Regional Information Report No. 5J21-04

Genetic Stock Composition Estimates for the Upper Cook Inlet Sockeye Salmon Commercial Fishery, 2020

by

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and

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September 2021

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

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

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GENETIC STOCK IDENTIFICATION OF UPPER COOK INLET SOCKEYE SALMON HARVEST, 2020

by

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September 2021

The Regional Information Report Series was established in 1987 and was redefined in 2007 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as area management plans, budgetary information, staff comments and opinions to Alaska Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: http://www.adfg.alaska.gov/sf/publications/.

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This document should be cited as follows:
Barclay, A. W., and E. L. Chenoweth. 2021. Genetic stock identification of Upper Cook Inlet sockeye salmon harvest, 2020. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J21-04, Anchorage.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF APPENDICES (Continued)

Appendix **Page**

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries, is responsible for managing the commercial fisheries in Upper Cook Inlet (UCI) under the sustained yield principle. Application of the sustained yield principle requires an understanding of the relationship between the number of fish that spawn (escapement) in a drainage (stock) and the number of their offspring that make it to reproductive adulthood (returns) in a brood table. The number of offspring that return for each stock is calculated by adding the number of spawners in the drainage to the number of fish harvested before reaching the spawning grounds for each of the 5 major sockeye salmon-producing drainages in UCI: Crescent River, Susitna River, Fish Creek, Kenai River, and Kasilof River (Figure 1).

ADF&G has used genetic mixed stock analysis (MSA) to estimate stock-specific harvests of sockeye salmon (*Oncorhynchus nerka*) in the Central and Northern district commercial fisheries of UCI since 2005. The MSA sampling design has remained relatively consistent since 2005; however, the number of samples and strata analyzed has declined over the years due to budget cuts and the redirecting of project funds to answer other fisheries questions. Regardless, the analyzed samples have represented over 90% of the catch since 2006. Spatiotemporal estimates for each fishing season are provided to area managers the spring following each season. Additionally, overall estimates from 2005 to 2016 were published in Barclay (2017) and estimates from 2015 to 2018 were published in Barclay (2019). However, only spatiotemporal estimates from 2005 to 2019 have been published in ADF&G reports.

Upper Cook Inlet MSA reports generally contain an overview of the management strategy and the highlights of each season to help the reader interpret the patterns of stock composition in the fishery harvests. Overview of the 2020 fishery is not included in this report but can be found in detail in the UCI fishery management report (Marston and Frothingham *in prep*).

This report includes stock composition and stock-specific harvest estimates for 2020 Central District set and drift gillnet fisheries and Northern District set gillnet fishery for the following 8 reporting groups: (1) the largest producer of sockeye salmon on the west side of Cook Inlet (Crescent River; *Crescent*); (2) the remaining West Cook Inlet producers (*West*); (3) the lakes monitored by weirs in the Susitna/Yentna Rivers (Judd/Chelatna/Larson lakes) with the addition of the Mama and Papa Bear Lakes and Talkeetna Sloughs population (*JCL*); (4) the remaining producers in the Susitna/Yentna Rivers (*SusYen*); (5) the only major creek monitored with a weir in the Knik/Turnagain/Northeast Cook Inlet area (Fish Creek; *Fish*); (6) the remaining Knik/Turnagain/Northeast Cook Inlet producers (*KTNE*); (7) the composite of all populations within the Kenai River (*Kenai*); and (8) the composite of all populations within the Kasilof River (*Kasilof*). See Figure 1 for a map of these reporting groups.

METHODS

Methods for the 2020 season MSA generally follow those reported in the 2014 report (Barclay et al. 2018), except for the program used to estimate stock compositions.

Since the 2017 fishery analysis, a new *R*[1] package called *rubias* (Moran and Anderson 2019) has been used to estimate fishery stock compositions. The *rubias* package is a Bayesian approach to the conditional genetic stock identification model based upon computationally efficient C code implemented in *R*. It uses cross validation and simulation to quantify and correct for biases in reporting group estimates. For each mixture analysis, a single Markov Chain Monte Carlo chain with 25,000 iterations was run. The first 5,000 iterations of the chain were discarded to remove the influence of starting values. The prior parameters for each reporting group were defined to be equal (i.e., a flat prior). Within each reporting group, the population prior parameters were divided equally among the populations within that reporting group. Stock proportion estimates and the 90% credibility intervals for each mixture were calculated by taking the mean and 5% and 95% quantiles of the posterior distribution from the single chain output.

RESULTS

TISSUE SAMPLING

Field Sampling

Tissues suitable for genetic analysis were sampled from a total of 15,548 sockeye salmon from commercial catches throughout the UCI Central and Northern districts (Appendix A1).

Subsampling for Analysis

A total of 8 mixture samples (strata) were constructed for estimating stock compositions and stock-specific harvests of fishing area (area strata) harvests in 2020 (Table 1). Mixture sample sizes ranged from 250 to 382 fish.

Drift gillnet

For the Central District drift gillnet fishery, mixtures were constructed to represent both districtwide (excluding corridor-only; 1 mixture) and corridor-only (1 mixture) harvests in 2020 (Table 1; Appendix A1; Appendix B1). See Figure 2 for a map of Central District drift gillnet statistical area boundaries.

Set gillnet

For the Upper Subdistrict (Central District) set gillnet fishery, 2 spatiotemporal mixtures were constructed for 2020 (Table 1; Appendix A1; Appendix B1). In 2020, 2 fishing periods (July 16 and July 21) were restricted to within 600 feet of the mean high tide mark in the Kasilof Section to minimize the harvest of Kenai River Chinook and sockeye salmon. Sufficient samples were collected to construct 2 mixtures to represent the combined July 16 and July 21 harvests for the Kasilof Section (1 mixture) and all other Upper Subdistrict section harvests in 2020 (1 mixture). There were other Upper Subdistrict fishing periods restricted to within 600 feet of the mean high tide mark in 2020 (Marston and Frothingham *in prep*); however, insufficient samples were collected to construct separate mixtures representing those harvests.

[1] The R project for statistical computing, Vienna, Austria. Available from https://www.R-project.org/ (accessed September 17, 2021).

For the Western, Kustatan, and Kalgin Island subdistricts (Central District) set gillnet fisheries, a single mixture was constructed to represent the combined subdistricts harvest in 2020 (Table 1; Appendix A1; Appendix B1).

For the Eastern and General subdistricts (Northern District) set gillnet fisheries, 3 mixtures were constructed to represent the Eastern Subdistrict, and the north and south sections of the General Subdistrict harvests in 2020 (Table 1; Appendix A1; Appendix B1).

See Figure 3 for a map of set gillnet subdistrict boundaries.

STOCK COMPOSITION AND STOCK-SPECIFIC HARVEST ESTIMATES

Individual Strata

Stock composition and stock-specific harvest estimates for individual strata (mixtures) for each fishery can be found in 3 appendices:

(1) Central District drift gillnet; Appendix C
(2) Central District set gillnet, including Upper Subdistrict and Western, Kustatan, and Kalgin Island subdistricts; Appendix D
(3) Northern District set gillnet, including Eastern and General subdistricts; Appendix E

Estimates by Area Strata

Annual stock-specific harvest estimates for area strata can be found in Table 2 and Figure 4.

All Strata Combined

Annual UCI stock-specific harvest estimates representing all analyzed strata from 2005 to 2020 can be found in Table 3 and Figure 5.

ALL STRATA 2005–2020

A summary of all strata analyzed since 2005, including where the estimates were reported, can be found in Appendix F1 and F2.

ACKNOWLEDGEMENTS

Producing the MSA estimates in this report required the efforts of a large number of dedicated people. The author acknowledges ADF&G Gene Conservation Laboratory members Heather Hoyt and staff for producing genetic data used in the MSA and Christopher Habicht for reviewing this document. The author would like to thank the people with Soldotna commercial fishery sampling crews who collected the thousands of samples required for producing harvest-proportional samples of fish for MSA.

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TABLES AND FIGURES

Table 1.–Commercial fishery strata (mixtures) for estimating stock compositions and stock-specific harvests for 2020, including mixture number, the fishery and fishing area represented, sampling dates, dates and harvest represented by each mixture, and number of fish genotyped and used in mixed stock analysis.

Mixture No.	Fishery	Area	Dates sampled	Dates represented	Harvest represented	Number of fish	
						Genotyped	Used[a]
1	Central District drift	Districtwide (excluding corridor-only periods)	6/22–7/13	6/22–7/13	103,502	380	374
2	Central District drift	Corridor-only periods	7/16–8/15	7/15–8/15	166,764	381	371
3	Central District set (East Cook Inlet)	Upper Subdistrict (All sections)[b]	6/23–7/22	6/23–7/22	274,412	382	371
4		Upper Subdistrict (Kasilof Section 600 ft)[c]	7/16 & 7/21	7/16 & 7/21	7,765	381	366
5	Central District set (West Cook Inlet)	Western, Kustatan, & Kalgin Island subdistricts	6/22–8/10	6/15–8/17	61,619	382	364
6	Northern District set	Eastern Subdistrict	7/2–8/13	6/25–8/20	24,865	379	353
7		General Subdistrict - north	7/9–8/13	7/2–8/20	4,519	250	235
8		General Subdistrict - south	7/6–8/13	6/29–8/20	14,723	380	355

[a] Samples missing genotypes for 20% or more loci and duplicate samples were removed prior to analysis.

[b] This mixture sample includes fish from July 6, when the Kenai Section fishery were restricted to within 600 feet of the mean high tide mark and does not include fish from the Kasilof Section on July 16 and 21.

[c] This mixture sample only includes fish from fisheries restricted to within 600 feet of the mean high tide mark.

