

# Report to the Alaska Board of Fisheries

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## Eastside Susitna King Salmon Stock Status and Action Plan, 2020

By

Cook Inlet Staff

January 2020

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Alaska Department of Fish and Game



## Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the *Système International d'Unités* (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics, fisheries</b>	
Centimeter	cm	All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis	$H_A$
deciliter	dL	All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
gram	g	And	&	catch per unit effort	CPUE
hectare	ha	At	@	coefficient of variation	CV
kilogram	kg	Compass directions:		common test statistics	F, t, $\chi^2$ , etc.
kilometer	km	east	E	confidence interval	C.I.
liter	L	north	N	correlation coefficient	R (multiple)
meter	m	south	S	correlation coefficient	r (simple)
metric ton	mt	west	W	covariance	cov
milliliter	ml	Copyright	©	degree (angular or temperature)	°
millimeter	mm	Corporate suffixes:		degrees of freedom	df
<b>Weights and measures (English)</b>		Company	Co.	divided by	÷ or / (in equations)
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	equals	=
foot	ft	Incorporated	Inc.	expected value	E
gallon	gal	Limited	Ltd.	fork length	FL
inch	in	et alii (and other people)	et al.	greater than	>
mile	mi	et cetera (and so forth)	etc.	greater than or equal to	≥
ounce	oz	exempli gratia (for example)	e.g.,	harvest per unit effort	HPUE
pound	lb	id est (that is)	i.e.,	less than	<
quart	qt	latitude or longitude	lat. or long.	less than or equal to	≤
yard	yd	monetary symbols (U.S.)	\$, ¢	logarithm (natural)	ln
Spell out acre and ton.		months (tables and figures): first three letters	Jan, ..., Dec	logarithm (base 10)	log
<b>Time and temperature</b>		number (before a number)	# (e.g., #10)	logarithm (specify base)	log <sub>2</sub> , etc.
day	d	pounds (after a number)	# (e.g., 10#)	mid-eye-to-fork	MEF
degrees Celsius	°C	registered trademark	®	minute (angular)	'
degrees Fahrenheit	°F	Trademark	™	multiplied by	x
hour (spell out for 24-hour clock)	h	United States (adjective)	U.S.	not significant	NS
minute	min	United States of America (noun)	USA	null hypothesis	$H_0$
second	s	U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	percent	%
Spell out year, month, and week.				probability	P
<b>Physics and chemistry</b>				probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
all atomic symbols				probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
alternating current	AC			second (angular)	"
ampere	A			standard deviation	SD
calorie	Cal			standard error	SE
direct current	DC			standard length	SL
hertz	Hz			total length	TL
horsepower	hp			variance	Var
hydrogen ion activity	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

# ***REPORT TO THE ALASKA BOARD OF FISHERIES***

Eastside Susitna King Salmon Stock Status and Action Plan, 2020

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Cook Inlet Staff  
Alaska Department of Fish and Game  
Divisions of Sport Fish, Commercial Fisheries, and Subsistence

January 2020

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# TABLE OF CONTENTS

	Page
<b>TABLE OF CONTENTS .....</b>	<b>IV</b>
<b>LIST OF TABLES .....</b>	<b>VI</b>
<b>LIST OF FIGURES .....</b>	<b>VI</b>
<b>INTRODUCTION.....</b>	<b>1</b>
<b>STOCK ASSESSMENT BACKGROUND.....</b>	<b>1</b>
SHEEP CREEK.....	2
<i>Escapement</i> .....	2
<i>Harvest</i> .....	2
GOOSE CREEK.....	3
<i>Escapement</i> .....	3
<i>Harvest</i> .....	3
<b>ESCAPEMENT GOAL EVALUATION.....</b>	<b>4</b>
ESCAPEMENT GOAL HISTORY .....	4
ESCAPEMENT DATA AND SEG ANALYSIS .....	4
<i>Sheep Creek</i> .....	5
<i>Goose Creek</i> .....	5
ESCAPEMENT GOAL RECOMMENDATION .....	5
<b>STOCK OF CONCERN RECOMMENDATION .....</b>	<b>5</b>
OUTLOOK.....	6
<b>HABITAT ASSESSMENT.....</b>	<b>6</b>
<b>FISHERIES MANAGEMENT OVERVIEW AND BACKGROUND .....</b>	<b>6</b>
SPORT FISHERIES .....	6
<i>Past Sport Fisheries Management Actions</i> .....	7
COMMERCIAL FISHERIES.....	9
<i>Past Commercial Fisheries Management Actions</i> .....	9
SUBSISTENCE FISHERY.....	12
<i>Past Subsistence Fishery Management Actions</i> .....	12
<b>MANAGEMENT OPTIONS FOR ADDRESSING STOCK OF CONCERN.....</b>	<b>13</b>
ACTION #1 – SPORT FISHERY .....	13
<i>Option A. – Status Quo</i> .....	13
<i>Option B. – Restrict to Nonretention</i> .....	14
<i>Option C. – Reduce the King Salmon Sport Fishing Season</i> .....	14
<i>Option D. – Close Sport Fisheries</i> .....	14
ACTION #2 – COMMERCIAL FISHERY .....	14
<i>Option A. – Status Quo</i> .....	15

<i>Option B. – Reduce Hours of Commercial Fishing Periods.....</i>	<i>16</i>
<i>Option C. – Reduce Number of Commercial Fishing Periods.....</i>	<i>16</i>
<i>Option D. – Close Specific Fishing Areas .....</i>	<i>16</i>
<i>Option E. – Close All Commercial Fishing in the Northern District .....</i>	<i>16</i>
<b>ACTION #3 – SUBSISTENCE FISHERY .....</b>	<b>17</b>
<i>Option A. – Reduce Hours of Subsistence Fishing Periods.....</i>	<i>17</i>
<i>Option B. – Reduce Number of Subsistence Fishing Periods.....</i>	<i>17</i>
<b>2020 ALASKA BOARD OF FISHERIES REGULATORY PROPOSALS AFFECTING SHEEP CREEK AND GOOSE CREEK .....</b>	<b>18</b>
<b>RESEARCH PLAN .....</b>	<b>18</b>
CURRENT RESEARCH PROJECTS .....	18
CONDITIONS FOR REDUCING MANAGEMENT RESTRICTIONS OR DELISTING A STOCK OF CONCERN.....	19
<b>LITERATURE CITED .....</b>	<b>20</b>

## LIST OF TABLES

<b>Table</b>		<b>Page</b>
1.	Index counts of king salmon escapement, and angler effort and king salmon sport harvest for Sheep and Goose creeks, 1979–2019.....	21
2.	Northern District commercial king salmon directed harvest by statistical area, 2002–2019.....	22
3.	Subsistence salmon harvests, Tyonek Subdistrict, 1980–2018. ....	24

## LIST OF FIGURES

<b>Figure</b>		<b>Page</b>
1.	Map depicting Susitna River drainages.....	25
2.	Goose Creek king salmon aerial escapement survey index area.....	26
3.	Angler effort and king salmon sport harvest for Sheep and Goose creeks, 1986–2017.....	27
4.	Sheep Creek and Goose Creek king salmon escapement index counts, 1979-2019.....	28
5.	Map showing harvest locations of king salmon by set gillnet, Tyonek Subdistrict subsistence salmon fishery, 2006.....	29
6.	Northern District statistical harvest reporting areas and directed commercial king salmon harvest, 2010–2019.....	30

## INTRODUCTION

The *Policy for 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 2011 the board designated three king salmon stocks of concern in the Susitna drainage; Alexander Creek king salmon was identified as a stock of management concern and Willow and Goose creeks king salmon were identified as stocks of yield concern.

In October 2013, the department recommended that the board designate Sheep Creek and Goose Creek king salmon as stocks of management concern at the regulatory board meeting for the Northern Cook Inlet (NCI) Management Area in February of 2014<sup>1</sup>. This recommendation was based on guidelines established in the SSFP. The SSFP states that a “management concern means 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, BEG, OEG, or other specified management objectives for the fishery...” Chronic inability is further defined in the SSFP as “...the continuing or anticipated inability to meet escapement thresholds over a four to five year period which is approximately the generation time of most salmon species.”

This action plan provides the department’s assessment of Sheep, Goose, and Willow creek king salmon as stocks of concern, summarizes historical assessments of annual run sizes, and describes the existing regulations and emergency order (EO) authority that the department exercises to manage Sheep, Goose, and Willow creek king salmon. Options are then presented for potential management actions for the commercial, sport, and subsistence fisheries, and research projects for these king salmon stocks.

## STOCK ASSESSMENT BACKGROUND

The Susitna River drainage originates in the Alaska and Talkeetna mountain ranges and flows south to Cook Inlet (Figure 1). The Susitna River drainage supports numerous king salmon sport fisheries; 16 king salmon stocks have sustainable escapement goals (SEGs). Tributaries flowing into the Susitna River from the west generally originate in the Alaska Range with relatively low gradient and velocity, and access only by boat or airplane. Tributaries flowing into the Susitna River from the east mostly drain from the Talkeetna Mountains with relatively high gradient and velocity, and easy access from the Parks Highway. Eastside tributaries between Willow and Talkeetna – including Sheep, Goose and Willow creeks – support moderate sized runs of king salmon, high sport fishing angler effort due to ease of access, and close proximity with each other.

The department has conducted single aerial surveys on Sheep, Goose, and Willow creek (Figure 1) since 1979 to index spawning escapement of king salmon. These surveys are conducted post-season from rotary-wing aircraft (i.e., helicopter) at slower speeds than traditional fixed-wing aircraft surveys.

Sheep and Goose creeks share a common channel (Figure 2) created in 1971 by a flood that caused a breach in the Sheep Creek channel. Despite efforts to prevent Sheep Creek water flowing into this channel, it persists and is part of the Goose Creek aerial survey index area. Beavers

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<sup>1</sup> Unpublished memorandum from J. Regnart and C. Swanton, ADF&G, to Board of Fisheries, October, 2013.

progressively colonized this channel and, since 2009, a multigenerational beaver dam blocks fish passage some years upstream of the confluence of this channel with Goose Creek.

Sheep, Goose, and Willow creek king salmon are harvested primarily in inriver sport fisheries. Sport harvests from 1977–2018 have been estimated from the Statewide Harvest Survey for each creek (Table 1; Figure 3). These stocks may also be harvested in the Northern District commercial set gillnet king salmon fishery, and a subsistence fishery that occurs in the Tyonek Subdistrict marine waters adjacent to the community of Tyonek. No estimates of harvest for Sheep Creek and Goose Creek king salmon stocks to the marine fisheries are available because the stock contribution of these fisheries has never been fully determined.

## **SHEEP CREEK**

### **Escapement**

The average escapement index from 1979–2018 was approximately 750 fish (Table 1; Figure 4). A more recent average (2014–2018) is approximately 350 king salmon. Despite cautious incremental development of regulation since 1980; inseason emergency order (EO) closures of the sport fishery in 2009, 2010 and 2012; and regulatory and preseason EO actions since 2011 to restrict harvest of king salmon in both sport and commercial fisheries, the sustainable escapement goal (SEG) was not achieved on years a count could be conducted.

