Fishery Management Report No. 19-21

Area Management Report for the Sport Fisheries of the North Gulf Coast, 2016–2018

by

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November 2019

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

FISHERY MANAGEMENT REPORT NO. 19-21

AREA MANAGEMENT REPORT FOR THE SPORT FISHERIES OF THE NORTH GULF COAST, 2016–2018

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ABSTRACT

This report provides a detailed summary of the sport fisheries in the North Gulf Coast Management Area. Included are a description and overview of each fishery, how the fisheries are managed, and fishery performance and escapement for 2016 through 2018. The sport fisheries include Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), sockeye salmon (*O. nerka*), pink salmon (*O. gorbuscha*), chum salmon (*O. keta*), Pacific halibut (*Hippoglossus stenolepis*), rockfish (*Sebastes* spp. and *Sebastolobus* spp.), lingcod (*Ophiodon elongates*), sharks (Chondrichthys), rainbow trout (*O. mykiss*), and Dolly Varden (*Salvelinus malma*).

Key words: North Gulf Coast Management Area, Alaska Board of Fisheries, Seward, Chinook salmon, coho salmon, sockeye salmon, pink salmon, chum salmon, halibut, rockfish, lingcod, sharks, rainbow trout, Dolly Varden, sport fisheries overview

INTRODUCTION

The North Gulf Coast Management Area (NGCMA) consists of all waters between Gore Point (156°96′25″W longitude) and Cape Fairfield (148°50′25″W longitude) (Figure 1). The eastern boundary of the NGCMA used to be located 15 miles farther east at Cape Puget. At the 2008 Alaska Board of Fisheries (BOF) meeting, the eastern boundary was moved to Cape Fairfield to align the commercial, subsistence, and sport fish regulatory boundaries to 1 location. The City of Seward is the only community in the management area.

The Port of Seward, at the head of Resurrection Bay, is the gateway to sport fishing in the NGCMA. Tourism, including a sport fish charter industry, is important to the economy of Seward. Access to area sport fisheries is by road, rail, air, and boat but most sport fisheries in the NGCMA require a boat or plane for access, so participation and effort (angler-days) from boat anglers, both private and charter, dominate these fisheries (Tables 1–3). Local Seward beaches, which are adjacent to stocking sites, are the only easily accessible shore fisheries for salmon in the NGCMA. In contrast to boat-accessible fisheries, road-accessible streams and lakes provide only minor sport fisheries. Principal land managers include private individuals, the City of Seward, U.S. National Park Service, U.S. Forest Service, Native corporations, and the State of Alaska.

Most area sport fisheries occur in salt water and target 5 species of Pacific salmon (coho or silver [*Oncorhynchus kisutch*], Chinook or king, [*O. tshawytscha*], pink or humpy [*O. gorbuscha*], chum or dog [*O. keta*], sockeye or red [*O. nerka*]) and Dolly Varden (*Salvelinus malma*). The NGCMA supports a large marine coho salmon sport fishery (Table 4). The Seward Silver Salmon Derby sponsored by the Seward Chamber of Commerce highlights this popular fishery each year in August. Coho salmon are a mix of hatchery and wild fish; Chinook and sockeye salmon are a result of hatchery production; pink and chum salmon and Dolly Varden are all wild fish. The management and allocation of these fisheries is guided by the *Trail Lakes Hatchery Salmon Hatchery Management Plan* (5 AAC 21.373) and the *Resurrection Bay Salmon Management Plan* (5 AAC 21.376) (Appendix A1). Bottomfish species are also targeted by sport anglers and include Pacific halibut (*Hippoglossus stenolepis*), rockfish (*Sebastes* spp.), and lingcod (*Ophiodon elongates*) (Table 4). When weather permits, charter boats travel daily to the marine waters of the Prince William Sound Management Area to target the abundant bottomfish resources. There is also a relatively small salmon shark (*Lamna ditropis*) fishery.

All freshwater drainages in Resurrection Bay, except the Resurrection River drainage downstream of the Seward Highway and Nash Road in Seward, are closed to salmon fishing but are open to Dolly Varden, rainbow trout (*O. mykiss*), and Arctic grayling (*Thymallus arcticus*) sport fishing.

All charter boat operators are required to record all fish caught and harvested for each angler, including the captain and crew, in saltwater logbooks issued by the Alaska Department of Fish and Game (ADF&G). Logbooks must be completed before anglers or fish leave the boat and must be mailed or delivered to the ADF&G office no later than 1 week after the fishing trip. Logbook data are compiled in an ADF&G database and a data summary is published annually. Each fishery will be discussed in greater detail in individual chapters.

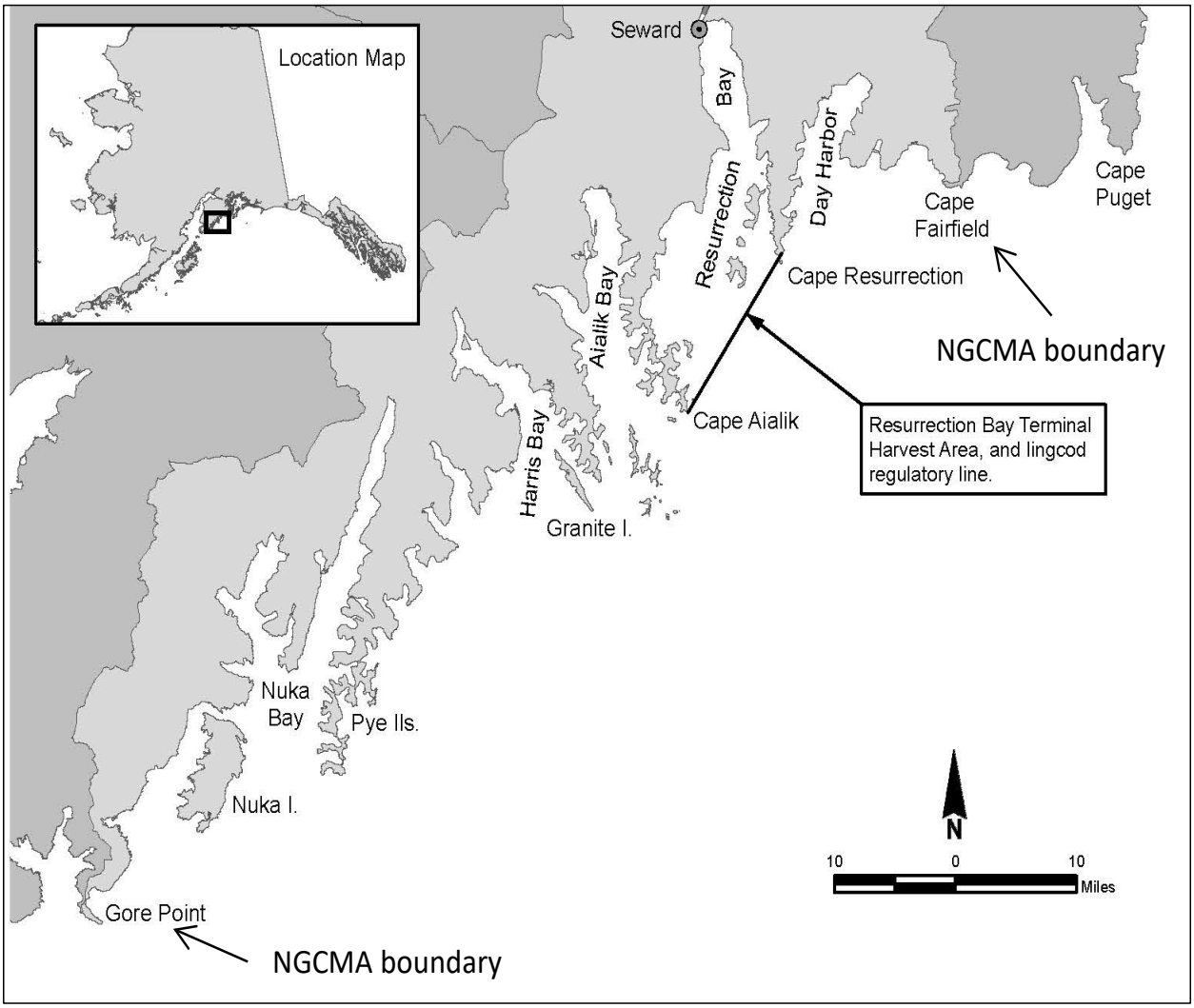

Figure 1.–Map of the North Gulf Coast Management Area and Resurrection Bay Terminal Harvest Area.

Table 1.–Sport fishing effort in angler-days in the North Gulf Coast Management Area compared to Southcentral and statewide, 1999–2018.

Year	Effort (angler-days)			Percent of statewide	Percent of Southcentral
	Statewide	Southcentral	NGC		
1999	2,499,152	1,659,966	84,742	3	5
2000	2,627,805	1,844,824	83,830	3	5
2001	2,621,941	1,560,562	91,477	3	6
2002	2,259,091	1,569,513	97,351	4	6
2003	2,219,398	1,535,501	95,579	4	6
2004	2,473,961	1,709,671	117,941	5	7
2005	2,461,933	1,712,610	115,605	5	7
2006	2,294,548	1,605,983	102,239	4	6
2007	2,543,674	1,799,352	119,553	5	7
2008	2,315,601	1,622,920	102,635	4	6
2009	2,216,445	1,522,346	99,195	4	7
2010	2,000,167	1,371,492	85,990	4	6
2011	1,919,313	1,326,950	90,812	5	7
2012	1,885,692	1,252,263	72,536	4	6
2013	2,202,957	1,488,383	96,461	4	6
2014	2,309,853	1,571,650	96,940	4	6
2015	2,212,331	1,470,381	95,364	4	6
2016	1,982,300	1,314,668	86,840	4	7
2017	2,006,244	1,312,586	93,631	5	7
2018	1,878,008	1,245,252	86,678	5	7
Average					
2009–2018	2,061,331	1,387,597	90,402	4	7
2016–2018	1,955,517	1,290,835	89,050	5	7

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Starting in 2001, location codes for Resurrection Bay are based on destination rather than location, so harvest, catch, and effort is estimated by "port of return" and a small portion of these estimates may have come from outside the North Gulf Coast Area.

Table 2.–Saltwater sport fishing effort in angler-days by user group in the North Gulf Coast Management Area, 1999–2018.

Year	Saltwater effort	Charter boat		Private boat		Shore	
		Effort	Percent	Effort	Percent	Effort	Percent
1999	84,637	22,962	27.1	45,143	53.3	16,532	19.5
2000	83,551	27,184	32.5	41,560	49.7	14,807	17.7
2001	91,477	29,573	32.3	44,195	48.3	17,709	19.4
2002	97,351	33,138	34.0	47,074	48.4	17,139	17.6
2003	95,579	37,762	39.5	43,303	45.3	14,514	15.2
2004	117,941	29,943	25.4	71,681	60.8	16,317	13.8
2005	115,605	33,248	28.8	64,007	55.4	18,350	15.9
2006	102,239	30,201	29.5	59,815	58.5	12,223	12.0
2007	119,553	45,913	38.4	59,591	49.8	14,049	11.8
2008	102,635	37,050	36.1	55,834	54.4	9,751	9.5
2009	99,416	36,993	37.3	50,515	50.9	11,687	11.8
2010	85,566	34,714	40.6	42,507	49.7	8,345	9.8
2011	90,152	35,831	39.7	46,594	51.7	7,727	8.6
2012	72,018	32,968	45.8	31,831	44.2	7,219	10.0
2013	94,444	40,714	43.1	44,619	47.2	9,111	9.6
2014	96,164	36,177	37.6	50,417	52.4	9,570	10.0
2015	94,664	39,216	41.4	43,746	46.2	11,702	12.4
2016	85,204	38,945	45.7	36,751	43.1	9,508	11.2
2017	92,731	35,934	38.8	42,710	46.1	14,087	15.2
2018	86,470	32,943	38.1	38,286	44.3	15,241	17.6
Average							
2009–2018	89,661	36,444	41	42,798	48	10,420	12
2016–2018	88,135	35,941	41	39,249	44	12,945	15

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Starting in 2001, location codes for Resurrection Bay are based on destination rather than location, so harvest, catch, and effort is estimated by "port of return" and a small portion of these estimates may have come from outside the North Gulf Coast Area.

Table 3.–Sport fishing effort in angler-days for salt and fresh waters in the North Gulf Coast Management Area, 1999–2018.

	Salt water		Fresh water		
Year	Effort	Percent	Effort	Percent	All effort
1999	84,637	99.9	105	0.1	84,572
2000	83,551	99.7	253	0.3	83,648
2001	91,477	99.6	367	0.4	92,383
2002	97,351	99.4	558	0.6	98,546
2003	95,579	99.1	924	0.9	97,520
2004	117,941	99.7	360	0.3	114,698
2005	115,605	99.3	761	0.7	116,366
2006	102,239	99.4	667	0.6	103,232
2007	119,553	99.7	383	0.3	120,039
2008	102,635	99.6	461	0.4	103,198
2009	99,416	99.3	726	0.7	100,142
2010	85,566	99.5	424	0.5	85,990
2011	90,152	99.3	660	0.7	90,812
2012	72,018	99.3	518	0.7	72,536
2013	94,444	97.9	2,017	2.1	96,461
2014	96,164	99.2	776	0.8	96,940
2015	94,664	99.3	700	0.7	95,364
2016	85,204	98.1	1,636	1.9	86,840
2017	92,731	99.0	900	1.0	93,631
2018	86,470	99.8	208	0.2	86,678
Average					
2009–2018	89,683	99.1	857	0.9	90,539
2016–2018	88,135	99.0	915	1.0	89,050

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019).

Note: Estimates for 1996–1999 were recalculated due to error in original, published data analysis.

Table 4.–Sport fishing harvest by species in the North Gulf Coast Management Area, 1999–2018.

	Salmon						Dolly	Bottomfish		
Year	Chinook	Coho	Pink	Sockeye	Chum	Total	Varden	Lingcod	Rockfish	Other [a]
1999	2,640	75,620	4,560	1,064	663	84,547	221	3,445	25,237	29,856
2000	2,655	70,771	3,883	1,485	1,179	79,973	242	5,565	32,031	34,150
2001	2,281	96,470	3,840	1,263	650	104,504	216	3,694	32,460	31,841
2002	3,380	98,559	4,280	3,112	430	109,761	915	4,158	39,833	38,799
2003	2,792	86,011	4,470	2,077	263	95,613	653	4,209	30,394	44,764
2004	3,302	107,916	5,603	2,984	1,063	120,868	679	5,066	47,331	59,792
2005	2,768	135,946	7,051	5,460	1,178	152,403	146	5,451	38,512	57,355
2006	3,388	82,699	3,452	4,977	715	95,231	194	6,277	38,673	50,315
2007	3,522	105,970	5,941	5,761	318	121,512	220	9,047	44,384	65,487
2008	1,834	79,956	6,172	5,732	1,218	94,912	157	9,163	48,917	61,551
2009	1,981	91,235	4,399	10,619	580	108,814	165	6,797	46,047	51,604
2010	2,657	70,555	3,250	4,949	275	81,686	116	7,399	47,214	50,576
2011	2,419	88,376	2,401	9,592	438	103,226	170	7,235	46,675	56,190
2012	1,461	44,036	6,055	5,593	578	57,723	102	6,780	40,467	44,051
2013	2,763	80,938	5,908	6,453	1,491	97,553	175	6,426	51,777	54,030
2014	2,593	78,197	4,782	5,913	630	92,115	171	5,474	56,748	56,544
2015	3,750	90,370	7,514	7,119	993	109,746	148	5,444	59,370	61,134
2016	2,541	25,991	1,720	12,921	238	43,411	68	4,754	80,081	56,931
2017	3,690	86,103	7,831	12,868	654	111,146	23	3,536	48,006	43,155
2018	4,438	42,789	3,096	16,922	214	67,459	27	3,695	49,750	38,723
Average										
2009–2018	2,829	69,859	4,696	9,295	609	87,288	117	5,754	52,614	51,294
2016–2018	3,556	51,628	4,216	14,237	369	74,005	39	3,995	59,279	46,270

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Estimates for 1996–1999 were recalculated due to an error in the original published data analysis. Estimates for 1995 are biased but could not be recalculated.

[a] Other may include halibut, smelt, herring, sablefish, cod, greenling, sculpin, shark, and lingcod (1987–2007).

AREAWIDE OVERVIEW

FISHING EFFORT

From 2016 to 2018, the average estimated angler effort in the NGCMA was 89,050 angler-days, or about 5% of the total statewide sport fishing effort and 7% of the total Southcentral Alaska effort (Table 1). The NGCMA effort in 2012, 72,536 angler-days (Figure 2), was one of the lowest since the 1990s whereas on average over the last 10 years, estimated effort has been 90,402 angler-days. In the NGCMA, most sport fisheries occur in salt water and account for almost all angling effort (about 99%; Tables 2 and 3). Since 1990, anglers fishing from boats have composed the largest amount of the angler effort (Table 2, Figure 3).

Salmon harvest in the NGCMA has varied since 1999 with a peak harvest of 152,403 salmon occurring in 2005 (Table 4). From 2016 to 2018, salmon harvest ranged from 43,411 in 2016 to 111,146 in 2017. Coho salmon annually composed the largest anadromous catch by area anglers, followed by sockeye salmon, pink salmon, Chinook salmon, and chum salmon (Table 4).

Bottomfish catch and harvest in the NGCMA varies but has generally increased since 1999 (Table 4). The "other" bottomfish category in Table 4, which includes Pacific halibut, composed the largest proportion of the bottomfish catch until recently, followed closely by rockfish, and far less by lingcod (Table 4).