Table 2.–Stock-specific harvest, standard deviation (SD), and 90% credibility intervals calculated using a stratified estimator for combined strata in the Central District drift gillnet excluding corridor-only periods (1 temporal strata); drift gillnet corridor-only periods (1 temporal stratum); Western, Kustatan, and Kalgin Island subdistricts set gillnet (1 temporal stratum); Upper Subdistrict set gillnet (2 spatiotemporal strata); and Northern District set gillnet (3 spatiotemporal strata) fisheries and based on genetic analysis of mixtures of sockeye salmon harvested in Upper Cook Inlet in 2020.

			90% CI		
Area strata	Reporting group	Harvest	5%	95%	SD
Central District drift gillnet (excluding corridor-only periods)					
	Crescent	859	0	2,542	839
	West	6,318	3,614	9,493	1,788
	JCL	4,350	2,267	6,819	1,394
	SusYen	9,132	3,932	14,565	3,265
	Fish	6,906	4,142	9,842	1,732
	KTNE	1,778	366	4,202	1,258
	Kenai	55,036	47,990	62,161	4,271
	Kasilof	19,122	13,990	24,354	3,192
	Harvest represented	103,502			
	Harvest unrepresented	2,801			
	Total harvest	106,303			
Central District drift gillnet (corridor-only periods)					
	Crescent	177	0	1,028	448
	West	11,864	7,462	17,139	2,954
	JCL	4,956	2,174	8,327	1,917
	SusYen	1,740	242	5,365	1,837
	Fish	1,662	0	4,262	1,353
	KTNE	1,061	0	3,407	1,158
	Kenai	139,998	132,816	146,758	4,345
	Kasilof	5,307	1,702	9,677	2,429
	Harvest represented	166,764			
	Harvest unrepresented	0			
	Total harvest	166,764			

-continued-

Table 2.–Page 2 of 2.

Area strata	Reporting group	Harvest	90% CI 5%	90% CI 95%	SD
Central District, Upper Subdistrict set gillnet					
	Crescent	247	0	1,186	572
	West	942	0	4,864	1,881
	JCL	2,929	98	6,905	2,160
	SusYen	1,897	0	8,549	2,958
	Fish	8,422	3,076	15,081	3,740
	KTNE	5,422	1,782	10,535	2,796
	Kenai	142,352	126,375	159,405	10,080
	Kasilof	119,966	103,660	135,442	9,648
	Harvest represented	282,177			
	Harvest unrepresented	0			
	Total harvest	282,177			
Central District, Western, Kustatan, and Kalgin Island Subdistricts set gillnet					
	Crescent	27,903	24,389	31,627	2,168
	West	17,161	14,132	20,336	1,877
	JCL	138	0	640	229
	SusYen	122	0	682	307
	Fish	64	0	376	158
	KTNE	534	0	2,024	721
	Kenai	8,404	5,833	11,217	1,644
	Kasilof	7,294	5,346	9,377	1,223
	Harvest represented	61,619			
	Harvest unrepresented	6,507			
	Total harvest	68,126			
Northern District, Eastern and General Subdistricts set gillnet					
	Crescent	128	0	465	164
	West	6,831	5,722	8,269	792
	JCL	7,083	6,101	8,134	610
	SusYen	8,665	6,992	10,383	1,038
	Fish	11,162	9,892	12,408	774
	KTNE	7,214	5,666	8,872	970
	Kenai	2,843	1,768	4,041	688
	Kasilof	181	0	675	232
	Harvest represented	44,107			
	Harvest unrepresented	1,938			
	Total harvest	46,045			

Table 3.–Stock-specific harvest, standard deviation (SD), and 90% credibility intervals (CI) calculated using a stratified estimator for combined spatial and temporal strata in all represented fishing area strata and based on genetic analysis of sockeye salmon harvested in the Upper Cook Inlet commercial fishery, 2005–2020. The numbers of fish that contribute to the unrepresented strata are also provided.

			90% CI		
Year	Reporting group	Mean	5%	95%	SD
2005	*Crescent*	14,569	107	29,869	8,821
	West	33,352	20,975	49,146	8,750
	JCL	27,178	17,392	38,970	6,613
	SusYen	27,748	15,479	43,405	8,693
	Fish	3,935	90	9,413	2,952
	KTNE	14,820	6,907	25,800	5,914
	Kenai	2,936,487	2,873,151	2,999,297	38,564
	Kasilof	1,019,935	960,285	1,080,028	36,531
	Harvest represented	4,078,024			
	Harvest unrepresented	1,157,465			
	Total harvest	5,235,489			
2006	*Crescent*	27,109	25,290	30,394	1,644
	West	53,574	45,690	62,233	5,053
	JCL	16,230	12,447	20,392	2,422
	SusYen	28,231	21,890	35,100	4,019
	Fish	333	8	1251	507
	KTNE	17,350	12,749	22,525	2,979
	Kenai	577,512	557,738	597,314	12,032
	Kasilof	1,324,611	1,304,965	1,344,149	11,928
	Harvest represented	2,044,951			
	Harvest unrepresented	143,252			
	Total harvest	2,188,203			
2007[a]	*Crescent*	54,041	47,038	62,475	4,757
	West	152,145	128,233	177,461	14,971
	JCL	134,111	112,750	156,726	13,420
	SusYen	104,916	75,880	136,631	18,509
	Fish	8,200	3,943	14,174	3,189
	KTNE	75,059	56,784	95,117	11,663
	Kenai	1,921,009	1,870,874	1,970,414	30,280
	Kasilof	687,179	644,972	730,615	26,028
	Harvest represented	3,136,660			
	Harvest unrepresented	177,662			
	Total harvest	3,314,322			

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Table 3.–Page 2 of 6.

Year	Reporting group	Mean	90% CI 5%	90% CI 95%	SD
2008[b]	*Crescent*	25,708	19,187	33,709	4,432
	West	68,049	57,160	81,678	7,538
	JCL	85,191	71,952	99,293	8,302
	SusYen	50,569	36,661	66,366	9,107
	Fish	4,621	1,825	8,184	1,974
	KTNE	63,214	51,049	75,925	7,603
	Kenai	817,164	783,676	851,252	20,457
	Kasilof	1,120,753	1,087,203	1,154,515	20,276
	Harvest represented	2,235,268			
	Harvest unrepresented	142,378			
	Total harvest	2,377,646			
2009	*Crescent*	59,630	54,264	68,063	4,259
	West	163,460	147,418	180,982	10,273
	JCL	45,224	35,597	55,723	6,156
	SusYen	57,296	42,919	73,061	9,166
	Fish	37,648	29,187	47,236	5,519
	KTNE	54,198	44,828	64,699	6,058
	Kenai	943,784	913,438	973,810	18,349
	Kasilof	670,243	644,903	695,821	15,588
	Harvest represented	2,031,483			
	Harvest unrepresented	9,797			
	Total harvest	2,041,280			
2010[c]	*Crescent*	51,025	46,483	56,466	3,057
	West	204,880	187,051	223,389	11,027
	JCL	55,659	46,016	66,127	6,129
	SusYen	58,425	47,281	70,688	7,125
	Fish	93,905	81,945	106,752	7,548
	KTNE	78,996	67,471	91,598	7,360
	Kenai	1,821,553	1,791,995	1,850,794	17,872
	Kasilof	423,296	404,867	442,301	11,366
	Harvest represented	2,787,738			
	Harvest unrepresented	36,494			
	Total harvest	2,824,232			

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Table 3.–Page 3 of 6.

Year	Reporting group	Mean	90% CI 5%	90% CI 95%	SD
2011	*Crescent*	63,232	58,364	70,028	3,629
	West	295,953	263,201	330,645	20,471
	JCL	92,480	72,759	114,705	12,768
	SusYen	125,039	98,621	154,410	16,997
	Fish	80,172	62,469	100,096	11,490
	KTNE	83,572	64,428	105,570	12,555
	Kenai	3,901,433	3,842,526	3,958,817	35,450
	Kasilof	470,319	437,456	505,024	20,539
	Harvest represented	5,112,200			
	Harvest unrepresented	161,399			
	Total harvest	5,273,599			
2012	*Crescent*	31,142	26,325	37,615	3,517
	West	139,175	117,443	163,628	14,072
	JCL	90,128	69,548	113,076	13,279
	SusYen	88,826	65,832	114,506	14,858
	Fish	20,029	11,630	31,003	5,997
	KTNE	42,393	29,588	58,010	8,711
	Kenai	2,513,544	2,466,204	2,559,099	28,280
	Kasilof	158,968	133,983	186,339	15,951
	Harvest represented	3,084,205			
	Harvest unrepresented	5,874			
	Total harvest	3,090,079			
2013	*Crescent*	24,942	18,225	35,382	5,454
	West	163,040	134,237	194,974	18,557
	JCL	110,754	85,767	138,712	16,135
	SusYen	76,336	55,991	99,733	13,353
	Fish	4,492	1,671	8,693	2,224
	KTNE	54,522	39,589	72,198	9,970
	Kenai	1,816,297	1,759,722	1,871,163	33,862
	Kasilof	335,839	299,715	374,057	22,589
	Harvest represented	2,586,223			
	Harvest unrepresented	21,792			
	Total harvest	2,608,015			

-continued-

Table 3.–Page 4 of 6.

Year	Reporting group	Mean	90% CI 5%	90% CI 95%	SD
2014	*Crescent*	32,555	30,045	35,226	1,809
	West	164,220	87,101	236,147	45,058
	JCL	56,109	32,826	82,212	15,068
	SusYen	67,659	34,078	124,917	27,974
	Fish	12,424	1,813	30,557	9,728
	KTNE	53,306	25,842	115,557	27,478
	Kenai	1,406,865	1,329,437	1,483,643	46,966
	Kasilof	327,136	277,631	379,368	31,014
	Harvest represented	2,120,276			
	Harvest unrepresented	223,106			
	Total harvest	2,343,382			
2015[d]	*Crescent*	40,194	32,902	52,502	6,102
	West	130,819	100,289	178,524	23,551
	JCL	40,993	27,230	57,134	9,188
	SusYen	159,452	111,357	206,679	28,798
	Fish	17,283	8,015	29,737	6,704
	KTNE	36,978	22,092	55,376	10,295
	Kenai	1,658,415	1,593,069	1,723,423	39,618
	Kasilof	427,887	379,353	476,957	29,688
	Harvest represented	2,512,019			
	Harvest unrepresented	137,058			
	Total harvest	2,649,077			
2016[d,e]	*Crescent*	32,300	26,298	39,348	4,796
	West	31,845	21,633	48,749	8,780
	JCL	47,927	34,022	63,921	9,140
	SusYen	76,635	42,669	122,867	25,155
	Fish	21,481	11,682	34,106	6,962
	KTNE	53,462	35,526	74,593	11,958
	Kenai	1,973,123	1,910,957	2,030,020	36,302
	Kasilof	146,521	108,136	187,852	24,211
	Harvest represented	2,383,292			
	Harvest unrepresented	13,493			
	Total harvest	2,396,785			

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Table 3.–Page 5 of 6.