Indexing Sheep Creek king salmon escapement is challenging some years because the creek is semi glacial, which makes sighting and counting spawners difficult. Escapement survey counts were not possible in 6 of the past 10 years due to poor survey conditions, including 2019 (Table 1). Given streams adjacent to Sheep Creek did not achieve their respective SEGs in 2019, it is likely the SEG of Sheep Creek was similarly not met.

### **Harvest**

From 1979–2018, Sheep Creek experienced up to 18,700 angler-days of sport fishing effort per year (Table 1; Figure 3) and averaged approximately 9,000 angler-days. In 2018, approximately 3,100 angler-days were expended. Sport harvest of king salmon from this system was as high as 2,600 fish (1992); however, no king salmon have been harvested since 2011 due to emergency orders prohibiting harvest or total closure of the sport fishery (Table 1; Figure 3).

Prior to 2002, the Northern District commercial set gillnet king salmon fishing season occurred during June. Fishing was allowed for six hours each Monday (i.e., three 6-hour periods) until a quota of 12,500 king salmon was harvested or until the regular season opened on June 25. The Northern District commercial fishery was liberalized by the board in 2005 from six hours per period to 12 hours per period, and in 2008 from three periods per season to four or five periods per season. Beginning in 2011, as a result of several king salmon stocks receiving a stock of concern designation, the board prohibited commercial fishing in marine waters from the wood chip dock (located near Tyonek) to the Susitna River. In 2012, the department reduced all directed king salmon fishing periods from 12 hours to 6 hours and closed the first regular fishing period of the year on June 25 for king salmon conservation. In 2013, the first commercial period of the king salmon-directed fishery was closed and all remaining periods were again reduced to 6 hours. Commercial harvest of king salmon in the Northern District averaged 1,626 for the last 5 years prior to 2018; the fishery was closed entirely from 2018 and 2019. Commercial harvests since 1993 averaged 2,150 fish.



The subsistence fishery occurs in the Tyonek Subdistrict marine waters adjacent to the community of Tyonek in West Cook Inlet (Figure 5). The subdistrict includes the area from one mile south of the mouth of the Chuitna River south to the easternmost tip of Granite Point, and from the mean point of high tide to the mean point of low tide. The average harvest of king salmon in the subsistence fishery from 1980–2018, based on returned permits, was 1,421 fish (Table 3). The average number of permits issued during the same time period was 79, and the number of returned permits was 59 (75%). In the past five years (2014–2018), the subsistence king salmon harvest, based on returned permits, ranged from 896 to 1,308 fish.

## **GOOSE CREEK**

### **Escapement**

The average escapement index from 1979–2018 was approximately 350 fish (Table 1; Figure 4). A more recent average (2014–2018) is approximately 160 fish. Despite cautious incremental development of regulation since 1980, inseason EO closures of the sport fishery in 2009 and 2010, closure of the sport fishery by regulation since 2011, and restrictions to the Northern District commercial set gillnet king salmon fishery since 2011, the SEG was not achieved. During the aerial survey in 2009 and 2010, a beaver dam appeared to block adult fish passage to the upper reaches of the index area, and this same area had poor visibility in 2013 (Figure 2). The beaver dam likely reduced the number of spawning salmon above this location by an unknown amount, but surveyors typically observe the majority of spawning king salmon below the location of the dam. Sightability of fish can be challenging depending on the volume of semi glacial waters flowing into Goose Creek by way of its connection with Sheep Creek, which change on a yearly basis. A count could only be conducted in two of the past 5 years and on both years (2017 and 2018) the SEG was not met.

### **Harvest**

Sport fishing effort at Goose Creek from 1979–2018 averaged approximately 2,200 angler-days per year (Table 1; Figure 3). Between 2014 and 2018, angler effort ranged from 3,672 angler-days to 339 angler-days. Sport harvest of king salmon from this system was as high as 1,033 fish (1992); no harvest has occurred since closed by emergency order 2009–2010 and then by regulation in 2011.

See “Sheep Creek” above for an explanation of the subsistence and commercial fisheries.

## ***Willow Creek***

### **Escapement**

The average escapement in Willow Creek from 1979–2018 was approximately 2,100 fish (Table 1; Figure 3). A more recent average (2014–2018) is approximately 1,400 fish. An estimated 2% hatchery fish stray into the Willow Creek escapement annually. Despite cautious incremental development of regulations since 1980 and prohibition of harvest and full closure of the sport fishery in recent years by emergency order, the sustainable escapement goal (SEG) was not achieved in three of the past five years.

## Harvest

The sport fishery includes harvest of hatchery fish. Past studies (Ivey *et al.* 2009) estimated the contribution of hatchery fish to the sport harvest averaged 40% and ranged from 26–51% (1991–2005). Beginning in 2003, stocking levels were reduced by 50%–60%, except in 2004 when a targeted release of approximately 200,000 smolt occurred. This may have resulted in a higher proportion of wild king salmon in the harvest than in past years. From 1979–2018, this system experienced up to 51,000 angler-days of sport fishing effort per year (Table 1; Figure 2) and averaged approximately 23,000 angler-days. In 2018, approximately 8,600 angler-days were expended. Sport harvest of king salmon from this system was as high as 8,884 fish (1992); however, no harvest has occurred since 2012 due to the sport fishery being restricted to nonretention 2013–2017 and total closure 2018–2019 by preseason emergency order (Table 1; Figure 2).

See “Sheep Creek” above for an explanation of the subsistence and commercial fisheries.

## ESCAPEMENT GOAL EVALUATION

### ESCAPEMENT GOAL HISTORY

The *Salmon Escapement Goal Policy*, adopted by the department in 1992, established the formal process for setting escapement goals and required publication of the goals (Fried 1994). The escapement goals for these systems were adopted in 1993 and were set as point biological escapement goals, representing the escapement index that produced the greatest yield. The goals were calculated as 66% of the average escapement index. A percentage of the average was used because biologists felt that the escapement indexes used in calculating the average were generally above the level needed to sustain high long-term production. The escapement indexes used in the averages occurred during 1979–1992 for Sheep Creek, and 1981–1992 for Goose Creek, except for years when conditions were too poor to conduct a survey. The resulting king salmon escapement goals for Sheep Creek and Goose Creek were 650 and 350 fish, respectively. The king salmon escapement goals for Willow Creek and Goose Creek were 1,350 and 350 fish, respectively.

### ESCAPEMENT DATA AND SEG ANALYSIS

In 2001, based on the *Policy for Statewide Salmon Escapement Goals* (5 AAC 39.223) adopted that year, escapement and return data were reviewed to determine the type of escapement goal (BEG or SEG) and recommend an escapement goal range for Sheep Creek and Goose Creek king salmon. Because escapements are indexed via rotary-wing aerial survey rather than estimated (e.g., weir count, sonar, mark-recapture), total annual returns cannot be estimated. Some age composition data are available for Sheep Creek escapements and harvest. However, harvest data may not be stock specific because the majority of harvest occurs at the confluence of Sheep Creek and the Susitna River. No age composition data are available from harvests or escapements of Goose Creek king salmon. Based on the limitations of these data, the escapement goal policy indicates that a SEG be set based on 5 AAC 39.223 (a)(3): “establish sustainable escapement goals (SEG) for salmon stocks for which the department can reliably estimate escapement levels when

there is not sufficient information to enumerate total annual returns and the range of escapements that are used to develop BEGs.”

### **Sheep Creek**

During the escapement goal review in 2001, twenty-one years of aerial escapement index counts between 1979 and 2000 were inspected and found to have fair data quality, with a high contrast of 10.6 (ratio of highest escapement to lowest escapement) and moderate exploitation. This indicated that the SEG range should be set from the 25<sup>th</sup> and 75<sup>th</sup> percentiles of the escapement data and rounded to the nearest 100 fish. The 25<sup>th</sup> percentile was 634 fish and the 75<sup>th</sup> percentile was 1,160, for a SEG range of 600 to 1,200 fish (Bue and Hasbrouck *Unpublished*).

### **Goose Creek**

Nineteen years of aerial escapement index counts between 1981 and 2000 were inspected and found to have fair data quality, with a medium contrast of 7.7. This indicated that the SEG range should be set from the 15<sup>th</sup> and 85<sup>th</sup> percentiles of the escapement data and rounded to the nearest 50 fish. The 15<sup>th</sup> percentile was 266 fish and the 85<sup>th</sup> percentile was 637, for a SEG range of 250 to 650 fish (Bue and Hasbrouck *Unpublished*).

### **Willow Creek**

Twenty-one years of spawner index counts between 1979 and 2000 were inspected and found to have fair data quality, with a high contrast of 8.5 (ratio of highest escapement to lowest escapement) and moderate exploitation. This indicated that the SEG range should be set from the 25<sup>th</sup> and 75<sup>th</sup> percentiles of the escapement data and rounded to the nearest 100 fish. The 25<sup>th</sup> percentile was 1,660 fish and the 75<sup>th</sup> percentile was 2,768, for a SEG range of 1,600 to 2,800 fish (Bue and Hasbrouck *Unpublished*).

## **ESCAPEMENT GOAL RECOMMENDATION**

Since 2001 the department has reviewed escapement goals of Upper Cook Inlet salmon stocks every three years (Hasbrouck and Edmundson 2007; Fair et al. 2007, 2010). The department recently reviewed these escapement goals in 2019 and recommends dropping Sheep, Goose, and Willow creek individual tributary goals and replacing them with a broader Eastside stock goal of 13,000-25,000 fish. The department is modifying its Susitna River drainage king salmon program by assessing drainages by stocks rather than individual tributaries.

## **STOCK OF CONCERN RECOMMENDATION**

Goose and Willow creek king salmon were designated a stock of yield concern in 2011. Completed Sheep Creek king salmon escapement indexes have not met the SEG since. Inseason management actions taken by EO since 2009 and board action taken in 2011 to correct this trend were insufficient to achieve the current SEGs. Therefore, in October 2013, the department recommended that the board designate Sheep Creek king salmon as a stock of management concern and change the status of Goose Creek king salmon to stock of management concern at the board meeting for Upper Cook Inlet in February 2014. Three of five streams within Unit 2 of the Susitna River, an area now termed the Eastside Stock, are recognized stocks of concern. Eastside (Unit 2 of Susitna River) streams tend to be managed together as a unit and have been since 2012,

when the department began issuing pre-season EOs to restrict or completely prohibit harvest in this area of the Susitna River drainage. Under the Stock Grouping scenario, the entire Eastside Susitna Streams Group would be designated a Stock of Concern and actions by the board would apply to the entire stock group, not just Sheep, Goose, and Willow creeks.