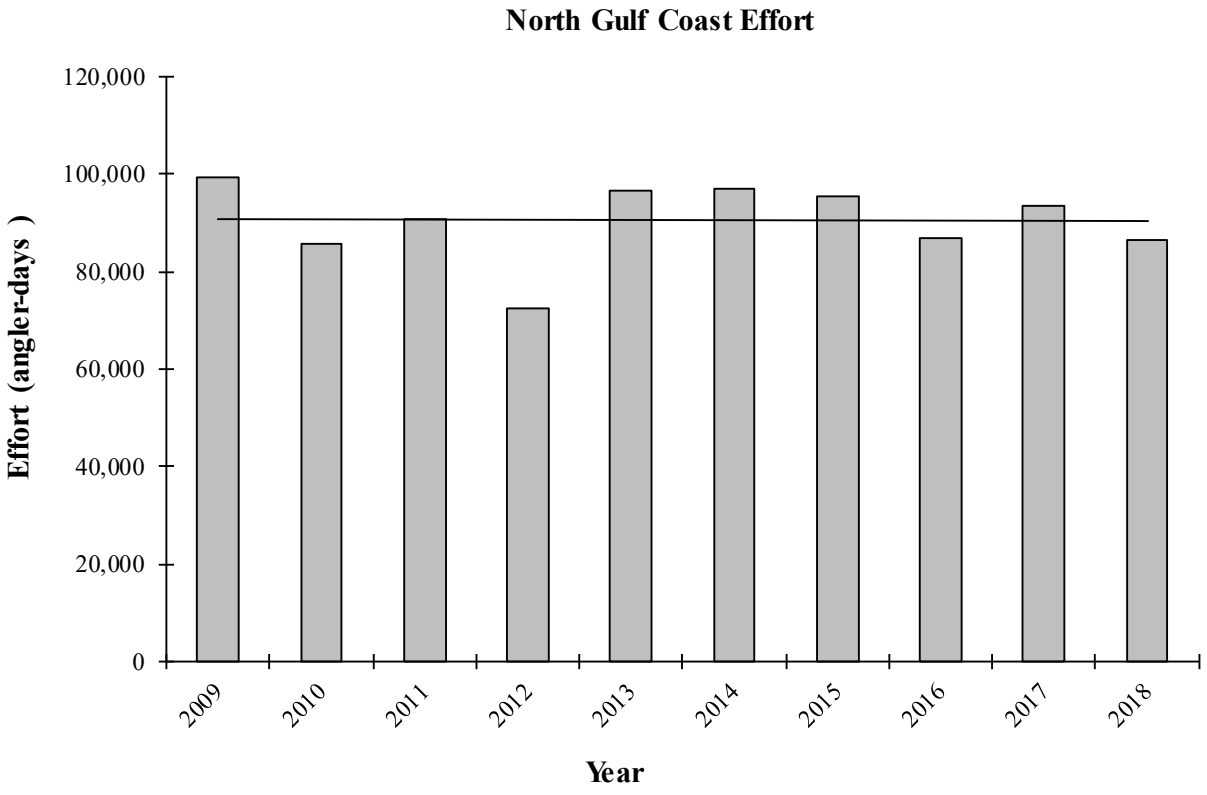

Figure 2.–Sport fishing angler effort (and trend line) in angler-days in the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

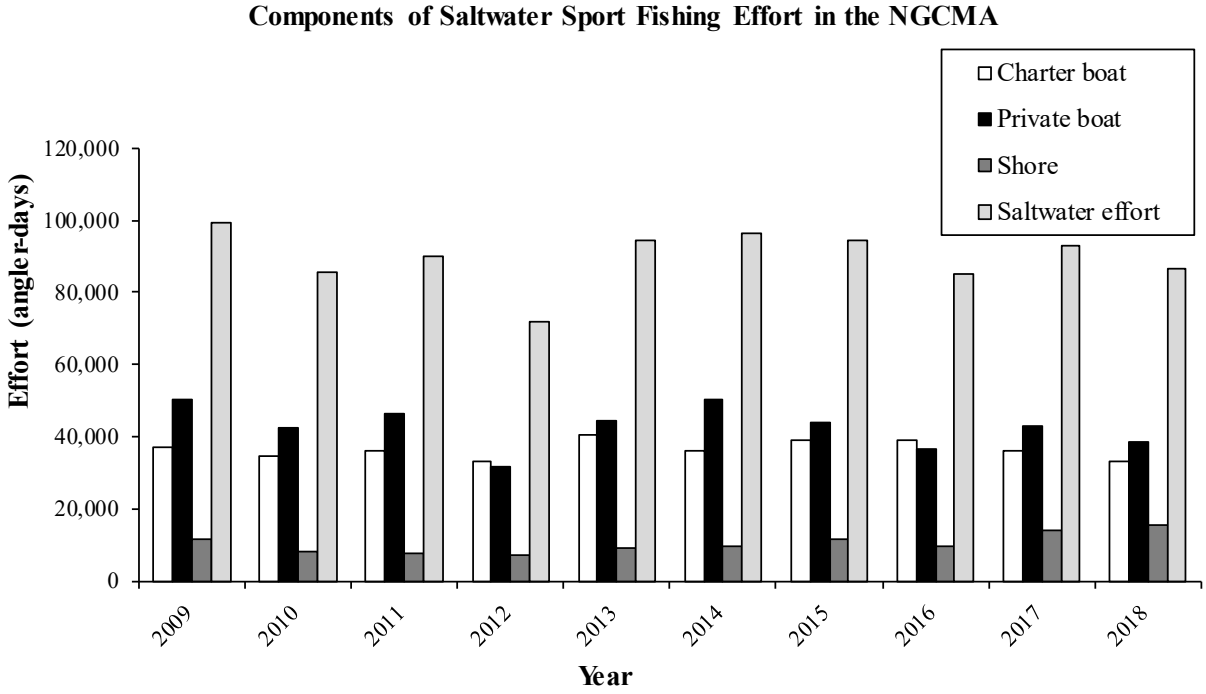

Figure 3.–Components of the saltwater sport fishing effort in the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

SALTWATER GUIDE LOGBOOK AND STATEWIDE HARVEST SURVEY OVERVIEW

For the most part, angler-days of saltwater effort in the guided sport fishing industry in the NGCMA have remained steady over the last 10 years (Table 3); however, there are still allocation and management decisions that affect the guided sport fishing industry. Guides in the sport fishing industry are required to complete a logbook and submit the information to the ADF&G Guide Logbook program. Guide Logbook data are used to document guided use and provide information to resolve issues that arise regarding the industry and its effect on fishery resources. The sport fishing guide and business registration and licensing programs were designed to provide a way to comprehensively define and document this diverse industry throughout Alaska. Guide logbooks collect data on individual guided anglers and include only the guided portion of the total fishing effort, catch, and harvest. Alaska has conducted a mail-out Statewide Harvest Survey (SWHS) to estimate total sport fishing harvest (fish kept) since 1977 and total catch (fish kept plus fish released) since 1990. The SWHS collects household data through a mail-out survey that includes both guided and unguided anglers to estimate total catch, harvest, and effort. Guide Logbook data represent information from only anglers that use guide services versus the SWHS, which is a survey of all sport anglers. Because of this, caution should be used when comparing the two sets of data. Data from the SWHS and Guide Logbook program are both used to confirm trends in effort, catch, and harvest.

The saltwater charter industry at the Port of Seward has declined since 2007 when there were approximately 100 licensed charter businesses, 140 registered charter vessels, and 43,000 charter angler-days per year (Table 5). From 2016 to 2018, the number of charter business ranged from 52 (2017) to 56 businesses (2018), and the number of charter vessels ranged from 87 (2017) to 95 vessels (2016). From 2016 through 2018, there was an average of 39,580 angler-days annually on charter vessels of which an average of 687 charter trips specifically targeted salmon and an average of 1,978 trips targeting both salmon and bottomfish (Table 5). In 2016, there were 4,706 charter trips out of Seward, which was 265 trips higher than the 10-year (2009–2018) average of 4,441 trips. In 2017 and 2018, the number of charter-based trips was slightly lower than average (4,271 and 4,290, respectively; Table 5). Weather, fuel prices, economic reasons, or regulations could all be factors that influence the number of charter trips in a year. Even with the variation between years, Seward is the second highest in number of charter businesses in Southcentral Alaska, behind the port of Homer; and the fourth highest in the state, behind Sitka, Ketchikan, and Homer[1].

[1] Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. [Accessed October 6, 2019]. URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.

Table 5.–Guide Logbook data for the port of Seward, 2006–2018.

			Angler-days				Trip target				
Year	Businesses	Vessels	Resident	Nonresident	Other [a]	Total	Salmon	Bottomfish	Both	Unknown	Total
2006	102	142	11,827	26,427	4,427	47,108	1,552	1,922	1,959	6	5,439
2007	104	143	12,378	29,085	674	42,811	1,287	2,059	2,342	11	5,699
2008	98	136	10,879	27,211	1,004	40,098	976	2,067	2,121	19	5,183
2009	80	120	9,958	20,726	830	32,344	1,059	1,315	1,906	7	4,287
2010	73	110	10,047	22,971	3,149	39,316	970	1,647	1,793	13	4,423
2011	67	103	9,561	23,143	2,921	38,546	960	1,222	2,283	13	4,478
2012	67	101	10,565	23,621	3,356	40,898	789	1,877	1,750	8	4,424
2013	55	90	10,596	24,725	3,426	42,173	979	1,411	2,114	5	4,509
2014	58	102	10,212	25,052	1,932	39,128	912	1,315	2,201	2	4,430
2015	54	96	9,325	26,720	2,427	40,899	710	960	2,918	0	4,588
2016	54	95	9,894	27,330	2,181	41,586	500	2,247	1,956	3	4,706
2017	52	87	8,734	26,005	2,307	39,353	823	1,180	2,267	1	4,271
2018	56	93	7,964	26,104	1,866	37,800	738	1,841	1,711	0	4,290
Average											
2009–2018	62	100	9,686	24,640	2,440	39,204	844	1,502	2,090	5	4,441
2016–2018	54	97	8,864	26,480	2,118	39,580	687	1,756	1,978	1	4,422

Source: Sigurdsson and Powers (2009). Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. [Accessed October 6, 2019]. URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.

[a] Includes complementary, crew, or unreported angler-days.

STOCKED FISHERIES

ARCTIC GRAYLING AND RAINBOW TROUT

Fishery Description

In the late 1990s, ADF&G began a trout stocking program to increase sport fishing opportunities within the NGCMA (Tables 6 and 7). There are only a few systems that support natural rainbow trout fisheries and none for Arctic grayling in the NGCMA. These fish have been stocked in lakes near Seward to diversify opportunities for sport anglers (Table 7). Lost Lake was stocked in 1999 and 2001 with a combined total of about 67,800 diploid fingerling rainbow trout. No recent stocking of Lost Lake has occurred. First Lake, located in Seward's Two Lakes Park, is stocked annually with catchable-sized rainbow trout. From 2016 to 2018, First Lake was stocked annually with an average of 1,206 catchable rainbow trout (Table 7). Rainbow trout stocking provides opportunities for locals and supports a youth-only fishery sponsored by the Seward Advisory Committee and local businesses. Seward's First Lake was last stocked with Arctic grayling in 2011.

Fishery Management and Objectives

The management goal for the NGCMA stocking program is to provide sport fishing opportunity through annual or alternate-year stocking of lakes with catchable-sized rainbow trout. The ADF&G Statewide Stocking Plan for Recreational Fisheries is updated annually and available for public comment. The stocking plan can be found online at http://www.adfg.alaska.gov/index.cfm?adfg=fishingSportStockingHatcheries.stockingPlan.

SALMON

Fishery Description

Over the last 10 years (2009–2018), an average of 2,934 charter trips or 66% of all charter trips made annually out of Seward involved anglers catching salmon on the trip (Figure 4). All 5 salmon species found in Alaska are caught on charter trips but the most commonly kept salmon species is coho salmon followed by "other" (pink and chum salmon combined), Chinook salmon, and lastly sockeye salmon. The importance of salmon in the NGCMA was identified early and ADF&G began stocking salmon in the 1960s. The stocking of hatchery fish has increased and diversified the opportunities available to sport anglers in the NGCMA, especially for Resurrection Bay saltwater anglers. These stocking activities consist of 2 types of programs: large private nonprofit hatchery releases to enhance fish abundance for both commercial and sport fisheries, and smaller ADF&G hatchery releases targeted at enhancing sport fisheries. The total hatchery releases of salmon in the NGCMA have averaged just over 5.0 million fish per year over the last 10 years (calculated from Tables 6 and 7). Most of the salmon released are sockeye salmon. All hatchery salmon releases contribute to the common property of all fisheries.

Stocking programs directed toward enhancing sport fisheries include the releasing of coho and Chinook salmon smolt by state-operated hatcheries and the release of coho salmon raised by Cook Inlet Aquaculture Association (CIAA). CIAA also releases sockeye salmon into Resurrection Bay fresh and salt waters primarily intended for commercial harvest but also caught by sport anglers. There is no stocking of pink or chum salmon.

Table 6.–Hatchery releases of coho and Chinook salmon by location and year for the North Gulf Coast Management Area, 1999–2018.

	Coho salmon							Chinook salmon			
	Fry	Smolt						Smolt			
Year	Bear Lake	Bear Creek	Bear Lake	Lowell Creek	Seward Lagoon	Seward SeaLife	Total	Lowell Creek	Seward Lagoon	Seward SeaLife	Total
1999	306,000	51,000		62,580	109,142		528,722	85,502	88,066		173,568
2000	316,000	102,000		54,184	145,693		617,877	109,461	212,873		322,334
2001	310,000	121,000		125,618	124,703		681,321	114,748	113,147		227,895
2002	404,700	123,800		119,512	121,743		769,755	93,296	100,314		193,610
2003	404,800		253,400	124,225	123,718		906,143	110,331	109,976		220,307
2004	406,000	285,000		131,989	131,798	192,000	1,146,787	89,388	109,600	30,066	229,054
2005	400,500	0	488,200	132,276	132,229		1,153,205	100,088	114,847	96,702	311,637
2006	447,300		115,300	131,261	131,326	146,100	971,287		226,621	76,596	303,217
2007	521,000		237,000	130,862	132,811		1,021,673			117,842	117,842
2008	360,000		142,000		233,365		735,365			142,469	142,469
2009	270,000		68,000	91,833	91,979		521,812				0
2010	435,000			133,947	134,008		702,955	109,779	110,671		220,450
2011	437,000				255,252		692,252		223,881		223,881
2012	222,000	93,000			249,309		564,309		219,743		219,743
2013	405,000				216,444		621,444		141,550		141,550
2014	468,000	55,000			97,675		620,675		183,464		183,464
2015	448,000	98,000			279,546		825,546		298,542		298,542
2016	446,600	100,000			272,212		818,812		320,711		320,711
2017	125,000	54,000			264,935		443,935		328,337		328,337
2018	438,000	70,000			28,000		536,000		324,509		324,509
Average											
2009–2018	369,460	78,333			188,936		634,774		239,045		226,119
2016–2018	336,533	74,667			188,382		599,582		324,519		324,519

Source: Marianne McNair, ADF&G, CFMD, Juneau; Tom Prochazka and Mark Thomas, CIAA, Trail Lakes Hatchery; ADF&G, Division of Sport Fish stocking records.

Note: These numbers are included in the yearly totals for Table 7.

Table 7.–Hatchery releases of sockeye salmon, rainbow trout, Arctic grayling by location and year for the North Gulf Coast Management Area, 1999–2018.

	Sockeye salmon							Rainbow trout		Arctic grayling
	Fry	Fingerling	Smolt and presmolt					Catchables	Fingerling	Catchables
Year	Bear Lake	Bear Lake	Bear Lake	Bear Creek	Grouse Lake	Saltwater release	Total	First Lake	Lost Lake	First Lake
1999	1,380,000						1,380,000		42,802	
2000	1,796,000	223,000					2,019,000	1,000		
2001	145,000						145,000	1,000	25,000	
2002	2,407,700		802,600				3,210,300	1,007		
2003	1,467,000		334,000				1,801,000	1,427		
2004	2,406,000		603,000				3,009,000	955		
2005	2,416,000		1,006,000				3,422,000	760		
2006	2,413,900			979,000			3,392,900	405		
2007	2,437,000		619,000				3,056,000			478
2008	2,400,000					1,600,000	4,000,000			981
2009	2,543,000					1,675,000	4,218,000	150		
2010	2,200,000					1,650,000	3,850,000	150		
2011	2,488,000					0	2,488,000	75		909
2012	2,490,000					1,305,000	3,795,000	1,132		
2013	2,548,000					2,090,000	4,638,000	1,054		
2014	2,405,000					1,742,000	4,147,000	1,029		
2015	2,415,000					1,758,000	4,173,000	512		
2016	2,374,000					1,680,165	4,054,165	1,270		
2017	2,468,000			288,000		1,528,000	4,284,000	1,139		
2018	2,555,000					1,488,000	4,043,000	1,208		
Average										
2009–2018	2,448,600					1,491,617	3,969,017	772		
2016–2018	2,438,111					1,471,241	3,941,352	1,206		

Source: Marianne McNair, ADF&G, CFMD, Juneau; Tom Prochazka and Mark Thomas, CIAA, Trail Lakes Hatchery; ADF&G, Division of Sport Fish stocking records.

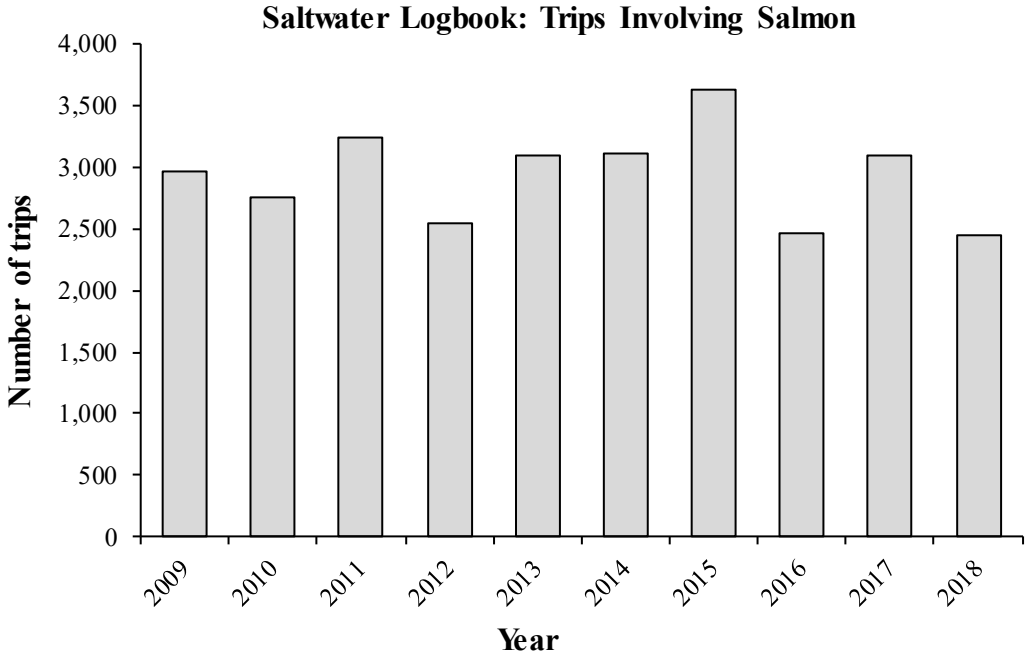

Figure 4.–Total number of trips taken annually by guided anglers where salmon were caught in the NGCMA.