Year	Reporting group	Mean	90% CI 5%	90% CI 95%	SD
2017	*Crescent*	55,339	38,898	76,144	11,316
	West	201,200	170,122	233,194	19,413
	JCL	37,489	25,064	51,691	8,089
	SusYen	148,646	113,353	187,813	23,061
	Fish	61,785	44,328	81,572	11,329
	KTNE	69,156	48,384	93,114	13,637
	Kenai	906,523	846,051	965,981	36,297
	Kasilof	332,623	290,424	376,533	26,991
	Harvest represented	1,812,761			
	Harvest unrepresented	36,089			
	Total harvest	1,848,850			
2018	*Crescent*	36,321	30,811	43,325	4,092
	West	76,940	51,954	105,697	16,846
	JCL	52,596	39,648	66,503	8,124
	SusYen	50,558	29,949	76,528	14,507
	Fish	34,167	24,454	45,202	6,396
	KTNE	35,292	20,341	55,310	10,963
	Kenai	317,200	288,663	346,923	18,205
	Kasilof	204,000	181,477	225,759	13,676
	Harvest represented	807,072			
	Harvest unrepresented	10,724			
	Total harvest	817,796			
2019	*Crescent*	76,903	64,972	93,932	9,061
	West	144,818	118,275	179,131	18,514
	JCL	36,979	26,925	48,568	6,760
	SusYen	39,319	21,087	60,689	12,199
	Fish	9,346	3,537	20,248	5,203
	KTNE	38,511	24,334	56,420	10,173
	Kenai	1,248,570	1,201,224	1,293,305	28,146
	Kasilof	120,908	87,445	157,705	21,177
	Harvest represented	1,715,352			
	Harvest unrepresented	4,943			
	Total harvest	1,720,295			

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Table 3.–Page 6 of 6.

Year	Reporting group	Mean	90% CI 5%	90% CI 95%	SD
2020	*Crescent*	29,314	25,482	33,549	2,442
	West	43,116	36,506	50,869	4,401
	JCL	19,455	14,354	25,005	3,299
	SusYen	21,556	14,447	31,051	4,978
	Fish	28,215	21,787	36,041	4,423
	KTNE	16,009	11,097	22,280	3,453
	Kenai	348,634	329,328	368,725	11,879
	Kasilof	151,870	133,726	169,103	10,505
	Harvest represented	658,169			
	Harvest unrepresented	11,246			
	Total harvest	669,415			

Note: 90% credibility intervals and standard deviations for harvest years prior to 2014 may differ from what was originally reported due a different rounding procedure used when summarizing the BAYES output for this report. The harvest numbers used in this table were pulled from the fish ticket database when these estimates were originally reported and, therefore, may not match current harvest numbers in the database.

[a] Estimates for 2007 differ from what was previously reported in Barclay et al. (2010a, 2010b, 2013, 2017, 2018) and Barclay (2017, 2019) due to an error in the Kasilof Section July 16–21, 2007, stock composition estimates was corrected for this report.

[b] Estimates for 2008 differ from what was previously reported in Barclay et al. (2010a, 2010b, 2013, 2017, 2018) and Barclay (2017, 2019) because of a correction made to the harvest represented for the Upper Subdistrict.

[c] Estimates for 2010 differ from what was previously reported in Barclay et al. (2013) because Western Subdistrict harvests were not included in that report because the BAYES chains for the Western Subdistrict mixture failed to converge due to a missing baseline population. Harvest for the Western Subdistrict is reported here for 2010 after the mixture was reanalyzed using the updated baseline.

[d] Estimates for 2015 and 2016 differ from what was reported in Barclay (2017) due to an error in the fish ticket database that put some districtwide harvests in the wrong statistical area; therefore, those harvests were not included in the represented harvest in that report. The stock-specific harvest estimates in this report have been recalculated using the correct harvest numbers.

[e] Estimates for 2016 differ from what was reported in Barclay (2019) due to a correction made to the harvest represented for the Central District drift gillnet (excluding corridor-only periods) fishery.

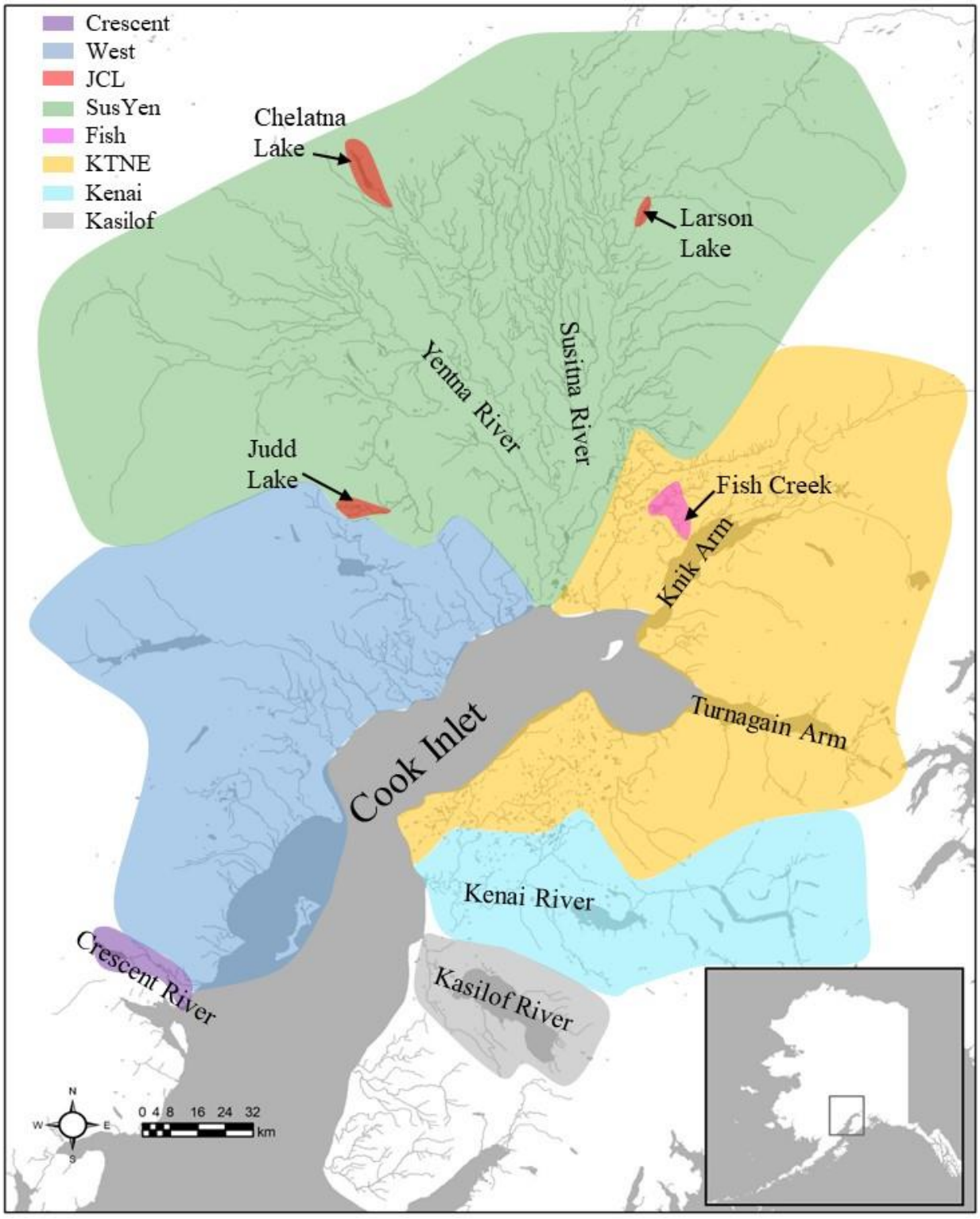

Figure 1.–Map of Cook Inlet showing reporting group areas for genetic mixed stock analysis of sockeye salmon harvest samples.

