-March through June), District 8 terminal fisheries (commercial

drift gillnet and sport fisheries), and in Canadian inriver fisheries (commercial gillnet, recreation, and First Nations food fisheries). Due to conservation concerns, District 8 terminal and spring troll fisheries were restricted from 2016 to 2020, and the harvest rate was reduced to less than 1% in 2018, 1% in 2019, and 2% in 2020 (Table 2).

Over the recent 10-year period from 2011 to 2020, the harvest rate on Stikine River king salmon in all Alaska fisheries combined averaged 14% (range 0-24%; Table 2). Average harvest rates by fishery during that period were 6% in commercial troll, 4% in commercial net (drift gillnet and purse seine), and 4% in sport fisheries. Commercial troll fisheries are divided into winter, spring, and summer fishing periods and, until recently, most commercial troll harvest of Stikine River king salmon occurred in the spring fishery. Management measures implemented in recent years to reduce harvest of Stikine River king salmon included closing the spring troll fishery and not allowing retention of king salmon in District 8 during the summer troll opening. Harvest in the sport fishery occurs primarily from May through July. Since 2017, however, retention of king salmon in the District 8 sport fishery has been prohibited from April 1 through July 14.

The terminal subsistence harvest accounts for the smallest percentage of the total U.S. harvest of Stikine River king salmon. The annual subsistence harvest averaged only 31 large king salmon over the past 10 years (2011–2020) and 16 large king salmon over the past 5 years (2016–2020; Table 1).

ANDREW CREEK

Andrew Creek is a clearwater tributary that flows into the lower Stikine River near the upper limit of tidal influence (Figure 2). The drainage, which includes 2 main tributaries, is located entirely within Alaska and covers about 200 km² (~77 mi²). Only a small portion of the north fork of Andrew Creek is accessible to salmon, and most king salmon spawn in the south fork. A weir was operated at Andrew Creek from 1976 to 1984 and in 1997 and 1998 to provide measures of escapement and to provide brood stock for hatcheries. Standardized foot and aerial surveys to count king salmon have been conducted annually since 1985, and escapement estimates are developed annually from expanded foot or aerial surveys.

Andrew Creek king salmon are genetically and behaviorally different from Stikine River king salmon. Andrew Creek king salmon predominately rear in inside waters of SEAK, while Stikine River king salmon predominately rear in waters outside of SEAK (Richards et al. 2018). Run timing is also slightly later for Andrew Creek king salmon (Courtney et al. *in prep*) and is expected to be similar to that observed for the Unuk River king salmon run, which is also an inside-rearing stock. It could be expected that approximately 75% of Andrew Creek king salmon will have passed through terminal marine fisheries and entered freshwater by July 14. Andrew Creek king salmon are believed to enter the Stikine River primarily through Sumner Strait; however, since Andrew Creek king salmon are primarily inside rearing, their migration route is not as well defined as Stikine River fish, which migrate from the Gulf of Alaska. Andrew Creek king salmon are the broodstock for most hatchery-produced king salmon in SEAK.

Escapement

Andrew Creek king salmon escapement estimates are germane to large spawners and are based on expanded foot or aerial survey counts. An expansion factor of 1.95 is used to account for fish not observed during surveys. This expansion factor was developed based on the relationship between 5 years of paired weir and survey counts (Clark et al. 1998).

Since 1996, escapements averaged 1,150 large fish; however, the recent 10-year average escapement of 690 fish and the recent 5-year average escapement of 480 fish are substantially lower than the long-term average. From 1996 to 2015, Andrew Creek escapements met or exceeded the BEG range in all years except 1997, 1999, and 2012. From 2016 to 2020, Andrew Creek escapements failed to achieve the lower bound of the BEG in 4 of 5 years, despite restrictive actions taken since 2017 to reduce king salmon harvest in sport and commercial fisheries (Table 1).

Harvest

Andrew Creek king salmon are harvested in various commercial and sport fisheries throughout SEAK. Directed Stikine River king salmon fisheries occurred in District 8 from 2005 to 2009, and in 2011, 2012, 2015, and 2016. Presumably, these directed fisheries increased harvest rates on Andrew Creek king salmon; however, since these fish are not coded-wire-tagged it was not possible to generate estimates of harvest. Also, since Andrew Creek is a significant source of king salmon broodstock in SEAK hatcheries, genetic stock identification methods cannot be used to distinguish wild Andrew Creek king salmon from hatchery king salmon produced from Andrew Creek broodstock. Instead, when sample sizes are adequate, researchers have used genetics to distinguish Andrew Creek king salmon (wild and hatchery stocks combined) from other stocks in mixed stock harvests; estimated contributions of Andrew Creek origin hatchery fish (based on CWT recoveries) are then subtracted and the remainder by default are wild Andrew Creek king salmon. Although this is a novel approach to estimating harvest, it is data limited and requires robust fishery sampling rates to be viable.

ESCAPEMENT GOAL EVALUATION

The *Policy for Statewide Salmon Escapement Goals* (SSEGP; 5 AAC 39.223), adopted by the board in 2001, established the formal process for setting escapement goals. Prior to this the department followed its *Salmon Escapement Goal Policy* adopted in 1992 that established a formal process to set, evaluate, and modify existing escapement goals (Fried 1994). The SSEGP and the SSFP require the department to report on salmon stock status and escapement goals to the board on a regular basis, document and review existing salmon escapement goals, establish goals for stocks for which escapement can be reliably measured, and prepare scientific analyses with supporting data when goals are created, modified, or recommended for elimination.

STIKINE RIVER

In 1999, ADF&G established a BEG range of 14,000 to 28,000 large king salmon for the Stikine River based on a spawner-recruit analysis by Bernard et al. (2000). The goal was reviewed by the Pacific Salmon Commission's (PSC) Chinook Technical Committee in 1999 and subsequently agreed to by the PSC. Several drainagewide or index goals previously developed by the U.S. and Canada under the PST were based on limited available data and professional judgement.

ANDREW CREEK

In 1985, ADF&G established an escapement goal of 750 large fish. The current BEG range of 650 to 1,500 large spawners was established in 1998, based on a stock-recruit analysis by Clark et al. (1998).

ESCAPEMENT GOAL RECOMMENDATION

The department has reviewed salmon escapement goals every 3 years prior to the Southeast and Yakutat board meeting and recommended no changes to the Stikine River king salmon escapement goal since 2000 (Bernard et al. 2000) or the Andrew Creek king salmon escapement goal since 1998 (Clark et al. 1998).

STOCK OF CONCERN RECOMMENDATION

Conservative management actions have been taken each year since the 2016 fishing season to reduce harvests of Stikine River king salmon and pass fish to escapement. These actions have certainly also reduced harvest of Andrew Creek king salmon, due to their close proximity and overlap in run timing. While these efforts have been successful in reducing harvest rates, king salmon production has fallen to such low levels that escapements have been below the Stikine River BEG in 5 of the past 5 years and below the Andrew Creek BEG in 4 of the past 5 years. Therefore, during the October 2020 board work session, the department recommended that the board designate Stikine River and Andrew Creek king salmon runs as stocks of management concern.

OUTLOOK

The department produces preseason forecasts for the total Situk, Chilkat, Taku, Stikine, and Unuk River king salmon runs by December 1 of each year. The Stikine River king salmon forecast uses sibling models in which the 2018 and 2019 estimated total returns from brood years 2015 and 2016 were used to predict the returns of age-5 (BY2016) and age-6 (BY2015) fish in 2021. The forecast uses the relationships observed in Stikine River king salmon age classes and returns over the most recent 9 years. The 2021 Stikine River forecast is for a total run of 9,900 large fish, which is below the lower bound of the BEG range of 14,000 to 28,000 large spawners. Due to limited stock assessment data, run forecasts are not produced for Andrew Creek king salmon.

HABITAT ASSESSMENT

STIKINE RIVER

The Stikine River drainage is the largest transboundary system in British Columbia and SEAK, covering an area of about 52,000 km²; however, only around 15,000 km² are accessible to anadromous fish due to a large canyon that creates a natural barrier upstream of the confluence of the Tuya and Stikine Rivers. The mouth of the Stikine River is located near the communities of Wrangell and Petersburg in SEAK. The Stikine River has many clear water tributaries, though the drainage is predominately glacially influenced. Major anadromous tributaries of the Stikine River include the Tahltan, Tuya, Chutine, Scud, Porcupine, and Iskut Rivers. Most of the accessible king salmon spawning habitat in the Stikine River drainage is in the Tahltan River and its tributaries, though major spawning populations are present in the Chutine and Iskut rivers. The upper portion of the Stikine River drainage is road accessible via the Telegraph Creek Road and the Stewart Cassiar Highway (Figure 2).

In 2014, a landslide occurred on the lower Tahltan River, a major Stikine River tributary that supports the largest population of king salmon in the Canadian portion of the drainage. The landslide created a partial impediment to fish movement during high flows but did not completely prevent upstream fish passage. DFO took steps to modify the slide so that the obstruction might

be cleared during a high-water event. Unfortunately, from 2017 to 2019, the region experienced a series of drier than usual conditions and low precipitation that did not provide enough flow to move the debris downriver; however, the low flows allowed for unimpeded fish passage. In 2020, high water flows succeeded in moving a substantial portion of slide debris downriver, which improved conditions for fish passage.

ANDREW CREEK

Andrew Creek king salmon spawn entirely within the U.S. portion of the Stikine River watershed and this population is genetically distinct from Stikine River king salmon. The Andrew Creek watershed is generally intact with no serious habitat issues.

FISHERY MANAGEMENT OVERVIEW AND BACKGROUND

PACIFIC SALMON TREATY

Stikine River king salmon are managed through provisions of Chapter 1 of the Pacific Salmon Treaty. The department manages the Stikine River king salmon run in accordance with the PST and as required by the *United States-Canada Salmon Management Plan* (5 AAC 33.361). Per the PST, annual run size and terminal harvest estimates of Stikine River king salmon are developed from inriver escapement surveys, mark–recapture projects, and genetic stock identification (GSI) analysis. The PST directs both countries to take actions necessary to ensure that escapement goals are achieved. Paragraph 4 of Chapter 1 outlines steps to be taken by both countries if escapement goals are not achieved in 3 consecutive years. Management actions in Canadian fisheries and Alaska District 8 terminal fisheries are reviewed prior to the season and resultant harvest and escapement are reviewed postseason by the Transboundary Rivers (TBR) Panel. Early season management actions are predicated on preseason forecasts of run size and are evaluated and then adjusted weekly based on inseason projections of terminal run size. Management actions are outlined in annual, bilateral PSC Transboundary Technical Committee (TTC) management plans (TTC 2020) developed prior to each fishing season. It should be noted that District 8 has an additional layer of management regulation developed through the board process in the *District 8 King Salmon Management Plan* (5 AAC 33.368) and the *Stikine River King Salmon Management Plan* (5 AAC 47.057), which provide additional guidance to the department.