## **OUTLOOK**

The department does not develop a formal forecast of northern-bound king salmon stocks, but based upon recent run performance, king salmon abundance is likely to be below the long-term average.

## **HABITAT ASSESSMENT**

Human activities potentially impacting fish habitat on the Sheep Creek and Goose Creek drainages have remained relatively minor. There were several bridge/culvert repair projects conducted after the 2006 floods. Activity levels have subsided somewhat over the past several years, and projects have been limited to minor bridge and culvert maintenance, and water withdrawals that have little or no direct impacts to salmon production. Land development in the area continues, but no large development projects have been proposed within the watershed of these two creeks. Recreational suction dredging and small-scale commercial placer mining activities have been ongoing, mostly in the headwaters of the Sheep Creek system. This type of mining activity has increased somewhat due to increased gold prices but has likely had little direct impact on salmon production because of its location and how it is conducted.

A document entitled “A Comprehensive Inventory of Impaired Anadromous Fish Habitats in the Matanuska-Susitna Basin, with Recommendations for Restoration, 2013” prepared by department staff is available online. This document contains information on potential habitat projects that could help identify whether any restorative or proactive actions relative to habitat be taken within Goose or Sheep creeks.

## **FISHERIES MANAGEMENT OVERVIEW AND BACKGROUND**

### **SPORT FISHERIES**

All streams crossing the Parks Highway between Willow and Talkeetna (Figure 1) are within the Unit 2 management area of the Susitna River. These streams provide ease of access to fishing and small to moderate runs of king salmon. Because access to these streams is primarily from the road system, they receive relatively high sport angling effort and are managed conservatively. Popular king salmon sport fisheries within Unit 2 include Willow, Little Willow, Caswell, Sheep, Goose, Greys, Montana, and Sunshine creeks, and the Kashwitna River.

Since these streams share similar high angling effort, easy access, and are geographically close together, they are managed collectively as a unit under the same regulatory structure. An EO to restrict (or liberalize) one fishery typically includes all other streams in the unit as well because a closure on one stream would result in intensified pressure on adjacent streams, and possible increased harvest on those streams. Sheep Creek is the third largest of nine king salmon fisheries within Unit 2 largely because of a state-maintained angler access site that is capable of accommodating a high level of traffic.

Unit 2 streams are open to sport fishing January 1; only specified waters of Unit 2 are open to king salmon fishing. King salmon fishing, in general, is limited to the first few miles of Unit 2 streams

which in most cases equates to waters downstream of the Parks Highway. In waters open to king salmon fishing, fishing is allowed only from 6:00 a.m. to 11:00 p.m. from May 15 to July 13. After the third Monday in June, king salmon fishing is allowed only for the following two consecutive weekends (Saturday–Monday) to control harvest rates through the average peak of the runs to these streams.

The board restricted all Unit 2 streams in 2011 after designating Willow and Goose creeks as stocks of yield concern (Sheep Creek was added as a SOC in 2014). Goose Creek was closed to fishing for king salmon and fishing time on other Unit 2 streams (including Sheep Creek) was reduced to 6:00 a.m. to 11:00 p.m. and a third three-day weekend, added by the board in 2005, was removed from regulation. No regulatory changes have occurred since 2011. Emergency orders restricting the sport fishery have been issued preseason 2012–2019 in an effort to achieve escapement goals while maximizing sport opportunity (below).

### **Past Sport Fisheries Management Actions**

The commissioner may, by EO, change bag and possession limits and annual limits, and alter methods and means in sport fisheries (5 AAC 75.003). These changes may not reduce the allocation of harvest amongst other user groups. An EO may not supersede provisions for increasing or decreasing bag and possession limits or change methods and means specified in regulatory management plans established by the board.

Sport fisheries for king salmon in Susitna River Unit 2 streams began to open following a period when sport fisheries were closed to fishing for king salmon through most of the 1970s. Cautious incremental expansion of fishing opportunity occurred from 1980 through 2005, followed by reductions in opportunity since then. Below is an outline of significant changes to sport fisheries that affected harvest and escapement of king salmon to Unit 2 streams:

1977:

- NCI king salmon greater than 20 inches in length closed to sport harvest.

1979:

- King salmon sport fishing open on Saturdays and Sundays for four consecutive weekends on Willow, Montana, and Caswell creeks.
- Bag and possession limit of one king salmon 20 inches or greater in length.
- Annual limit of five king salmon established.

1980:

- Bag and possession limit changed to two per day greater than 20 inches, but only one could be greater than 28 inches.

1981:

- Bag and possession limit changed to one per day and two in possession greater than 20 inches.

1986:

- Bag and possession limit changed to one per day and two in possession greater than 16 inches.

- Goose, Sheep, Little Willow, Sunshine, and Birch creeks added to list of weekend only fisheries.

1987:

- King salmon sport fishing open on Saturdays, Sundays, and Mondays for four consecutive weekends.

1990:

- No seasonal limit.

1992:

- Seasonal limit of five king salmon greater than 16 inches.
- Guides prohibited from fishing while engaged in guiding activities for king salmon.

1995:

- Bag and possession limit changed to one per day and one in possession greater than 16 inches.
- The use of bait was prohibited during king salmon season and allowing sport fishing.

1997:

- A person may not fish for king salmon during the same day after taking a king salmon 16 inches or greater in length.

1999–2003:

- King salmon sport fishing season extended by EO.

2005:

- King salmon season extended by regulation for an additional three-day weekend.

2009:

- King salmon sport fishing, including catch-and-release, closed by EO on Parks Highway streams during final weekend.

2010:

- King salmon sport fishing, including catch-and-release, closed by EO on Parks Highway streams during final two weekends.

2011:

- Goose and Willow creeks designated as stocks of yield concern.
- Goose Creek closed to fishing for king salmon.
- In Unit 2 of the Susitna River, fishing time reduced to 6:00 a.m. to 11:00 p.m. and last three-day weekend removed from regulation.

2012:

- In Unit 2 of the Susitna River other than Goose Creek, preseason EO allowed harvest through the second Monday in June, instead of the third Monday used in regulation, then catch-and-release only for the following three, three-day weekends.

- King salmon sport fishing, including catch-and-release, closed by EO on Parks Highway streams during final weekend.

2013–2017:

- In Unit 2 of the Susitna River other than Goose Creek, preseason EO allowed only catch-and-release fishing to occur during the days and times specified in regulation during which Parks Highway fisheries are normally prosecuted.

2018–2019:

- Unit 2 fisheries closed preseason by EO.

## **COMMERCIAL FISHERIES**

Some marine harvest of Sheep Creek and Goose Creek king salmon stocks may occur in the adjacent Northern District set gillnet king salmon fishery, but the stock contribution of this fishery has never been fully determined. The current management plans pertinent to king salmon returning to these rivers are:

5 AAC 21.363. *Upper Cook Inlet Salmon Management Plan.*

5 AAC 21.366. *Northern District King Salmon Management Plan.*

The Northern District king salmon fishery opens for commercial fishing beginning on the first Monday on or after May 25, and continues through June 24, unless closed earlier by EO. Fishing periods are from 7:00 a.m. to 7:00 p.m. on Mondays. Set gillnets may not exceed 35 fathoms in length and six inches in mesh size, and no set gillnet may be set or operated within 1,200 feet of another set gillnet (twice the minimum distance in the Northern District sockeye salmon fishery). The most productive waters for commercial harvest of king salmon are found from one mile south of the Theodore River to the mouth of the Susitna River; however, this area is open to fishing for the second regular Monday period only (Figure 6). The harvest may not exceed 12,500 king salmon.

If the Theodore, Lewis, or Ivan rivers are closed to sport fishing, the area from an ADF&G regulatory marker located one mile south of the Theodore River to the Susitna River shall be closed to commercial king salmon fishing for the remainder of the directed king salmon fishery. If the Deshka River is closed to sport fishing, the commercial king salmon fishery throughout the Northern District shall be closed for the remainder of the directed king salmon fishery. If the Chuitna River is closed to sport fishing, the area from a point at the wood chip dock (located approximately three miles south of Tyonek) to the Susitna River shall be closed to commercial king salmon fishing for the remainder of the directed king salmon fishery.

## **Past Commercial Fisheries Management Actions**

The *Northern District King Salmon Management Plan* was first adopted in 1986 and has been changed at various board meetings. In the early 1990s, various EOs and regulatory changes were issued limiting the commercial harvest of king salmon. Prior to 2002, the Northern District commercial king salmon fishing season was the month of June, and fishing was allowed for six hours each Monday until a quota of 12,500 king salmon was harvested or until the season closed on June 24. In 2005, fishing time was increased from six to twelve hours due in part to fewer

registered users and a trend of increasing king salmon runs. Each participant was allowed one 35-fathom gillnet and a minimum distance of 1,200 feet had to be maintained between nets.

Below is an outline of significant changes to commercial fisheries that may have affected harvest and escapement of king salmon returning to the Sheep Creek and Goose Creek:

1994:

- Final commercial fishing period closed by EO.

1995:

- Commercial fishing limited by EO to only one period.

1996:

- Commercial fishing limited by EO to only one period.

1997:

- Season closure of Northern District commercial salmon fishery from one mile south of Theodore River to the mouth of Susitna River.
- Commercial fishing in remainder of Northern District limited by EO to only one period.

1998:

- Season closure of Northern District commercial salmon fishery from one mile south of Theodore River to the mouth of Susitna River.
- Commercial fishing in remainder of Northern District limited by EO to two periods.

1999:

- Northern District commercial king salmon season opened June 1 through June 24.
- The area from one mile south of the Theodore River to the Susitna River opened the first Monday in June only.

2002:

- Northern District commercial king salmon fishery opened on or after May 25, but not to exceed three fishing periods.
- The area from one mile south of the Theodore River to the Susitna River opened on the second fishing period only.

2005:

- Commercial fishing periods increased from six hours to twelve hours.

2008:

- Commercial fishing periods increased from three periods to four or five periods by extending the season through June 24.
- Fifth commercial fishing period closed by EO.

2009:

- First two fishing periods reduced from 12 hours to 6 hours by board emergency regulation.
- Fourth and fifth commercial fishing periods closed by EO.



2010:

- Northern District commercial salmon fishery closed from one mile south of Chuitna River to the mouth of Susitna River by EO.
- Third commercial fishing period reduced from 12 hours to 6 hours.

2011:

- Closed that portion of the General Subdistrict of the Northern District from a point at the wood chip dock located approximately three miles south of Tyonek to the Susitna River.

2012:

- Reduced fishing time in all areas of the Northern District Chinook Salmon fishery from 12 to 6 hours per open period.
- Closed that portion of the General Subdistrict of the Northern District from a point at the wood chip dock located approximately three miles south of Tyonek to the Susitna River.
- Closed Northern District salmon fishing period of June 25.

2013:

- All fishing periods reduced from 12 hours to 6 hours (7:00 a.m. to 1:00 p.m.) by EO.
- First regular fishing period of the directed king salmon fishing season (May 27) closed in all of the Northern District by EO.