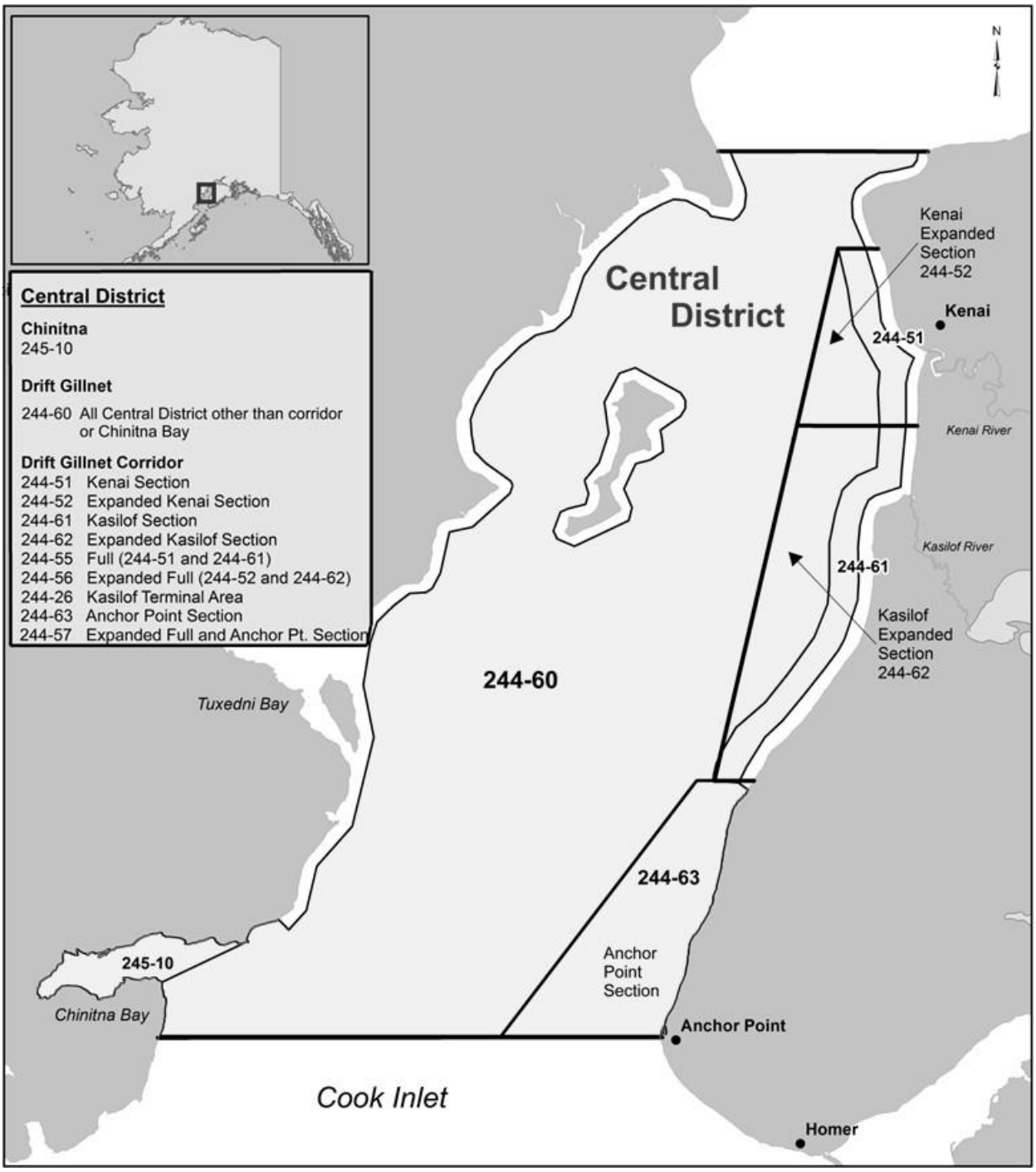

Figure 2.–Map of Upper Cook Inlet showing commercial fishing boundaries (statistical areas) within the Central District drift gillnet fishery, including the Kenai and Kasilof Sections and expanded sections.

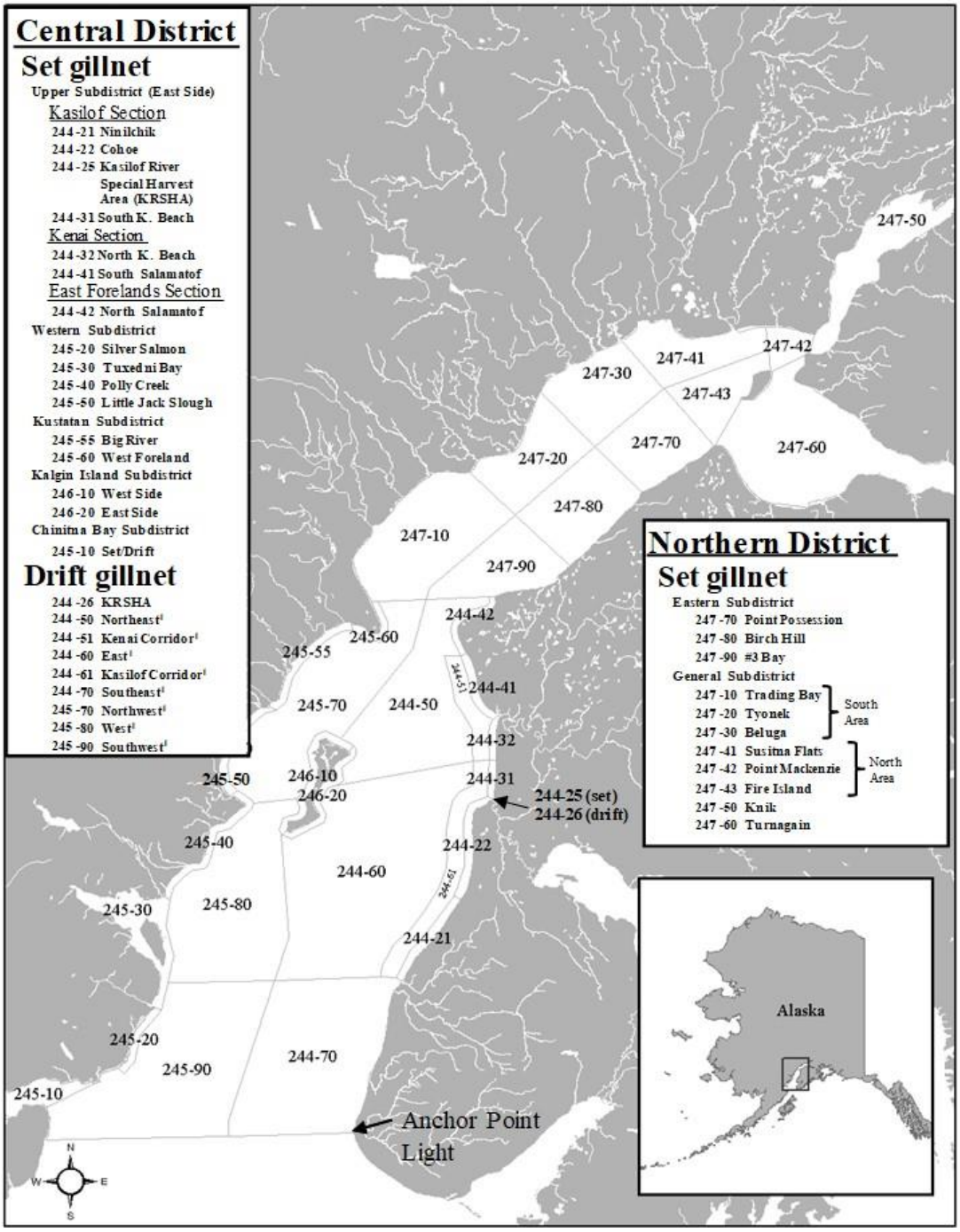

Figure 3.–Map of Upper Cook Inlet showing commercial fishing boundaries (statistical areas) for subdistricts and selected sections and subsections within the Northern and Central Districts for both set and drift gillnet fisheries. See Figure 6 for a map of the Kasilof River Special Harvest Area (KRSHA).

Note: Districts, subdistricts, and sections are defined in Alaska Administrative Code (5 AAC 21.200).

[1] These stat areas are grouped into one stat area (244-60) in Figure 2 and Appendices A and B to represent all Central District drift gillnet areas excluding Chinitna Bay.

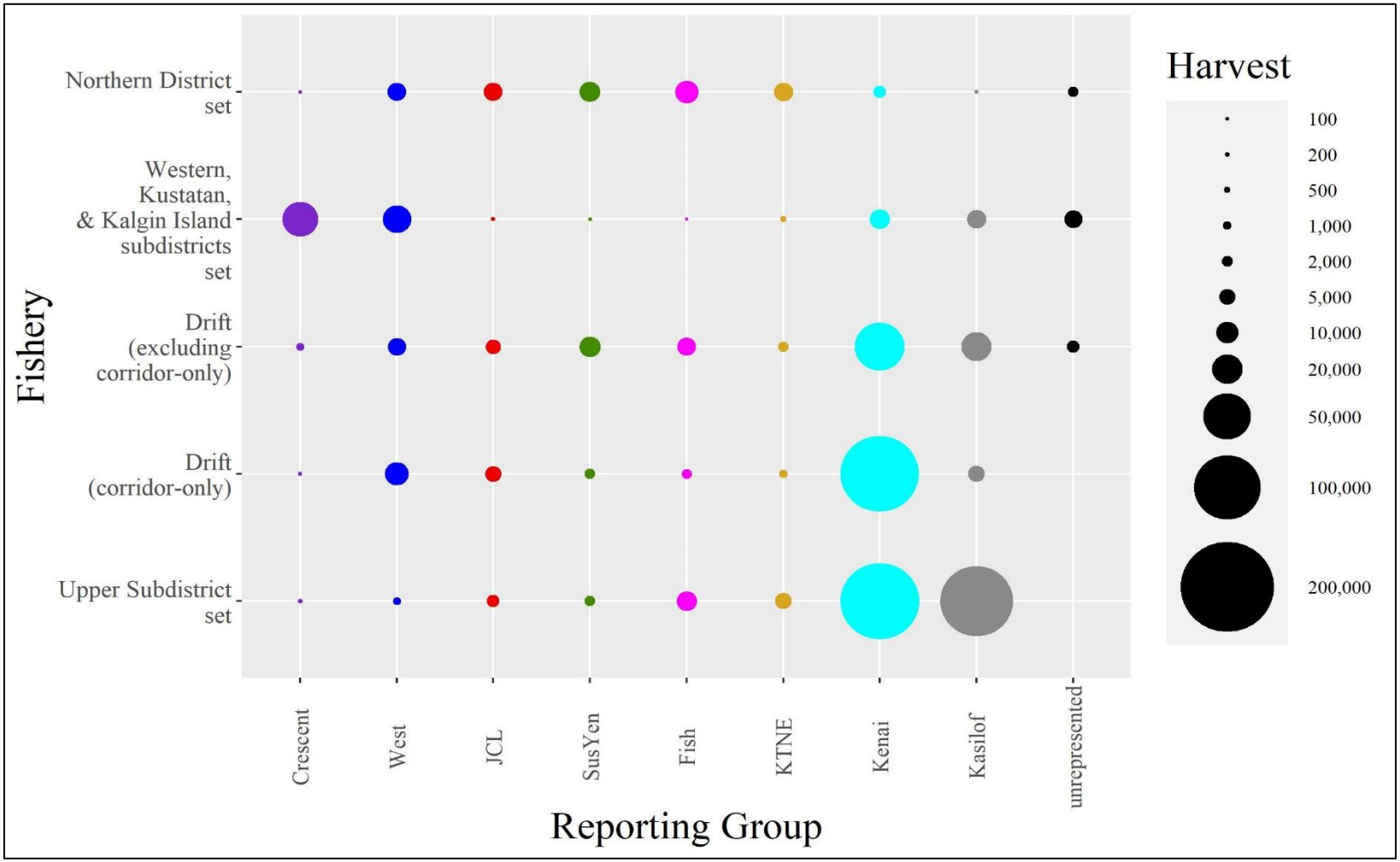

Figure 4.–Upper Cook Inlet commercial sockeye salmon harvest estimates and harvest not included in the analysis (unrepresented) by stock (reporting group) fishery, 2020. Black circles indicate the portion of the total harvest from each fishery not included in the analysis (unrepresented).