The preseason forecast serves as the principal run size estimate until inseason run projections become available (typically by SW 21 in mid-May). Inseason projections are generated by the Stikine Chinook Management Model (SCMM), or a mark–recapture estimate, or a combination of these 2 methods. On average (1996–2019), approximately 25% of the run has passed the Kakwan Point stock assessment site in the lower Stikine River by May 25. An inseason run estimate before May 25 may be adopted if agreed to bilaterally. Weekly mark–recapture estimates are typically available by SW 22. If available, mark–recapture estimates are used as the principal run size estimator or used in concert with the SCMM in assessing weekly run sizes. Catch performance of the Canadian lower Stikine River commercial fishery, in conjunction with daily water levels, are monitored and can also be used, in part, to assess run size. From 2005 to 2016, the average of the mark–recapture and SCMM estimates was deemed to be the most reliable predictor of terminal run size and was the principal method used to predict terminal run size after SW 22. From 2017 to 2019, only the SCMM was used to predict terminal run size because insufficient mark–recapture data were available inseason.

From 2017 to 2020, preseason forecasts indicated the Stikine River king salmon runs would be within (2017) or below the escapement goal range (2018–2020). As a result, the Canadian inriver king salmon assessment fishery was not operated, and further restrictions were enacted in the Canadian fisheries. Restrictions included delaying the start of the commercial fishery by up to 2 weeks, nonretention of king salmon in commercial and recreational fisheries, mesh size restrictions in the commercial fishery, and voluntary reduction in the First Nation's food fishery. In U.S. District 8 fisheries, additional management actions included area, time, and mesh restrictions in the commercial drift gillnet fishery, nonretention of king salmon in the sport fishery through mid-July, nonretention of king salmon in commercial troll fisheries through mid-July and closure of the federally managed king salmon subsistence fishery. In addition, management measures outlined in the 2018 Unuk River king salmon action plan (Lum and Fair 2018) to reduce harvest of king salmon in commercial and sport fisheries in southern SEAK further served to reduce harvest of Stikine River king salmon.

Actions taken in U.S. fisheries per the PST to conserve Canadian origin stocks will also benefit Andrew Creek king salmon, which overlap in run timing with Stikine River king salmon. Beginning in 2016, king salmon harvests declined substantially; however, despite a progression of increasing restrictions, escapements have followed a similar declining trend. In the 5 years from 2016 to 2020, king salmon escapement goals (Stikine River and Andrew Creek) were achieved only at Andrew Creek and only in 2019, although the escapement in that year was near the lower bound of the escapement goal range.

SPORT FISHERIES

Stikine River and Andrew Creek king salmon contribute to the mixed stock marine sport fishery in the vicinity of Petersburg and Wrangell, and to a lesser extent in other areas of SEAK (Table 2, Figure 1). The sport fishery for king salmon primarily occurs between May and mid-July with some effort continuing throughout the year. The District 8 marine sport fishery is managed in accordance with the PST, the *Stikine River King Salmon Management Plan* (5 AAC 47.057) and the *Southeast Alaska King Salmon Management Plan* (5 AAC 47.055). In years when the Stikine River preseason forecast indicates an allowable catch will be available, additional sport fishing opportunity is provided as prescribed by the *Stikine River King Salmon Management Plan*. In years when the preseason forecast indicates no allowable catch will be available, but the BEG is expected to be achieved, the regional king salmon regulations as prescribed by the *Southeast Alaska King Salmon Management Plan* are enacted. In years when the BEG is not expected to be achieved, restrictive action is taken in the sport fishery to achieve escapement goals. Management action may change according to inseason projections.

The Crystal Lake Hatchery produces king salmon which provide sport fishing opportunity largely in the Blind Slough/Wrangell Narrows Terminal Harvest Area (THA), near Petersburg. A smaller remote release was also recently established in District 8 at City Creek, near Petersburg, where adult returns first occurred in 2017. Since 2017, the City Creek release site has been managed to provide sport fish opportunity while minimizing interception of wild stock king salmon.

The sport harvest of Stikine River king salmon is estimated by sampling marine sport harvest for genetic tissue samples and CWTs. Since 2005, GSI analysis has been used in most years to estimate the harvest of Stikine River king salmon in the District 8 sport fishery. In 2018 and 2020, however, very low harvests of king salmon resulted in insufficient sample sizes to use this method. In those years, the sport harvest of Stikine River king salmon was instead estimated by subtracting the

contribution of Alaska hatchery-produced king salmon (determined from CWT analysis) from the total estimated sport harvest; the remaining harvest of wild fish was then assumed to consist entirely of Stikine River king salmon. This method results in the most conservative estimate, since not all of the wild fish are Stikine River king salmon. Outside of District 8, CWT recoveries of tagged Stikine River king salmon are expanded to estimate sport harvest.

Past Sport Fishery Management Actions

Management actions taken in the sport fishery to reduce the harvest of Stikine River and Andrew Creek king salmon were taken each year 2016 to 2020. Detailed actions are included below.

2016

The Stikine River preseason forecast was for a terminal run of 33,900 large king salmon, which allowed for increased sport fishing opportunity within the marine waters of District 8 beginning May 1, 2016 in accordance with the *Stikine River King Salmon Management Plan*. Inseason run projections later indicated Stikine River king salmon abundance was lower than forecasted and an allowable catch was no longer available. Sport fishing regulations returned to the regionwide bag and possession limits, effective June 2, 2016.

2017

The Stikine River preseason forecast was for a terminal run of 18,300 large king salmon. While the run was forecasted to be within the escapement goal range, restrictive actions were implemented due to the uncertainty associated with preseason forecasts and the failure to meet the Stikine River king salmon escapement goal in 2016. An EO was issued to reduce harvest of Stikine River king salmon while continuing to provide limited sport fishing opportunity in District 8 by establishing a bag and possession limit of 1 king salmon, 28 inches or greater in length. Inseason run projections later indicated that the terminal run would likely fall below the lower bound of the escapement goal range. Management actions were adjusted to further restrict the sport fishery by closing the majority of District 8 to fishing for king salmon, effective May 25, 2017. The resulting sport harvest of large Stikine River king salmon in District 8 was reduced by approximately 68% (139 fish) when compared to the estimated harvest in 2016 (438 fish), when no restrictive actions were taken.

2018

The Stikine River preseason forecast was for a terminal run of 6,900 large king salmon, indicating the escapement goal would not be met. Restrictive action was implemented in the sport fishery to prohibit retention of king salmon in District 8 and a small portion of District 7 between April 1 and July 14. Additional regionwide actions were implemented to protect wild SEAK king salmon including prohibiting the retention of king salmon in the majority of the Petersburg/Wrangell management area (Districts 6, 7, 8 10, and portions of Districts 5 and 9; Figure 6) between April 1 and June 14. Limited sport fishing opportunity was provided for Alaska hatchery-produced king salmon in the City Creek release site between June 1 and July 31; the bag and possession limit was set at 1 king salmon, any size, and fishing area was reduced to a very limited area immediately adjacent to the City Creek release site (Figure 7). These actions reduced the sport harvest of Stikine River king salmon to 12 fish (Table 1).

2019

The Stikine River preseason forecast was for a terminal run of 8,250 large king salmon, indicating the escapement goal would not be met. Restrictive action was implemented in the sport fishery to prohibit retention of king salmon in District 8 and a portion of District 7 between April 1 and July 14. Additional regionwide actions were implemented to protect wild SEAK king salmon including prohibiting the retention of king salmon in the majority of the Petersburg/Wrangell management area (Districts 6, 7, 8 10, and portions of Districts 5 and 9; Figure 6) between April 1 and June 14. Because a larger run of hatchery king salmon was expected at the City Creek release site in 2019, the area boundaries were expanded to allow marine sport trolling, but the opening date was delayed until June 15 to avoid interception of Stikine River and Andrew Creek king salmon. Total sport harvest of Stikine River king salmon during 2019 was estimated to be 2 fish.

2020

The Stikine River preseason forecast for large king salmon indicated the escapement goal would not be met. Restrictive action was again implemented in the sport fishery to prohibit the retention of king salmon in District 8 and a portion of District 7 between April 1 and July 14, and retention of king salmon was prohibited in the majority of the Petersburg/Wrangell management area (Figure 6) between April 1 and June 14. The opening date in the City Creek release site was delayed until June 15, and area boundaries and bag and possession limits were identical to those used in 2019. Total sport harvest of Stikine River king salmon during 2020 was estimated to be 93 fish. Due to insufficient genetic samples, CWT methods were used to apportion the harvest within District 8, resulting in 100% of harvest being attributed to Stikine River king salmon—the actual percentage of Stikine River king salmon in the sport harvest was likely much lower.

COMMERCIAL FISHERIES

Drift Gillnet Fisheries

Drift gillnet fisheries occur in marine waters adjacent to Prince of Wales and Zarembo Islands in District 6, and in waters offshore of the saltwater terminus of the Stikine River in District 8. Waters open to commercial drift gillnet fishing in District 6 include Sections 6-A (Sumner Strait), 6-B, 6-C, and a portion of 6-D (Clarence Strait). The District 8 commercial drift gillnet fishery occurs in Sections 8-A and 8-B in waters immediately adjacent to the Stikine River delta (Figure 4). Management of the District 6 and 8 fisheries is interrelated due to their close proximity and the similar migration patterns of some of the salmon stocks harvested in both areas. Salmon stocks of Stikine River origin are harvested in District 8 and to a lesser degree in District 6. Management of king salmon in District 8 and sockeye salmon (*O. nerka*) in Districts 6 and 8 is conducted in accordance with the PST. King salmon have the earliest run timing, and early-season management in District 8 (May and first 2 weeks of June) is based on Stikine River king salmon abundance. In June, as the king salmon run begins to wane, management emphasis shifts to sockeye salmon. Since 2017, directed sockeye salmon fishing in District 8 has been delayed until the bulk of the Stikine River king salmon run has passed through the district. On average, about 90% of the king salmon run has passed through District 8 by SW 25, 95% by SW 26, and 98% by SW 27 (approximately late June). Area, time, and mesh size restrictions were used in District 8 to reduce harvest of Stikine River king salmon. In District 6, time and mesh size restrictions were implemented.