Source: Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. (Accessed October 6, 2019). URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.

Fishery Management and Objectives

The coho and Chinook salmon stocking program in Seward is designed to create additional saltwater and shoreline fishing opportunities and draw anglers to fish hatchery stocks.

The Alaska Board of Fisheries has established 3 salmon management plans for North Gulf Coast and Resurrection Bay. These plans provide for the sustained yield of area fisheries, as well as establish allocation and management guidelines for ADF&G managers (Appendix A1). Management plans and policies established for Resurrection Bay include the following:

1) Trail Lakes Hatchery Salmon Management Plan 5 AAC 21.373. This management plan establishes guidelines for the enhancement of coho and sockeye salmon in Bear Lake near Seward. The plan provides for the enhancement of sockeye salmon in Bear Lake intended for commercial use in Resurrection Bay, provided the enhancement does not negatively impact coho salmon smolt production from Bear Lake. Surplus sockeye salmon are split 50:50—50% to CIAA cost recovery and 50% to the commercial fishing fleet.

2) Resurrection Bay Salmon Management Plan 5 AAC 21.376. This management plan provides allocation and management guidelines for Resurrection Bay salmon fisheries. The plan stipulates that coho and Chinook salmon fisheries of Resurrection Bay be managed primarily for recreational (sport fishery) uses and provides for a commercial fishery for other salmon species only if the prosecution of these fisheries does not interfere with the sport fishery in Resurrection Bay.

3) North Gulf Coast King Salmon Sport Fishery Management Plan 5 AAC 58.065. This management plan directs Chinook salmon fishery effort to hatchery stocks and stabilizes the sport harvest of Chinook salmon in the North Gulf Coast.

CHINOOK SALMON FISHERIES

FISHERY DESCRIPTION

There is little wild production of Chinook salmon in NGCMA waters; therefore, the Chinook salmon sport fishery in NGCMA is supported almost entirely by hatchery-produced fish. Resurrection Bay is the only location in NGCMA waters that is stocked with Chinook salmon, and in the past, stocking by hatchery enhancement had created 2 distinct Chinook salmon runs. The late-run Chinook salmon program was canceled in 1998 due to lack of available broodstock. Currently, early-run hatchery Chinook salmon return to release sites as mature adults from late May through mid-July. Marine anglers harvest Chinook salmon feeding in the area throughout the year, with winter months being the most productive. In 2007, an annual youth-only Chinook salmon sport fishery was approved by the BOF and now occurs in the Seward Lagoon and outflow stream the third weekend of June and the second weekend in July.

FISHERY MANAGEMENT AND OBJECTIVES

The Alaska Board of Fisheries has established management plans for North Gulf Coast and Resurrection Bay salmon (Appendix A1). These plans provide for the sustained yield of area fisheries, as well as establishing allocation and management guidelines for ADF&G managers. No formal escapement goals have been established for Chinook salmon in the North Gulf Coast; however, the purpose of the Chinook salmon enhancement program is to provide sport fishing opportunities in Resurrection Bay. The management objectives of the hatchery enhancement program are as follows: 1) produce a return of 4,000–6,000 early-run adult Chinook salmon to Resurrection Bay, and 2) generate 10,000 angler-days of annual sport fishing effort directed at stocked Chinook salmon in Resurrection Bay (Statewide Stocking Plan for Sport Fisheries; http://www.adfg.alaska.gov/index.cfm?adfg=fishingsportstockinghatcheries.stockingplan, accessed October 2019).

STOCKING PROGRAM

The current ADF&G statewide stocking plan sets a stocking target of 305,000 Chinook salmon smolt for Seward Lagoon, Resurrection Bay. The purpose of this stocking is to provide Chinook salmon sport-fishing opportunities in Resurrection Bay. The primary Chinook salmon broodstock source is Crooked Creek, and if the number of spawning pairs from the primary brood source is inadequate, the secondary broodstock source is Ship Creek. A variety of brood sources have been used in the past, but the Chinook salmon brood sources from 2016 through 2018 were only taken from Crooked Creek and Ship Creek. (Table 8). The amount of Chinook salmon stocked into NGCMA has varied in the past (Table 6) but since the new William Jack Hernandez Sport Fish Hatchery (WJHSFH) became operational in 2011, the size of stocked fish has become more reliable. The WJHSFH can raise larger smolt in 1 year versus the 2 years it would have taken in the colder waters at the former Fort Richardson Sport Fish Hatchery. Chinook salmon are currently raised in the WJHSFH and released between mid-May to mid-June into the Seward Lagoon. The amount of time that a Chinook salmon typically spends feeding in marine waters can vary from 3 to 6 years, so it is difficult to associate a particular stocking event or year class to the yearly catch.

From 2016 through 2018, the average number of Chinook salmon released into the Seward Lagoon was 324,519 fish (Table 6) and each fish averaged 14.15 g (obtained from hatchery records). This is an increase of about 98,400 more Chinook salmon smolt than the last 10-year (2009–2018) average (226,119 smolt; calculated from Table 6).

Table 8.–Broodstock origin of salmon stocked in Resurrection Bay tributaries, 1965–2018.

Salmon species	State of origin	Brood stock	Brood year
Coho			
	AK	Swanson River	1965–1966
	OR	Big Creek	1966
	AK	Rose Tead Lake	1966, 1972
	OR	Eagle Creek	1967
	AK	Bear Creek	1968–1969, 1972, 1974, 1980–2018
	AK	Miam Lake	1970
	AK	Seward Lagoon	1971, 1973, 1975–1977, 1978–1980
	AK	Ship Creek	1971, 1975, 1985
	AK	Grouse Lake	1979
	AK	Crooked Creek	1985–1986
	AK	Ward Lake	1990
	AK	Little Su	1998
Chinook			
	AK	Kenai R	1985
	AK	Crooked Creek	1978–1979,1983, 1989–1994, 1999–2006, 2008–2009, 2011–2012, 2014–2018
	AK	Kasilof R.	1990–1993, 1995–1996, 1998
	AK	Willow Cr	1995–1997
	AK	Deception Cr.	1999, 2004, 2006, 2008, 2010, 2018
	AK	Ship Creek	1976–1978, 2004, 2006, 2009–2011, 2013–2014, 2016–2017
	AK	Ninilchik	1996
Sockeye			
	AK	Big River	1990–1993, 2009–2018
	AK	Upper Russian Lake	1990–1992, 2009–2018
	AK	Bear Creek/Lake	1993–2009, 2018
	AK	Packers Lake	1994–1995, 1997–1998
	AK	Meadow Creek	1995–1998
	AK	Tustumena Lake	1995, 1997–1998

FISHERY PERFORMANCE

The annual catch of Chinook salmon has generally increased since 2012 (Figure 5). As a general trend, the catch and harvest in both the SWHS data and saltwater logbook data for Chinook salmon increased from 2012 to 2015 followed by a decline in 2016 and then increases through 2018 (Figures 5 and 6). Many Chinook salmon stocks and associated fisheries across Alaska have seen a general decline since 2012, and a Chinook Salmon Symposium was held in October of 2012 to address concerns regarding the lack of returning fish (ADF&G Chinook Salmon Research Team 2013).

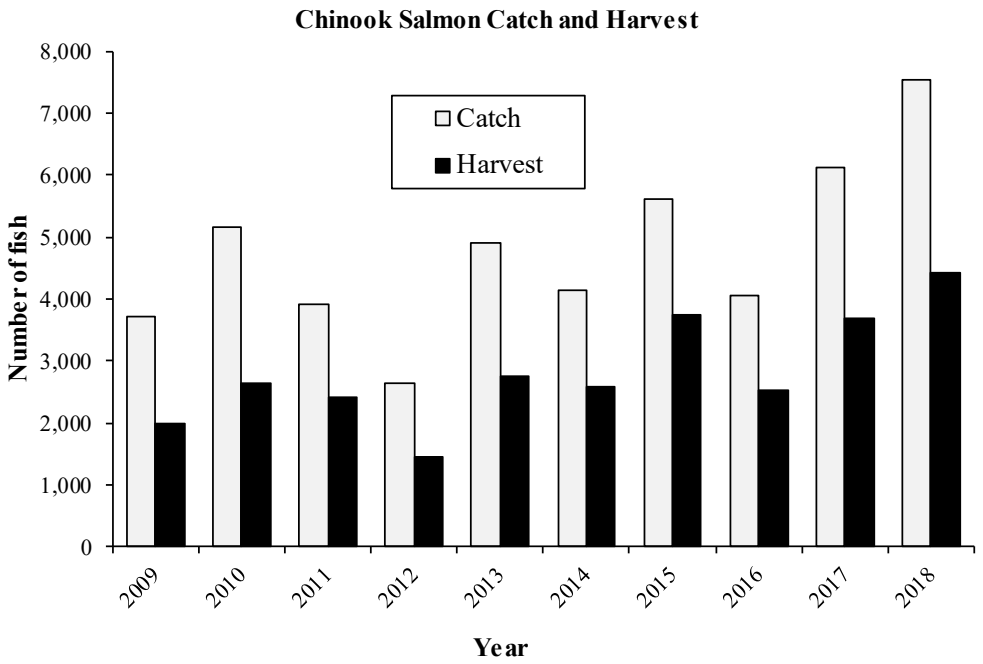

Figure 5.–Chinook salmon catch and harvest for the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

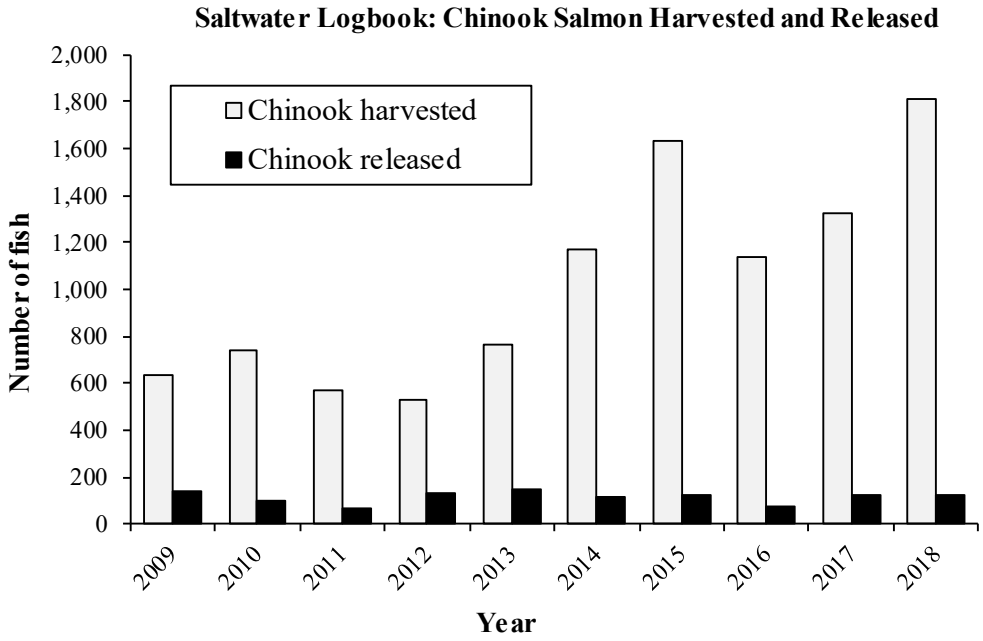

Figure 6.–Chinook salmon harvested and released by guided anglers, 2009–2018.

Source: Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. (Accessed October 6, 2019). URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.

According to the SWHS, the average estimated annual catch of Chinook salmon in the NGCMA for 2016–2018 was 5,912 fish (Table 9) but this varied between a low of 4,051 in 2016 and a high of 7,544 in 2018. The average estimated harvest from 2016 to 2018 was 3,556 fish. Anglers harvested 61% of their Chinook salmon catch on average during this period (2016–2018), which was slightly higher than the 10-year average (59%). The average catch during 2009–2018 was 4,784 Chinook salmon, which was nearly 2 times the catch in 2012. In 2018, the annual catch (7,544 fish) was the highest observed since the late 1990s. From 2016 to 2018, an average of 93% of harvested Chinook salmon were caught by boat anglers versus shore anglers. From 2016 to 2018, average annual catch by anglers on private boats (2,855 fish) was just slightly higher than anglers on charter boats (2,754 fish). This relationship changes year to year; in 2016 and 2017, charter boats caught 808 and 482 more Chinook salmon, respectively than private boats, but in 2018, private anglers caught 1,593 more Chinook salmon. The reason for the large increase in private boat catch in 2018 is unknown and could be related to factors affecting effort or for economic reasons. Shore anglers have had less annual catch than boat anglers since the late 1990s. This could be because of less effort by the shore anglers targeting Chinook salmon or because Chinook salmon are more accessible for boat anglers. It also might be a result of boat anglers targeting other salmon species and incidentally catching Chinook salmon.

Table 9.–Chinook salmon catch and harvest in the North Gulf Coast Management Area, 1999–2018.

	Boat									
	Charter		Private		Total		Shore		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	594	303	1,185	779	1,779	1,082	2,432	1,558	4,211	2,640
2000	854	717	1,478	717	2,332	1,434	1,565	1,221	3,897	2,655
2001	907	572	1,278	870	2,185	1,442	1,093	839	3,278	2,281
2002	1,509	982	1,853	1,247	3,362	2,229	1,503	1,151	4,865	3,380
2003	1,581	862	2,025	1,186	3,606	2,048	854	744	4,460	2,792
2004	1,402	865	3,611	1,744	5,013	2,609	841	693	5,854	3,302
2005	3,142	1,179	2,864	1,151	6,006	2,330	484	438	6,490	2,768
2006	1,924	1,064	3,866	1,999	5,790	3,063	370	325	6,160	3,388
2007	2,703	1,366	2,191	1,576	4,894	2,942	645	580	5,539	3,522
2008	1,667	793	1,473	731	3,140	1,524	362	310	3,502	1,834
2009	1,597	910	2,106	1,045	3,703	1,955	26	26	3,729	1,981
2010	2,454	1,209	2,237	1,320	4,691	2,529	460	128	5,151	2,657
2011	2,052	1,165	1,784	1,172	3,836	2,337	82	82	3,918	2,419
2012	1,502	966	1,109	482	2,611	1,448	27	13	2,638	1,461
2013	2,344	1,473	2,432	1,182	4,776	2,655	129	108	4,905	2,763
2014	1,988	1,368	1,733	910	3,721	2,278	433	315	4,154	2,593
2015	3,282	2,283	1,792	1,034	5,074	3,317	538	433	5,612	3,750
2016	2,308	1,603	1,500	735	3,808	2,338	243	203	4,051	2,541
2017	3,228	1,973	2,746	1,551	5,974	3,524	166	166	6,140	3,690
2018	2,727	2,146	4,320	1,877	7,047	4,023	497	415	7,544	4,438
Average										
2009–2018	2,348	1,510	2,176	1,131	4,524	2,640	260	189	4,784	2,829
2016–2018	2,754	1,907	2,855	1,388	5,610	3,295	302	261	5,912	3,556

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Estimates for 1996–1999 were recalculated due to an error in the original published data analysis.

According to Guide Logbook information, on average (2016–2018) 1,422 Chinook salmon are harvested annually by anglers utilizing guide services (Table 10). This was 392 fish higher than the 10-year average (2009–2018) of 1,030 fish. In addition, on average from 2009 to 2018, approximately 11% of Chinook salmon caught by anglers on charter vessels were released whereas only 7% were released on average from 2016 to 2018 (Table 10).

Table 10.–Number of Chinook salmon harvested and released and percent of catch released by guided anglers for Seward, 2006–2018.

	Chinook salmon		
Year	Harvested	Released	Percent of catch released
2006	1,233	147	11
2007	774	91	11
2008	411	84	17
2009	633	139	18
2010	741	99	12
2011	570	64	10
2012	531	132	20
2013	762	152	17
2014	1,167	114	9
2015	1,632	127	7
2016	1,137	74	6
2017	1,321	128	9
2018	1,808	121	6
Average			
2009–2018	1,030	115	11
2016–2018	1,422	108	7

Source: Sigurdsson and Powers (2009). Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. [Accessed October 6, 2019]. URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.

COHO SALMON FISHERIES

FISHERY DESCRIPTION

The North Gulf Coast and Resurrection Bay annually support one of the largest marine coho salmon sport fisheries in Alaska. The coho salmon sport fishery has grown substantially since the 1990s and is one of the most popular sport fisheries in NGCMA. Natural bathymetric features such as Aialik Peninsula and the Chiswell Ridge combined with coastal ocean currents and upwelling result in an area rich in primary production that attracts great numbers of feeding coho salmon. This fishery starts in late June to early July as anglers target wild and hatchery coho salmon feeding just outside of Resurrection Bay. This fishery culminates with the Seward Silver Salmon Derby held each August since 1956, a shoreline fishery over Labor Day weekend, and an annual youth-only fishery that occurs the last weekend of August and first weekend in September.

FISHERY MANAGEMENT AND OBJECTIVES

The Alaska Board of Fisheries has established management plans for North Gulf Coast and Resurrection Bay salmon (Appendix A1). These plans provide for the sustained yield of area fisheries, as well as establish allocation and management guidelines for ADF&G managers.

The purpose of the coho salmon enhancement program is to increase coho salmon sport fishing opportunities in Resurrection Bay while maintaining the natural production of Resurrection Bay drainages. The management objectives are as follows: 1) produce a return of 20,000 adult coho salmon to Resurrection Bay, and 2) generate 25,000 angler-days of annual sport fishing effort directed at stocked coho salmon in Resurrection Bay. Although no formal escapement goals have been established for coho salmon runs in Resurrection Bay, CIAA allows a minimum of 300 coho salmon into Bear Lake. A weir on Bear Creek is used to collect coho salmon eggs for ADF&G and CIAA stocking activities.