Note: The scale on this figure differs from the scale used for previously reported years.

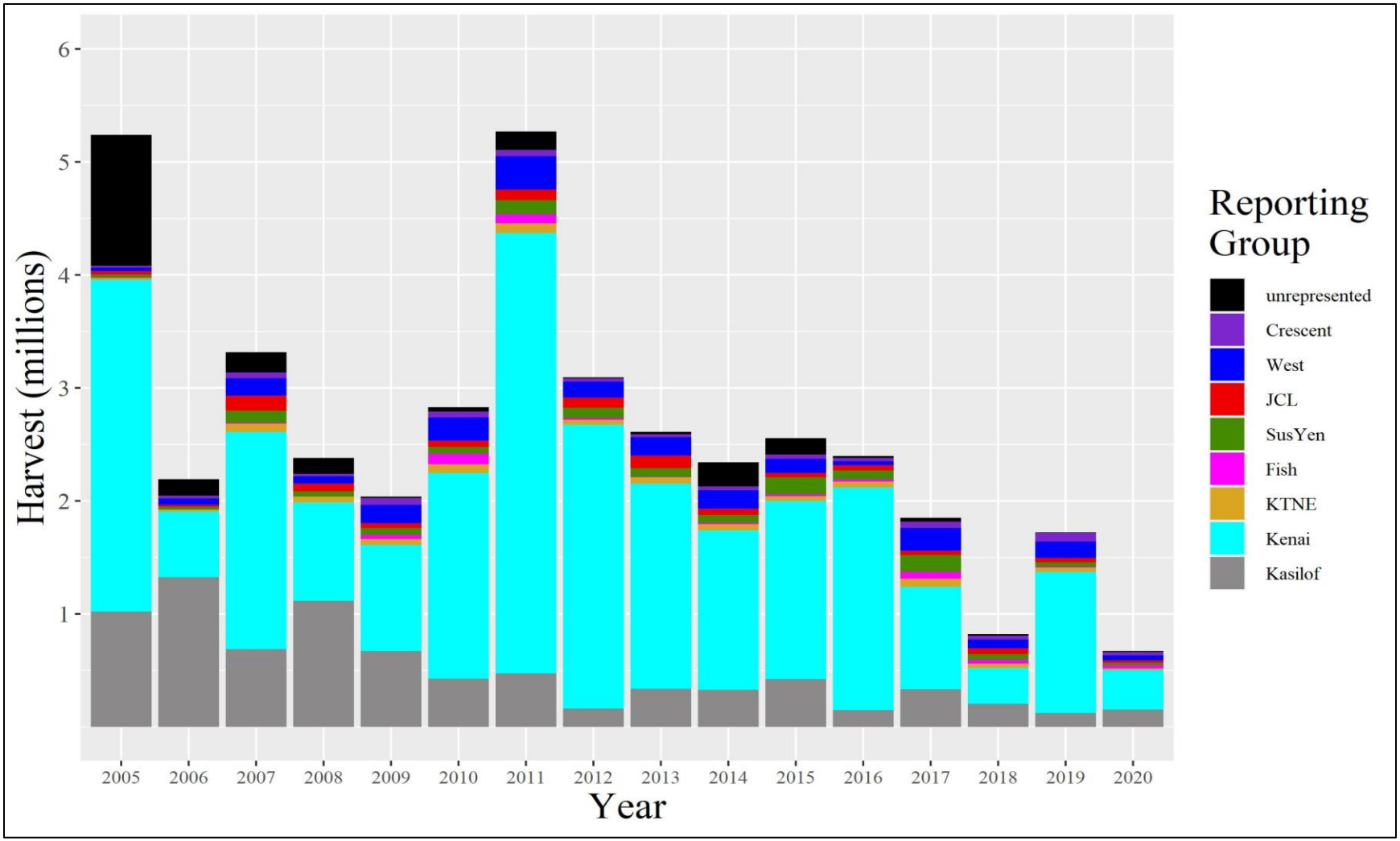

Figure 5.–Overall Upper Cook Inlet commercial fishery stratified harvest estimates for sockeye salmon by stock for 2005–2020. Black bars indicate the portion of the total harvest from each year not included in the analysis (unrepresented).

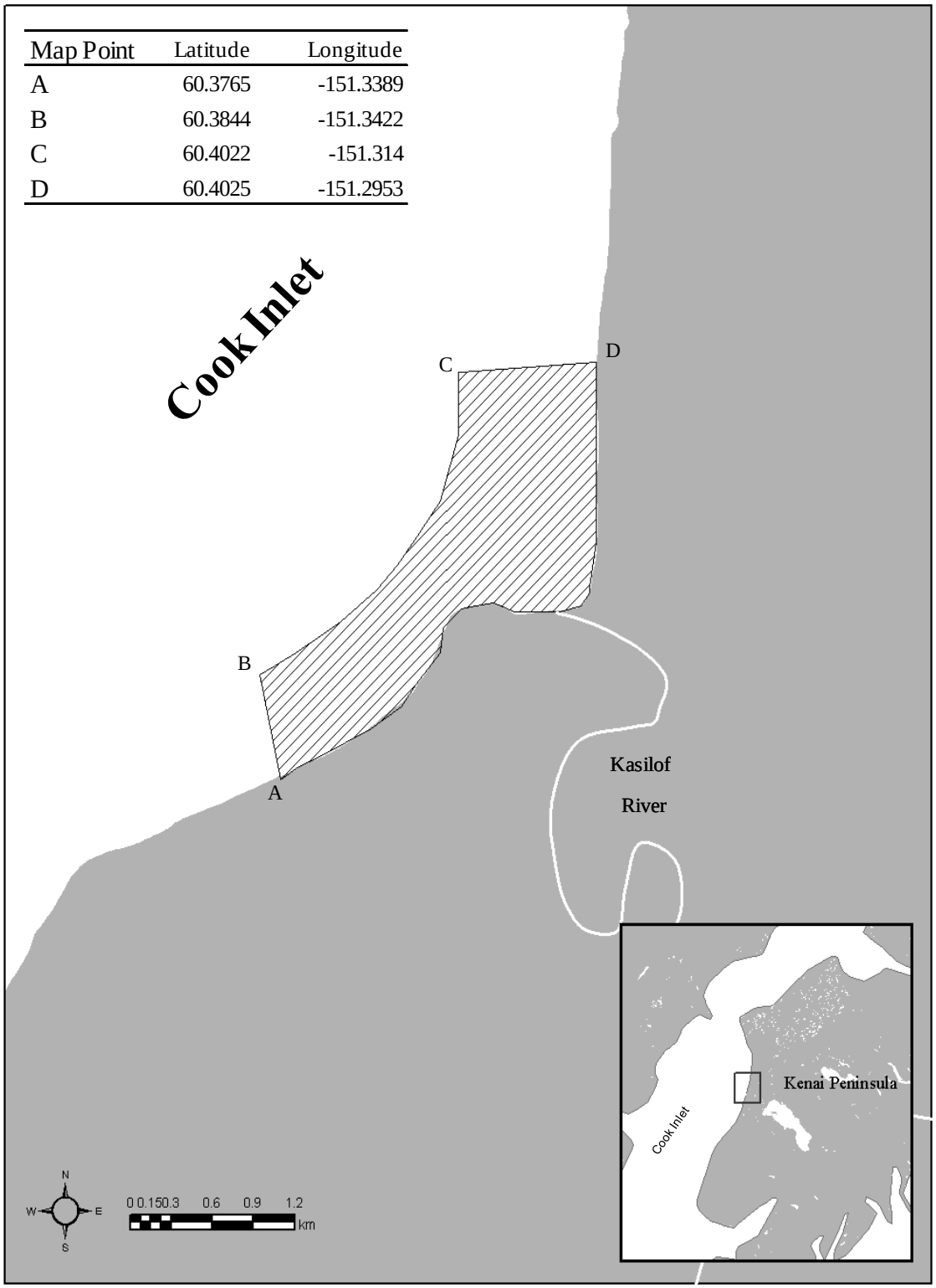

Figure 6.–Map of the mouth of the Kasilof River showing management fishing boundaries for the Kasilof River Special Harvest Area (Central District, Upper Subdistrict).

APPENDIX A: SAMPLE COLLECTION INFORMATION, 2020

Appendix A1.–Statistical area, sampling dates, number of fish sampled and genotyped, and mixture dates and number for mixtures of sockeye salmon harvested in the Upper Cook Inlet commercial fishery in 2020. Mixture numbers correspond to mixture numbers in Table 1. Maps of statistical areas can be found on Figures 2 and 3.