Troll Fisheries

The commercial troll fishery in SEAK (Figure 4) occurs in State of Alaska waters and in the Federal Exclusive Economic Zone (EEZ) east of the longitude of Cape Suckling (5 AAC 29.010 and 5 AAC 29.020). All other waters of Alaska are closed to commercial trolling.

There are 3 commercial troll seasons in SEAK: winter, spring, and summer. The winter troll fishery is managed for a guideline harvest level (GHL) of 45,000 non-Alaska hatchery-produced king salmon, with a guideline harvest range of 43,000–47,000 non-Alaska hatchery-produced fish, plus the number of Alaska hatchery-produced king salmon harvested during the winter fishery. Under provisions of the 2018 Unuk River king salmon action plan, the winter troll fishery is conducted from October 11 through March 15, closing earlier than the allowable April 30 regulatory timeframe. Also provided in the action plan, following the closure of the winter troll fishery, and prior to June 30, spring troll fisheries may open by EO to target Alaskan hatchery-produced king and chum salmon (*O. keta*), but are now limited to outer coastal areas or near hatcheries, hatchery release sites, and in areas of low wild SEAK king salmon abundance (Figure 5). Terminal area fisheries occur adjacent to hatcheries or at remote release sites. Most of the annual troll king salmon harvest is taken during the general summer troll fishery beginning July 1 when salmon may be taken throughout most of SEAK, including the outside waters of the EEZ. The summer troll king salmon harvest is divided into 2 retention periods. The first retention period targets 70% of the remaining annual troll king salmon allocation, after winter and spring troll non-Alaska hatchery-produced harvests are subtracted. Following the first retention period, any remaining portion of the annual troll allocation is harvested in a second king salmon retention period, which typically occurs in mid-August, and follows any closure of the troll fishery for coho salmon (*O. kisutch*) conservation.

Management decisions that potentially result in the reduction of commercially troll caught Stikine River and Andrew Creek king salmon include fishery closures, delayed fishery openings, and reduced area. The closure of the late winter troll fishery in mid-March is designed to reduce harvest of early-run wild king salmon from all SEAK systems. Both CWT and GSI analyses show these stocks are encountered at increasing rates in the troll fishery beginning in late March and early April. Directed spring troll king salmon fisheries in May and June are closed to help reduced harvest of these stocks during the peak migration period. Implementing nonretention during the first summer troll fishery opening in areas adjacent to king salmon spawning systems reduces troll harvest on those stocks.

Purse Seine Fishery

Regulations allow purse seine fishing in Districts 1 (Sections 1-C, 1-D, 1-E, and 1-F only), 2, 3, 4, 5, 6 (Sections 6-C and 6-D only), 7, 9, 10, 11 (Sections 11-A and 11-D only), 12, 13, and 14. Purse seine fishing is also allowed in hatchery THAs at Neets Bay, Kendrick Bay, Anita Bay, Southeast Cove, Thomas Bay, Deep Inlet, and Hidden Falls (Figure 3). Although the areas specified above are designated purse seine fishing areas, specific open areas and fishing times are established in season by EO.

King salmon are not targeted in traditional purse seine fisheries but are harvested incidentally. King salmon less than 28 inches may be retained but not sold. King salmon greater than 28 inches may be only retained during periods established by EO. Purse seine fisheries can occur in lower

Clarence Strait (District 2), Ernest Sound (District 7), and Frederick Sound (District 10) in early July and northern Chatham Strait (District 12) and eastern Icy Strait (District 14) in mid- to late July, near or after Stikine River and Andrew Creek king salmon runs have passed through those areas. Regionwide king salmon retention periods typically do not begin until mid- to late July (SWs 29 to 30) but have been delayed further in recent years to reduce harvest of Unuk River and Chickamin River king salmon, which have later run timing.

Past Commercial Fishery Management Actions

Commercial salmon fisheries are coordinated regionally by gear type and are opened and closed by EO. Fishery managers adjust time and area and, in some situations, impose gear stipulations for regularly scheduled openings in response to harvestable surpluses and conservation concerns. Below is an outline of significant management measures taken in the commercial net and troll fisheries that reduced harvest of Stikine River and Andrew Creek king salmon from 2016 to 2020.

Drift Gillnet Fisheries

District 6 Drift Gillnet Fishery

The District 6 drift gillnet fishery is managed under provisions of annual management plans produced by the Transboundary Technical Committee and approved by the Transboundary Rivers Panel, as directed by Chapter 1 of the Pacific Salmon Treaty (TTC 2020). In addition, District 6 is managed in accordance with the McDonald Lake sockeye salmon action plan (Walker et al. 2018) for SWs 29–31. Management measures aimed at reducing harvest of king salmon were taken in 2018–2020:

2016–2017

No specific actions taken.

2018

Delayed the start of the District 6 drift gillnet fishery by 1 week until SW 25 (June 17). Fishing time was restricted to 2 days in SW 25. A maximum gillnet mesh size restriction of 6 inches was implemented through SW 27 (the first week of July).

2019

Delayed the start of the District 6 drift gillnet fishery by 1 week until SW 25 (June 16). Fishing time was restricted to 2 days during SW 25. A maximum gillnet mesh size restriction of 6 inches was implemented through SW 27 (the first week of July).

2020

Delayed the start of the District 6 drift gillnet fishery by 1 week until SW 26 (June 21). A maximum gillnet mesh size restriction of 6 inches was implemented through SW 28.

District 8 Drift Gillnet Fishery

The District 8 drift gillnet fishery is managed under provisions of annual management plans produced by the Transboundary Technical Committee and approved by the Transboundary Rivers Panel, as directed by Chapter 1 of the Pacific Salmon Treaty (TTC 2020). Regulatory management plans developed through the board process are in effect concurrently with TTC plans. Management measures to reduce harvest of king salmon were taken in 2016–2020:

2016

The directed king salmon fishery was open for 1 day per week for the first 3 weeks of the fishery (SW 19, SW 20, and SW 21) The fishery was then closed after inseason run size projections fell below levels that would provide for an Alaska allowable catch of Stikine River king salmon. These actions resulted in an estimated harvest of 1,060 large Stikine River king salmon.

2017

The start of the sockeye salmon fishery was delayed 1 week to SW 26 (June 25), area open to fishing was restricted, and fishing time was restricted to 3 days. In SW 27, open area was restricted, and fishing was open 4 days. In SW 28, because inseason run projections increased, fishing was permitted in a larger area. In SW 29 the inseason run projection decreased and fishing area was again reduced. A maximum gillnet mesh size restriction of 6 inches was implemented through SW 29. These actions resulted in an estimated harvest of 19 large Stikine River king salmon.

2018

The start of the sockeye salmon fishery was delayed 3 weeks until SW 27 (first week in July), area open to fishing was restricted, and fishing time was restricted to 3 days. In SW 28, fishing time remained at 3 days and open area was further reduced. In SW 29, fishing time was 4 days and area restrictions were again reduced. A maximum gillnet mesh size restriction of 6 inches was implemented through SW 29. These actions resulted in an estimated harvest of 5 large Stikine River king salmon.

2019

The start of the sockeye salmon fishery was delayed by 2 weeks until SW 26, with area restrictions implemented and fishing time restricted to 2 days. In SW 27, open area increased and fishing time remained at 2 days. Fishing time and area remained unchanged in SW 28 and SW 29. A maximum gillnet mesh size restriction of 6 inches was implemented through SW 29. These actions resulted in an estimated harvest of 112 large Stikine River king salmon.

2020

The start of the sockeye salmon fishery was delayed by 2 weeks until SW 27, with large area restrictions and fishing time restricted to 3 days. In SW 28, area remained unchanged, but fishing time decreased to 2 days. In SW 29, open area increased and fishing time remained at 2 days. A maximum gillnet mesh size restriction of 6 inches was implemented through SW 29. These actions resulted in an estimated harvest of 62 large Stikine River king salmon.

Purse Seine Fishery

The purse seine fishery in southern SEAK begins in THA fisheries in early to mid-June, and traditional common property fisheries typically do not begin until early to late July (SW 28). Outside of the THAs, commercial purse seine fishing generally begins in Section 7-A (upper Ernest Sound), which is not in the migratory path of Stikine River king salmon. Purse seine gear is not permitted in District 8, and seine openings in District 6 do not usually occur until late July/early August—after Stikine River and Andrew Creek king salmon have migrated through the area. Management measures taken in 2018–2020 included:

- Hatchery THA openings were delayed from June 1 to June 15.

- The purse seine fishery was closed to retention of king salmon throughout the season in 2018, through SW 29 in 2019, and through SW 31 in 2020.

Troll Fisheries

The commercial troll fishery was managed in accordance with the 2018 Unuk River king salmon action plan. The broadscale regional provisions of this action plan also reduced harvest of Stikine River and Andrew Creek stocks. The troll fishery in District 8 was also managed under provisions of annual management plans produced by the Transboundary Technical Committee and approved by the Transboundary Rivers Panel as directed by Chapter 1 of the Pacific Salmon Treaty (TTC 2020). Management measures provided within, and supplementary to, the 2018 Unuk River king salmon action plan and under provisions of TTC management plans (TTC 2020) included:

2018–2020

- The winter troll fishery closed by EO in all waters of SEAK on March 15, 6 weeks prior to the regulatory closure.
- Beginning May 1, spring troll king salmon fisheries in SEAK were reduced to portions of District 1, and the outer coast in Districts 3, 13, and 183. All other districts remained closed through June 30.
- All THA openings in central SEAK were delayed until June 1.
- Hatchery chum salmon fishery openings in Districts 9, 10, 12, and 14 were delayed until June 15 and closed to retention of king salmon.
- District 8 was closed to retention of king salmon during the first summer troll king salmon retention period in July.

SUBSISTENCE AND PERSONAL USE FISHERIES

There are no state-managed subsistence salmon fisheries, and no personal use salmon fisheries for the fresh waters of either the Stikine River or Andrew Creek. The Federal Subsistence Board has made a positive customary and traditional use finding for all fish on federal public lands for all residents of Southeast Alaska and the Yakutat Area, including the Stikine River. Upwards of 100 federal permits are issued on an annual basis for subsistence fishing in the Stikine River, where sockeye salmon are the targeted species, although the regulations allow harvest of king and coho salmon. The permit is a household permit, and only 1 permit per household is issued. The program is administered by the U.S. Forest Service and there has been no directed king salmon subsistence fishery since 2016. There has been minimal incidental harvest of king salmon during the sockeye salmon fishery (average 16 fish per year). King salmon caught incidentally during permitted subsistence fishing are legal to retain. From 2017 to 2020, fishing was delayed until July 21 to allow most of the king salmon run to pass through the area.