2014:

- Closed all of Northern District commercial king salmon fishery for May 26.
- Reduced fishing time in all areas of the Northern District commercial king salmon fishery from 12 to 6 hours per open period.
- Closed that portion of the General Subdistrict of the Northern District from a point at the wood chip dock located approximately three miles south of Tyonek to the Susitna River.

2015:

- Closed all of Northern District commercial king salmon fishery for May 25.
- Reduced fishing time in all areas of the Northern District commercial king salmon fishery from 12 to 6 hours per open period.
- Closed that portion of the General Subdistrict of the Northern District from a point at the wood chip dock located approximately three miles south of Tyonek to the Susitna River.
- Restored Northern District commercial king salmon fishery to 12 hours for June 15 and 22; not including area from wood chip dock to the Susitna River.

2016:

- Reduced fishing time in all areas of the Northern District commercial king salmon fishery from 12 to 6 hours per open period.
- Closed that portion of the General Subdistrict of the Northern District from a point at the wood chip dock located approximately three miles south of Tyonek to the Susitna River.

2017:

- Closed that portion of the General Subdistrict of the Northern District from a point at the wood chip dock located approximately three miles south of Tyonek to the Susitna River.

- Reduced fishing time in all areas of the Northern District commercial king salmon fishery from 12 to 6 hours per open period on June 19.

2018:

- Closed all of Northern District commercial king salmon fishery
- Closed Northern District salmon fishing period of June 25.

2019:

- Closed all of Northern District commercial king salmon fishery.

## **SUBSISTENCE FISHERY**

Regulations for the Tyonek Subdistrict subsistence set gillnet fishery were established by court order in 1980 and adopted by the board in 1981 following a positive customary and traditional use (C&T) finding. In an administrative finding made in November 1992, the board established the following amounts as reasonably necessary for subsistence (ANS) for this fishery: 750–2,750 king salmon, 100–275 sockeye salmon, 50–100 chum salmon, 50–100 pink salmon, and 100–375 coho salmon (Holen and Fall 2011). At the 2011 UCI meeting the board confirmed the C&T use of salmon in the Tyonek Subdistrict and set the amounts reasonably necessary for subsistence in regulation: 700–2,700 king salmon and 150–500 salmon other than king salmon (5 AAC 01.566 (a)(1)(f)). Subsistence fishing is allowed only in the Tyonek Subdistrict of the Northern District in salt waters adjacent to the community of Tyonek. Subsistence fishing is open during two seasons per year. The early season, which runs from May 15 through June 15, is open for three periods per week (Tuesday, Thursday, and Friday) and for 16 hours per period, from 4:00 a.m. through 8:00 p.m. The late season, which runs from June 16 through October 15, is open for one period per week (Saturday) and for 12 hours, from 6:00 a.m. to 6:00 p.m. Few king salmon are harvested during the second fishing period. Between 2002 and 2011 the average harvest of king salmon was 999 during the early fishing period and 8 during the second period.

A subsistence fishing permit is required and there are separate permits for each season of the fishery. The permit is a household permit. The total annual possession limit for each permit is 70 king salmon and 25 salmon other than king salmon for the head of household with 10 additional other salmon for each dependent of the head of household.

Prior to 2011 no more than 4,200 king salmon could be harvested from May through June 30. If 4,200 king salmon were harvested in the early season, the early season closed by EO and the late season would not open until July 1. The cap of 4,200 king salmon was removed in 2011 when the ANS finding was implemented in regulation.

### **Past Subsistence Fishery Management Actions**

There have been no restrictions to the subsistence fishing season or on methods since regulations were adopted in 1980 until 2019, when the fishery was restricted by closing one (Tuesdays) of the three open days per week in the Tyonek subsistence fishery.

## MANAGEMENT OPTIONS FOR ADDRESSING STOCK OF CONCERN

The goal of this action plan is to rebuild the Eastside Susitna king salmon stock to levels that achieve the SEG and provide sustainable harvest opportunity.

Potential management actions described below, other than status quo, are allocative and do not necessarily reflect endorsement by the department. 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 SEG range for the Eastside Susitna king salmon stock.

### ACTION #1 – SPORT FISHERY

**Objective: Reduce harvest of sport-caught king salmon.**

**Background:** Goose Creek was closed by board action in 2011 after being designated a stock of yield concern. Sheep Creek is open to king salmon fishing downstream of the Parks Highway from January 1 through the third Monday in June and for the following two consecutive three-day weekends (Saturday-Monday). From May 15 to July 13 fishing is allowed only from 6:00 a.m. to 11:00 p.m. in waters open to king salmon fishing. The king salmon bag limit is one per day, one in possession for fish 20 inches or greater in length, and only unbaited, artificial lures are allowed June 1–July 13. There is a five fish annual limit for king salmon 20 inches or greater in length.

The sport fishery was not restricted by EO during the 2011 season following the regulatory changes made during the 2011 board meeting. The commissioner’s EO authority was used preseason in 2012 to further restrict harvest opportunity for the majority of the season, and in 2013 to allow only catch-and-release fishing during the entire season. In 2012 the fishery was closed by EO on June 25 but in 2013 remained open to catch-and-release fishing throughout the season. The EOs applied to all Unit 2 streams because these road-accessible streams are managed collectively. In addition, management of other Susitna River streams were taken into consideration because of concerns about possible shifts (increased) in angler effort and harvest. All Unit 2 streams were restricted to catch-and-release fishing by emergency order issued preseason 2014–2017. The fishery was closed completely midseason 2017. In 2018–2019, Unit 2 was closed to king salmon fishing preseason.

### **Option A. – Status Quo**

**Specific Action:** Use EO authority to restrict Unit 2 king salmon sport fisheries to nonretention and/or close the fisheries as needed, preseason and/or inseason. Goose Creek would remain closed. Absent board action, the department anticipates restricting all other Unit 2 streams, including Sheep Creek, by EO in 2020. Action may also be taken in other Susitna River management units to account for shifting of anglers.

**Benefits:** Benefits of continuing to manage Unit 2 streams with EO authority include keeping regulations consistent while retaining the ability to return to more normal fisheries if king salmon runs rebuild prior to the next board meeting. If king salmon abundance appears sufficient to achieve escapement goals, the EO may be rescinded and sport fishing could resume prior to the end of the season.

**Detriments:** Average and below average runs are difficult to detect so EO actions would be reacting to previous seasons' index counts, general regionwide trends, staff surveys of angling success, and inseason aerial monitoring of escapements which can't occur until later in the season.

### **Option B. – Restrict to Nonretention**

**Specific Action:** Board action to restrict all Unit 2 king salmon fisheries to nonretention by regulation. Goose Creek would remain closed.

**Benefits:** Sport fishing gear in nonretention fisheries is typically restricted to one single hook artificial lure to allow fishing opportunity and minimize release mortality.

**Detriments:** In years of low king salmon runs, it may be desirable to eliminate all possible causes of mortality and maximize the number of spawners in the escapement.

### **Option C. – Reduce the King Salmon Sport Fishing Season**

**Specific Action:** Board action to allow only one three-day weekend or reduce days per weekend to fishing for king salmon Eastside Stock group. Goose Creek would remain closed.

**Benefits:** Reducing fishing days would increase king salmon escapement by an unknown amount. The season could be extended by EO during years of large runs as was done prior to 2005.

**Detriments:** This action may not reduce harvest enough during periods of poor productivity unless timely EOs reducing harvest earlier in the season accompanies this action.

### **Option D. – Close Sport Fisheries**

Unit 2 streams would be closed to sport fishing for king salmon, including nonretention.

**Specific Action:** Board action to close all Unit 2 streams to fishing for king salmon.

**Benefits:** Provides the most consistent management option and eliminates release mortality.

**Detriments:** There would be no opportunity to fish for king salmon in Unit 2 until reconsideration at the next UCI board meeting.

## **ACTION #2 – COMMERCIAL FISHERY**

**Objective: Reduce commercial harvest of king salmon.**

**Background:** The Northern District king salmon fishery opens for commercial fishing beginning on the first Monday on or after May 25, continuing through June 24, unless closed earlier by EO. There are four or five fishing periods annually, depending on the calendar year. Fishing periods are from 7:00 a.m. to 7:00 p.m. The commercial fishery is managed to not exceed a harvest limit of 12,500 king salmon.

The *Northern District King Salmon Management Plan* (5 AAC 21.366) contains three provisions closing waters of the northern district by EO contingent on closures to sport fisheries:

- If the Theodore, Lewis, or Ivan rivers are closed to sport fishing, the area from an ADF&G regulatory marker located one mile south of the Theodore River to the Susitna River shall close to commercial king salmon fishing for the remainder of the directed king salmon fishery.
- If the Deshka River is closed to sport fishing, the Northern District shall close commercial king salmon fishing for the remainder of the directed king salmon fishery.
- If the Chuitna River is closed to sport fishing, the area from an ADF&G regulatory marker located one mile south of the Chuitna River (Wood Chip Dock) to the Susitna River shall close to commercial king salmon fishing for the remainder of the directed king salmon fishery.

The commercial fishery was not restricted by EO during the 2011 season following the regulatory changes made during the 2011 board meeting. The commissioner's EO authority was used in 2012 to reduce fishing periods to six hours and close the first period of the general salmon fishing season. In 2013 the department used EO authority to reduce fishing periods to six hours and close the first period of the directed Northern District king salmon commercial fishery.

### **Option A. – Status Quo**

The fishery will continue to be managed as directed in the *Northern District King Salmon Management Plan*. Commercial fishing closures on northern-bound stocks would be dependent on sport fishing management actions, and EO authority would be used to close the Northern District commercial salmon fishery in marine waters from areas along the westside of Cook Inlet specified in the management plan to the mouth of the Susitna River when sport fishing is closed for king salmon on the Chuitna, or Theodore rivers.

**Specific Action:** Use EO authority to close Northern District commercial salmon fishery in designated areas or times when sport fishing is closed for king salmon on the Chuitna or Theodore rivers.

**Benefits:** The benefit of providing the department flexibility to manage Eastside king salmon stock group inseason with EO authority is the potential to liberalize commercial fisheries if king salmon runs to those systems rebuild prior to the next board meeting. These benefits would likely apply to the Eastside king salmon stock group as well. The benefits to Status Quo commercial fishery management is retaining management decisions on stocks that are either closer to the fishery or are deemed better indicators of general stock status (i.e., the Deshka River)

**Detriments:** Emergency order actions are reactive to actions taken in the sport fishery. Emergency orders need to be taken preseason because stock assessment activities occur well after the fishing season. No formal forecast can be made, so actions would be in response to previous season's index counts for Chuitna, Theodore, rivers and general regionwide trends. These trends may not necessarily reflect trends in the Eastside king salmon stock group. The detriments to managing the commercial fishery based on abundance of the Eastside king salmon stock group include not being able to determine how many fish from these systems would be saved in a specific action in the commercial fishery. For example, what does a 12 hour to 6 hour reduction in fishing time mean to additional fish in Sheep Creek, is it one fish, 10 fish, 100 fish, we don't know, but assume it would be a small number.