Statistical area(s)	Sample date	Number of fish			Mixture	
		Sampled	Genotyped	Used	Dates	Number
Central District drift gillnet						
244-60	6/22/2020	48	4	4	6/22–7/13	1
244-60	6/25/2020	192	13	12	6/22–7/13	1
244-60	6/29/2020	384	17	17	6/22–7/13	1
244-60	7/2/2020	480	51	50	6/22–7/13	1
244-60	7/6/2020	480	60	58	6/22–7/13	1
244-60	7/9/2020	440	88	88	6/22–7/13	1
244-60	7/13/2020	480	147	145	6/22–7/13	1
244-56	7/16/2020	480	144	137	7/15–8/15	2
244-57	7/20/2020	480	44	43	7/15–8/15	2
244-57	7/22/2020	480	80	79	7/15–8/15	2
244-56	7/27/2020	480	44	44	7/15–8/15	2
244-56	7/30/2020	480	24	24	7/15–8/15	2
244-57	8/3/2020	377	15	14	7/15–8/15	2
244-57	8/6/2020	288	12	12	7/15–8/15	2
244-57	8/10/2020	192	9	9	7/15–8/15	2
244-57	8/13/2020	192	7	7	7/15–8/15	2
244-57	8/15/2020	406	2	2	7/15–8/15	2
Central District - Upper Subdistrict set gillnet						
244-21 & 22	6/23/2020	188	11	10	6/23–7/22	3
244-31	6/23/2020	94	7	7	6/23–7/22	3
244-21 & 22	6/25/2020	191	27	26	6/23–7/22	3
244-31	6/25/2020	94	6	6	6/23–7/22	3
244-21 & 22	6/30/2020	189	11	11	6/23–7/22	3
244-31	6/30/2020	95	11	11	6/23–7/22	3
244-21 & 22	7/2/2020	190	16	15	6/23–7/22	3
244-31	7/2/2020	95	4	4	6/23–7/22	3
244-21 & 22	7/6/2020	189	45	42	6/23–7/22	3
244-31	7/6/2020	137	14	14	6/23–7/22	3
244-32	7/6/2020	186	9	9	6/23–7/22	3
244-21 & 22	7/9/2020	236	24	24	6/23–7/22	3
244-31	7/9/2020	137	4	3	6/23–7/22	3
244-32	7/9/2020	95	3	3	6/23–7/22	3
244-41	7/9/2020	140	4	4	6/23–7/22	3
244-42	7/9/2020	48	1	1	6/23–7/22	3
244-21 & 22	7/13/2020	235	23	23	6/23–7/22	3
244-31	7/13/2020	178	11	11	6/23–7/22	3

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Appendix A1.–Page 2 of 3.

Statistical area(s)	Sample date	Number of fish			Mixture	
		Sampled	Genotyped	Used	Dates	Number
Central District - Upper Subdistrict set gillnet (continued)						
244-32	7/13/2020	142	4	4	6/23–7/22	3
244-41	7/13/2020	144	24	21	6/23–7/22	3
244-42	7/13/2020	48	6	6	6/23–7/22	3
244-32	7/16/2020	400	8	8	6/23–7/22	3
244-21 & 22	7/20/2020	240	11	11	6/23–7/22	3
244-31	7/20/2020	179	4	4	6/23–7/22	3
244-32	7/20/2020	142	4	4	6/23–7/22	3
244-41	7/20/2020	192	33	33	6/23–7/22	3
244-42	7/20/2020	48	9	9	6/23–7/22	3
244-21 & 22	7/22/2020	189	4	4	6/23–7/22	3
244-31	7/22/2020	181	3	3	6/23–7/22	3
244-32	7/22/2020	93	3	3	6/23–7/22	3
244-41	7/22/2020	192	24	23	6/23–7/22	3
244-42	7/22/2020	48	14	14	6/23–7/22	3
244-21 & 22	7/16/2020	239	146	141	7/16 & 7/21	4
244-31	7/16/2020	136	46	46	7/16 & 7/21	4
244-21 & 22	7/21/2020	401	121	115	7/16 & 7/21	4
244-31	7/21/2020	226	68	64	7/16 & 7/21	4
Central District - Western, Kustatan, and Kalgin Island Subdistricts set gillnet						
246-10	6/22/2020	34	23	23	6/15–8/17	5
245-30 & 60	6/25/2020	47	8	8	6/15–8/17	5
245-30 & 50	6/29/2020	24	8	7	6/15–8/17	5
246-10 & 20	7/2/2020	48	18	16	6/15–8/17	5
245-30, 50, 55, & 60	7/2/2020	48	10	9	6/15–8/17	5
246-10 & 20	7/6/2020	95	9	8	6/15–8/17	5
246-10 & 20	7/9/2020	46	16	15	6/15–8/17	5
245-30, 50, & 55	7/9/2020	139	22	22	6/15–8/17	5
246-10 & 20	7/13/2020	96	22	20	6/15–8/17	5
245-30, 50, & 55	7/13/2020	95	15	15	6/15–8/17	5
245-30, 50, 55, & 60	7/16/2020	48	13	12	6/15–8/17	5
246-10 & 20	7/20/2020	144	17	15	6/15–8/17	5
245-30, 50, 55, & 60	7/20/2020	48	24	23	6/15–8/17	5
246-10 & 20	7/23/2020	48	30	29	6/15–8/17	5
245-30, 50, 55, & 60	7/23/2020	47	13	13	6/15–8/17	5
245-30, 50, 55, & 60	7/27/2020	47	38	37	6/15–8/17	5
246-10 & 20	8/3/2020	22	22	20	6/15–8/17	5
245-30, 50, 55, & 60	8/3/2020	24	20	20	6/15–8/17	5

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Appendix A1.–Page 3 of 3.

Statistical area(s)	Sample date	Number of fish			Mixture	
		Sampled	Genotyped	Used	Dates	Number
Central District - Western, Kustatan, and Kalgin Island Subdistricts set gillnet (*continued*)						
246-10 & 20	8/6/2020	24	23	23	6/15–8/17	5
245-30, 50, 55, & 60	8/6/2020	24	11	10	6/15–8/17	5
246-10 & 20	8/10/2020	24	20	19	6/15–8/17	5
Northern District - Eastern and General Subdistricts set gillnet						
247-70, 80, & 90	7/2/2020	94	17	16	6/25–8/20	6
247-70, 80, & 90	7/6/2020	96	36	33	6/25–8/20	6
247-70, 80, & 90	7/9/2020	94	20	17	6/25–8/20	6
247-70, 80, & 90	7/13/2020	144	29	27	6/25–8/20	6
247-70, 80, & 90	7/16/2020	141	24	23	6/25–8/20	6
247-70, 80, & 90	7/20/2020	142	32	29	6/25–8/20	6
247-70, 80, & 90	7/23/2020	80	14	11	6/25–8/20	6
247-70, 80, & 90	7/27/2020	96	27	23	6/25–8/20	6
247-70, 80, & 90	7/30/2020	48	37	36	6/25–8/20	6
247-70, 80, & 90	8/3/2020	48	44	43	6/25–8/20	6
247-70, 80, & 90	8/6/2020	48	20	19	6/25–8/20	6
247-70, 80, & 90	8/10/2020	47	38	37	6/25–8/20	6
247-70, 80, & 90	8/13/2020	41	41	39	6/25–8/20	6
247-41, 42, & 43	7/9/2020	94	16	15	7/2–8/20	7
247-41, 42, & 43	7/13/2020	28	15	14	7/2–8/20	7
247-41, 42, & 43	7/16/2020	44	44	42	7/2–8/20	7
247-41, 42, & 43	7/20/2020	46	46	40	7/2–8/20	7
247-41, 42, & 43	7/23/2020	43	43	41	7/2–8/20	7
247-41, 42, & 43	8/10/2020	48	48	45	7/2–8/20	7
247-41, 42, & 43	8/13/2020	48	38	38	7/2–8/20	7
247-10, 20, 30	7/6/2020	48	18	18	6/29–8/20	8
247-10, 20, 30	7/9/2020	46	17	16	6/29–8/20	8
247-10, 20, 30	7/13/2020	70	40	38	6/29–8/20	8
247-10, 20, 30	7/16/2020	71	31	30	6/29–8/20	8
247-10, 20, 30	7/20/2020	48	48	42	6/29–8/20	8
247-10, 20, 30	7/23/2020	46	26	25	6/29–8/20	8
247-10, 20, 30	7/27/2020	48	42	41	6/29–8/20	8
247-10, 20, 30	7/30/2020	48	24	24	6/29–8/20	8
247-10, 20, 30	8/3/2020	48	46	44	6/29–8/20	8
247-10, 20, 30	8/6/2020	48	19	15	6/29–8/20	8
247-10, 20, 30	8/10/2020	22	22	21	6/29–8/20	8
247-10, 20, 30	8/13/2020	47	47	41	6/29–8/20	8

APPENDIX B: UPPER COOK INLET COMMERCIAL SOCKEYE SALMON HARVEST BY STATISTICAL AREA AND DATE, 2020

Appendix B1.–Commercial sockeye salmon harvest by area and date in Upper Cook Inlet, 2020.

Key: Represented harvest is shaded in dark gray if sampled and light gray if unsampled. The harvest represented for each genetic mixed stock analysis stratum (mixture; Table 1) is indicated with black outline. The harvest represented for strata where the fishery was restricted to within 600 feet of the mean high tide mark are indicated by bold numbers.