ACTION PLAN MANAGEMENT OPTIONS FOR ADDRESSING STOCK OF CONCERN

ACTION PLAN GOAL

The primary goal of this plan is to rebuild Stikine River and Andrew Creek king salmon runs to consistently achieve escapements within the escapement goal range and to consistently provide harvestable yield.

ACTION PLAN ALTERNATIVES

The benefits and detriments described below are intended to reflect only those related to the goal of rebuilding king salmon to levels that achieve the current escapement goal ranges for Stikine River and Andrew Creek king salmon runs. Any board directed action will be considered the minimum action to be taken unless the conditions for reducing management restrictions or delisting a stock of concern as described in subsequent section are met. The department may have to increase management actions due to previously unaccounted for changes in fishing patterns, increases in effort, and/or new stock assessment data.

Action #1–Sport Fishery

Objective: Reduce the sport harvest of Stikine River and Andrew Creek king salmon.

Background: The department has used EO authority to reduce the harvest of Stikine River and Andrew Creek king salmon by reducing bag and possession limits, restricting fishing time and area, and prohibiting the retention of king salmon. Restrictive action was taken in the sport fishery during 2017, and more restrictive regulations were applied in 2018 and continued through 2020. Apart from the City Creek release site, where Alaska hatchery-produced king salmon return, the waters adjacent to the Stikine River and Andrew Creek (District 8 and a portion of District 7) have been closed to retention of king salmon from April 1 through July 14 (Figure 6). This action protects Stikine River king salmon throughout the time period when these fish would be available for harvest in terminal marine fisheries.

In addition to the action in the terminal area, regionwide action implemented annually since 2018 to protect SEAK wild stock king salmon has prohibited the retention of king salmon in the majority of the Petersburg/Wrangell management area (Figure 6) area between April 1 and June 14. Collectively, these actions dramatically reduced the annual harvest of Stikine River king salmon in the SEAK sport fishery to an annual average of only 36 fish over the last 3 years (2018–2020). These actions are expected to have a similar reduction in harvest of Andrew Creek king salmon.

Option A – Status Quo

Continue to use EO authority to implement conservative king salmon regulations identical to those implemented from 2018 through 2020 (Figure 6). Continue to use EO authority to provide opportunity for Alaska hatchery-produced king salmon within the City Creek release site between June 15 and July 14 using the area boundaries applied in 2019 and 2020.

Specific Action to Implement the Objective: Use EO authority to restrict the king salmon sport fishery while providing opportunity to harvest Alaska hatchery king salmon at the City Creek release site.

1. **In waters adjacent to the Stikine River:** Retention of king salmon is prohibited from April 1 through July 14. Includes the waters of District 8 as described in 5 AAC 47.057(d) and a portion of District 7 in the waters of Eastern Passage west of a line from a point on Wrangell Island at 56° 22.19' N lat, 132° 11.75' W long to a point on the mainland shore at 56° 22.76' N lat, 132° 10.62' W long (Figure 6).
2. **In most marine waters within the Petersburg/Wrangell management area:** Retention of king salmon is prohibited from April 1 through June 14. Includes the waters of District 5 north of line between Point Baker and a point on the shore of Kuiu Island at 56° 20.80' N. lat., 133° 50.87' W. long., District 6, District 7 excluding the waters of Eastern

Passage west of a line from a point on Wrangell Island at 56° 22.19' N lat, 132° 11.75' W long to a point on the mainland shore at 56° 22.76' N. lat., 132° 10.62' W. long., District 9 north of line between Point Ellis and Patterson Point, and District 10 as described in 5 AAC 33.200.

3. **In the City Creek release site:** Between June 15 and July 14 the bag and possession limit is 1 king salmon of any size. The area boundaries are described as the marine waters adjacent to City Creek between a point on the Mitkof Island shore, at 56° 47.83' N. lat., 132° 51.57' W. long. to 56° 48.30' N. lat., 132° 51.50' W. long. to 56° 49.77' N lat, 132° 55.78' W long and back to the Mitkof Island shore at Hungry Point (56° 49.36' N lat, 132° 56.38' W long), and includes the freshwaters of City Creek.
4. **Remainder of Petersburg/Wrangell management area:** Regional king salmon regulations established under the *Southeast Alaska King Salmon Management Plan* apply.

Benefits: The proposed dates and areas of nonretention provide protection to Stikine River, Andrew Creek, and other SEAK wild stock king salmon populations while allowing sport fishing opportunity for Alaska hatchery-produced king salmon. These management actions successfully reduced harvest of wild stock king salmon in the sport fishery between 2018 and 2020.

Detriments: The king salmon fishery has been restricted throughout the majority of the Petersburg/Wrangell management area and during the historical peak timing of the fishery. Opportunity to harvest king salmon has been limited to periods of lower catch rates and within areas where Alaska hatchery-produced king salmon are available.

Option B – Reduce Size of the City Creek release site.

In addition to management actions listed in Option A, reduce the size of the City Creek release site where opportunity to harvest Alaska hatchery king salmon is provided. The reduced size of the City Creek release site effectively restricts fishing opportunity to a shoreline fishery immediately adjacent to City Creek. This action may further reduce the harvest of Stikine River and Andrew Creek king salmon.

Specific Action to Implement the Objective: In addition to management actions in Option A, use EO authority to reduce the fishing area available to harvest Alaska hatchery king salmon at the City Creek release site.

1. **In the City Creek release site:** The area boundaries are described as the marine waters adjacent to City Creek between markers posted on the Mitkof Island shore (56° 48.10' N lat, 132° 53.78' W long, and 56° 47.98' N lat, 132° 53.23' W long) and seaward to a line approximately 250 yards offshore between points at 56° 48.20' N lat, 132° 53.70' W long and 56° 48.09' N lat, 132° 53.15' W long, and includes the freshwaters of City Creek.

Benefits: The proposed dates and areas of nonretention provide protection to Stikine River, Andrew Creek, and other nearby SEAK wild stock king salmon populations. These management actions successfully reduced harvest in the sport fishery between 2018 and 2020. Reducing the fishing area in the City Creek release site may further reduce the harvest of Stikine River or Andrew Creek king salmon.

Detriments: Opportunity to harvest Alaska hatchery-produced king salmon at the City Creek release site would be further limited, resulting in an unharvested surplus of hatchery fish. The king

salmon fishery has been restricted throughout the majority of the Petersburg/Wrangell management area during the historical peak timing of the fishery. Opportunity to harvest king salmon has been limited to periods of lower catch rates and within areas where Alaska hatchery-produced king salmon are available.

Action #2—Commercial Fisheries

Option A—Status Quo

Objective: Continue to manage per the PST and take management actions that reduced the commercial harvest of Stikine River/Andrew Creek king salmon.

Specific Action to Implement the Objective:

1. Drift Gillnet Fisheries

Continue to manage the District 6 and 8 drift gillnet fisheries according to provisions of annual management plans produced by the Transboundary Technical Committee and approved by the Transboundary Rivers Panel, as directed by Chapter 1 of the Pacific Salmon Treaty. Management actions per the annual management plan include but are not limited to: delay start of District 8 drift gillnet fishery for at least 2 weeks and delay the start of the District 6 drift gillnet fishery up to 1 week; implement area restrictions in District 8 near the mouth of the Stikine River through SW 28; and restrict mesh size to a maximum of 6 inches through SW 28 in District 6 and through SW 29 in District 8.

2. Troll Fisheries

Implement broadscale regional troll fishery provisions outlined in the 2018 Unuk River king salmon action plan that also benefit both Stikine River and Andrew Creek king salmon. The actions taken that conserved these stocks under the 2018 Unuk River king salmon action plan from 2018 to 2020 include:

- Notwithstanding any remaining portion of the seasonal guideline harvest level, the winter troll fishery will close by EO in all waters of SEAK on March 15, 6 weeks prior to the regulatory closing date.
- Spring troll king salmon fisheries will be limited to outer coastal areas near hatchery or hatchery release sites in Districts 1, 3, 13, and 183—all other waters of the region will be closed.
- Hatchery-produced chum salmon fishery openings in Districts 9 and 10 will be delayed until June 15 and closed to the retention of king salmon.
- Continue to manage the troll fishery in District 8 fisheries according to provisions of annual management plans produced by the Transboundary Technical Committee and approved by the Transboundary Rivers Panel, as directed by Chapter 1 of the Pacific Salmon Treaty. Management actions taken in the District 8 troll fishery will include closing the waters of District 8 to king salmon retention and possession during the first general summer troll king salmon retention period.

3. Purse Seine Fishery

Continue to implement nonretention of king salmon until at least the third week of July in traditional fisheries and in THAs that do not have hatchery king salmon runs.

4. Terminal Harvest Area Fisheries

Continue to delay the start of the Anita Bay THA from May 1 to June 1.

Benefits: These management actions can be accomplished through EO authority, they have been effective in reducing harvest rates, and user groups are accustomed to the actions.

Detriments: Opportunity to harvest other salmon stocks, specifically sockeye salmon, and hatchery-produced chum and king salmon would be impacted. Troll harvest opportunity for hatchery-produced SEAK king salmon, as well as for species other than king salmon, may be lost due to king salmon restrictions.

Option B – Increased Management Actions

Specific Action to Implement the Objective:

1. Drift Gillnet Fisheries

Continue to manage the District 6 and 8 drift gillnet fisheries according to provisions of annual management plans produced by the Transboundary Technical Committee and approved by the Transboundary Rivers Panel, as directed by Chapter 1 of the Pacific Salmon Treaty. Additional Management actions could include but are not limited to: delay opening of District 8 for 3 weeks; restrict open area in District 8 through SW 29; delay opening of District 6 for up to 2 weeks; and consider an area closure in eastern Section 6-A the first week the district opens.

2. Troll Fisheries

No additional restrictions considered. Closing the winter troll fishery early, closing most spring troll fisheries, particularly in Districts 6 and 8, and implementing nonretention of king salmon in District 8 during the first summer troll fishery has reduced the harvest of Stikine River and Andrew Creek king salmon to zero or very low levels.