### **Option B. – Reduce Hours of Commercial Fishing Periods**

Current fishing periods are from 7:00 a.m. to 7:00 p.m.

**Specific Action:** Board action to reduce commercial fishing periods to fewer than twelve hours in length.

**Benefits:** Reducing the Northern District king salmon commercial fishing time would increase king salmon escapements in the Eastside king salmon stock group by an unknown amount.

**Detriments:** Harvest of king salmon would continue and may not be lower than historical harvest ranges. Reduction in harvest of king salmon bound for the Eastside king salmon stock group would be unknown.

### **Option C. – Reduce Number of Commercial Fishing Periods**

Current fishing periods are four or five periods, depending on the calendar year.

**Specific Action:** Board action to reduce commercial fishing periods to fewer than four or five periods.

**Benefits:** Reducing the Northern District king salmon commercial fishing time would increase king salmon escapements in the Eastside king salmon stock group by an unknown amount.

**Detriments:** Harvest of king salmon would continue and may not be lower than historical harvest ranges. Reduction in harvest of king salmon bound for the Eastside king salmon stock group would be unknown.

### **Option D. – Close Specific Fishing Areas**

Past commercial fishing management actions have focused on closing areas near the Chuitna, Theodore, rivers.

**Specific Action:** Board action to reduce areas open to commercial king salmon fishing.

**Benefits:** Reducing the area open to commercial fishing would increase king salmon escapements in the Eastside king salmon stock group by an unknown amount.

**Detriments:** Harvest of king salmon would continue and may not be lower than historical harvest ranges. Reduction in harvest of king salmon bound for the Eastside king salmon stock group would be unknown.

### **Option E. – Close All Commercial Fishing in the Northern District**

The entire Northern District would be closed until the start of the sockeye salmon season on June 25.

**Specific Action:** Board action to close commercial fishing in the Northern District until June 25.

**Benefits:** Potential harvest savings of 1,100 to 3,900 Northern District king salmon and an unknown increase in escapement to the Eastside king salmon stock group because the contribution of this stock to commercial fisheries has never been fully determined.

**Detriments:** If harvest is not the only factor limiting escapement, then this action is not a long-term solution. Additional escapement into Eastside king salmon streams from a complete closure of the ND commercial fishery may not result in escapement goals being achieved.

### **ACTION #3 – SUBSISTENCE FISHERY**

**Objective:** Reduce subsistence harvest of king salmon.

**Background:** The subsistence fishing season operates in two parts. The first part, which focuses on king salmon, is open from 4:00 a.m. through 8:00 p.m. on Tuesdays, Thursdays, and Fridays from May 15–June 15. The second part is open from 6:00 a.m. through 6:00 p.m. on Saturdays from June 16–October 15. Allowable gear is one 10-fathom (60 ft.) gillnet with mesh size no greater than six inches and 45 meshes in depth.

The board has determined that the current three day per week fishing period from May 15 through June 15 provides a reasonable opportunity for subsistence in the Tyonek Subdistrict subsistence fishery.

#### **Option A. – Reduce Hours of Subsistence Fishing Periods**

Current fishing periods are from 4:00 a.m. through 8:00 p.m.

**Specific Action:** Board action to reduce subsistence fishing periods to fewer than 16 hours in length.

**Benefits:** Reducing subsistence fishing time may increase king salmon escapements in Eastside king salmon stock group by an unknown amount.

**Detriments:** Harvest of king salmon of this stock grouping would continue and may not be lower than historical harvest ranges. Restricting hours per period in the subsistence fishery may not provide a reasonable opportunity for success because it may provide fishing opportunity during only one tide per period.

#### **Option B. – Reduce Number of Subsistence Fishing Periods**

Current fishing periods are three days per week (Tuesdays, Thursdays, and Fridays) from May 15–June 15, for a total of 13–15 periods, depending on the calendar year.

**Specific Action:** Board action to reduce subsistence fishing periods to fewer than 13–15 periods.

**Benefits:** Reducing subsistence fishing time may increase king salmon escapements in Eastside king salmon stock group by an unknown amount.

**Detriments:** Harvest of king salmon of this stock grouping would continue and may not be lower than historical harvest ranges. Restricting number of periods in the subsistence fishery may not provide a reasonable opportunity for success because king salmon abundance varies among fishing periods.

## **2020 ALASKA BOARD OF FISHERIES REGULATORY PROPOSALS AFFECTING EASTSIDE SUSITNA KING SALMON**

- Proposal 80- Prohibit retention of king salmon greater than 36” in the Upper Cook Inlet commercial gillnet fisheries
- Proposal 199- Amend the *Northern District King Salmon Management Plan*
- Proposal 200- Close the Northern District commercial king salmon fishery when the sport fishery in the Susitna or Knik Arm drainages are restricted
- Proposal 201- Amend paired restrictions in the Deshka River king salmon sport and commercial fisheries
- Proposal 202- Amend the *Northern District King Salmon Management Plan* to allow operation of one set gillnet per permit
- Proposal 203- Provide additional fishing periods in the Northern District king salmon commercial fishery when the Deshka River king salmon sport fishery is liberalized
- Proposal 205- Clarify the definition of “minimize” in the *Northern District Salmon Management Plan*
- Proposal 206- Amend the *Northern District Salmon Management Plan* to allow for regular amounts of set gillnet gear in the Northern District commercial sockeye salmon fishery during times of reduced effort in the Central District
- Proposal 207- Remove the Eastern Subdistrict gear restrictions in the *Northern District Salmon Management Plan*

### **RESEARCH PLAN**

There has been little research directed at king salmon in the Eastside Susitna king salmon stock. Aside from the current aerial survey program, estimates of harvest by user group, and ancillary information collected from king salmon during other projects, there has been no research to estimate the total abundance of king salmon or age composition information needed to better determine productivity parameters of these stocks.

### **CURRENT RESEARCH PROJECTS**

The following research programs are being or will be conducted to gather detailed information about king salmon stocks in the Susitna River and Northern District. Projects that estimate inriver abundance or mixed stock harvest of Susitna River king salmon also fulfill data gaps identified as part of the Statewide Chinook Salmon Research Initiative.

1. King Salmon Genetic Baseline: The department is developing a genetic baseline for king salmon in Alaska. The baseline includes extensive sampling of populations within Cook Inlet and is nearing completion. At least nine reporting groups can be identified within Cook Inlet: West Cook Inlet streams/Yentna River, Susitna River, Deshka River, Knik and Turnagain Arm streams, Kenai River tributaries, Kenai River mainstem, Kasilof River mainstem, Crooked Creek (Kasilof River tributary), and South Kenai Peninsula streams. Work is ongoing to include additional king salmon populations in the baseline and determine if better separation of populations within these reporting groups may be possible.



2. Marine Harvest Sampling: The department will receive funding, contingent on allocation of funds to the Alaska Sustainable Salmon Fund program, to sample king salmon harvested in the Northern District commercial and Tyonek Subdistrict subsistence fisheries and apply genetic stock identification (GSI) techniques to estimate the contribution of the reporting groups mentioned above to each fishery. This project will provide information necessary to understand the production of Susitna River and North Cook Inlet king salmon stocks and provide new information useful to manage king salmon fisheries in North Cook Inlet.
3. Aerial Surveys: The department plans to continue the single annual aerial escapement index surveys on the Eastside Susitna king salmon stock to monitor trends in king salmon abundance.
4. Susitna River King Salmon Abundance and Spawner Distribution: In 2012 the department conducted a project, funded by the Alaska Energy Authority (AEA), to capture king salmon in the mainstem Susitna River and tag them with radio transmitters to identify spawning locations in the drainage. In 2013 this project was expanded to include the Yentna River, a westside tributary to the Susitna River, and to estimate inriver abundance of king salmon in the Yentna and mainstem Susitna rivers. This project provides data to help assess king salmon escapement into Unit 2 streams and how well the aerial escapement surveys index escapement.
5. Assess Goose Creek Beaver Dam: Assessing beaver dams that impair fish passage is a project identified in the comprehensive anadromous fish habitat inventory document mentioned in the Habitat Assessment section of this Action Plan. A habitat survey could be conducted on Eastside Susitna king salmon stock streams to assess the degree the beaver dam blocks fish passage, and perhaps the quantity and quality of spawning and potential juvenile rearing habitat in the channel upstream of the dam.

## **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 at least 3 consecutive years or is met in at least 4 out of 6 consecutive years, the department may recommend removing Eastside Susitna River king salmon as a stock of concern at the first Upper Cook Inlet board meeting after this condition is met. Management restrictions could be kept in place on specific streams even if the stock goal is met.
2. In the event that two consecutive years of escapements are near the upper bound of the escapement goal range or above the range, management restrictions may be relaxed or set aside using EO authority.

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**Table 1.–Index counts of king salmon escapement, and angler effort and king salmon harvest for Sheep and Goose creeks, 1979–2019.**

Year	Sheep Creek			Goose Creek		
	Escapement	Harvest	Effort	Escapement	Harvest	Effort
1979	778	10	6,728		<sup>c</sup>	
1980		<sup>c</sup> 45	8,014		<sup>c</sup>	
1981	1,013	0	6,936	262		
1982	527	0	9,093	140		
1983	975	0	6,237	477		
1984	1,028	0	6,106	258	0	1,305
1985	1,634	0	2,844	401		
1986	1,285	1,778	10,091	630	145	1,993
1987	895	1,610	9,019	416	334	1,865
1988	1,215	1,847	18,699	1,076	218	2,947
1989	610	1,116	13,010	835	385	3,058
1990	634	1,537	11,392	552	504	3,714
1991	154	<sup>b</sup> 1,519	14,872	968	288	2,811
1992		<sup>c</sup> 2,663	17,509	369	1,033	4,908
1993		<sup>c</sup> 2,300	12,636	347	633	3,423
1994	542	1,349	11,526	375	361	3,300
1995	1,049	746	9,758	374	226	1,993
1996	1,028	1,397	8,112	305	437	1,796
1997		<sup>c</sup> 550	9,172	308	298	3,151
1998	1,160	700	9,716	415	348	2,510
1999		<sup>c</sup> 2,558	17,188	268	371	3,561
2000	1,162	851	12,660	348	258	3,266
2001		<sup>c</sup> 1,420	11,742		<sup>c</sup> 160	2,339
2002	854	928	12,853	565	403	2,845
2003		<sup>c</sup> 1,284	12,878	175	350	2,965
2004	285	914	10,310	417	335	2,645
2005	760	878	8,521	468	150	2,039
2006	580	707	9,437	306	27	2,593
2007	400	964	10,156	105	31	621
2008		<sup>c</sup> 589	8,574	117	134	1,895
2009	500	393	9,248	65	<sup>d</sup> 0	1,640
2010		<sup>c</sup> 153	7,042	76	<sup>d</sup> 0	1,051
2011	350	213	5,868	80	0	717
2012	363	0	3,877	57	0	994
2013		<sup>c</sup> 0	5,268	62	0	674
2014	262	0	4,887	232	0	3,672
2015		<sup>c</sup> 0	3,885		<sup>c</sup> 0	733
2016		<sup>c</sup> 0	4,060		<sup>c</sup> 0	1,686
2017		<sup>c</sup> 0	3,392	148	0	339
2018	334	0	3,092	90	0	763
2019		<sup>c</sup> NA	NA		<sup>c</sup> NA	NA
<b>Averages</b>						
1979-2018	755	775	9,160	345	219	2,230
2009-2018	362	76	5,062	101	0	1,227
2014-2018	298	0	3,863	157	0	1,439
SEG <sup>a</sup>	600-1,200			250-650		
<sup>b</sup> Poor count due to timing, poor visibility or weather conditions.						
<sup>c</sup> No counts conducted due to poor water visibility.						
<sup>d</sup> Beaver dam blocking fish passage.						