Central District drift gillnet

	Statistical area				
Date	244-56	244-57	244-60	244-61	245-10
6/22/2020			1,043		
6/25/2020			3,424		
6/27/2020				79	
6/29/2020			4,383		
6/30/2020				148	
7/2/2020			13,945		
7/4/2020				9	
7/6/2020			16,274		
7/7/2020				13	
7/8/2020				54	
7/9/2020			23,835		
7/13/2020			40,295		
7/15/2020	20,159				
7/16/2020	42,863				
7/20/2020		19,401			
7/22/2020		16,129			
7/23/2020	18,979				
7/27/2020	19,419				
7/30/2020	10,348				
7/31/2020	41				
8/3/2020		6,757			
8/6/2020		4,786			
8/7/2020		42			
8/10/2020		3,953			
8/13/2020		3,029			
8/15/2020		858			
8/17/2020			1,445		
8/18/2020					131
8/20/2020			489		
8/21/2020					184
8/24/2020			244		
8/25/2020					96
8/27/2020			46		
8/28/2020					16

-continued-

Central District drift gillnet (continued)

	Statistical area					
Date	244-56	244-57	244-60	244-61	245-10	244-56
9/3/2020			99			
9/4/2020					35	
9/10/2020			16			

Central District - Upper Subdistrict set gillnet

	Statistical area					
Date	244-21	244-22	244-31	244-32	244-41	244-42
6/23/2020	4,611	3,614	5,257			
6/25/2020	6,017	4,514	1,816			
6/27/2020	4,963	3,740	2,282			
6/30/2020	4,020	3,821	8,093			
7/2/2020	7,582	3,957	2,784	1,897		
7/4/2020	5,391	3,898	2,280	684		
7/6/2020	7,900	9,828	6,506	2,260		
7/7/2020	2,966	2,416	1,259	1,796		
7/8/2020	5,417	2,584	1,144	629		
7/9/2020	5,500	3,960	1,406	1,479	2,587	714
7/13/2020	5,785	4,049	3,761	3,032	9,913	2,960
7/15/2020	3,576	3,074	4,147	3,315	7,239	1,251
7/16/2020	**2,000**	**979**	**940**	2,275		
7/20/2020	4,740	2,902	2,959	2,947	23,814	6,222
7/21/2020	**1,485**	**979**	**1,382**			
7/22/2020	1,425	1,657	1,843	2,154	17,528	10,272

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Central District - West Side set gillnet

	Statistical area						
Date	245-10	245-30	245-50	245-55	245-60	246-10	246-20
6/1/2020				117		373	
6/3/2020				475		729	
6/5/2020				206		583	
6/8/2020				95		243	
6/10/2020				308		983	
6/12/2020						279	
6/15/2020				90		225	
6/18/2020		164	10				
6/19/2020						225	
6/22/2020		473		24		1,312	
6/24/2020						1,018	
6/25/2020		677			20	760	222
6/26/2020							28
6/29/2020		1,334	15			609	
7/2/2020		1,268	60	205	112	1,616	278
7/3/2020						336	
7/6/2020		1,904	69			1,186	283
7/9/2020		1,280	86	171		2,127	396
7/13/2020		1,842	187	324		1,186	344
7/16/2020		1,206	148	390	402	1,736	248
7/18/2020		2,086					
7/20/2020		1,320	140	331	60	2,161	165
7/21/2020							350
7/23/2020		1,606	158	128	147	1,033	312
7/25/2020		1,644					
7/27/2020		1,387	333	30	590	2,664	789
7/30/2020		1,196	199	29	784	1,389	432
8/1/2020		1,415					
8/3/2020	3	780	190	331	531	2,261	1,368
8/6/2020		427	94	141	310	1,344	422
8/10/2020	2		63	118	182	899	244
8/13/2020	3	248	68	145		625	322
8/17/2020	10		50	163		995	127
8/20/2020			761	175		481	
8/24/2020				163		134	
9/3/2020				49			
9/10/2020				32			

-continued-

Appendix B1.–Page 4 of 4.

Northern District set gillnet

	Statistical area								
Date	247-10	247-20	247-30	247-41	247-42	247-43	247-70	247-80	247-90
5/25/2020							1		3
6/1/2020	7				4	3	15	10	31
6/8/2020	4	2					141	21	41
6/15/2020	27	8				1	64	34	36
6/22/2020	1	5					22	11	80
6/25/2020	10	1			2		7	52	182
6/29/2020	5	7			8	3	119	58	83
7/2/2020	58	136			2	10	212	139	293
7/6/2020	65	417		18		16	887	578	868
7/9/2020	43	618		35	120	94	702	379	251
7/13/2020	168	976	393	124	113	42	682	812	417
7/16/2020	239	746	233	186	318	79	313	656	606
7/20/2020	29	1,314	823	130	328	202	588	803	712
7/23/2020	106	402	205	125	350	177	234	162	511
7/27/2020	721	775	146	67	91	177	298	424	1,072
7/30/2020	270	561	92	17	104	42	429	612	1,374
8/3/2020	239	832	700	128	162	113	770	918	1,182
8/6/2020	58	331	11		292		270	396	624
8/10/2020	136	445	27	120	137	211	324	663	1,002
8/13/2020	1,046	419		116	11	60	298	447	657
8/17/2020	524	21		12	114	16	136	203	563
8/20/2020	386				24	36	125	291	481
8/24/2020	124	11			8	17	202	150	421
8/27/2020	4	2					69	70	89
8/31/2020	2						28	63	4
9/3/2020	1						16	9	45
9/7/2020	1							3	
9/10/2020								2	
9/21/2020	1								

Source: Harvest numbers were pulled from fish ticket database on October 12, 2020.

APPENDIX C: CENTRAL DISTRICT DRIFT GILLNET STOCK COMPOSITION AND STOCK-SPECIFIC HARVEST BY DATE, 2020

Appendix C1.–Central District drift gillnet fishery, 2020: stock composition (%) and stock-specific harvest estimates, including the final number of samples used in the genetic analysis (*n*), mean, 90% credibility interval (CI), and standard deviation (SD).

Excluding corridor-only periods

Dates: 6/22–7/13	Stock composition (*n* = 374)				Harvest = 103,502			
		90% CI				90% CI		
Reporting group	Mean	5%	95%	SD	Mean	5%	95%	SD
Crescent	0.8	0.0	2.5	0.8	859	0	2,542	839
West	6.1	3.5	9.2	1.7	6,318	3,614	9,493	1,788
JCL	4.2	2.2	6.6	1.3	4,350	2,267	6,819	1,394
SusYen	8.8	3.8	14.1	3.2	9,132	3,932	14,565	3,265
Fish	6.7	4.0	9.5	1.7	6,906	4,142	9,842	1,732
KTNE	1.7	0.4	4.1	1.2	1,778	366	4,202	1,258
Kenai	53.2	46.4	60.1	4.1	55,036	47,990	62,161	4,271
Kasilof	18.5	13.5	23.5	3.1	19,122	13,990	24,354	3,192

Corridor-only periods

Dates: 7/15–8/15	Stock composition (*n* = 371)				Harvest = 166,764			
		90% CI				90% CI		
Reporting group	Mean	5%	95%	SD	Mean	5%	95%	SD
Crescent	0.1	0.0	0.6	0.3	177	0	1,028	448
West	7.1	4.5	10.3	1.8	11,864	7,462	17,139	2,954
JCL	3.0	1.3	5.0	1.1	4,956	2,174	8,327	1,917
SusYen	1.0	0.1	3.2	1.1	1,740	242	5,365	1,837
Fish	1.0	0.0	2.6	0.8	1,662	0	4,262	1,353
KTNE	0.6	0.0	2.0	0.7	1,061	0	3,407	1,158
Kenai	83.9	79.6	88.0	2.6	139,998	132,816	146,758	4,345
Kasilof	3.2	1.0	5.8	1.5	5,307	1,702	9,677	2,429

Note: The 90% credibility intervals of harvest estimates may not include the point estimate for the very low extrapolated harvest numbers because fewer than 5% of iterations had values above zero.

Note: Stock composition and harvest estimates may not sum to 100% due to rounding error.

APPENDIX D: CENTRAL DISTRICT SET GILLNET STOCK COMPOSTION AND STOCK-SPECIFIC HARVEST BY DATE, 2020

Appendix D1.–Upper Subdistrict set gillnet (Central District), 2020: stock composition (%) and stock-specific harvest estimates, including the final number of samples used in the genetic analysis (*n*), mean, 90% credibility interval (CI), and standard deviation (SD).

All sections (excluding Kasilof Section July 16 and 21 periods)

Dates: 6/23–7/22	Stock composition (*n* = 371)				Harvest = 274,412			
		90% CI				90% CI		
Reporting group	Mean	5%	95%	SD	Mean	5%	95%	SD
Crescent	0.1	0.0	0.4	0.2	207	0	1,155	570
West	0.3	0.0	1.8	0.7	902	0	4,808	1,878
JCL	1.1	0.0	2.5	0.8	2,899	28	6,886	2,159
SusYen	0.7	0.0	3.1	1.1	1,867	0	8,539	2,959
Fish	3.0	1.0	5.4	1.4	8,122	2,777	14,806	3,737
KTNE	1.9	0.6	3.8	1.0	5,335	1,678	10,442	2,797
Kenai	50.3	44.5	56.5	3.7	137,947	122,088	154,944	10,086
Kasilof	42.7	36.8	48.4	3.5	117,134	100,969	132,704	9,648

Kasilof Section 600 ft[a]

Dates: 7/16 & 7/21	Stock composition (*n* = 366)				Harvest = 7,765			
		90% CI				90% CI		
Reporting group	Mean	5%	95%	SD	Mean	5%	95%	SD
Crescent	0.5	0.0	2.3	0.8	40	0	180	64
West	0.5	0.0	2.2	0.8	41	0	174	66
JCL	0.4	0.0	1.4	0.5	30	0	108	37
SusYen	0.4	0.0	1.9	0.8	31	0	151	63
Fish	3.9	1.9	6.2	1.3	300	150	483	99
KTNE	1.1	0.1	2.9	0.9	87	11	228	72
Kenai	56.7	51.3	62.0	3.2	4,405	3,983	4,817	251
Kasilof	36.5	31.5	41.5	3.0	2,832	2,443	3,220	232

Note: The 90% credibility intervals of harvest estimates may not include the point estimate for the very low extrapolated harvest numbers because fewer than 5% of iterations had values above zero.

Note: Stock composition and harvest estimates may not sum to 100% due to rounding error.