3. Purse Seine Fishery

No additional restrictions considered. Implementing nonretention of king salmon in the purse seine fishery through at least the third week in July is beyond the run timing of Stikine River and Andrew Creek king salmon in those areas the purse seine fishery would be open.

4. Terminal Harvest Area Fisheries

No additional restrictions considered.

Benefits: These management actions can be accomplished through EO authority. The restrictions are directly related to historical run timing of Stikine River king salmon.

Detriments: Harvest opportunity for sockeye salmon and hatchery-produced chum and king salmon may be lost due to conservation measures implemented to protect Stikine River and Andrew Creek king salmon.

Action #3 – Subsistence Fisheries

Objective: Reduce subsistence harvest of Stikine River and Andrew Creek king salmon.

No board action recommended. The subsistence fishery is managed under provisions of annual management plans produced by the Transboundary Technical Committee and approved by the Transboundary Rivers Panel, as directed by Chapter 1 of the Pacific Salmon Treaty. In addition, the subsistence fishery is federally managed by the USFS; therefore, the board has no jurisdiction over the fishery. Department management staff recommend actions to the USFS based on stock status and preseason expectations of allowable catch. If there is no allowable catch, the department recommends closure of the directed subsistence king salmon fishery.

CONDITIONS FOR REDUCING MANAGEMENT RESTRICTIONS OR DELISTING A STOCK OF CONCERN

1. If the lower bound of the biological escapement goal range is met or exceeded in 3 consecutive years or is met in 4 out of 6 consecutive years, the department will recommend removing the Stikine River and/or Andrew Creek king salmon runs as a stock of management concern at the first Southeast and Yakutat board meeting after this condition is met.
2. Management measures could be relaxed in specific areas or during specific time periods if updated stock composition and harvest data indicates areas and/or times where and/or when restrictions are no longer needed to ensure the escapement goal is met.
3. In the event the lower bound of the biological escapement goal range is met or exceeded in 2 consecutive years, management restrictions may be relaxed or set aside.
4. Should the TTC determine that a harvestable surplus of Stikine River king salmon is available, directed king salmon fisheries in District 8 may occur pursuant to the annual TBR management plan under provisions of the PST. Before implementing directed fisheries, Andrew Creek king salmon run size and escapement would have to be considered.

Stock status, action plan performance (including information on harvest rate, distribution, and timing in commercial fisheries), and escapement goal review will be updated in a report to the board at the 2025 Southeast and Yakutat meeting.

2021/2022 ALASKA BOARD OF FISHERIES REGULATORY PROPOSALS AFFECTING STIKINE RIVER/ANDREW CREEK KING SALMON

- Proposal 80 – Amend regulation to address payback provisions when the State of Alaska king salmon fisheries exceed Alaska’s annual king salmon all-gear harvest.
- Proposal 81 – Allocate any Alaska all gear-allocation king salmon remaining after September 1 to the commercial troll fishery.
- Proposal 83– Amend the *Southeast Alaska King Salmon Management Plan* to manage for an average sport harvest of 20% of the sport/troll allocation with commensurate regulations addressing sport fishery overages in the commercial troll fishery).
- Proposal 84 – Amend the *Southeast Alaska King Salmon Management Plan* to ensure no closure of the resident king salmon fishery due to allocation concerns.
- Proposal 85 – Amend the *Southeast Alaska King Salmon Management Plan* to manage for a resident priority by implementing closed periods and reducing bag limits for nonresidents.
- Proposal 86 – Amend the *Southeast Alaska King Salmon Management Plan* to manage for a resident priority by implementing closed periods and reducing bag limits for nonresidents.
- Proposal 87 – Make numerous changes to management of commercial troll and sport fisheries for king salmon in Southeast Alaska.

- Proposal 88 – Amend the *Southeast Alaska King Salmon Management Plan* to manage for a sliding sport allocation between 16 and 24 percent with commensurate commercial troll fishery allocation modification under commercial regulation.
- Proposal 89 – Allow the use of 2 additional fishing lines during periods of king salmon nonretention in all of the Southeast-Yakutat area if there is more than one CFEC power troll permit holder on board the vessel.
- Proposal 91 – Reallocate the annual troll harvest allocation between the winter, spring, and summer troll fisheries.
- Proposal 93 – Amend the *Southeast Alaska King Salmon Management Plan* by reducing the maximum nonresident annual limit to 3 king salmon.
- Proposal 94 – Amend the *Southeast Alaska King Salmon Management Plan* to manage for a resident priority by implementing specific closed periods and reducing annual limits for nonresidents.
- Proposal 95 – Amend the *Southeast Alaska King Salmon Management Plan* to provide for inseason liberalization of management measures when the sport fish allocation will not be met.
- Proposal 115 – Modify the start date of the winter troll fishery.
- Proposal 116 – Require retention of king salmon caught during periods of nonretention to be retained if they are deemed too injured to be released and set price at one dollar for selling retained fish.
- Proposal 118 – Modify the boundaries of Districts 6 and 8 in Sumner Strait.
- Proposal 155 – Prohibit the removal of salmon from the water when nonretention regulations apply and prohibit the use of a multiple hook in SEAK sport fisheries.

RESEARCH PLAN

PAST AND CURRENT RESEARCH PROJECTS FOR THE STIKINE RIVER AND ANDREW CREEK

The department has conducted extensive research and monitoring projects on Stikine River king salmon, beginning with coded-wire-tagging studies implemented in 2000 through the present. Stikine River king salmon is an escapement and exploitation rate indicator stock recognized by the Pacific Salmon Commission and the Chinook Technical Committee. PST obligations include producing the full suite of stock assessment data for Stikine River king salmon: smolt production, marine survival, harvest (calendar year) and exploitation (brood year) rates, and estimates of escapement, as well as the age-sex-length composition of those escapements. The Andrew Creek king salmon run is 1 of the 11 indicator stocks used by the department to monitor king salmon runs in SEAK. The following research programs have been and are being conducted to gather detailed information about Stikine River and Andrew Creek king salmon:

1. Stikine River and Andrew Creek king salmon are part of the coastwide king salmon genetic baseline (Seeb et al. 2007).
2. Standardized aerial and foot escapement surveys on Andrew Creek have been conducted annually since the 1970s (Richards and Frost 2018).

3. Mark–recapture studies to estimate total inriver abundance of Stikine River king salmon began in 1996 and continue to present (Jaecks et al. 2016).
4. Age, sex, and length composition, CWT, and escapement sampling are conducted annually (Richards and Frost 2018; Jaecks et al. 2016).
5. Marine harvest sampling of commercial and sport fisheries is conducted by the department annually throughout SEAK. These programs include CWT and genetic sampling and various studies designed to estimate catch, harvest, and fishing effort and biological parameters such as age, sex, and size (Jaenicke et al. 2015; Buettner et al. 2017).
6. Radiotelemetry studies were conducted in 1997, 2005, 2015 and 2016 to assess migration behavior and spawning distribution of Stikine River king salmon (Richards et al. 2008; Courtney *In prep*).
7. In 2013, the department conducted interviews with Wrangell and Petersburg residents on their local traditional knowledge (LTK) of Stikine River king salmon, through funding from the Chinook Salmon Research Initiative. LTK was defined as knowledge that had either developed as a result of personal observation or that which was both local and intergenerational (Ream and Merriam 2017).
8. In 2003–2004, the department documented the historical and contemporary harvests of salmon in the Wrangell area, including on the Stikine River. This study also included ecological observations, historical changes, and interactions between subsistence, commercial, and sport fishers (Paige et al. 2009).

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Table 1.—Stikine River large king salmon terminal (District 8) harvest, escapement, and terminal run size and Little Tahltan River and Andrew Creek king salmon escapements, 1979–2020.

Year	Harvest						Stikine Escape- ment	Stikine Terminal Run Size	Little Tahltan Weir	Andrew Creek Escape- ment
	Troll	Gillnet	Sport	Subsis- tence	Total U.S.	Total Canada				
1979	384	39	1,759	—	2,182	1,636	—	—	—	327
1980	519	334	2,498	—	3,351	2,367	—	—	—	282
1981	565	252	2,022	—	2,839	1,617	—	—	—	536
1982	721	1,001	2,929	—	4,651	2,568	—	—	—	672
1983	978	24	2,634	—	3,636	1,456	—	—	—	366
1984	1,025	10	2,171	—	3,206	726	—	—	—	389
1985	2,803	15	2,953	—	5,771	1,203	—	—	3,114	624
1986	2,434	44	2,475	—	4,953	2,056	—	—	2,891	1,381
1987	2,310	63	1,834	—	4,207	2,528	—	—	4,783	1,537
1988	1,162	103	2,440	—	3,705	2,833	—	—	7,292	1,100
1989	1,660	198	2,776	—	4,634	3,018	—	—	4,715	1,034
1990	1,604	208	4,283	—	6,095	2,610	—	—	4,392	1,295
1991	1,204	581	3,657	—	5,442	1,807	—	—	4,506	780
1992	224	475	3,322	—	4,021	2,635	—	—	6,627	1,517
1993	335	707	4,227	—	5,269	2,757	—	—	11,437	2,067
1994	375	1,210	2,140	—	3,725	2,303	—	—	6,373	1,115
1995	346	605	1,218	—	2,169	2,001	—	—	3,072	669
1996	283	783	2,464	—	3,530	2,931	28,787	—	4,821	653
1997	311	1,736	3,475	—	5,522	4,701	26,808	—	5,547	571
1998	119	129	1,438	—	1,686	2,354	25,779	—	4,873	950
1999	437	564	3,668	—	4,669	3,935	19,781	—	4,733	1,180
2000	525	604	2,581	—	3,710	4,245	26,056	—	6,631	1,346
2001	680	6	2,263	—	2,949	3,517	63,129	—	9,730	2,055
2002	983	21	3,077	—	4,081	3,438	50,455	57,480	7,476	1,708
2003	1,426	84	3,252	—	4,762	2,866	47,015	53,776	6,492	1,160
2004	2,767	4,522	2,310	—	9,599	4,048	48,490	62,137	16,381	2,991
2005	2,969	21,233	3,665	15	27,882	20,049	39,836	87,767	7,253	1,979
2006	1,418	17,259	3,346	37	22,060	15,776	24,405	62,241	3,860	2,124
2007	1,574	7,057	2,218	36	10,885	10,510	14,559	35,954	562	1,736
2008	951	4,905	1,453	26	7,335	7,932	18,352	33,619	2,663	981
2009	188	244	887	31	1,350	2,146	12,972	16,468	2,245	628
2010	427	238	586	53	1,303	3,164	15,148	19,615	1,057	1,205
2011	463	970	648	61	2,142	3,141	14,511	19,794	1,058	936
2012	506	1,209	591	46	2,353	5,210	22,332	29,895	720	587
2013	434	455	636	41	1,566	3,370	16,784	21,720	878	920
2014 ^a	677	204	697	44	1,622	3,327	24,374	29,323	169	1,261
2015	306	379	781	34	1,500	4,258	21,597	27,355	450	796
2016	190	1,060	438	20	1,707	3,235	10,554	15,496	921	402
2017	35	19	139	14	207	603	7,335	8,145	428	349
2018	0	5	12	22	39	165	8,603	8,807	453	482
2019	0	112	2	19	133	333	13,817	14,169	536	698
2020	0	62	93	6	161	389	9,753	10,303	347	470
Averages										
2011–20	261	448	404	31	1,143	2,403	14,966	18,501	596	690
2016–20	45	252	137	16	449	945	10,012	11,384	537	480

^a In 2014, Stikine River escapement was adjusted for estimated mortality that occurred at the Tahltan landslide.