Annual foot stream surveys are used to assess the success of coho salmon runs to Resurrection Bay drainages (Figure 7). These surveys were performed in selected Resurrection Bay streams on coho salmon starting in 1960 (Dunn 1961) and were discontinued after 1989 (Carlon and Vincent-Lang 1990b) due to budget constraints. There are currently 27 years of historical data that provide a relative abundance index for streams in Resurrection Bay (Tables 11 and 12). Information about stream survey reach was not detailed in previous survey reports (Dunn 1961; Logan 1962-1969; McHenry 1970-1986; Sonnichsen et al. 1987; Vincent-Lang et al. 1988b; Carlon and Vincent-Lang 1990b), which made it difficult to know if the survey area reaches were consistent when resumed in 2013. However, historical stream survey reach information was relayed from personal communications in 2013 between Dan Bosch, Area Management coordinator, and Tom Prochazka, who was a Fish and Wildlife Technician III in Seward from 1981 through 1991 and who participated in the surveys. In 2013, stream surveys in Resurrection Bay resumed annually; however, the success of these surveys was limited in 2013 due to high water and the ability to survey only 5 of the 9 streams (Table 12). From 2016 to 2018, all historical sites were surveyed annually, but comparisons with historical surveys are questionable. It is difficult to compare historical survey numbers with recent years because the exact survey reach of the historical surveys is unknown. Resurrection River tributaries are subject to flooding and channel variation, causing variation in the survey from one year to the next. Six years of consistent data have now been collected and an analysis of trends will be conducted.

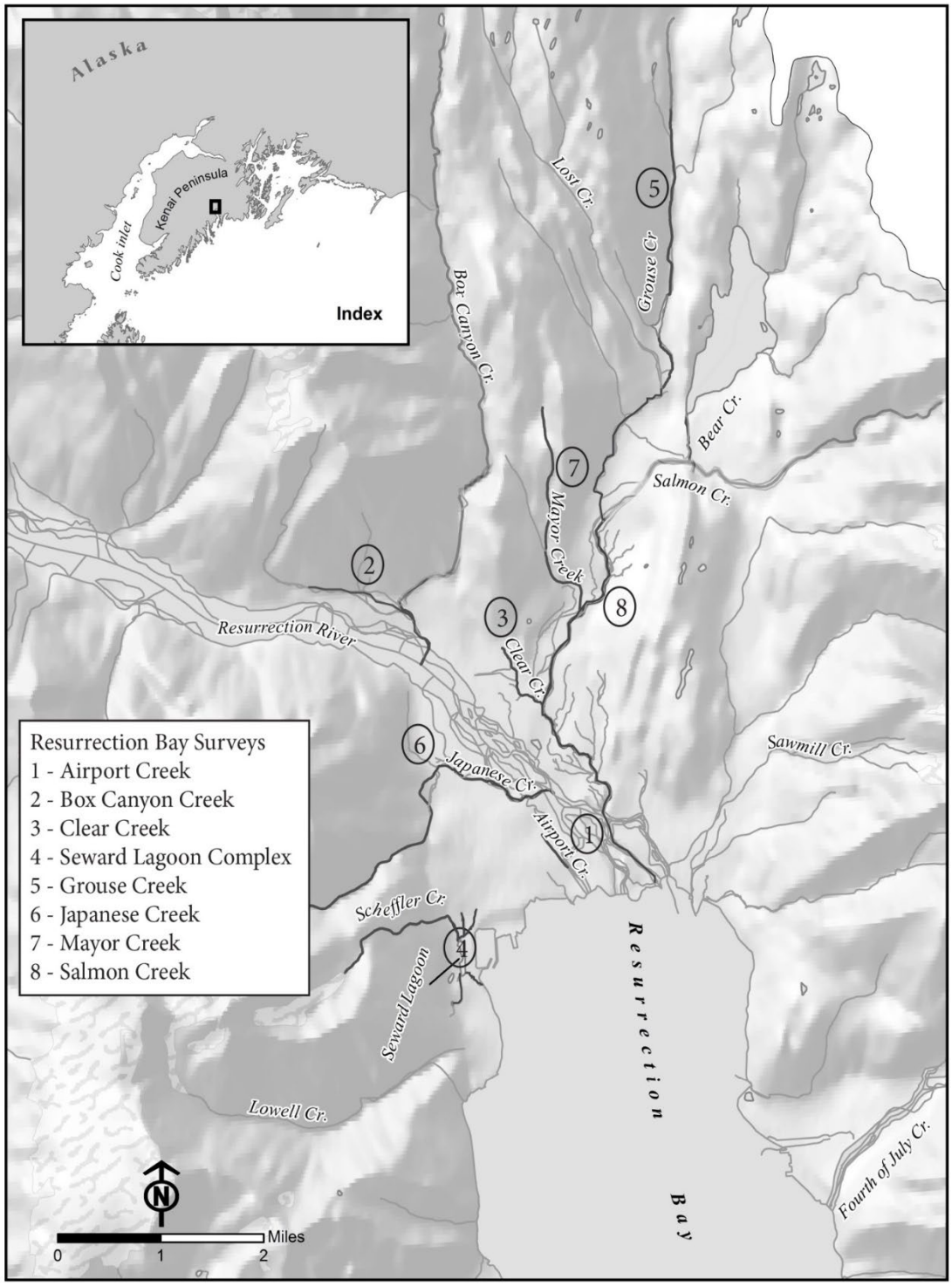

Figure 7.–Coho salmon stream survey locations in the North Gulf Coast Management Area, 2016–2018.

Table 11.–Historical North Gulf Coast Management Area coho salmon escapement index streams survey data, 1965–1988.

Year	Airport Creek	Lower Bear Creek	Box Canyon Creek	Clear Creek	Dairy Creek	Grouse Creek	Japanese Creek	Mayor Creek	Salmon Creek	Total
1965	50			56	48	106	86	16	174	536
1966	127			171	30	236	228	135	234	1,161
1967	55			227	99	174	172	66	329	1,122
1968	67			364	98	378	229	41	1,037	2,214
1969 [a]	36		54	59	115	182	78	64	19	607
1970	26		19	91	44	132	79	38	105	534
1971	13		56	93	46	150	79	19		456
1972	15		59	55	49	42	68	22		310
1973	4		36	37	63	34	40	4		218
1974	23		28	60	114	64	77	51		417
1975	2		8	15	32	12	31	5		105
1976	24		45	89	17	27	94	46		342
1977	7		45	37	134	187	62	42		514
1978	14		28	59	146	360	51	50		708
1979	1		121	42	68	14	61	30		337
1980	9		32	88	122	108	49	94		502
1981 [b]										
1982	0		248	241	108	307	328	145		1,377
1983	0		154	62	64	408	85	69		842
1984	0		144	140	251	396	121	138		1,190
1985	0		112	190	168	336	120	98		1,024
1986 [c]		71	119	115	225[c]	977	131	537		2,175
1987		24	1,158		602					1,784
1988		18	36	121	228	158	229	72		1,784

Source: Dunn (1961), Logan 1962-1969), McHenry 1970-1986), Sonnichsen et al. (1987), Vincent-Lang et al. (1988), Carlon and Vincent-Lang (1990b).

[a] In 1969, Box Canyon Creek was added as a survey site.

[b] In 1981, not enough data were collected to determine minimum escapement.

[c] In 1986, Dairy Creek became the Seward Lagoon system, which includes Dairy Creek, Pasture Creek, Railroad Creek, and First Lake Creek; Lower Bear Creek was also added in 1986.

Table 12.–North Gulf Coast Management Area coho salmon escapement index streams survey data, 2013–2018.

Year	Airport Slough	Box Canyon Creek	Clear Creek	Grouse Creek	Japanese Creek	Mayor Creek	Salmon Creek	Scheffler Complex	Total
2013 [a]		176	157	48		228		228	837
2014	246	43	122	18	29	16	378	5	857
2015	0	6	141	99	23	42	185 [b]	90	586
2016	0	53	146	9	0	18	127	75	428
2017	10	110	648	164	49	71	396	727	2175
2018 [c]	0	14	222	51	36	29	111	96	559

[a] In 2013, surveyors experienced high water events and difficulty completing surveys.

[b] In 2015, Salmon Creek survey was incomplete.

[c] In 2018, surveyors experienced poor conditions on Box, Japanese, Mayor, and Salmon creeks.

STOCKING PROGRAM

In Resurrection Bay, hatchery fish contribute up to 51% of the fish available to the sport fishery (Vincent-Lang 1987; Vincent-Lang et al. 1988a; Carlon and Vincent-Lang 1989, 1990a). A 2003–2005 coho salmon study (Bosch 2011) showed that stocking by ADF&G at Seward Lagoon and Lowell Creek sites provide as much as 80% of the coho salmon harvested from the Seward beach fishery during late August and September. Coho salmon released from hatcheries in Cook Inlet, Resurrection Bay, and Prince William Sound are all harvested by sport anglers fishing out of Seward (Bosch 2011). The hatchery contribution of coho salmon harvested by anglers in Resurrection Bay was 33% in 2003, 24% in 2004, and 33% in 2005.

Resurrection Bay drainages produce large numbers of coho salmon and support one of the largest saltwater coho salmon sport fisheries in the state (Brazil and Bosch 2016). However, natural production varies annually due to highly variable stream flows and water temperature fluctuations in this coastal region. The amount of time that coho salmon spend in fresh water as juveniles can vary, but upon leaving fresh water as smolt, coho salmon spend approximately 1 year in the ocean before returning to the location where they imprinted (Sandercock 1991). For example, most coho salmon returning to Bear Creek weir spend either 1 or 2 years in fresh water after emerging from the gravel before heading out to salt water for 1 year (35.7% and 61.5%, respectively)[2]. Therefore, to reduce annual variability, hatchery supplementation of natural production in Resurrection Bay is necessary to meet the demands of this sport fishery. In NGCMA, Resurrection Bay is the only place where coho salmon enhancement occurs. There are 2 hatchery programs that stock coho salmon into Resurrection Bay: one as cooperative agreement between ADF&G and Cook Inlet Aquaculture Association (CIAA), and one by ADF&G SF.

The ADF&G coho salmon enhancement program in Resurrection Bay began in 1969 with hatchery-reared smolt at several local release sites (Table 6) and with many different brood sources (Table 8). Currently, both CIAA and ADF&G stock coho salmon into streams that flow into Resurrection Bay. ADF&G stocks coho salmon smolt and CIAA stocks both smolt and fry.

In 2010, smolt raised by ADF&G were stocked at both Lowell Creek and the Seward Lagoon stocking sites; however, like Chinook salmon, 2010 was the last year that coho salmon were stocked into Lowell Creek because it was no longer a suitable stocking location (Table 6). Until a suitable location can be determined, all future stockings of coho salmon smolt by ADF&G for Resurrection Bay will be combined and will occur at the Seward Lagoon location. The current ADF&G statewide stocking plan has a stocking target of 240,000 coho salmon smolt into Seward Lagoon, which flows into Resurrection Bay. Since the late 1990s, the brood source for stocked coho salmon has been the Bear Lake broodstock. The stocking size for coho salmon smolt in Resurrection Bay has varied in the past; however, since the new ADF&G WJHSFH became operational in 2011, stocking size has become more reliable than in previous years. The smolt released into the Seward Lagoon in 2016 and 2017 were raised at WJHSFH and weighed on average 21.5 g and 22.6 g, respectively.

Through an ADF&G–CIAA cooperative agreement, CIAA operates the weir on Bear Creek to collect coho salmon broodstock. CIAA raises coho salmon at the Trail Lake hatchery and releases fry and smolt into Bear Creek drainage and Seward Lagoon. From 2016 through 2018, the CIAA

[2] Cherry, C. 2017. Bear Lake salmon enhancement progress report, 2016 http://www.ciaanet.org/Projects/2016_BEAR%20LAKE%20RPT.pdf (accessed October 2019).

hatcheries stocked an average of 74,667 coho salmon smolt and 369,460 coho salmon fry (Table 6) into the Bear Creek drainage. In 2016, the Bear Creek coho salmon return to the weir was approximately 400 fish[3], which was a historical low. Low counts were also observed in the 2016 NGCMA coho salmon stream counts (Table 12). All of the resulting progeny from the egg take were raised at the CIAA Trail Lake Hatchery. The low number of progeny from the 2016 brood year resulted in a lower than typical number of coho salmon available to stock in 2018. To increase the number of coho salmon released in Bear Creek in 2018, some coho salmon scheduled for release as fry in 2017 were held by CIAA until released as smolt in 2018. As a result, coho salmon fry stocking numbers in 2017 were reduced. In addition, to increase the number of adult coho salmon returning to Bear Creek in 2019, fry released in 2018 were stocked more heavily in Bear Creek, the brood source. The coho salmon smolt raised at the CIAA Trail Lake hatchery and released between 2016 and 2018 averaged 14.7 g. The fry also raised by CIAA and released into Bear Lake averaged 1.1 g (2016–2018).

FISHERY PERFORMANCE

The average annual catch of coho salmon in the NGCMA for 2016–2018 was an estimated 58,037 fish and ranged from 28,531 fish in 2016 to 97,329 fish in 2017 (Table 13; Figure 8). The average harvest during this time was 51,628 fish and 89% of the catch was harvested on average (Table 13).

In 2016, NGCMA had the lowest annual catch of coho salmon (28,531 fish) on record, according to the SWHS. This was well below (less than half) of the 10-year average (80,270 fish). In 2017, coho salmon catch (97,319 fish) rebounded above the 10-year average. In 2018, coho salmon catch (48,251 fish) returned to a lower level. Catches of coho salmon by shore anglers in 2017 and 2018 (5,347 and 5,687 fish, respectively) were some of the highest in the past 10 years (Figure 9). Historically, shore anglers make up 4–5% of the coho salmon catch but in 2018, shore anglers harvested over 11% of the total catch. The decrease in total coho salmon catch in 2016 and 2018 was also observed in the charter industry logbook data (Figure 10). With quality fish stocked from local area hatcheries and favorable ocean conditions, fishing for coho salmon in the NGCMA should continue to be favorable for anglers.

[3] Cherry, C. 2017. Bear Lake salmon enhancement progress report, 2016 https://www.ciaanet.org/Projects/2016_BEAR%20LAKE%20RPT.pdf (accessed October 2019).

Table 13.–Coho salmon catch and harvest in the North Gulf Coast Management Area, 1999–2018.

	Boat									
	Charter		Private		Total		Shore		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	29,891	24,053	54,169	44,500	84,060	68,553	8,628	7,067	92,688	75,620
2000	25,706	22,708	47,222	42,079	72,928	64,787	7,186	5,984	80,114	70,771
2001	41,739	36,873	53,011	45,990	94,750	82,863	15,969	13,607	110,719	96,470
2002	38,944	34,018	62,642	54,811	101,586	88,829	10,486	9,730	112,072	98,559
2003	26,697	22,834	69,385	54,401	96,082	77,235	11,275	8,776	107,357	86,011
2004	40,552	32,599	88,060	69,087	128,612	101,686	8,318	6,230	136,930	107,916
2005	50,211	43,371	107,126	81,440	157,337	124,811	13,399	11,135	170,736	135,946
2006	27,541	24,700	66,789	53,291	94,330	77,991	5,063	4,708	99,393	82,699
2007	50,314	43,547	74,566	60,177	124,880	103,724	2,971	2,246	127,851	105,970
2008	33,525	32,032	63,455	46,190	96,980	78,222	2,130	1,734	99,110	79,956
2009	44,718	39,814	57,065	49,722	101,783	89,536	2,210	1,699	103,993	91,235
2010	32,596	29,328	48,024	38,953	80,620	68,281	2,614	2,274	83,234	70,555
2011	43,394	37,735	66,318	49,928	109,712	87,663	815	713	110,527	88,376
2012	20,163	17,605	30,326	25,401	50,489	43,006	1,322	1,030	51,811	44,036
2013	42,743	36,639	50,421	43,059	93,164	79,698	1,499	1,240	94,663	80,938
2014	29,625	28,071	48,587	44,797	78,212	72,868	5,777	5,329	83,989	78,197
2015	47,266	43,197	48,883	44,854	96,149	88,051	4,222	2,319	100,371	90,370
2016	14,109	12,982	13,185	11,895	27,294	24,877	1,237	1,114	28,531	25,991
2017	44,184	39,843	47,798	41,154	91,982	80,997	5,347	5,106	97,329	86,103
2018	13,732	12,754	28,832	25,178	42,564	37,932	5,687	4,857	48,251	42,789
Average										
2009–2018	33,253	29,797	43,944	37,494	77,197	67,291	3,073	2,568	80,270	69,859
2016–2018	24,008	21,860	29,938	26,076	53,947	47,935	4,090	3,692	58,037	51,628

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Estimates for 1996–1999 were recalculated due to an error in the original published data analysis.