**Table 2.—Northern District commercial king salmon directed harvest by statistical area, 2002–2019.**

Year	Date	247-10	247-20	247-30	24-741	247-42	247-43	247-70	247-80	247-90	Total
2002	27-May	95			13	60	4	37	56	5	270
	3-Jun	223	136	85	87	57	16	64	70	72	810
	10-Jun	159	131		34	104	3	63	115	58	667
	Totals	477	267	85	134	221	23	164	241	135	1747
2003	26-May	18		36	37	45		24		19	179
	2-Jun	5	101	4	45	43	54	74	17	6	349
	9-Jun	47	396	67	53	49	2	33	9	1	657
	Totals	70	497	107	135	137	56	131	26	26	1185
2004	31-May	74	33	17	30	43	40	108		9	354
	7-Jun	62	285	147	266	101	82	100		23	1066
	14-Jun		137	47	46	56	38	59		16	399
	Totals	136	455	211	342	200	160	267		48	1819
2005	30-May	166	320		224	203	85	160		5	1163
	6-Jun	103	430	290	97	60	69	65	18	31	1163
	13-Jun	26	391		98	113	129	33	34		824
	Totals	295	1141	290	419	376	283	258	52	36	3150
2006	29-May	174	133	20	76	47	78	80	19	13	640
	5-Jun	322	312	150	247	108	74	127	23	13	1376
	12-Jun	335	489	212	165	116	232	204	79	39	1871
	Totals	831	934	382	488	271	384	411	121	65	3887
2007	28-May	178	99	21	15	42	7	78	28	30	498
	4-Jun	237	162	228	131	94	124	240	36	18	1270
	11-Jun	94	366	126	120	87	181	346	24	20	1364
	Totals	509	627	375	266	223	312	664	88	68	3132
2008	26-May	39	272	42	33	16	27	35	24	11	499
	2-Jun	110	165	49	72	50	37	96	7	11	597
	9-Jun	103	535	143	275	208	153	168	72	31	1688
	16-Jun	118	282	138	162	81	110	132	33	15	1071
	Totals	370	1254	372	542	355	327	431	136	68	3855
2009	25-May		28	14	6	3	1	24	3		79
	1-Jun	111	147	36	12	24	15	68	32	10	455
	8-Jun	148	181	94	64	101	56	77	3	8	732
	Totals	259	356	144	82	128	72	169	38	18	1266
2010	31-May	141	102		43	48	42	32	5	20	433
	7-Jun	180	302		71	63	71	74	22	19	802
	14-Jun		61		8	54	25	19	8	5	180
	21-Jun	17	147		2	23	39	20	7	4	259
	Totals	338	612		124	188	177	145	42	48	1674

**Table 2.–cont.**

2011	30-May	118	85	57	73	129	55	29	6	552
	6-Jun	305	192	51	53	112	64	19	25	821
	13-Jun	132	208	31	60	72	66	18	13	600
	20-Jun	27	83	18	20	32	22	3	9	214
	Totals	582	568	157	206	345	207	69	53	2187
2012	28-May	129	20	7	5	2	32	9	8	212
	4-Jun	35	27	36	26	44	40		6	214
	11-Jun	252	101	16	29	11	58	19	5	491
	18-Jun	10	34	12	14	16	20		7	113
	Totals	426	182	71	74	73	150	28	26	1030
2013	3-Jun	117		91	75	51	24	9		367
	10-Jun	179		52	74	51	87	14	12	469
	17-Jun	121		16	13	15	55	8	4	232
	24-Jun	44		3	13				6	66
	Totals	461		162	175	117	166	31	22	1134
2014	2-Jun	125	38	39	40	43	92	74	30	481
	9-Jun	263		37	45	71	22	10	3	451
	16-Jun	103		15	39	32	48	14	6	257
	23-Jun	41	95	8	23	5	10	3	3	188
	Totals	532	133	99	147	151	172	101	42	1377
2015	1-Jun	83	38	52	38	93	39	25	9	377
	8-Jun	92	76	48	27	85	72	41	22	463
	15-Jun	93	80	58	80	75	38	5	7	436
	22-Jun	86	29	34	33	51	37	10	4	284
	Totals	354	223	192	178	304	186	81	42	1560
2016	30-May	315	170	39	5	45	131	23	23	751
	6-Jun	43	177	1	46	19	76		6	368
	13-Jun	152	74	32	52	101	173		16	600
	20-Jun	42	93	11	37	55	71	1	1	311
	Totals	552	514	83	140	220	451	24	46	2030
2017	29-May	36	81	4	23	62	35	13	3	257
	5-Jun	291	97	7	80	111	151	25	4	766
	12-Jun	160	287	28	33	99	88	24	17	736
	19-Jun	37	107	14	37	43	27	3	4	272
	Totals	524	572	0	53	173	315	301	65	28
2018	Closed									
2019	Closed									

**Table 3.–Subsistence salmon harvests, Tyonek Subdistrict, 1980–2018.**

Year	Permits		Estimated salmon harvests					Total
	Issued	Returned	King	Sockeye	Coho	Chum	Pink	
1980	67	67	1,936	262	0	0	0	2,198
1981	70	70	2,002	269	64	32	15	2,382
1982	69	69	1,590	310	113	4	14	2,031
1983	73	73	2,755	251	78	6	0	3,090
1984	70	70	2,364	310	66	23	3	2,766
1985 <sup>a</sup>	176	ND	1,967	163	91	10	0	2,231
1986 <sup>a</sup>	101	ND	1,674	198	210	44	45	2,171
1987	64	61	1,689	174	156	25	10	2,055
1988	47	42	1,776	102	283	13	9	2,183
1989	49	47	1,303	89	120	1	0	1,513
1990	42	37	886	75	400	14	23	1,397
1991	57	54	925	20	69	0	0	1,014
1992	57	44	1,170	96	294	24	9	1,594
1993	62	54	1,566	68	88	25	23	1,769
1994	58	49	905	101	122	27	0	1,154
1995	70	55	1,632	54	186	18	0	1,891
1996	73	49	1,615	88	177	9	27	1,917
1997	70	42	1,051	200	241	13	0	1,505
1998	74	49	1,430	251	97	3	2	1,783
1999	77	54	1,620	247	175	20	66	2,127
2000	60	47	1,461	78	103	0	8	1,649
2001	84	58	1,450	254	72	9	6	1,790
2002	101	71	1,609	314	162	6	14	2,106
2003	87	74	1,384	136	54	12	9	1,595
2004	97	75	1,751	121	168	0	0	2,040
2005	78	67	1,183	65	159	2	0	1,409
2006	82	55	1,366	32	23	1	0	1,422
2007	84	67	1,526	249	164	3	4	1,946
2008	94	77	1,492	146	227	11	16	1,892
2009	89	69	817	229	320	2	1	1,369
2010	105	77	1,116	281	223	3	3	1,626
2011	114	63	851	202	34	10	10	1,107
2012	89	69	1,102	223	174	3	5	1,507
2013	82	48	1,352	278	311	0	32	1,973
2014	92	73	896	487	575	15	5	1,978
2015	83	72	1,070	505	568	16	6	2,165
2016	74	64	1,030	188	225	8	12	1,462
2017	74	49	1,304	442	306	31	6	2,089
2018	65	27	1,308	188	136	10	7	1,649
5-year average (2014–2018)	78	57	1,122	362	362	16	7	1,869
10-year average (2009–2018)	87	61	1,085	302	287	10	9	1,693
Historical average (1981–2018)	79	59	1,421	197	185	12	10	1,825

Source ADF&G Division of Subsistence, ASFDB 2018 (ADF&G 2019).

a Harvests were not expanded due to unknown permit returns.