Table 2.—Stikine River large^a king salmon escapement and harvest rate estimates, 2011–2020. Includes all SEAK harvest of Stikine River king salmon.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2016-20	2011-20
Escapement ^b	14,511	22,332	16,784	24,374	21,597	10,554	7,335	8,603	13,817	9,753	10,012	14,966
Total Harvest	8,744	10,765	7,240	7,072	7,761	6,114	1,858	204	790	1,010	1,995	5,156
Total Run	23,255	33,097	24,024	31,446	29,358	16,668	9,193	8,807	14,607	10,763	12,008	20,122
<u>Harvest Rates</u>												
Troll Winter	0.02	0.05	0.04	0.00	0.02	0.02	0.04	0.00	0.01	0.00	0.01	0.02
Troll Spring	0.05	0.04	0.01	0.05	0.04	0.02	0.03	0.00	0.00	0.02	0.01	0.03
Troll Summer R1 ^c	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00
Troll Summer R2 ^c	0.03	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Total Troll	0.12	0.09	0.06	0.05	0.05	0.05	0.08	0.00	0.02	0.02	0.03	0.06
Sport Non-terminal	0.03	0.01	0.03	0.00	0.02	0.03	0.04	0.00	0.00	0.00	0.01	0.02
Sport Terminal District 8	0.03	0.02	0.03	0.02	0.03	0.03	0.02	0.00	0.00	0.01	0.01	0.02
Total Sport	0.06	0.02	0.06	0.02	0.04	0.06	0.06	0.00	0.00	0.01	0.03	0.04
Subsistence	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gillnet Non-terminal	0.02	0.01	0.02	0.04	0.01	0.01	0.00	0.00	0.01	0.02	0.01	0.02
Gillnet District 8 Terminal	0.04	0.04	0.02	0.01	0.01	0.06	0.00	0.00	0.01	0.01	0.02	0.02
Total Gillnet	0.06	0.05	0.04	0.04	0.02	0.07	0.00	0.00	0.01	0.03	0.03	0.04
Net Other	0.01	0.01	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Total U.S.	0.24	0.17	0.16	0.12	0.12	0.17	0.14	0.00	0.03	0.06	0.09	0.14
Total Canada	0.14	0.16	0.14	0.11	0.15	0.19	0.07	0.02	0.02	0.04	0.08	0.12
Total	0.38	0.33	0.30	0.22	0.26	0.37	0.20	0.02	0.05	0.09	0.17	0.26

Note: Gray cells indicate the escapement for a given year was below the lower bound of the BEG.

^a Harvest estimates in District 8 are germane to large (≥ 660 mm MEF), harvest outside of District 8 is germane to large (age ≥ 1.2) as determined by CWT recoveries.

^b The BEG range for the Stikine River is 14,000 to 28,000 large king salmon.

^c Troll Summer R1 (retention period 1) occurs in July of the current year; Troll Summer R2 (retention period 2) occurs from August through September of the prior year.

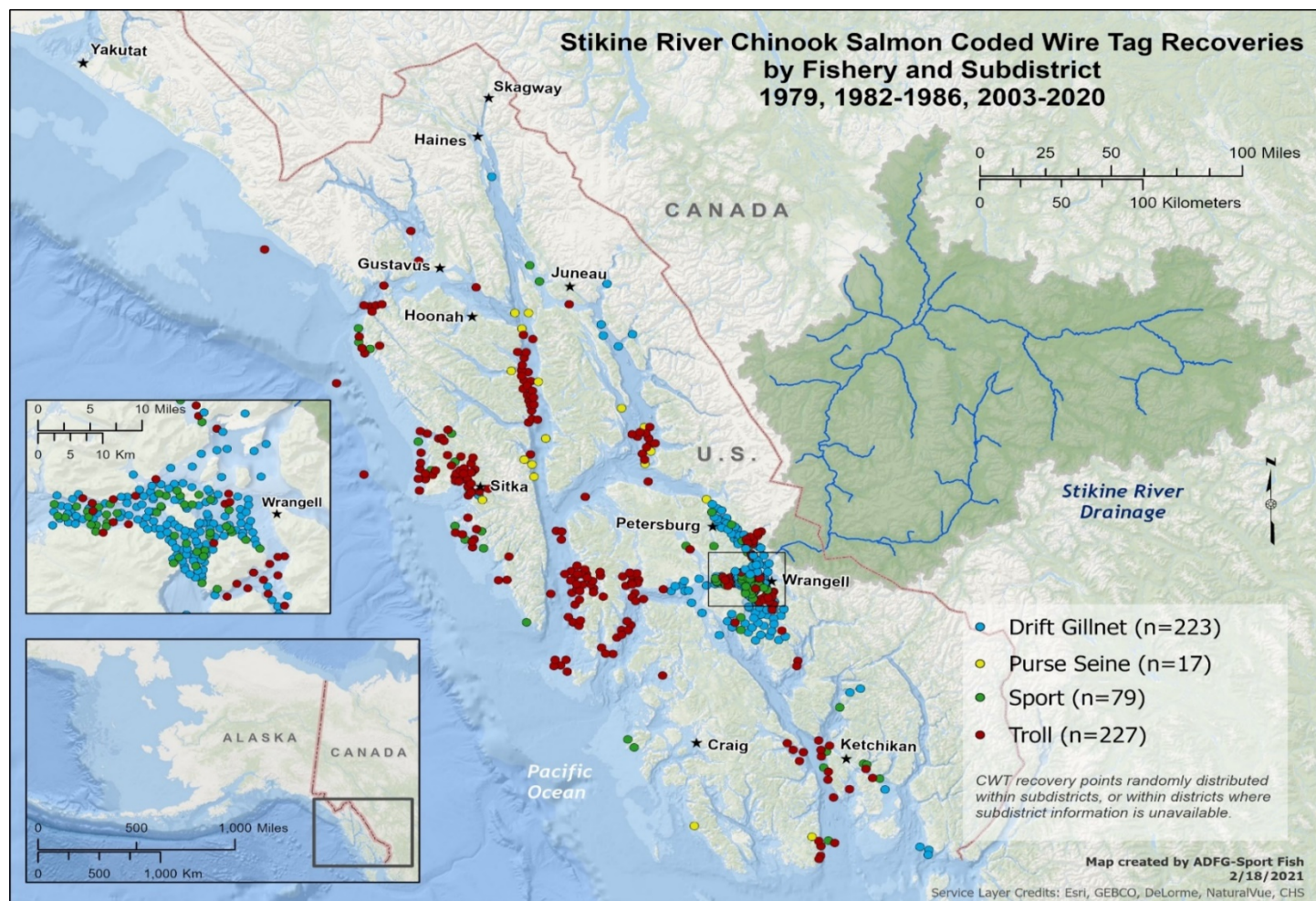


Figure 1.—Map of Stikine River king salmon coded wire tag Recoveries in SEAK fisheries, 1979, 1982–1986 and, 2003–2020.

Note: Tag recoveries were for the entire years which included recoveries in winter and spring troll fisheries as well as directed fisheries in District 8. Large scale directed king salmon fisheries have not occurred in District 8 since 2008, the winter troll fishery has been restricted since 2018, and spring troll fisheries have largely been closed since 2018. This map is intended to show where Stikine River king salmon were harvested over the course of the year in absence of large-scale fishery restrictions.

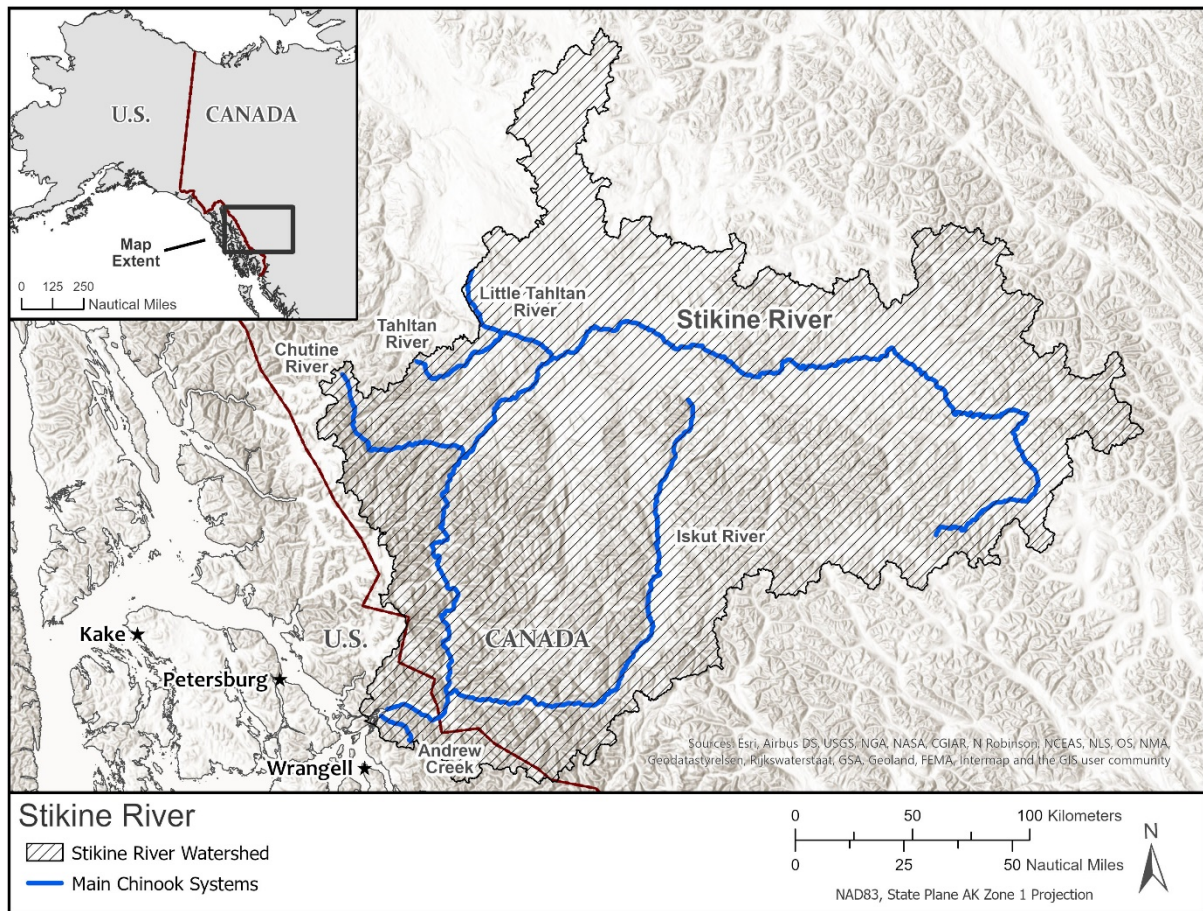


Figure 2.—Map of the Stikine River watershed and primary king salmon spawning tributaries.