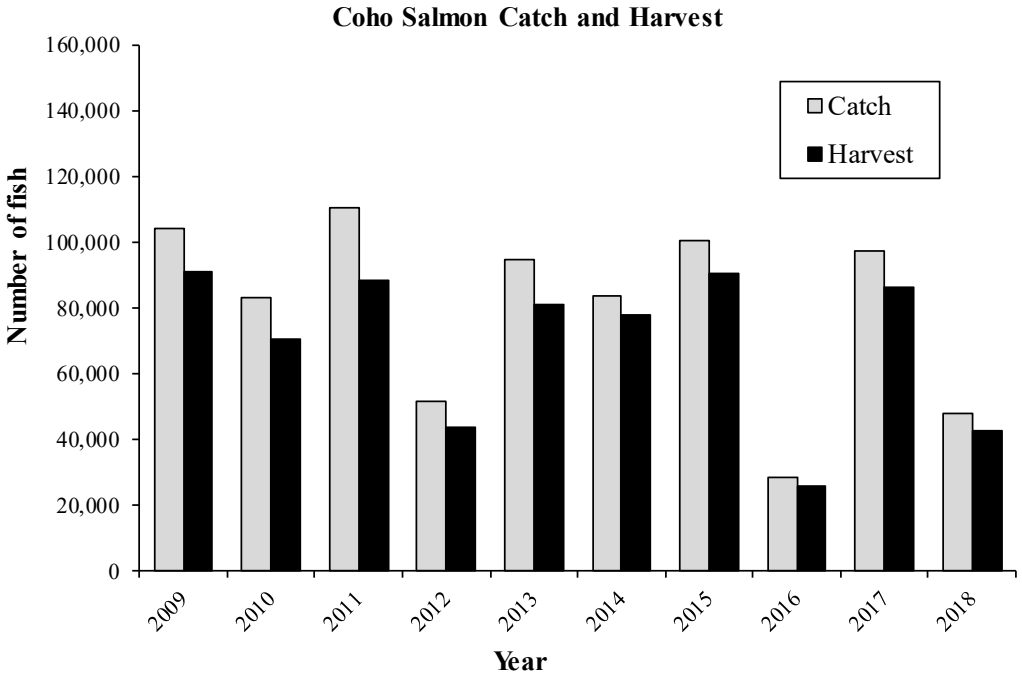

Figure 8.–Coho salmon catch and harvest in the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

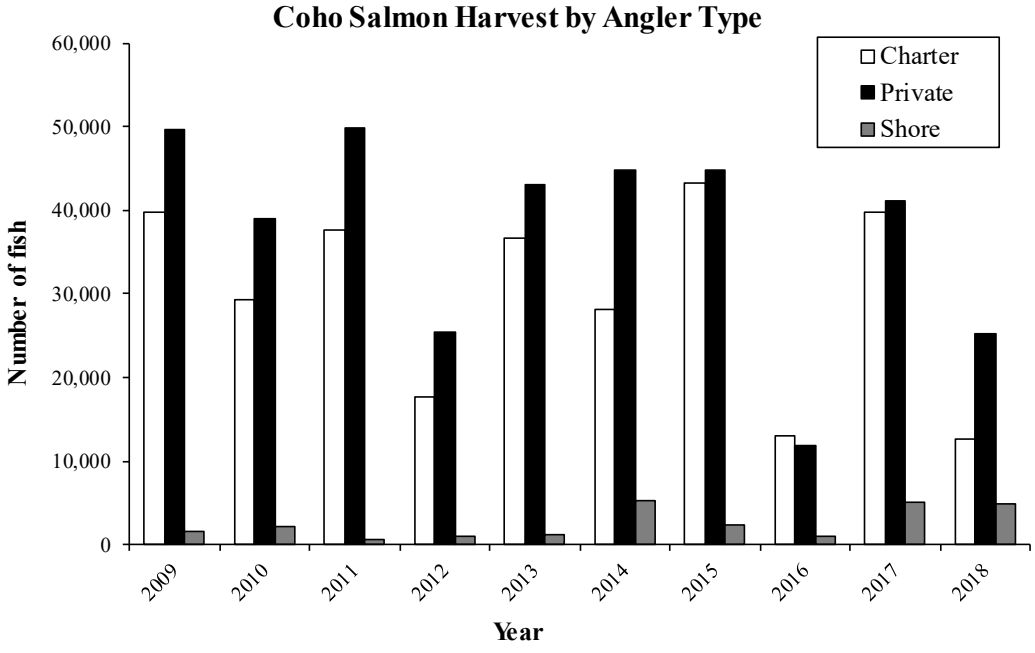

Figure 9.–Coho salmon harvest by user group, North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

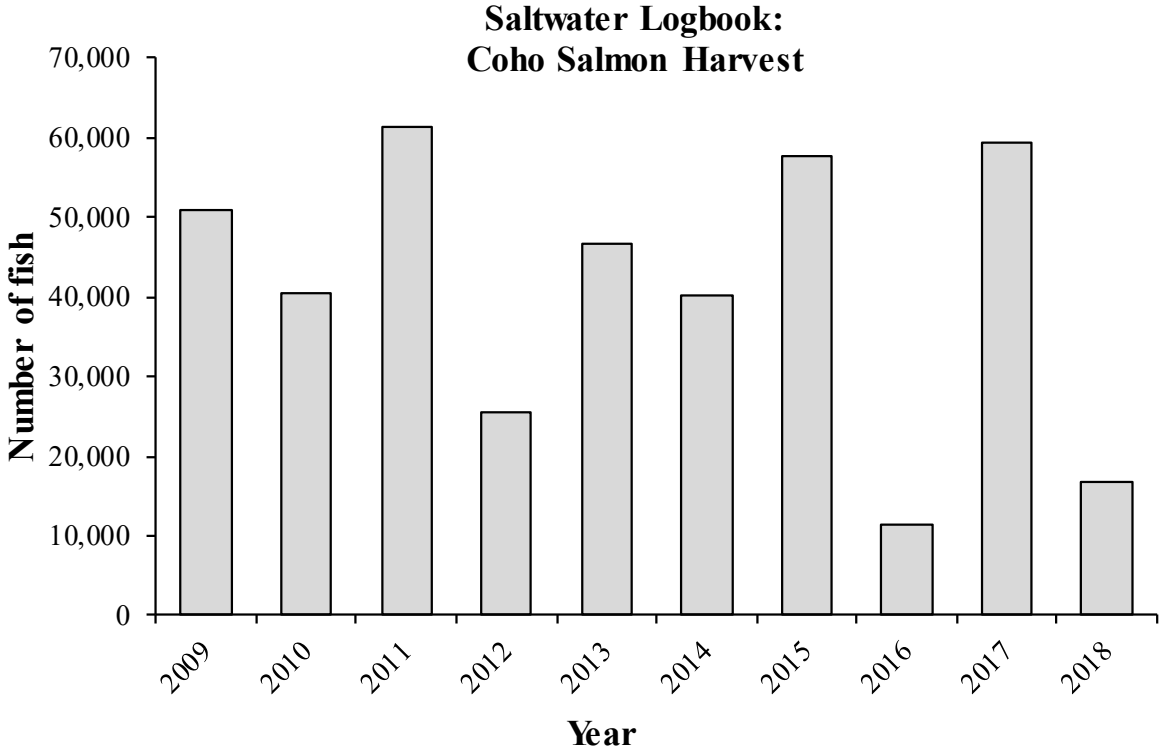

Figure 10.–Coho salmon harvest by guided anglers, 2009–2018.

Source: Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. (Accessed October 6, 2019). URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.

SOCKEYE SALMON FISHERY

FISHERY DESCRIPTION

Sockeye salmon return to NGCMA streams from late May through July and spawn from mid-July through September. Most of the NGCMA sockeye salmon fishery takes place at the mouth of the Resurrection River and targets hatchery stocks returning to Bear Lake. Smaller sockeye salmon fisheries occur on wild stocks throughout the management area and are accessible only by boat or air. A popular fishery occurs at Little Johnstone Bay and charter operators fly clients in from as far away as Anchorage and Soldotna. These small fisheries generally do not receive enough responses in the SWHS to accurately estimate effort or harvest.

FISHERY MANAGEMENT AND OBJECTIVES

The Alaska Board of Fisheries has established management plans for North Gulf Coast and Resurrection Bay salmon (Appendix A1). These plans provide for the sustained yield of area fisheries, as well as establish allocation and management guidelines for ADF&G managers.

Bear Lake has a desired escapement range of 5,600 to 13,200 sockeye salmon for broodstock and natural spawning requirements (Hammarstrom and Ford 2009). This goal has been achieved every year since 1994 (Hammarstrom and Ford 2009).

In 2016, 2017, and 2018 the Bear Lake sockeye salmon escapement goal was met or exceeded and emergency orders were issued to increase the bag and possession limit on sockeye salmon (Table 14).

Table 14.–Emergency orders (EO) issued in the NGCMA between 2016 and 2018.

Year	Effective dates	Emergency order number	Regulatory change
2016	July 6–July 31	2-RS-8-31-16	Increased the bag and possession limit from 6 to 12 for sockeye salmon in saltwater of Resurrection Bay.
2017	July 1–July 31	2-RS-8-23-17	Increased the bag and possession limit from 6 to 12 for sockeye salmon in saltwater of Resurrection Bay.
2017	June 14–July 31	2-RS-8-18-18	Increased the bag and possession limit from 6 to 12 for sockeye salmon in saltwater of Resurrection Bay.
2018	June 16–July 31	2-RS-8-19-18	Increased the bag and possession limit from 3 to 6 for sockeye salmon in fresh waters of Resurrection Bay drainages.

STOCKING PROGRAM

ADF&G does not have a sockeye salmon stocking program in NGCMA waters. Cook Inlet Aquaculture Association (CIAA) operates the Trail Lake Hatchery and a weir at Bear Lake under a cooperative agreement with ADF&G. The original sockeye salmon broodstock came from Big River Lakes in West Cook Inlet or Upper Russian Lake on the Kenai Peninsula. Since 1993, all sockeye salmon broodstock have been obtained from fish returning to Bear Lake. Bear Lake broodstock are allowed to enter the lake and mature under natural conditions and then are collected at spawning areas in the lake. This method of collection was found to minimize broodstock mortality and allows for more natural spawning behavior. Anadromous sockeye salmon typically utilize lakes for spawning more than other types of salmon and spend 1 to 3 years in freshwater

before heading into saltwater where they spend 1 to 4 years in the ocean prior to returning to spawn (Burgner 1991). Most sockeye salmon returning to the Bear Creek weir spend 1 year in fresh water after emerging from the gravel and 2 or 3 years in saltwater (40.6% and 50.2%, respectively[4]).

Over 2 million sockeye salmon fry have been released at Bear Lake annually since 2002, and with the exception of 2011, since 2008 over 1.3 million sockeye salmon smolt have been released annually into salt water (Table 7). From 2016 to 2018, the hatchery successfully obtained enough returning sockeye salmon to meet broodstock and escapement goals. An average of 2,438,111 fry were stocked into Bear Lake and 1,471,241 smolt into the saltwater.

FISHERY PERFORMANCE

The average annual catch of sockeye salmon in the NGCMA for 2016–2018 was 15,203 fish, the average harvest was 14,237, and the average harvest rate was 94% (Figure 11, Table 15). The 2018 sockeye salmon catch (18,261 fish) and harvest (16,922 fish) were the highest documented in the last 25 years (Table 15). From 2016 to 2018, shore anglers caught more sockeye salmon than boat anglers (71% of the total on average). Sockeye salmon are not as frequently targeted as other salmon by anglers using guide services. According to the Charter Logbook data, an average of only 376 sockeye salmon were harvested annually in the last 10 years (2009–2018), and in the last 3 years (2016–2018), an average of only 292 sockeye salmon were harvested (Figure 12).

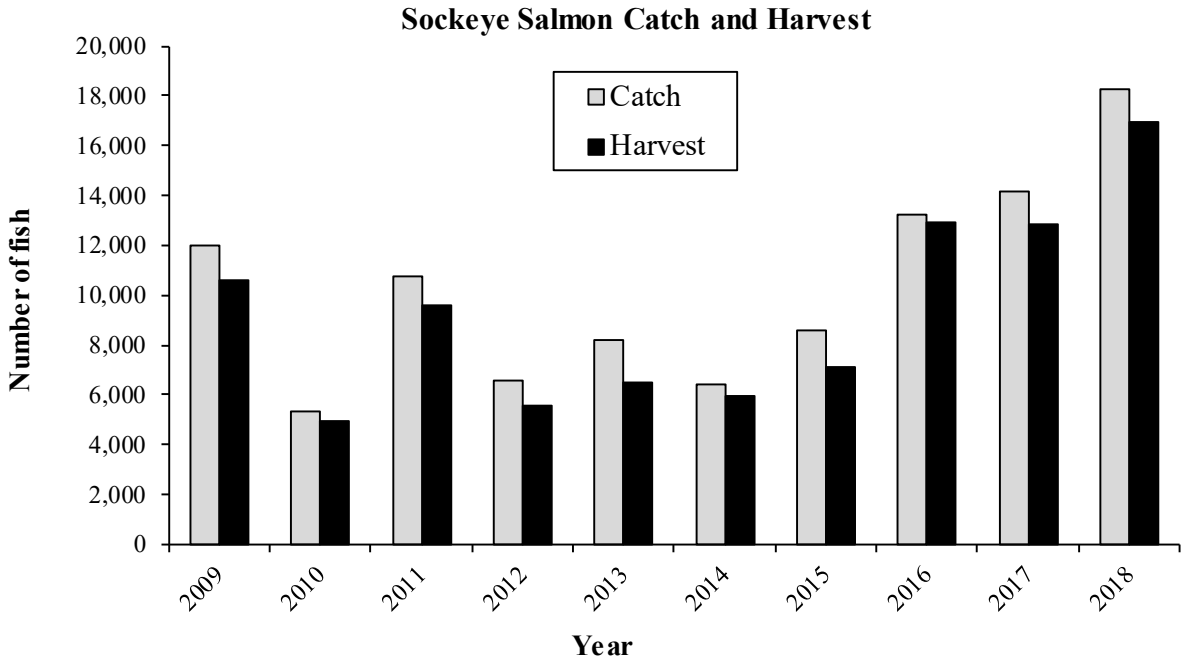

Figure 11.–Sockeye salmon catch and harvest in the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

[4] Cherry, C. 2017. Bear Lake salmon enhancement progress report, 2016 https://www.ciaanet.org/Projects/2016_BEAR%20LAKE%20RPT.pdf (accessed October 2019).

Table 15.–Sockeye salmon catch and harvest in the North Gulf Coast Management Area, 1999–2018.

	Boat									
	Charter		Private		Total		Shore		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	151	108	719	697	870	805	280	259	1,150	1,064
2000	460	331	1,609	477	2,069	808	712	677	2,781	1,485
2001	1,046	705	534	293	1,580	998	374	265	1,954	1,263
2002	317	252	2,629	2,087	2,946	2,339	900	773	3,846	3,112
2003	460	215	1,405	1,222	1,865	1,437	938	640	2,803	2,077
2004	227	154	2,571	2,051	2,798	2,205	888	779	3,686	2,984
2005	716	634	2,604	2,134	3,320	2,768	2,960	2,692	6,280	5,460
2006	1,409	1,248	2,664	1,705	4,073	2,953	2,292	2,024	6,365	4,977
2007	2,156	1,621	2,610	2,159	4,766	3,780	2,765	1,981	7,531	5,761
2008	1,836	974	1,799	1,579	3,635	2,553	4,240	3,179	7,875	5,732
2009	965	784	2,462	1,909	3,427	2,693	8,532	7,926	11,959	10,619
2010	972	928	626	439	1,598	1,367	3,702	3,582	5,300	4,949
2011	913	821	1,896	1,420	2,809	2,241	7,949	7,351	10,758	9,592
2012	2,036	1,420	436	336	2,472	1,756	4,117	3,837	6,589	5,593
2013	1,861	1,252	2,816	2,025	4,677	3,277	3,487	3,176	8,164	6,453
2014	982	881	2,015	1,971	2,997	2,852	3,405	3,061	6,402	5,913
2015	1,567	1,264	2,232	1,865	3,799	3,129	4,804	3,990	8,603	7,119
2016	381	301	2,515	2,515	2,896	2,816	10,304	10,105	13,200	12,921
2017	1,200	1,002	3,446	2,989	4,646	3,991	9,503	8,877	14,149	12,868
2018	418	362	5,548	5,146	5,966	5,508	12,295	11,414	18,261	16,922
Average										
2009–2018	1,130	902	2,399	2,062	3,529	2,963	6,810	6,332	10,339	9,295
2016–2018	666	555	3,836	3,550	4,503	4,105	10,701	10,132	15,203	14,237

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Estimates for 1996–1999 were recalculated due to an error in the original published data analysis.

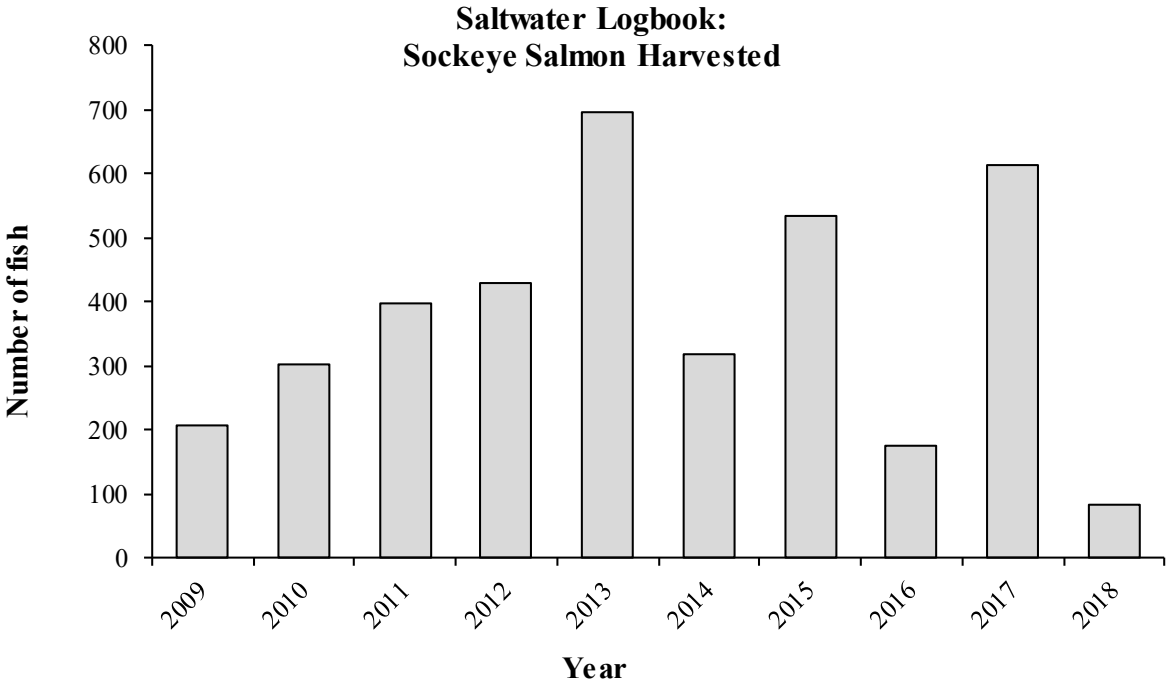

Figure 12.–Sockeye salmon harvest by guided anglers, 2009–2018.

Source: Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. (Accessed October 6, 2019). URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.

PINK SALMON FISHERIES

FISHERY DESCRIPTION

Pink salmon are the most common wild stock returning to Resurrection Bay and North Gulf Coast streams. Pink salmon begin their annual migration in late July through mid-September with peak run timing occurring in mid to late August. Pink salmon runs to the NGCMA are typically largest on odd years (Figure 13). Boat operators typically do not target pink salmon.

FISHERY MANAGEMENT AND OBJECTIVES

There are no formal management objectives for pink salmon in the NGCMA. ADF&G has a constitutional mandate to manage on the principle of sustained yield. Within the sustained yield principle, the Division of Sport Fish (SF) goals seek to optimize social and economic benefits and where possible, expand opportunity to participate in diverse fisheries on these stocks.

FISHERY PERFORMANCE

From 2016 to 2018, pink salmon catch averaged 13,393 fish and ranged from 4,540 fish in 2016 to 26,450 fish in 2017 (Table 16, Figure 13); during this period, average harvest was 4,216 fish and 34% of the catch was harvested on average. Boat anglers caught the majority of the pink salmon catch between 2016 and 2018 (76% on average); however, on average, only 30% of those fish were harvested. The 2016–2018 average catch for shore anglers was 3,654 pink salmon, average harvest was 927 fish and the average harvest rate was 30%. The high release rate is most likely related to the targeting of species other than pink salmon.