ND = no data

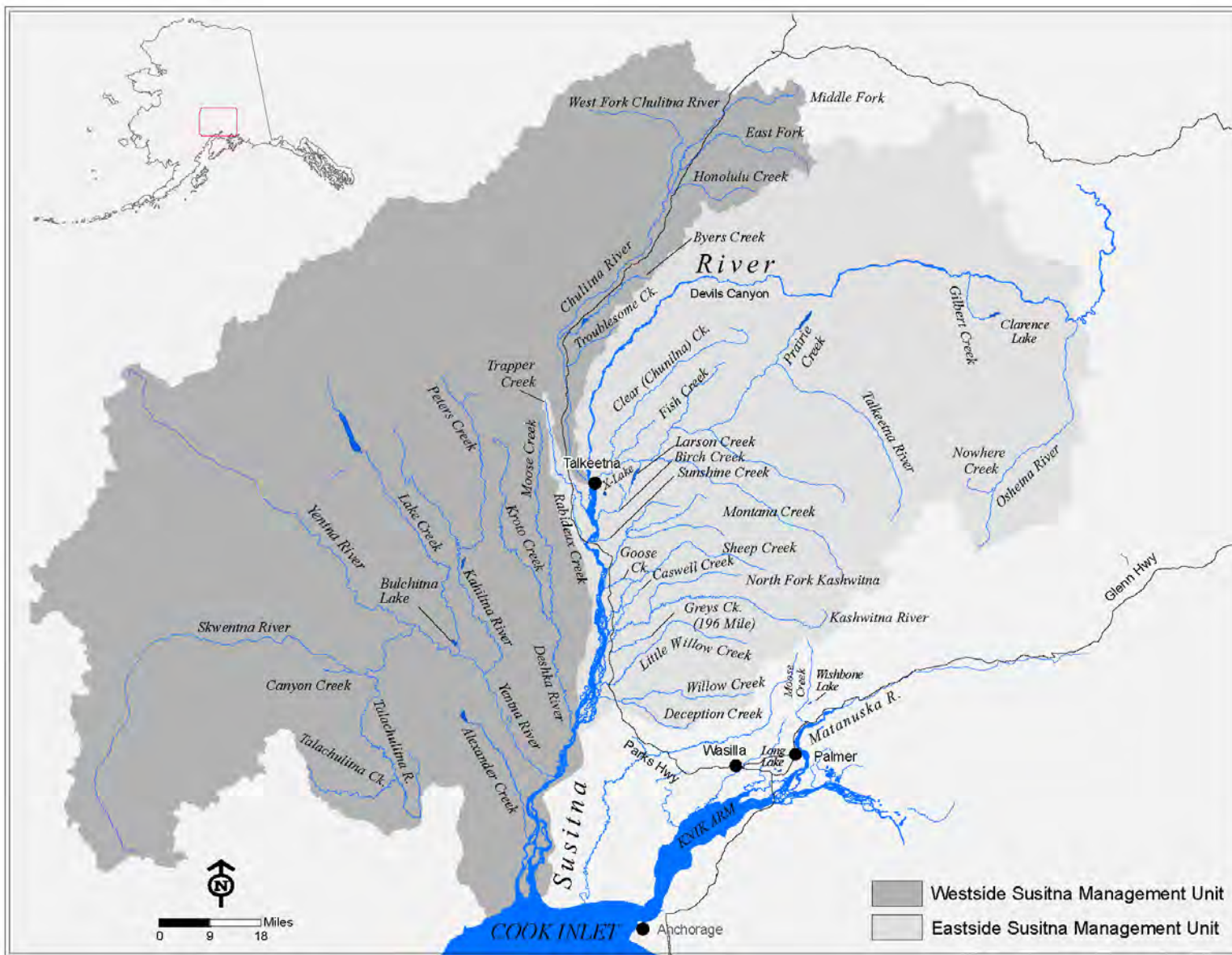
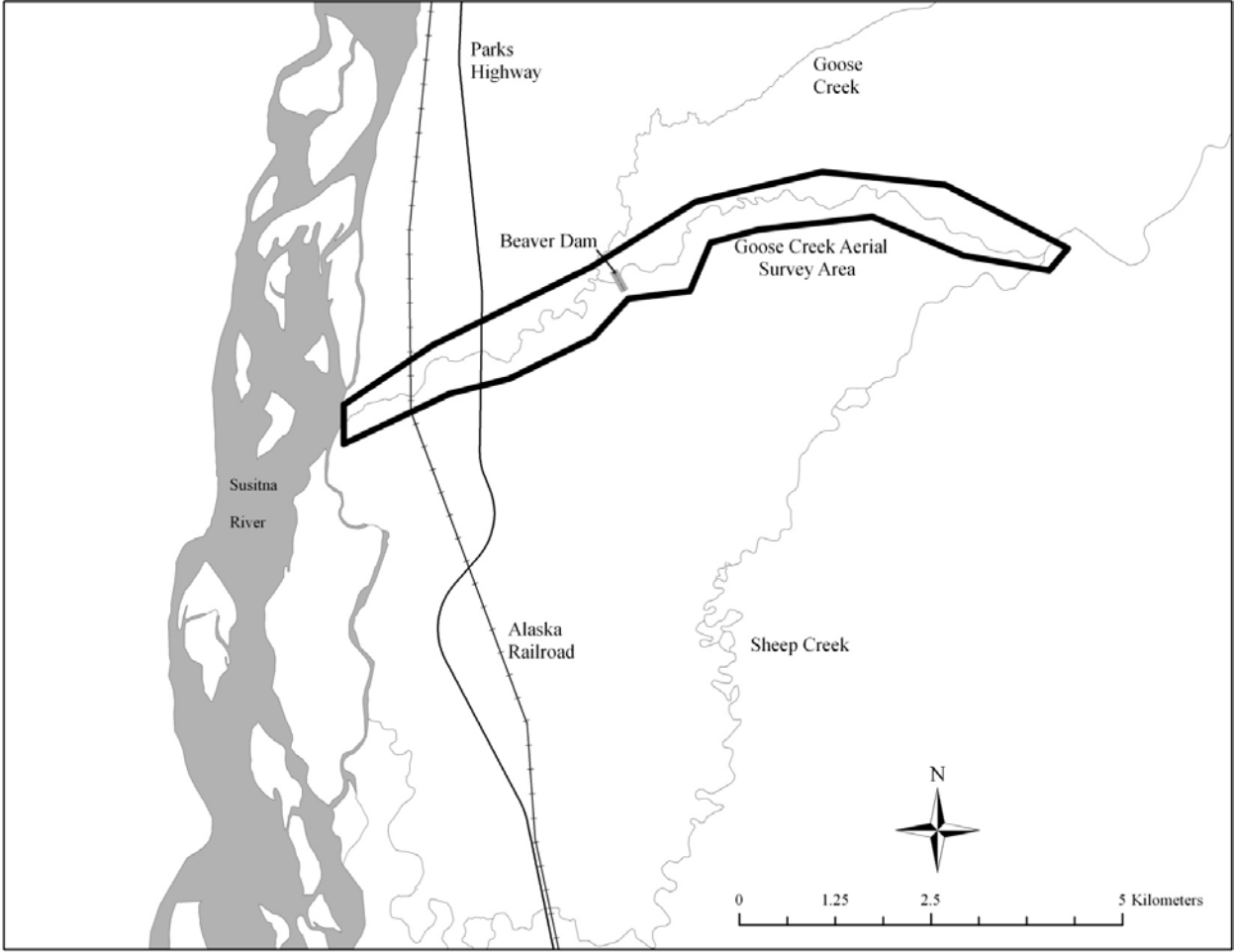


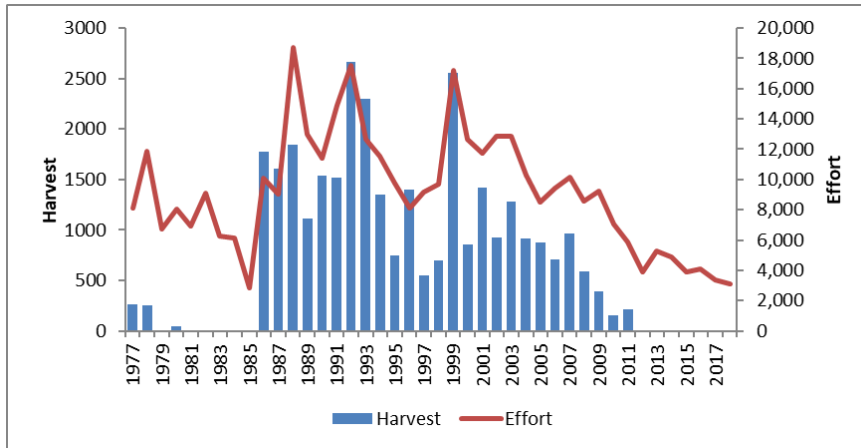
Figure 1.—Map depicting Susitna River drainages.



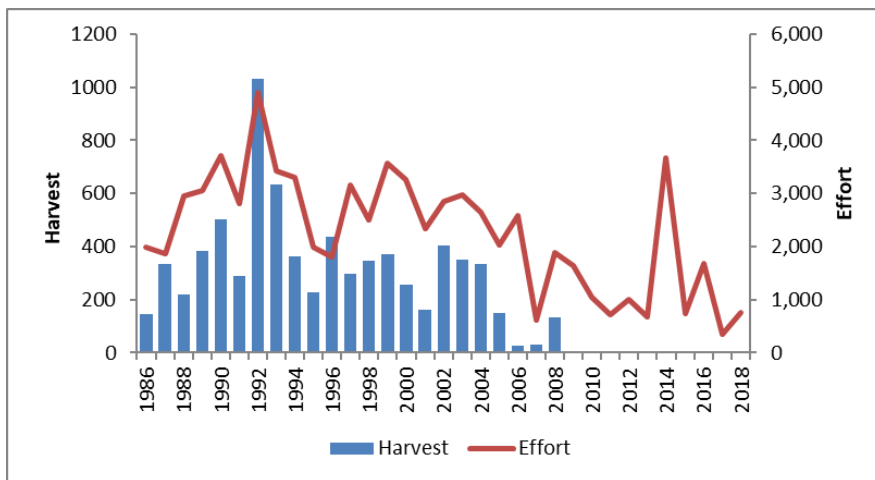
**Figure 2.—Goose Creek king salmon aerial escapement survey index area.**