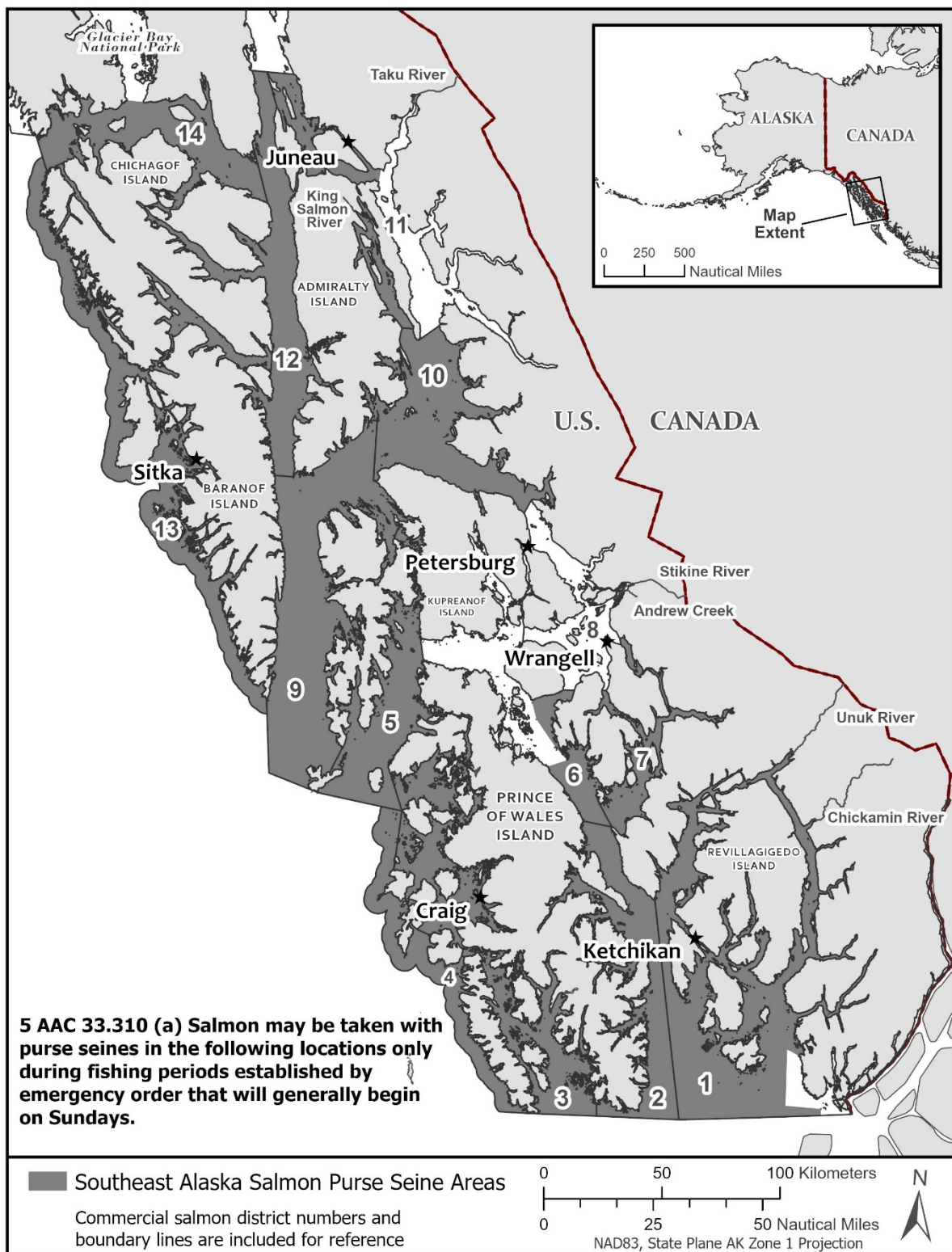


Figure 3.—Map of Southeast Alaska commercial purse seine fishing areas.

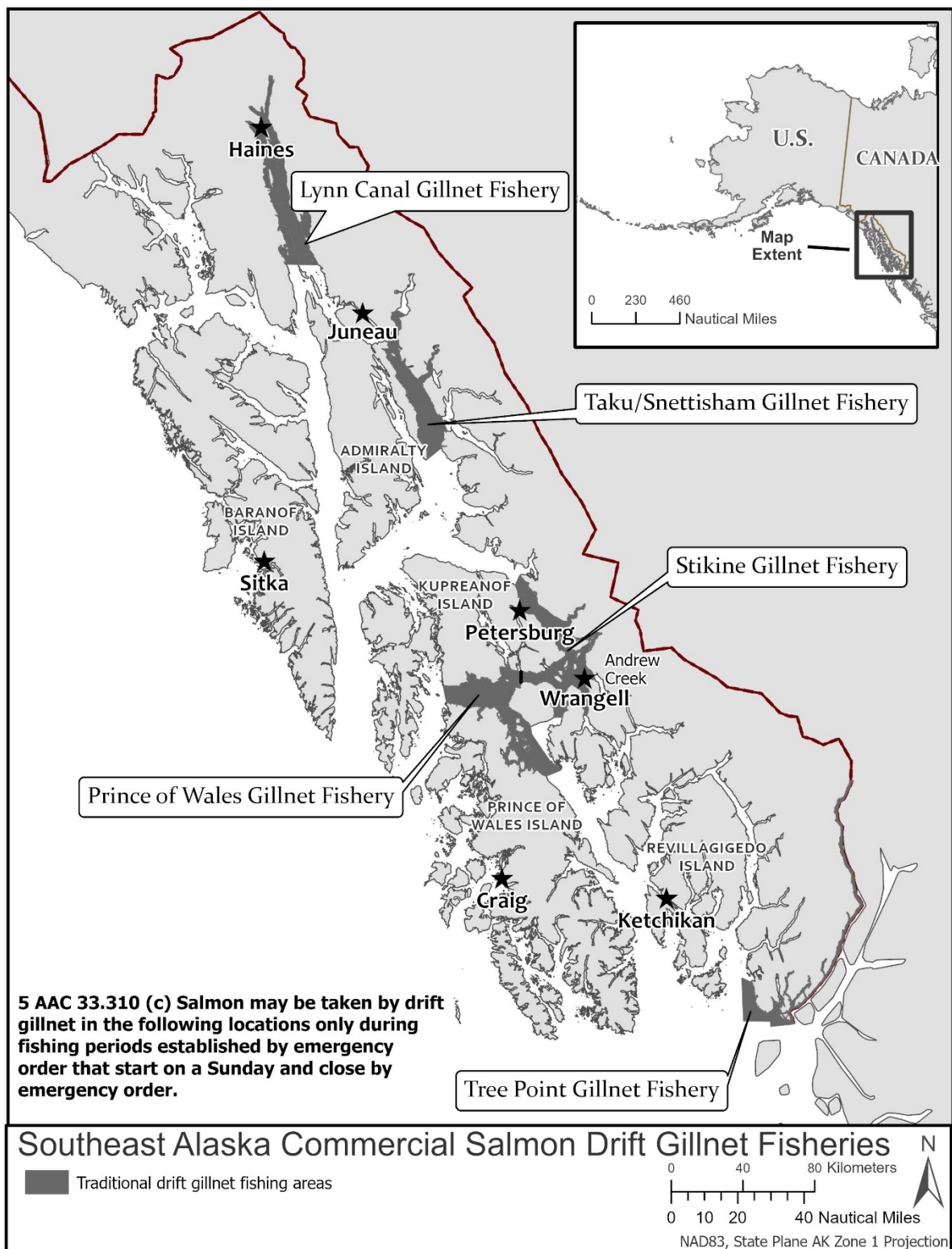


Figure 4.—Map of traditional commercial drift gillnet fishing areas in Southeast Alaska.