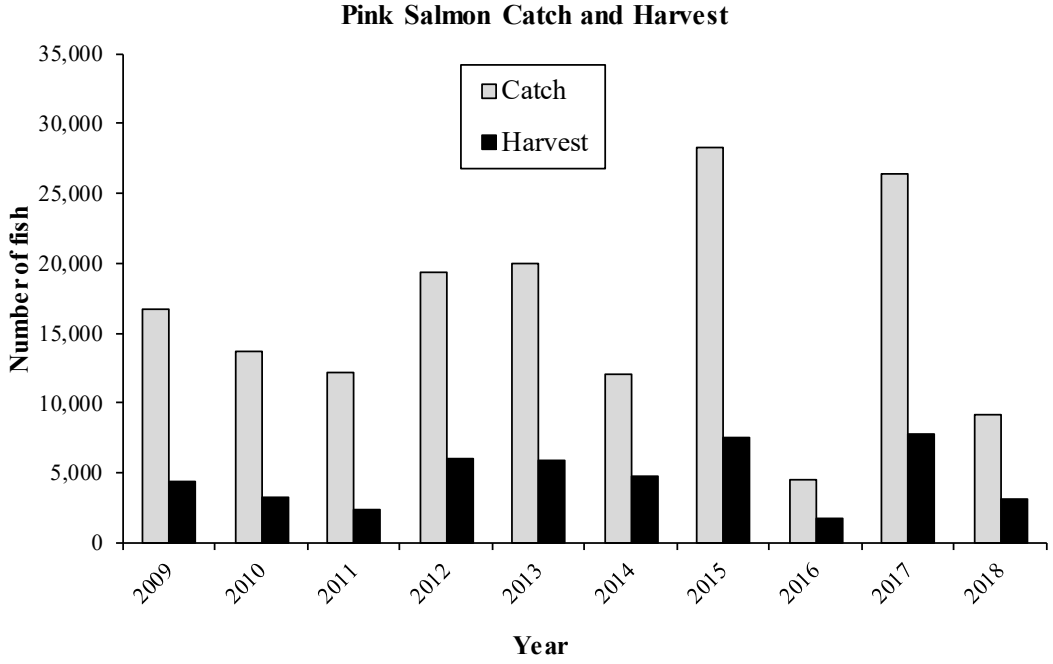

Figure 13.–Pink salmon catch and harvest in the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Table 16.–Pink salmon catch and harvest in the North Gulf Coast Management Area, 1999–2018.

	Boat									
	Charter		Private		Total		Shore		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	3,961	1,285	9,471	2,386	13,432	3,671	2,314	889	15,746	4,560
2000	2,355	791	8,189	1,681	10,544	2,472	6,848	1,411	17,392	3,883
2001	1,412	865	6,692	1,564	8,104	2,429	3,937	1,411	12,041	3,840
2002	2,736	650	8,186	2,098	10,922	2,748	5,630	1,532	16,552	4,280
2003	2,978	723	12,291	2,366	15,269	3,089	3,262	1,381	18,531	4,470
2004	1,724	426	8,140	2,920	9,864	3,346	5,665	2,257	15,529	5,603
2005	5,950	1,359	18,196	3,764	24,146	5,123	6,327	1,928	30,473	7,051
2006	1,489	402	9,428	1,941	10,917	2,343	3,727	1,109	14,644	3,452
2007	5,977	2,234	15,014	1,856	20,991	4,090	7,426	1,851	28,417	5,941
2008	3,602	1,567	13,811	3,157	17,413	4,724	6,274	1,448	23,687	6,172
2009	4,210	1,625	8,114	1,612	12,324	3,237	4,433	1,162	16,757	4,399
2010	3,695	1,434	7,916	1,437	11,611	2,871	2,052	379	13,663	3,250
2011	2,037	908	9,318	1,160	11,355	2,068	799	333	12,154	2,401
2012	4,952	2,604	13,962	3,147	18,914	5,751	459	304	19,373	6,055
2013	5,561	2,160	10,987	2,006	16,548	4,166	3,452	1,742	20,000	5,908
2014	3,872	2,433	6,348	1,643	10,220	4,076	1,886	706	12,106	4,782
2015	5,711	2,077	15,208	3,219	20,919	5,296	7,337	2,218	28,256	7,514
2016	1,017	542	2,195	844	3,212	1,386	1,328	334	4,540	1,720
2017	6,132	1,734	11,361	3,926	17,493	5,660	8,957	2,171	26,450	7,831
2018	3,356	1,943	5,155	876	8,511	2,819	678	277	9,189	3,096
Average										
2009–2018	4,054	1,746	9,056	1,987	13,111	3,733	3,138	963	16,249	4,696
2016–2018	3,502	1,406	6,237	1,882	9,739	3,288	3,654	927	13,393	4,216

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Estimates for 1996–1999 were recalculated due to an error in the original published data analysis.

CHUM SALMON FISHERIES

FISHERY DESCRIPTION

The chum salmon fishery in the NGCMA is a relatively small fishery. Wild stocks of chum salmon spawn in most NGCMA streams from mid-July through late August with the peak of the run in late June through early August. Most of the catch and harvest is incidental for boat anglers because these anglers are targeting other species such as Chinook or coho salmon. Shore anglers targeting chum salmon frequent Spring Creek, Fourth of July Creek, the mouth of the Resurrection River, and Tonsina Creek in Resurrection Bay.

FISHERY MANAGEMENT AND OBJECTIVES

There are no formal management objectives for chum salmon in the NGCMA. ADF&G has a constitutional mandate to manage on the principle of sustained yield. Within the sustained yield principle, SF goals seek to optimize social and economic benefits, and where possible, expand opportunity to participate in diverse fisheries on these stocks.

FISHERY PERFORMANCE

Catches of chum salmon vary annually in this small fishery. The estimated average annual catch of chum salmon from 2016 through 2018 was 1,049 fish with an average harvest of 369 fish and an average harvest rate of about 36% (Table 17). Between 2016 and 2018, chum salmon catch ranged from 535 fish (2016) to 1,886 (2017) (Figure 14). The annual catch of chum salmon in 2016 (535 fish) was the lowest since the late 1990s.

The average chum salmon catch for 2016–2018 (1,049 fish) was lower than the average catch for 2009–2018 (1,792 fish). On average (2016–2018) 35% of the chum salmon catch was by shore anglers. The 2017 chum salmon annual catch (1,886 fish) was just above the 10-year average. The current trend for this fishery indicates an overall annual decline in catch since 2013 (Figure 14).

Table 17.–Chum salmon catch and harvest, North Gulf Coast Management Area, 1999–2018.

	Boat									
	Charter		Private		Total		Shore		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	242	79	430	61	672	140	2,621	523	3,293	663
2000	844	179	1,103	541	1,947	720	2,488	459	4,435	1,179
2001	159	29	2,144	360	2,303	389	1,014	261	3,317	650
2002	560	71	638	181	1,198	252	868	178	2,066	430
2003	288	7	1,880	138	2,168	145	1,158	118	3,326	263
2004	178	74	903	300	1,081	374	1,629	689	2,710	1,063
2005	339	153	1,177	215	1,516	368	1,743	810	3,259	1,178
2006	394	152	732	144	1,126	296	1,468	419	2,594	715
2007	405	109	339	0	744	109	873	209	1,617	318
2008	384	0	966	128	1,350	128	3,344	1,090	4,694	1,218
2009	236	168	313	175	549	343	877	237	1,426	580
2010	244	183	510	53	754	236	135	39	889	275
2011	79	32	898	97	977	129	679	309	1,656	438
2012	219	47	311	189	530	236	1,282	342	1,812	578
2013	598	443	825	267	1,423	710	2,542	781	3,965	1,491
2014	113	45	1,318	427	1,431	472	576	158	2,007	630
2015	671	355	627	382	1,298	737	1,716	256	3,014	993
2016	206	131	161	65	367	196	168	42	535	238
2017	598	133	781	314	1,379	447	507	207	1,886	654
2018	66	20	325	59	391	79	336	135	727	214
Average										
2009–2018	303	156	607	203	910	359	882	251	1,792	609
2016–2018	290	95	422	146	712	241	337	128	1,049	369

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Estimates for 1996–1999 were recalculated due to an error in the original published data analysis.

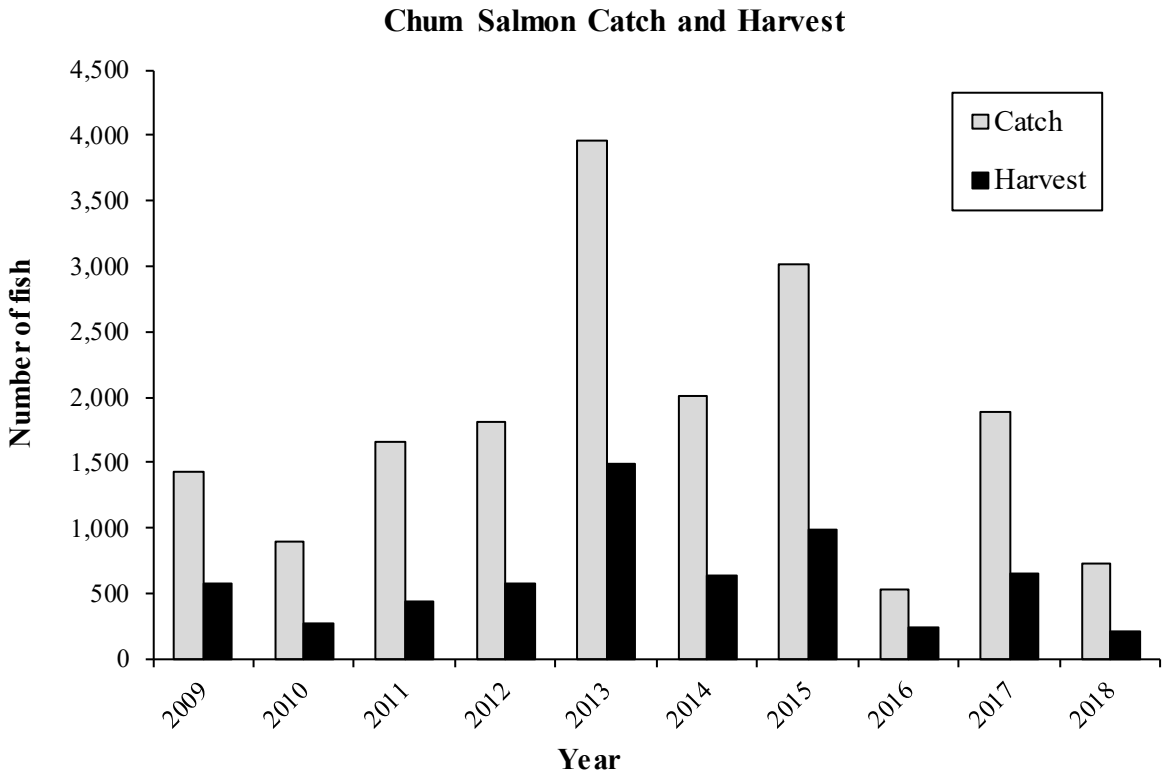

Figure 14.–Chum salmon catch and harvest in the North Gulf Coast Management Area, 2009–2015.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

DOLLY VARDEN FISHERIES

FISHERY DESCRIPTION

Dolly Varden are native to the NGCMA and available to anglers throughout the year; however, peak fishing opportunities generally occur as they migrate to and from wintering and spawning areas. Spawning begins as early as September and may continue into November. Peak harvest occurs in May and from mid-July through September, but much of the catch is incidental to fishing for other species.

This fishery starts each spring as the ice melts from freshwater wintering ponds and lakes in NGCMA drainages. Anglers fish these ponds and lakes each spring before these anadromous fish migrate to nearshore marine environments. Saltwater anglers target Dolly Varden throughout the summer until fish begin returning to overwintering areas in the fall.

FISHERY MANAGEMENT AND OBJECTIVES

There are no formal management objectives for Dolly Varden in the NGCMA. ADF&G has a constitutional mandate to manage on the principle of sustained yield. Within the sustained yield principle, SF goals seek to optimize social and economic benefits and, where possible, expand opportunity to participate in diverse fisheries on these stocks.

FISHERY PERFORMANCE

The 2016–2018 average annual catch and harvest of Dolly Varden was 266 and 39 fish, respectively (Table 18). Catch of Dolly Varden in 2017 was at a historical low (52 fish; Figure 15). However, in 2018, the Dolly Varden catch (467 fish) was higher than the 10-year average (330 fish). The annual catch has varied year to year.

Table 18.–Dolly Varden catch and harvest in the North Gulf Coast Management Area, 1999–2018.

	Boat									
	Charter		Private		Total		Shore		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	125	34	242	154	367	188	55	33	422	221
2000	138	34	105	34	243	68	498	174	741	242
2001	0	0	452	108	452	108	410	108	862	216
2002	69	0	531	391	600	391	783	524	1,383	915
2003	456	72	512	189	968	261	452	392	1,420	653
2004	163	201	552	92	715	293	676	386	1,391	679
2005	11	0	184	47	195	47	185	99	380	146
2006	144	28	337	64	481	92	102	102	583	194
2007	300	0	429	72	729	72	275	148	1,004	220
2008	104	0	926	157	1,030	157	245	0	1,275	157
2009	147	0	84	136	231	136	72	29	303	165
2010	39	27	29	15	68	42	155	74	223	116
2011	0	0	89	89	89	89	129	81	218	170
2012	38	0	29	13	67	13	165	89	232	102
2013	44	27	164	53	208	80	125	95	333	175
2014	45	0	444	121	489	121	50	50	539	171
2015	466	99	163	49	629	148	19	0	648	148
2016	200	45	68	23	268	68	12	0	280	68
2017	29	0	0	0	29	0	23	23	52	23
2018	0	0	69	0	69	0	398	27	467	27
Average										
2009–2018	101	20	114	50	215	70	115	47	330	117
2016–2018	76	15	46	8	122	23	144	17	266	39

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Estimates for 1996–1999 were recalculated due to an error in the original published data analysis.

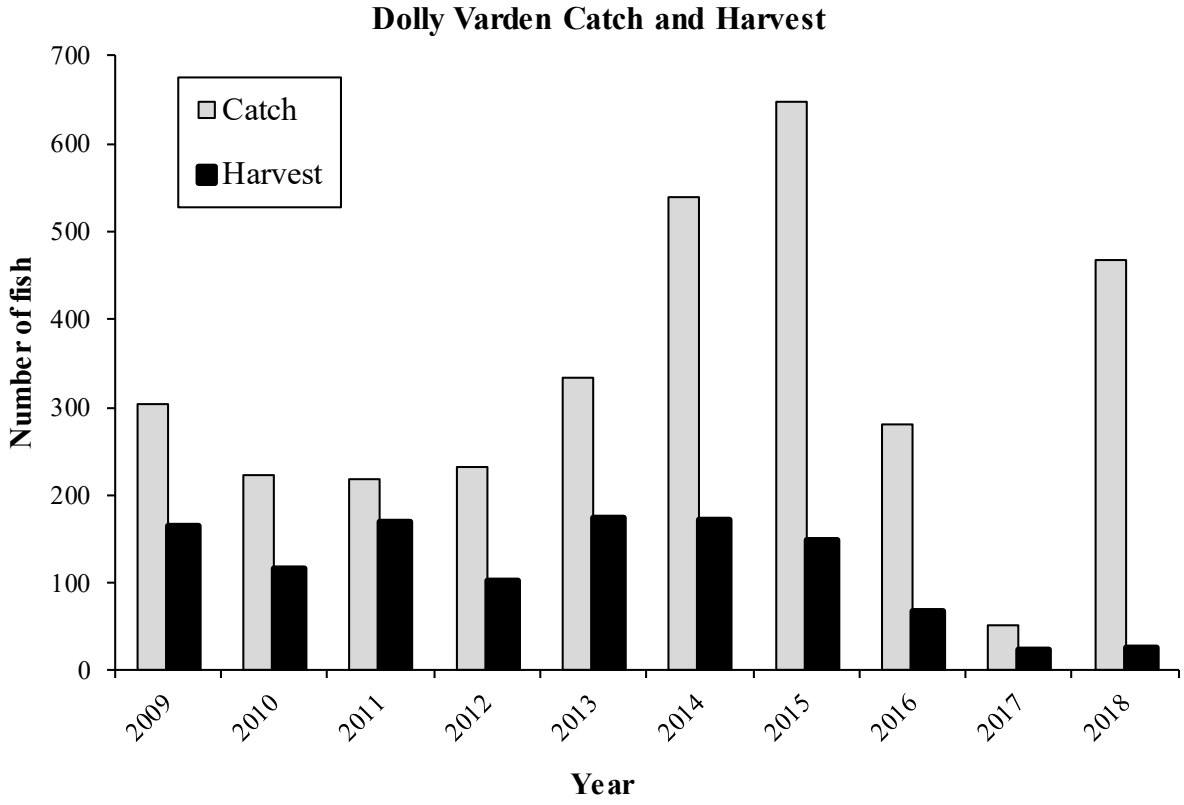

Figure 15.–Dolly Varden catch and harvest in the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

BOTTOMFISH

FISHERY DESCRIPTION

The bottomfish category encompasses a wide variety of species but sport anglers most commonly target halibut, rockfish, lingcod, or sharks. Over the last 10 years (2009–2018), an annual average of 81% of charter trips (3,591 trips) out of Seward involved catching bottomfish (Table 5).

HALIBUT FISHERIES

FISHERY DESCRIPTION

Pacific halibut are highly sought after by sport anglers in the marine waters of the NGCMA. Most halibut are harvested from May through early September. The average weight of sport-caught halibut ranged from 20 to 30 pounds throughout the 1990s but has since dropped to around 15–16 pounds. The decline in average weight corresponds with a long-term decline in size-at-age of halibut throughout the Gulf of Alaska (Stewart and Monnahan 2016); since 2014, size limits for the charter sector have further impacted the average weights of halibut in NGCMA. Halibut are caught by anglers fishing from private (unguided) boats and by the large charter fleet that operates out of the Port of Seward. Halibut fishing out of Seward is highly dependent upon weather. Charter vessels are typically larger than most of the private fleet, which allows them to venture farther into North Gulf Coast waters and well into Prince William Sound to fish more productive waters.