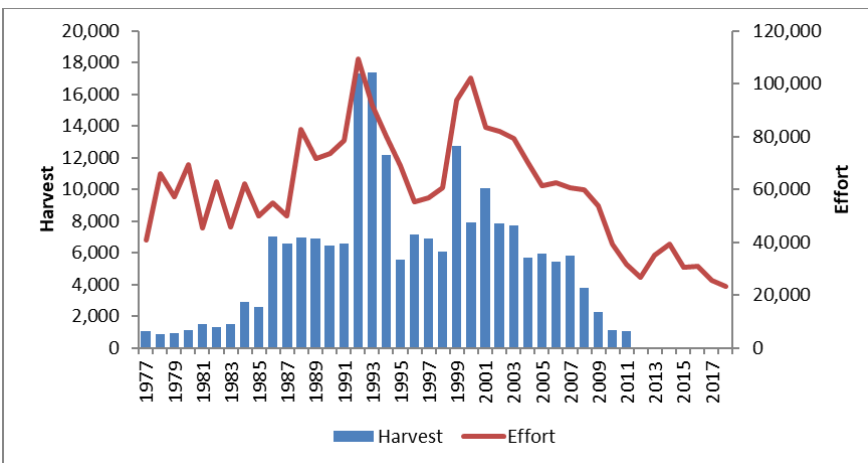
### Sheep Creek



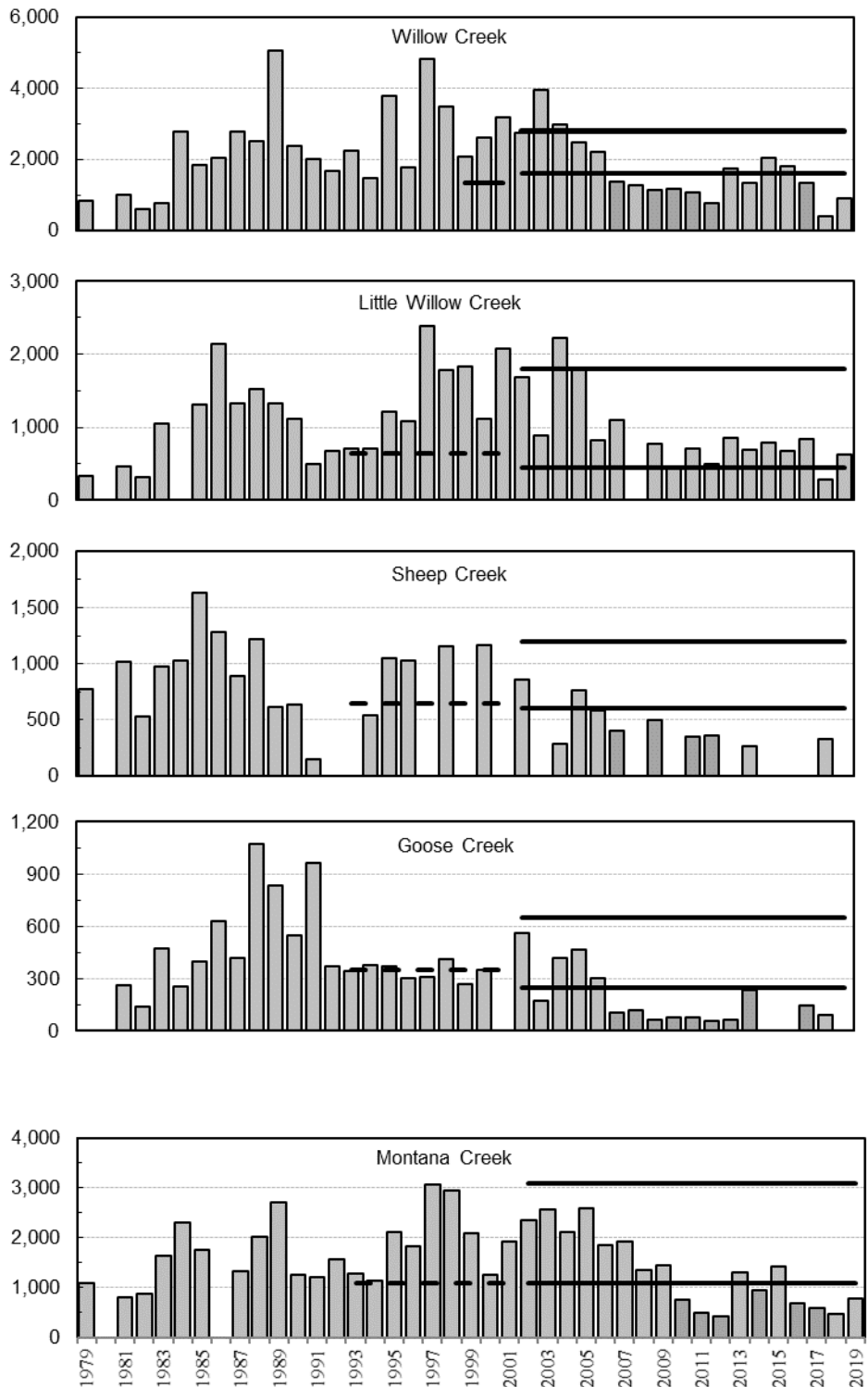
### Goose Creek



### Eastside- All Unit 2



**Figure 3.—Angler effort and king salmon sport harvest for Sheep and Goose creeks, and combined Eastside Stock Group, 1986–2017.**



**Figure 4.–King salmon escapements at Eastside Susitna River tributaries 1979-2019.**

**y-axis = King salmon. escapement (in number of fish).**

**Dashed line = biological escapement goal. Solid lines = sustainable escapement goal range.**

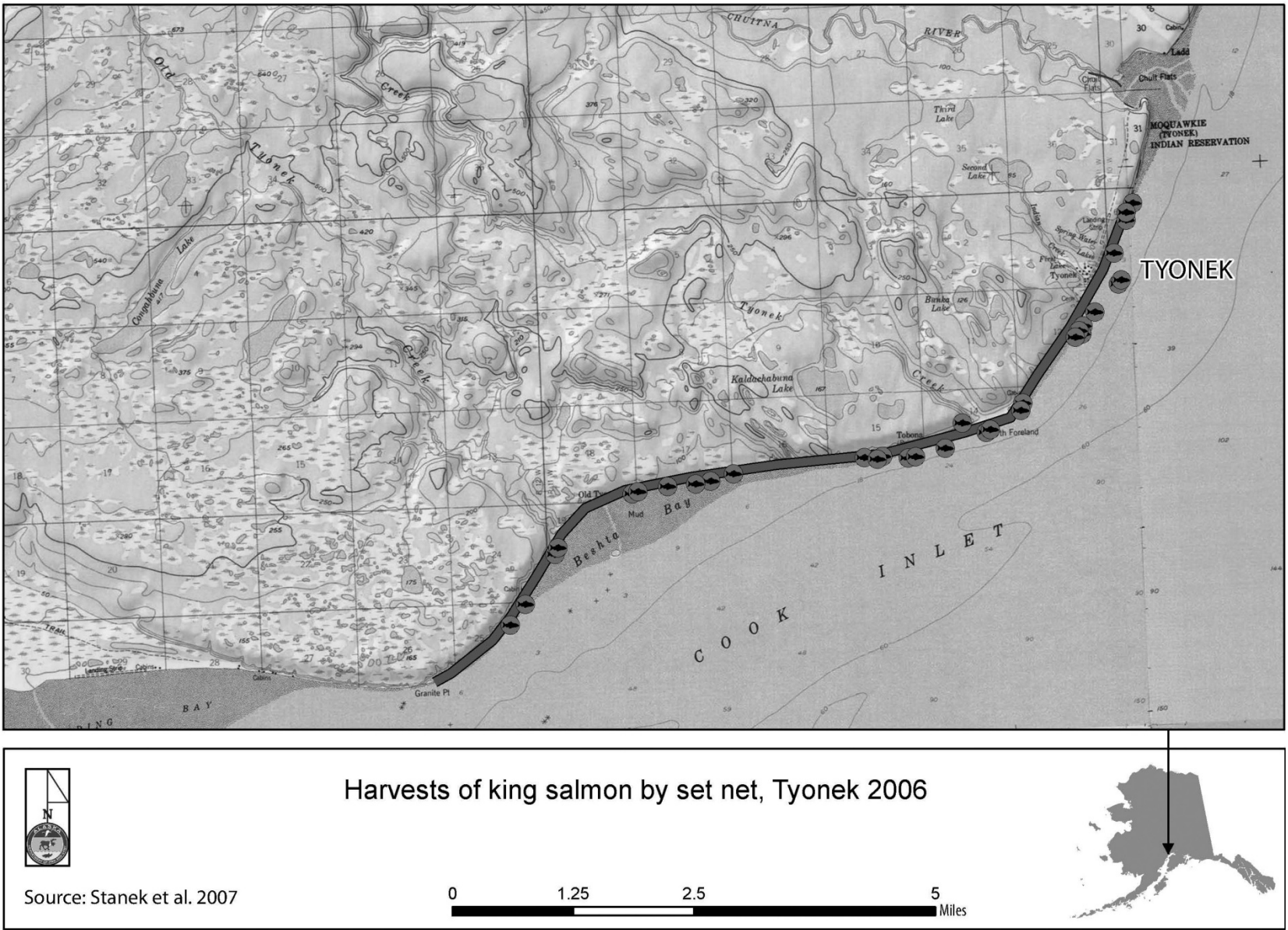


Figure 5.—Map showing harvest locations of king salmon by set gillnet, Tyonek Subdistrict subsistence salmon fishery, 2006.

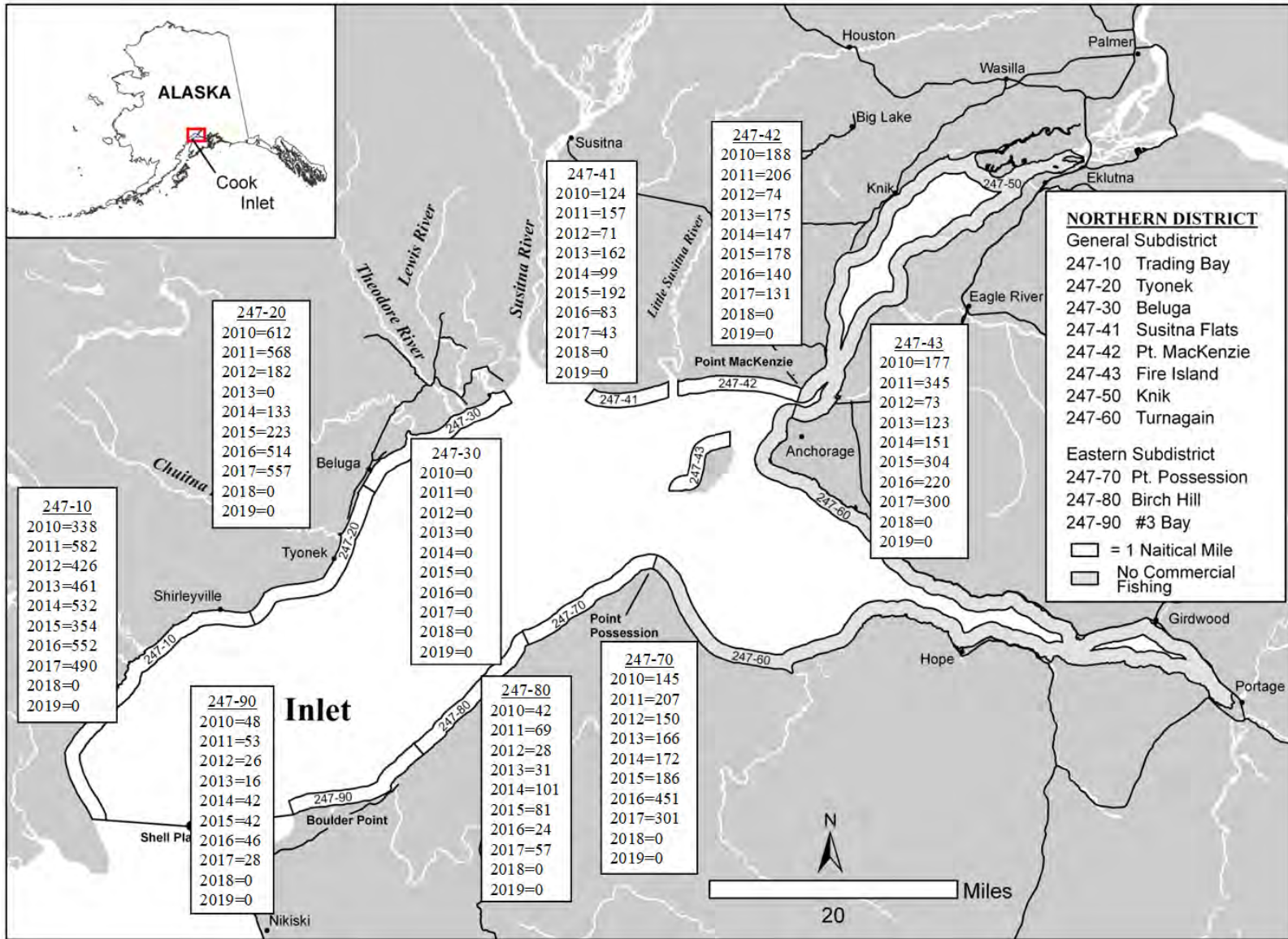


Figure 6.—Northern District statistical harvest reporting areas and directed commercial king salmon harvest, 2010–2013.