[a] This mixture represents fishing periods restricted to within 600 feet of the mean high tide mark.

Appendix D2.–Western, Kustatan, and Kalgin Island Subdistricts (Central District) set gillnet, 2020: stock composition (%) and stock-specific harvest estimates, including the final number of samples used in the genetic analysis (*n*), mean, 90% credibility interval (CI), and standard deviation (SD).

Dates: 6/15–8/17	Stock composition (*n* = 364)				Harvest = 61,619			
		90% CI				90% CI		
Reporting group	Mean	5%	95%	SD	Mean	5%	95%	SD
Crescent	45.3	39.6	51.3	3.5	27,903	24,389	31,627	2,168
West	27.8	22.9	33.0	3.0	17,161	14,132	20,336	1,877
JCL	0.2	0.0	1.0	0.4	138	0	640	229
SusYen	0.2	0.0	1.1	0.5	122	0	682	307
Fish	0.1	0.0	0.6	0.3	64	0	376	158
KTNE	0.9	0.0	3.3	1.2	534	0	2,024	721
Kenai	13.6	9.5	18.2	2.7	8,404	5,833	11,217	1,644
Kasilof	11.8	8.7	15.2	2.0	7,294	5,346	9,377	1,223

Note: The 90% credibility intervals of harvest estimates may not include the point estimate for the very low extrapolated harvest numbers because fewer than 5% of iterations had values above zero.

Note: Stock composition and harvest estimates may not sum to 100% due to rounding error.

APPENDIX E: NORTHERN DISTRICT SET GILLNET STOCK COMPOSTION AND STOCK-SPECIFIC HARVEST BY DATE, 2020

Appendix E1.–Eastern and General Subdistricts (Northern District) set gillnet fisheries, 2020: stock composition (%) and stock-specific harvest estimates, including the final number of samples used in the genetic analysis (*n*), mean, 90% credibility interval (CI), and standard deviation (SD).

Eastern Subdistrict

Dates: 6/25–8/20	Stock composition (*n* = 353)				Harvest = 24,865			
		90% CI				90% CI		
Reporting group	Mean	5%	95%	SD	Mean	5%	95%	SD
Crescent	0.3	0.0	1.4	0.6	64	0	357	137
West	5.4	2.3	10.8	2.7	1,341	567	2,694	671
JCL	7.1	4.5	10.0	1.6	1,755	1,127	2,475	410
SusYen	17.4	11.5	23.4	3.7	4,334	2,854	5,817	912
Fish	32.8	27.9	37.5	3.0	8,149	6,941	9,324	737
KTNE	25.5	19.6	31.8	3.8	6,341	4,879	7,901	933
Kenai	11.0	6.7	15.8	2.7	2,732	1,675	3,923	681
Kasilof	0.6	0.0	2.5	0.9	149	0	627	224

General Subdistrict - north

Dates: 7/2–8/20	Stock composition (*n* = 235)				Harvest = 4,519			
		90% CI				90% CI		
Reporting group	Mean	5%	95%	SD	Mean	5%	95%	SD
Crescent	0.8	0.0	3.5	1.2	36	0	157	55
West	0.3	0.0	1.8	0.8	15	0	79	37
JCL	15.3	10.8	20.1	2.8	690	487	910	126
SusYen	14.1	7.6	21.4	4.2	639	345	968	188
Fish	57.8	51.3	63.7	3.8	2,610	2,317	2,879	174
KTNE	11.4	6.4	17.6	3.3	517	290	793	151
Kenai	0.2	0.0	1.0	0.5	8	0	47	21
Kasilof	0.1	0.0	0.6	0.3	4	0	25	12

General Subdistrict - south

Dates: 6/29–8/20	Stock composition (*n* = 355)				Harvest = 14,723			
		90% CI				90% CI		
Reporting group	Mean	5%	95%	SD	Mean	5%	95%	SD
Crescent	0.2	0.0	1.2	0.5	29	0	175	67
West	37.2	32.5	41.9	2.9	5,475	4,778	6,174	423
JCL	31.5	26.7	36.6	3.0	4,637	3,935	5,383	440
SusYen	25.1	19.5	30.7	3.4	3,692	2,871	4,516	497
Fish	2.7	1.2	4.6	1.1	403	182	678	155
KTNE	2.4	0.8	4.7	1.2	356	119	695	183
Kenai	0.7	0.0	2.2	0.8	104	0	331	116
Kasilof	0.2	0.0	1.1	0.4	27	0	155	61

Note: The 90% credibility intervals of harvest estimates may not include the point estimate for the very low extrapolated harvest numbers because fewer than 5% of iterations had values above zero.

Note: Stock composition and harvest estimates may not sum to 100% due to rounding error.

APPENDIX F: UPPER COOK INLET COMMERCIAL AND OFFSHORE TEST FISHERIES GENETIC MIXED STOCK ANALYSIS STRATA, 2005–2020

Appendix F1.–Temporal strata analyzed in genetic mixed stock analysis of the Upper Cook Inlet commercial drift and set gillnet fisheries and offshore test fishery in 2005–2020, including: fishery, area name, statistical areas, year reported, and restriction (R) for each stratum.

Key: Gray boxes indicate which years were reported for a given stratum; "h" indicates that stock proportions and stock-specific harvests were reported, and "p" indicates that only stock proportions were reported.

			Year																
Fishery	Area	Stat. area(s)	2005[a]	2006[a]	2007[a]	2008[a]	2009[b]	2010[c]	2011[d]	2012[e]	2013[e]	2014[f]	2015[g]	2016[g]	2017[g]	2018[g]	2019[h]	2020[i]	R[j]
Central District drift	Districtwide[k]	244-60	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	
	Corridor	244-55		h															
		244-56							h	h									
		244-57															h		
		244-56, 57									h	h	h	h	h			h	
Upper Subdistrict set/drift	Kasilof River Special Harvest Area	244-26		h															
		244-25, 26		h		h										h			
		244-25		h															
Upper Subdistrict set	Kasilof Section	244-21, 22, 31	h	h	h	h	h	h	h	h	h	h							
		244-21, 22, 31		h			h										h		0.5 mi
		244-21, 22, 31											p						1.5 mi
		244-21, 22, 31											p			h		h	600 ft
		244-21, 22	p	p	p	p	p	p	p	p	p								
		244-31	p	p	p	p	p	p	p	p	p								
	Kenai/East Foreland Sections	244-32, 41, 42	h	h	h	h	h	h	h	h	h	h							
		244-32	p	p	p	p	p	p	p	p	p								
		244-32														h	h		600 ft
		244-41, 42	p	p	p	p	p	p	p	p	p								
	Subdistrictwide	244-21, 22, 31, 32, 41, 42											h	h	h	h	h	h	

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Fishery	Area	Stat. area(s)	Year																R[j]
			2005[a]	2006[a]	2007[a]	2008[a]	2009[b]	2010[c]	2011[d]	2012[e]	2013[e]	2014[f]	2015[g]	2016[g]	2017[g]	2018[g]	2019[h]	2020[i]	
Kalgin Island Subdistrict set	Subdistrictwide	246-10, 20		h	h	h	h	h	h	h	h	h							
Western Subdistrict	Subdistrictwide[k]	245-20, 30 40, 50		h	h	h	h	h	h	h	h								
Western/ Kustatan Subdistricts	Subdistrictwide[k]	245-20, 30 40, 50, 55, 60										h							
Western/ Kustatan/ Kalgin Island Subdistricts	Subdistrictwide[k]	245-20, 30 40, 55, 60; 246-10, 20											h	h	h	h	h	h	
Eastern Subdistrict set	Subdistrictwide	247-70, 80, 90		h	h	h	h	h	h	h	h	h							
General Subdistrict set	Subdistrictwide	247-10, 20, 30, 41, 42, 43				h			h			h							
	Southwest	247-10, 20, 30					h	h			h							h	
	Northwest	247-41, 42, 43					h	h		h								h	
Eastern/General Subdistricts set	Subdistrictwide	247-10, 20, 30, 41, 42, 43,70, 80, 90											h	h	h	h	h	h	

[a] 2005–2008 estimates reported in Barclay et al. (2010a; FMS 10-01).

[b] 2009 estimates reported in Barclay et al. (2010b; FDS 10-93).

[c] 2010 estimates reported in Barclay et al. (2013; FDS 13-56).

[d] 2011 estimates reported in Barclay et al. (2014; FDS 14-43).

[e] 2012 and 2013 estimates reported in Barclay et al. (2017; FDS 17-30).

[f] 2014 estimates reported in Barclay et al. (2018; FDS 18-08).

[g] 2015–2018 estimates reported in Barclay (2019; RIR 5J19-02).

[h] 2019 estimates reported in Barclay (2020; RIR 5J20-01)

[i] 2020 estimates are included in this report

[j] Distance from the mean high tide mark in which the fishery was restricted.

[k] Central District drift and west Cook Inlet strata do not include Chinitna Bay (245-10, Appendix B1).

Appendix F2.– Strata analyzed in genetic mixed stock analysis of the Upper Cook Inlet offshore test fishery, 2005–2020: test fishery and years reported for each fishery. Both temporal and spatial strata were analyzed each year.

Key: Gray boxes indicate which years were reported for a given test fish transect

Test fishery	Year															
	2005	2006[a]	2007[a]	2008[a]	2009[b]	2010[c]	2011[d]	2012[e]	2013[e]	2014[f]	2015	2016	2017	2018	2019	2020
Southern transect																
Northern transect(s)																

[a] 2005–2008 estimates reported in Barclay et al. (2010a; FMS 10-01).

[b] 2009 estimates reported in Barclay et al. (2010b; FDS 10-93).

[c] 2010 estimates reported in Barclay et al. (2013; FDS 13-56).

[d] 2011 estimates reported in Barclay et al. (2014; FDS 14-43).

[e] 2012 and 2013 estimates reported in Barclay et al. (2017; FDS 17-30).

[f] 2014 estimates reported in Barclay et al. (2018; FDS 18-08).