FISHERY MANAGEMENT AND OBJECTIVES

Pacific halibut fisheries are managed by federal and international agencies under the authority of the 1953 Halibut Convention as amended by the 1979 Protocol. The International Pacific Halibut Commission (IPHC), formed in 1923, assesses the halibut stock, conducts research, and sets legal gear, seasons, catch limits, and other regulatory measures for each of 10 regulatory areas. The NGCMA is in IPHC Regulatory Area 3A, which stretches from Cape Spencer to the southwest end of Kodiak Island. Within the United States, the IPHC and National Marine Fisheries Service (NMFS) manage halibut under the Northern Pacific Halibut Act of 1982. The Secretary of Commerce has authority to approve regulations necessary to carry out the objectives of the Convention and Halibut Act. In addition, the North Pacific Fisheries Management Council (NPFMC) has authority to develop regulations for allocation of the halibut resource within Alaska, permitted they are not in conflict with IPHC regulations.

Since the mid-1980s, ADF&G has assumed responsibility for collection of data from the sport fishery in order to advise federal management agencies such that decisions can be made based upon the best available information. ADF&G provides the IPHC with harvest information for stock assessments, formulation of harvest strategies, and to aid in apportionment of quota among regulatory areas. ADF&G also provides this information to the NPFMC and analyzes regulatory alternatives for management of the sport charter sector. In IPHC Regulatory Area 3A, these ADF&G data sources include the Statewide Harvest Survey, the Saltwater Guide Logbook, and a Pacific halibut and groundfish harvest monitoring program in all major ports in the region.

The IPHC first regulated the sport fishery in 1973. The open season for the halibut sport fishery is February 1–December 31 in all Alaskan waters. A bag limit of 2 fish of any size per day was established in 1975, and a possession limit of 4 fish was implemented in 1988. The bag and possession limits remain in place statewide for the unguided fishery and in western Alaska for the

charter fishery. State statutes for licensed sport fishing (AS 16.05.340-430) apply to the Pacific halibut sport fishery.

The charter fisheries in the NGCMA and the rest of the state (Regulatory Areas 2C and parts of 3A not in the NGCMA) have undergone a series of regulatory changes since the early 2000s to address growth of the fishery and perceived impacts on commercial quota shareholders. Allocation conflicts were addressed by 2 major NPFMC actions. In 2011, a limited access program was established for halibut charter vessels in Areas 2C and 3A (Federal Register 75 FR 554). This program issued permits to charter operators based on historical qualifying boat trips with endorsements for specific numbers of clients. In 2014, a Catch Sharing Plan (CSP) was implemented that allocates harvest between the commercial and charter sectors, establishes regulations to manage the charter fishery on an annual basis, and provides for temporary leases of commercial quota for use in the charter sector (Federal Registrar 78 FR 75844). Annual charter regulations are specific to Regulatory Areas. Charter regulations for Area 3A from 2014 through 2018 can be found in (Table 19). State statues governing guide registration, logbooks, and vessel registration also apply (5 AAC 75.075–.077).

Table 19.–Charter regulations for IPHC Regulatory Area 3A under the Catch Sharing Plan.

Year	Charter regulations
2014	Two fish bag limit, size limit of less than 29 inches on 1 fish, 1 trip per vessel per day, no harvest of halibut by crew.
2015	Two fish bag limit, size limit of less than 29 inches on 1 fish, 1 trip per vessel per day, Thursdays closed from 15 June to 31 August, annual limit of 5 halibut harvested on charter vessels, no harvest of halibut by crew.
2016	Two fish bag limit, size limit of less than 28 inches on 1 fish, 1 trip per vessel per day, Wednesdays closed all year, annual limit of 4 halibut harvested on charter vessels, no harvest of halibut by crew.
2017	Two fish bag limit, Size limit of less than 28 inches on 1 fish, 1 trip per vessel per day, Wednesdays closed all year, 3 Tuesday closures, annual limit of 4 halibut harvested on charter vessels, no harvest of halibut by crew.
2018	Two fish bag limit, size limit of less than 28 inches on 1 fish, 1 trip per vessel per day, Wednesdays closed all year, 6 Tuesday closures, annual limit of 4 halibut harvested on charter vessels, no harvest of halibut by crew.

FISHERY PERFORMANCE

Halibut catches from Area 3A have increased since the 1990s, with 2007 and 2008 having the highest harvests observed on record (402,471 and 343,394 fish harvested, respectively). The estimated average annual sport harvest of halibut in the Area 3A from 2016 to 2018 is 260,207 fish, which is below the 10-year average of 292,182 fish (Table 20). Since 2013, a slight decrease in the number of halibut harvested has been observed (Figure 16) for both charter and unguided anglers. In recent years (2017 and 2018), the average halibut weight (14.33 lb and 14.16 lb, respectively) caught by all anglers increased (Figure 17) compared to the 10-year average (13.32 lb). In 2016, the average weight was 12.35 lb, which was below the 10-year average. In 2016 through 2018, halibut harvested from the NGCMA contributed approximately 18 to 21% of the entire harvest (by weight) yielded from of Area 3A (unpublished data, ADF&G port sampling program [Failor 2016]). The 2016–2018 average sport harvest yield of halibut was 3.53 million (M) pounds, which was lower than the 10-year average yield (3.89 M lb). The average yield of

halibut in 2016–2018 decreased for both charter and unguided anglers (1.98 and 1.54, respectively; Table 20, Figure 18). There are many factors that could reduce yield of halibut annually, but the most likely influence on the large decrease in yield of halibut by the charter anglers was regulatory action taken by the IPHC and NPFMC, including management measures to reduce numbers and size of fish harvested (Table 19).

Table 20.–Sport harvest of halibut in Area 3A, 1996–2018.

	Charter harvest			Unguided			Total sport harvest		
Year	Number [a]	Avg. wt. (lb) [b]	Yield (M lb)	Number [c]	Avg. wt. (lb) [b]	Yield (M lb)	Number	Avg. wt. (lb)	Yield (M lb)
1996	142,957	19.74	2.82	108,812	17.63	1.92	251,769	18.83	4.74
1997	152,856	22.33	3.41	119,510	17.58	2.10	272,366	20.24	5.51
1998	143,368	20.82	2.98	105,876	16.22	1.72	249,244	18.86	4.70
1999	131,726	19.23	2.53	99,498	17.03	1.69	231,224	18.29	4.23
2000	159,609	19.67	3.14	128,427	16.86	2.16	288,036	18.42	5.30
2001	163,349	19.18	3.13	90,249	17.09	1.54	253,598	18.43	4.68
2002	149,608	18.20	2.72	93,240	15.86	1.48	242,848	17.30	4.20
2003	163,629	20.67	3.38	118,004	17.34	2.05	281,633	19.27	5.43
2004	197,208	18.60	3.67	134,960	14.35	1.94	332,168	16.88	5.61
2005	206,902	17.83	3.69	127,086	15.61	1.98	333,988	16.98	5.67
2006	204,115	17.95	3.66	114,887	14.57	1.67	319,002	16.73	5.34
2007	236,133	16.95	4.00	166,338	13.71	2.28	402,471	15.61	6.28
2008	198,108	17.05	3.38	145,286	13.37	1.94	343,394	15.49	5.32
2009	167,599	16.31	2.73	150,205	13.47	2.02	317,804	14.97	4.76
2010	177,460	15.20	2.70	124,088	12.79	1.59	301,548	14.21	4.28
2011	184,293	15.16	2.79	128,464	12.57	1.61	312,757	14.09	4.41
2012	173,582	13.16	2.28	113,359	11.83	1.34	286,941	12.64	3.63
2013	199,248	12.62	2.51	121,568	11.94	1.45	320,816	12.36	3.97
2014	174,351	11.67	2.03	127,125	12.06	1.53	301,476	11.83	3.57
2015	163,632	12.63	2.07	136,225	11.86	1.62	299,857	12.28	3.68
2016	158,212	12.67	2.00	128,582	11.96	1.54	286,794	12.35	3.54
2017	142,664	14.55	2.08	108,972	14.04	1.53	251,636	14.33	3.61
2018	136,312	13.75	1.87	105,880	14.69	1.56	242,192	14.16	3.43
Average									
2009–2018	167,735	13.77	2.31	124,447	12.72	1.58	292,182	13.32	3.89
2016–2018	145,729	13.66	1.98	114,478	13.56	1.54	260,207	13.61	3.53

[a] Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. (Accessed October 6, 2019). URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.

[b] Assessment of Pacific Halibut and Groundfish Sport Harvest in Southcentral Alaska (Martin Schuster, Fishery Biologist, ADF&G, port sampling program, Homer), Southeast Alaska Marine Boat Sport Fisher Harvest Studies program (Mike Jaenicke, Fishery Biologist and Diana Tersteeg, Research Analyst, ADF&G, Douglas), and weighted by harvest estimates from the Guide Logbook and SWHS programs.

[c] Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

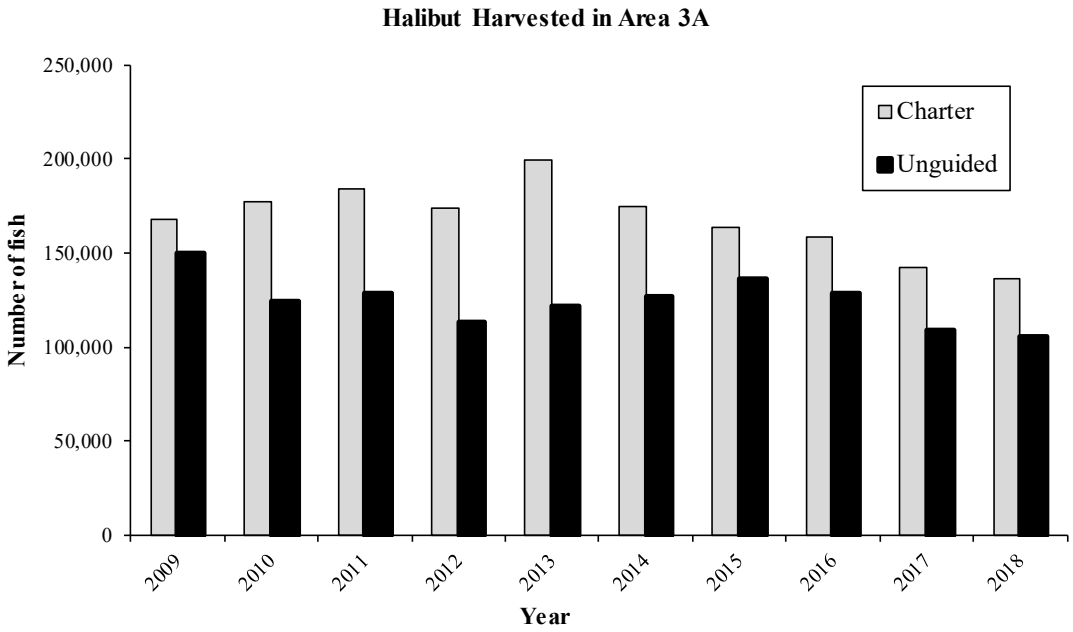

Figure 16.– Halibut sport harvest in Area 3A.

Source: Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. (Accessed October 6, 2019). URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests. Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

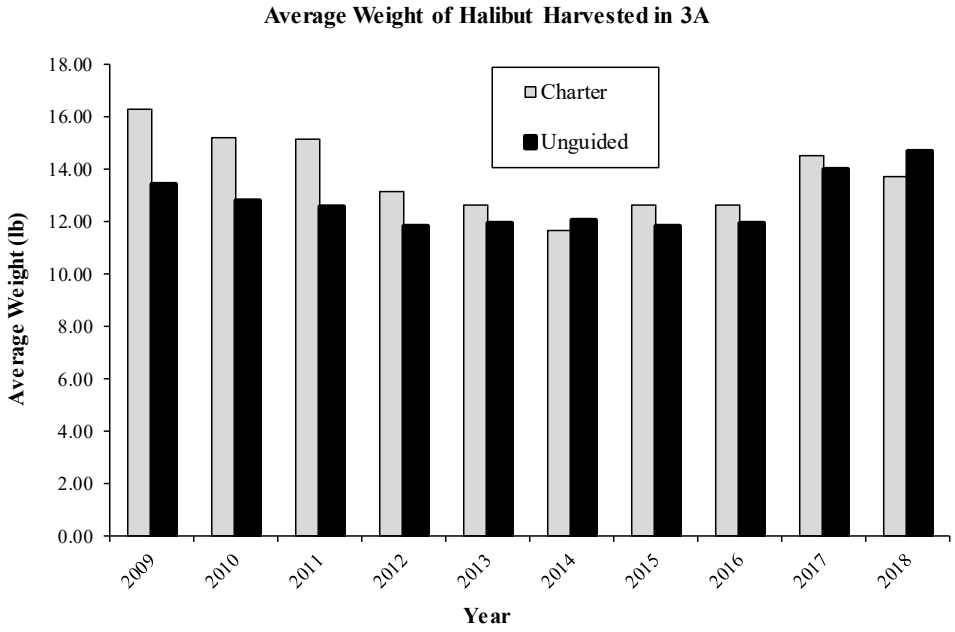

Figure 17.– Average weight of sport harvested halibut in Area 3A, 2009-2018.

Source: Assessment of Pacific Halibut and Groundfish Sport Harvest in Southcentral Alaska (Martin Schuster, Fishery Biologist, ADF&G, port sampling program, Homer), Southeast Alaska Marine Boat Sport Fisher Harvest Studies program (Mike Jaenicke, Fishery Biologist and Diana Tersteeg, Research Analyst, ADF&G, Douglas), and weighted by harvest estimates from the Charter Logbook and SWHS programs.

Note: Data from Yakutat and Glacier Bay are included in 3A.

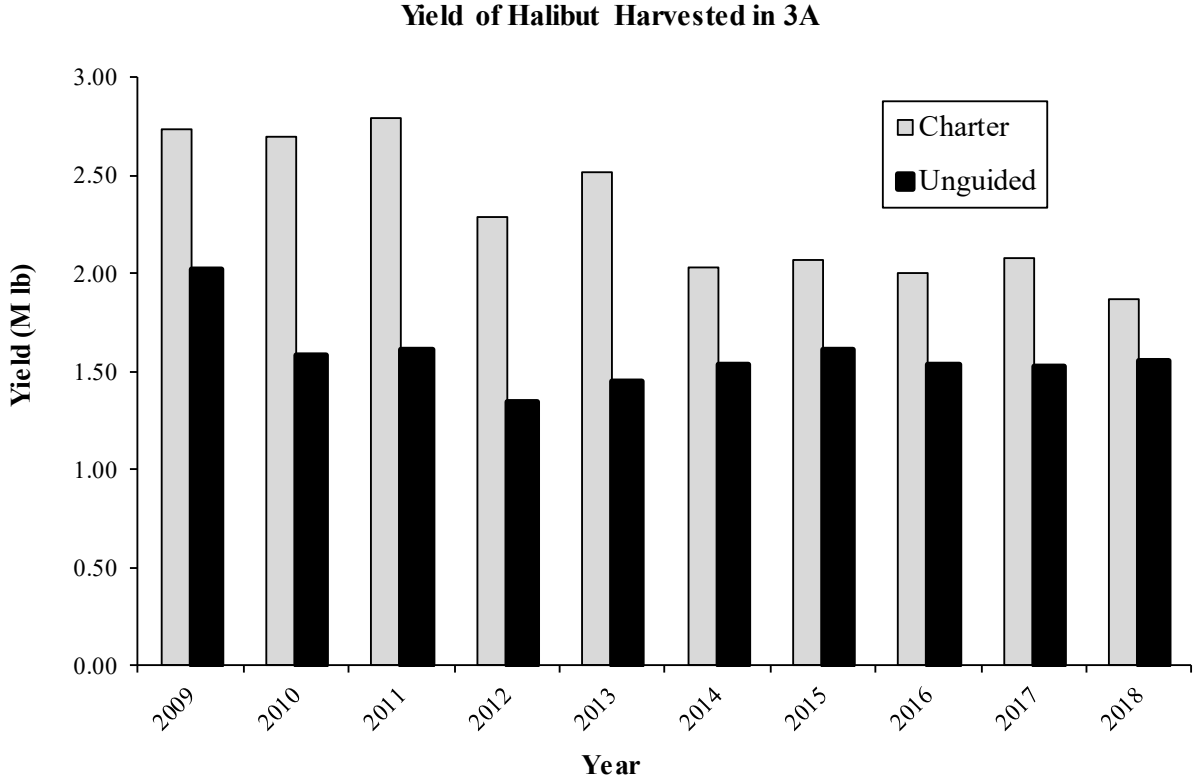

Figure 18.– Average yield of sport harvested halibut in Area 3A, 2009-2018.

Source: Assessment of Pacific Halibut and Groundfish Sport Harvest in Southcentral Alaska (Martin Schuster, Fishery Biologist, ADF&G, port sampling program, Homer) weighted by harvest estimates from the Charter Logbook and SWHS programs.

ROCKFISH FISHERIES

FISHERY DESCRIPTION

Rockfish are a popular target of sport anglers fishing NGCMA marine waters. A variety of rockfishes (*Sebastes* spp.) inhabit the marine waters of the NGCMA. The sport fishery primarily targets pelagic and nonpelagic (demersal) rockfish. Although many species of rockfish have been identified in the NGCMA, the most commonly harvested *Sebastes* species in terms of percentage of harvest since 1996 are pelagic black rockfish (*S. melanops*; 70%) and nonpelagic yelloweye rockfish (*S. ruberrimus*; 14%) followed by nonpelagic quillback (*S. maliger*), pelagic dark (*S. ciliates*), and pelagic dusky rockfish (*S. variabilis*; 14% combined for prior 3 species; Meyer et al. *In prep*). Although available year-round, most rockfish are harvested in the sport fishery from May through early September. Management issues and stock status are discussed in Meyer and Stock (2002).

FISHERY MANAGEMENT AND OBJECTIVES

Harvest limits for rockfish in the NGCMA are 4 fish per day, 8 in possession (only 1 per day and 2 in possession may be nonpelagic), with no size restrictions. This limit was put into effect during the 2007/2008 BOF meeting for NGCMA. During the 2019 Statewide Finfish BOF meeting, a regulatory change proposed by the Seward Advisory Committee was passed that will require all

anglers fishing in salt waters to carry a deepwater release mechanism and use it to release any rockfish not being retained down to depth of capture or at a minimum, 100 feet, effective statewide in January 2020.

Due to a lack of stock assessment data, no formal fishery objectives have been established for rockfish sport fisheries in the NGCMA. ADF&G has a constitutional mandate to manage on the principle of sustained yield. Within the sustained yield principle, SF goals seek to optimize social and economic benefits and, where possible, expand opportunity to participate in diverse fisheries on these stocks. The following management approaches are used:

1) a daily limit of 1 fish per day for nonpelagic species and a total daily limit of 4 rockfish
2) public education regarding rockfish life history, how to avoid catching these fish, and alternative methods of releasing sport caught rockfish (http://www.adfg.alaska.gov/index.cfm?adfg=fishingSportFishingInfo.rockfishconservation, accessed October 2019)

Rockfish management can be challenging because rockfish grow slowly, mature late, and exhibit low rates of natural mortality (Love et al. 2002). Beginning in September 2017, a statewide group was formed within ADF&G to focus on rockfish stocks and black and yelloweye rockfish stocks in particular. Data and information were shared across divisions and regions, and work continues to be done to address the lack of stock assessments in many of the management areas.