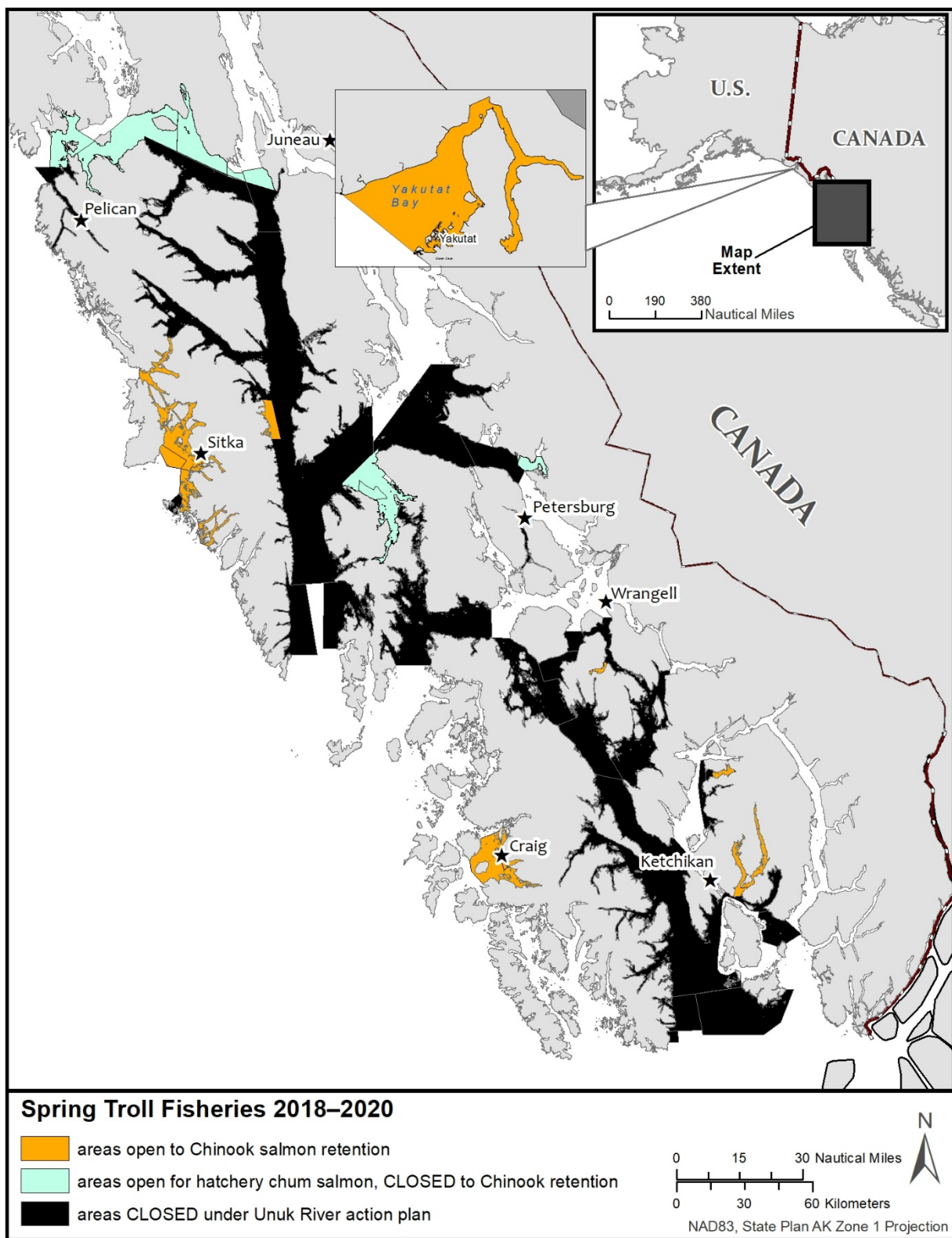


Figure 5.—Map of spring commercial troll fishing areas in Southeast Alaska.

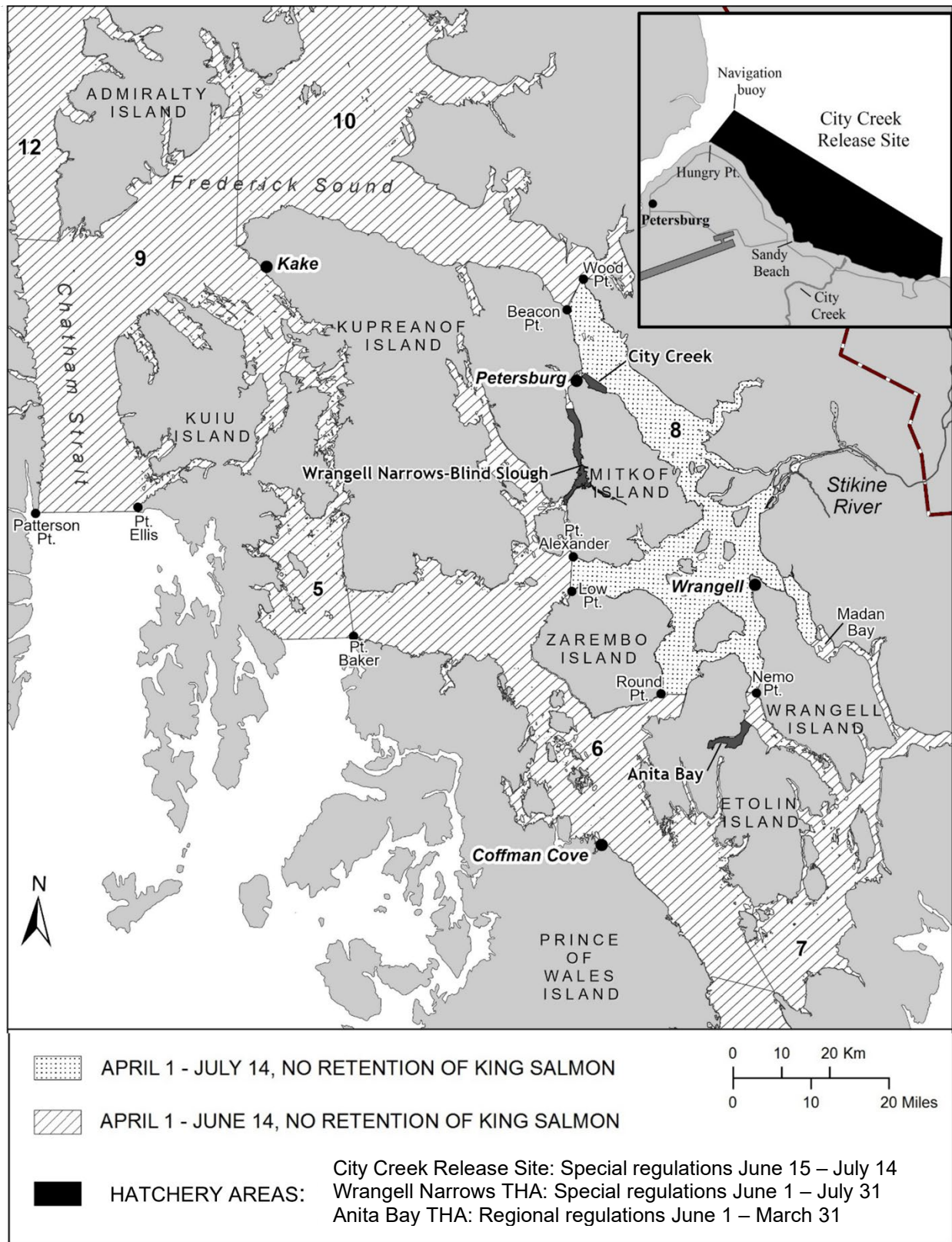


Figure 6.—Map depicting proposed sport fishery regulations and boundaries under Option A to protect Stikine River and Andrew Creek king salmon.

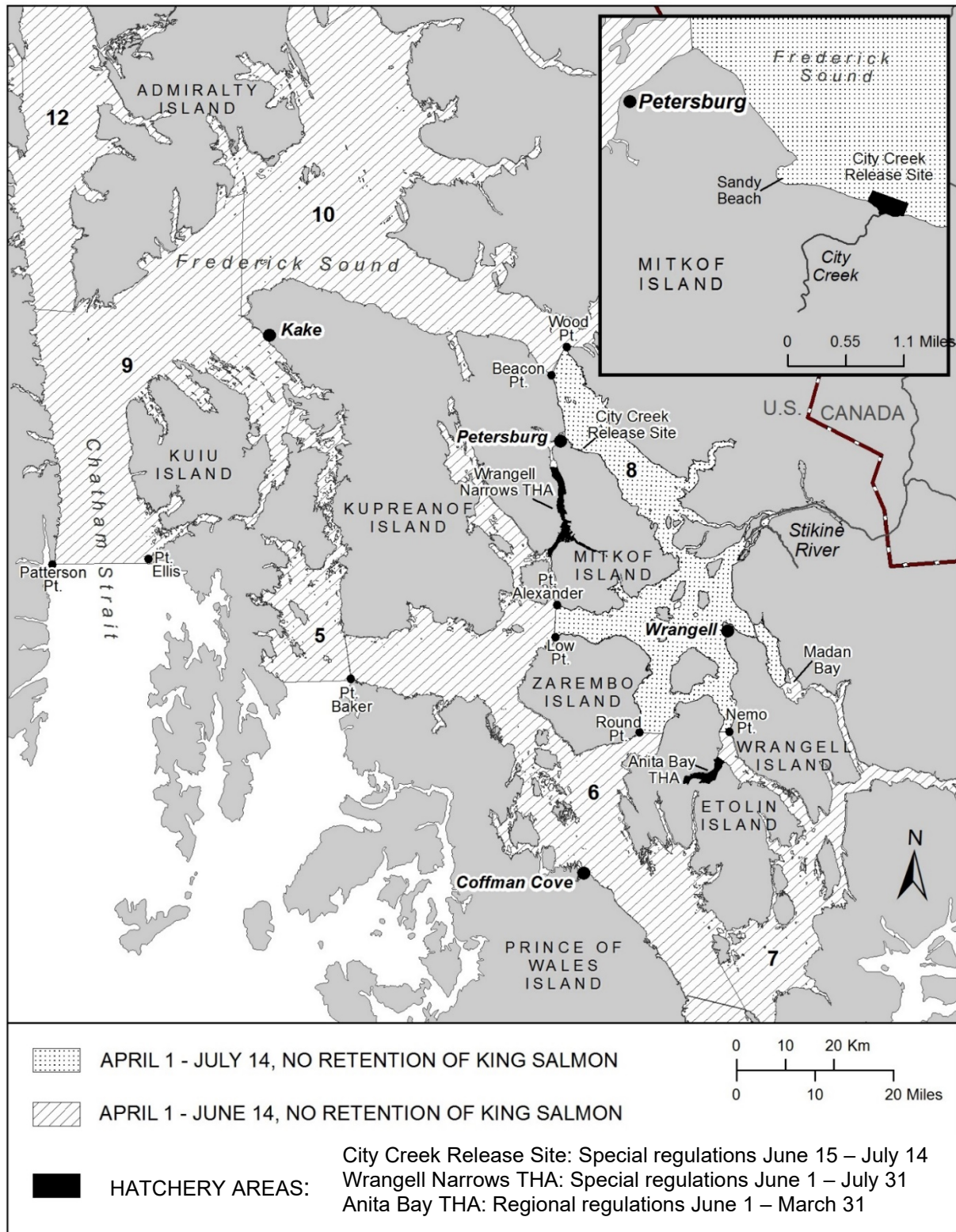


Figure 7.—Map depicting proposed sport fishery regulations and boundaries under Option B to protect Stikine River and Andrew Creek king salmon.