Information collected on rockfish species varies by division within ADF&G. The Division of Sport Fish (SF) groundfish harvest monitoring program provides estimates of species, age, length, and sex composition, as well as the spatial distribution of the rockfish sport harvest. This program is effective at describing harvest, but these data alone cannot be used to evaluate stock status or develop management objectives. The Division of Commercial Fisheries has a dockside sampling program to collect biological data as well as ADF&G fish tickets with reporting requirements. A meaningful index of abundance and further analysis needs to be developed before a program could be implemented to estimate stock status independent of the rockfish fisheries.

On average, approximately 20,000 rockfish are released annually by NGCMA sport anglers. Rockfish anatomy also provides challenges to managing this species because fish captured at depths greater than 60 ft often suffer physical damage associated with forced decompression (called barotrauma). Fish suffering barotrauma were historically believed to have a poor probability of surviving if released at the surface. A study by ADF&G in nearby Prince William Sound found that survival of yelloweye rockfish released at depth (versus at the surface) was 98% (Hochhalter and Reed 2011). Conversely, when yelloweye rockfish were released at the surface the probability of submergence and survival was only 22% (Hochhalter 2012). Results of these and other barotrauma studies have led ADF&G to encourage the use of deepwater release devices in all Alaska marine waters when a rockfish needs to be released and have led to the statewide changes in regulation. It is unknown exactly what percentage of rockfish caught in Alaska are released at the surface versus released using a deepwater release mechanism. However, preliminary data collected from 2013 to 2018 by SF port samplers indicates that although charter operators tended to release yelloweye rockfish more frequently using deepwater release mechanisms, it wasn't until recently that private operators adjusted to this method of releasing rockfish leading to increased use of release devices by 30% over 6 years (Table 21). In addition, it was found that few anglers use deepwater release mechanisms to release pelagic species, probably because pelagic species are better at submerging unassisted.

Prior to the mandatory regulation that will go into effect in January 2020, ADF&G staff have been educating anglers on the use of release devices and rockfish identification through materials provided by the Pacific State Marine Fisheries Commission. During 2018, many release devices were given out to both charter and private operators statewide, including operators out of the Seward area.

Table 21.–Proportion of rockfish released by user group and release method, North Gulf Coast sport fishery, 2013–2018.

	Charter				Private			
	Pelagic rockfish		Yelloweye rockfish		Pelagic rockfish		Yelloweye rockfish	
Year	P Rel (Total)[a]	P Rel (DWR)[b]	P Rel (Total)[a]	P Rel (DWR)[b]	P Rel (Total)[a]	P Rel (DWR)[b]	P Rel (Total)[a]	P Rel (DWR)[b]
2013	0.08	0.18	0.07	0.90	0.46	0.14	0.13	0.61
2014	0.05	0.06	0.03	0.80	0.28	0.01	0.10	0.67
2015	0.08	0.08	0.07	0.77	0.42	0.15	0.19	0.68
2016	0.06	0.18	0.04	0.97	0.34	0.14	0.11	0.75
2017	0.05	0.11	0.03	1.00	0.47	0.08	0.18	0.88
2018	0.08	0.06	0.11	1.00	0.43	0.06	0.23	0.89
Averages								
2013–2015	0.07	0.11	0.06	0.82	0.38	0.10	0.14	0.65
2016–2018	0.06	0.12	0.06	0.99	0.41	0.09	0.17	0.84

Note: Proportions based on port sampling interview data from all trips ending in Seward.

[a] Proportion of total pelagic or yelloweye rockfish catch reported as released.

[b] Proportion of released pelagic or yelloweye rockfish released using a deepwater release (DWR) mechanism; remainder were released at surface.

FISHERY PERFORMANCE

The estimated average annual sport catch of rockfish from the NGCMA during 2016–2018 was 77,463 fish (Table 22), with an average harvest of 59,279 fish and an average harvest rate of approximately 77%. Since 2012, the annual harvest rate has been over 72% for rockfish in the NGCMA versus prior years where it was closer to 60%. The trend of increased rockfish retention continues to be observed in the NGCMA sport fishery. In 2016, the highest recorded catch and harvest of rockfish was observed. Except 2004, catches of rockfish had never been documented to exceed 80,000 fish, but in 2016, catch exceeded 100,000 fish (Table 22 and Figure 19). On average from 2009 to 2018, harvest of rockfish in the NGCMA was approximately 53,000 fish and in 2016, harvest was estimated at just over 80,000 fish (Table 22). Despite these changes in harvest rate, age, length, and weight of harvested yelloweye and black rockfish has tended to remain static over the years (Table 23).

Rockfish catch and harvest in the NGCMA has varied over the last 20 years, but the overall trend is of increasing catch and harvest (Figure 19). In 2016, when rockfish harvest was at an all-time high, anglers reported an increase in black rockfish harvest, which can probably be attributed to the low runs of coho salmon that year. Discard mortality of released rockfish is always a concern for these fish; however, a decreasing trend since the early 2000s in the proportion of rockfish released has been observed in the SWHS data with a maximum of 41% released in 2004 and a minimum of 23% released in 2017 (calculated from Table 22). In 2010, over 50% of the total rockfish harvested were taken by charter operators and since 2015, this has increased to over 69% (calculated from Table 22). Saltwater Charter Logbook data indicates that guided anglers release less than 10% of their rockfish catch, regardless of species assemblage.

Table 22.–Rockfish catch and harvest in the North Gulf Coast Management Area, 1999–2018.

	Charter		Private		Total		
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Released
1999	15,795	9,418	27,209	15,819	43,004	25,237	17,767
2000	17,510	11,414	40,128	20,617	57,638	32,031	25,607
2001	23,400	15,966	33,104	16,494	56,504	32,460	24,044
2002	26,274	19,162	35,135	20,671	61,409	39,833	21,576
2003	21,499	14,007	28,337	16,387	49,836	30,394	19,442
2004	33,076	20,908	48,226	26,423	81,302	47,331	33,971
2005	22,787	16,920	41,574	21,592	64,361	38,512	25,849
2006	24,245	16,665	39,782	22,008	64,027	38,673	25,354
2007	28,542	20,322	38,261	24,062	66,803	44,384	22,419
2008	32,619	23,499	41,772	25,418	74,391	48,917	25,474
2009	25,538	18,708	51,125	27,339	76,663	46,047	30,616
2010	31,628	24,085	34,456	23,129	66,084	47,214	18,870
2011	37,213	28,164	33,194	18,511	70,407	46,675	23,732
2012	37,337	28,962	18,715	11,505	56,052	40,467	15,585
2013	39,060	32,845	30,181	18,932	69,241	51,777	17,464
2014	42,303	34,799	36,321	21,949	78,624	56,748	21,876
2015	51,164	41,163	26,098	18,207	77,262	59,370	17,892
2016	72,687	59,657	31,940	20,424	104,628	80,081	24,547
2017	39,587	32,903	22,650	15,102	62,237	48,006	14,231
2018	46,552	37,792	18,972	11,958	65,524	49,750	15,774
Average							
2009–2018	42,307	33,908	30,365	18,706	72,672	52,614	20,059
2016–2018	52,942	43,451	24,521	15,828	77,463	59,279	18,184

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

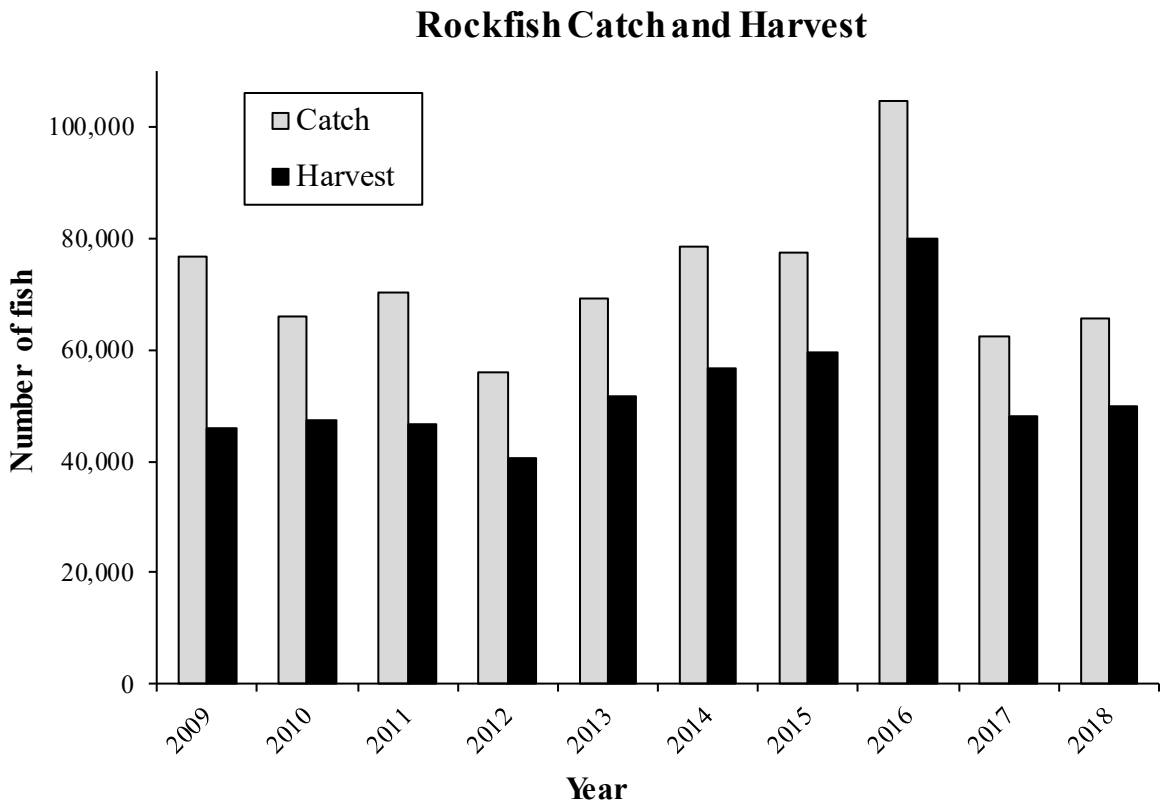

Figure 19.–Rockfish catch and harvest in the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Table 23.–Estimated average age, length, and weight of black and yelloweye rockfish harvested in the North Gulf Coast sport fishery, 1992–2018.

	Black rockfish			Yelloweye rockfish		
Year	Mean age	Mean length (cm)	Mean weight (lb)	Mean age	Mean length (cm)	Mean weight (lb)
1999	13	46.3	3.9	29	55.4	7.5
2000	11	45.9	3.7	31	58.6	8.9
2001	13	47.7	4.1	30	57.9	8.5
2002	13	49.9	4.7	29	58.3	8.7
2003	13	49.5	4.6	31	57.6	8.2
2004	14	49.7	4.6	32	57.3	8.3
2005	14	48.8	4.4	31	57.7	8.5
2006	14	50.3	4.8	32	58.3	8.7
2007	15	49.3	4.6	35	58.5	8.6
2008	15	50.6	4.9	29	57.8	8.4
2009	15	49.2	4.5	30	57.1	8.4
2010	15	49.9	4.7	31	57.8	8.5
2011	16	49.7	4.7	29	55.5	7.5
2012	15	49.3	4.6	30	56.0	7.8
2013	14	48.2	4.3	28	56.8	8.1
2014	16	48.9	4.5	27	54.0	7.1
2015	13	44.1	3.4	26	50.7	6.0
2016	13	46.1	3.8	28	54.7	7.4
2017	13	47.0	4.0	32	58.0	8.8
2018	12	44.7	3.6	30	55.8	7.7
Averages						
1992–2015	14	48	4.2	29	56	7.7
2016–2018	13	46	3.8	30	56	8.0

Source: Assessment of Pacific Halibut and Groundfish Sport Harvest in Southcentral Alaska (Martin Schuster, Fishery Biologist, ADF&G, port sampling program, Homer)

Note: Data based on species composition from Seward port sampling apportioned to total landings in Seward (SWHS).

LINGCOD FISHERIES

FISHERY DESCRIPTION

Lingcod are targeted by anglers in the NGCMA and are commonly found along the outer North Gulf Coast. They feed on many types of fish, crustaceans, and octopuses, and can be cannibalistic. Lingcod prefer rocky reef habitats and typically do not stray far from their home reef (Barss and Demory 1989; Jagielo 1990). However, some fish move great distances, and tagged lingcod have been caught as much as 50 kilometers from their release site (Stahl et al. 2014). Lingcod harvested in the NGCMA typically range in age from 9 to 21 years old (Martin Schuster, Research Biologist, ADF&G, Homer, personal communication). They commonly exceed 1 meter in length and can weigh more than 50 pounds. Growth is relatively rapid with both sexes reaching 50-60 cm by age 4 (Meyer 1992). Unlike rockfish, lingcod have no swim bladder and can be released with a high expectation of survival.

FISHERY MANAGEMENT AND OBJECTIVES

The current stock status of lingcod in North Gulf Coast waters is unknown and ADF&G has no fishery-independent assessment tool. Due to a lack of stock assessment data, no formal fishery objectives have been established for lingcod sport fisheries in the NGCMA. However, ADF&G has a constitutional mandate to manage on the principle of sustained yield. Within the sustained yield principle, SF goals seek to optimize social and economic benefits, and where possible, expand opportunity to participate in diverse fisheries on these stocks. Within the NGCMA, the following are used as management tools:

1) a daily bag limit of 1 per day, 1 in possession
2) seasonal closure to protect spawning fish from January 1 to June 30
3) a 35-inch minimum size limit for both sport and commercial fisheries allows most fish the opportunity to spawn at least once before reaching a harvestable size
4) all waters north of a line between Aialik Cape and Cape Resurrection are closed to lingcod fishing (Resurrection Bay)

Waters in Resurrection Bay are closed to the retention of lingcod. The proximity of Resurrection Bay to the Port of Seward makes them highly susceptible to excessive harvest if anglers are allowed a targeted lingcod fishery in Resurrection Bay. Current data on sport removals of lingcod from outside of the Resurrection Bay for the NGCMA comes primarily from the Division of Sport Fish groundfish harvest monitoring program, which provides baseline biological data from the lingcod sport fisheries throughout Southcentral Alaska through port sampling and creel surveys. This information, along with data from the Saltwater Charter Logbook database and the Statewide Harvest Survey are all integral to the management of the sport fishery. Transect surveys using remotely operated vehicles (ROVs) have been conducted by the Division of Commercial Fisheries in selected areas of the NGCMA (Byerly et al. 2015); however, these surveys have been conducted intermittently over the last 10 years and data from these surveys are still being processed and are unlikely to provide enough information to assist with monitoring this fishery.

FISHERY PERFORMANCE

The estimated average annual sport catch of lingcod from the NGCMA for 2016–2018 was 7,077 fish and average harvest was 3,995 fish (Table 24). Between 1999 and 2018, catch and harvest of lingcod peaked in 2008, with a catch of 23,940 fish and a harvest of 9,163 fish (Table 24). Since then, harvest has decreased (Figure 20), reaching its lowest harvest level of 3,536 fish in 2017. In 2018, there was an increase in catch and harvest, but only slightly over 2017 values (6,868 and 3,695 fish, respectively). Since 2010, the catch and harvest by anglers using charters has been higher than those of private anglers (Table 24).

According port sampling data for unguided sport anglers and data for guided sport anglers with trips ending in the port of Seward from the Saltwater Charter Logbook program, unguided anglers reported higher percentages of released lingcod than charter anglers. According to Charter Logbook information, the percentage of lingcod released by chartered anglers between 2006 and 2018 ranged from 19% (2017) to 46% (2006) (Table 25). The average annual percentage of released lingcod by charter anglers from 2016 to 2018 was 22%, which was lower than the 2006–2015 average of 34% (calculated from Table 25). According to port sampling data (Table 26), the percentage of lingcod released by unguided anglers from 2006 to 2018 ranged from 66% (2008) to 91% (2018). The average annual percentage of released lingcod by the unguided anglers

from 2016 to 2018 was 80%. The percentage of lingcod released was higher in 2017 (83%) and 2018 (91%) when compared to the prior historical average (2006–2015) of 74%.

Chartered anglers in recent years have caught and harvested more than private anglers and appear to be less likely to release a lingcod (Table 24). The lower release rate by charted anglers compared to unguided anglers could indicate that charters have a greater ability to specifically target harvestable lingcod. Anecdotal evidence from unguided anglers in recent years (2017–2018) indicates they are catching lots of small (sublegal) lingcod.

Table 24.–Lingcod catch and harvest in the North Gulf Coast Management Area, 1999–2018.

	Charter		Private		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	3,631	1,662	4,808	1,783	8,439	3,445
2000	4,655	2,561	8,408	3,004	13,063	5,565
2001	4,428	2,341	4,263	1,353	8,691	3,694
2002	4,240	2,247	5,492	1,911	9,732	4,158
2003	5,359	2,582	4,160	1,627	9,519	4,209
2004	5,720	2,979	6,226	2,087	11,946	5,066
2005	6,997	3,391	5,899	2,060	12,896	5,451
2006	8,979	4,385	5,806	1,892	14,785	6,277
2007	12,358	6,093	8,371	2,954	20,729	9,047
2008	14,215	5,688	9,725	3,475	23,940	9,163
2009	8,740	4,113	9,757	2,684	18,497	6,797
2010	8,590	5,131	5,592	2,268	14,182	7,399
2011	9,343	5,488	5,443	1,747	14,786	7,235
2012	9,828	5,599	3,388	1,181	13,216	6,780
2013	8,436	4,196	4,996	2,230	13,432	6,426
2014	6,593	4,254	3,506	1,220	10,099	5,474
2015	6,258	4,360	2,613	1,084	8,871	5,444
2016	5,720	3,676	2,260	1,078	7,980	4,754
2017	4,676	3,199	1,708	337	6,384	3,536
2018	4,818	2,967	2,050	728	6,868	3,695
Average						
2009–2018	7,300	4,298	4,131	1,456	11,432	5,754
2016–2018	5,071	3,281	2,006	714	7,077	3,995

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

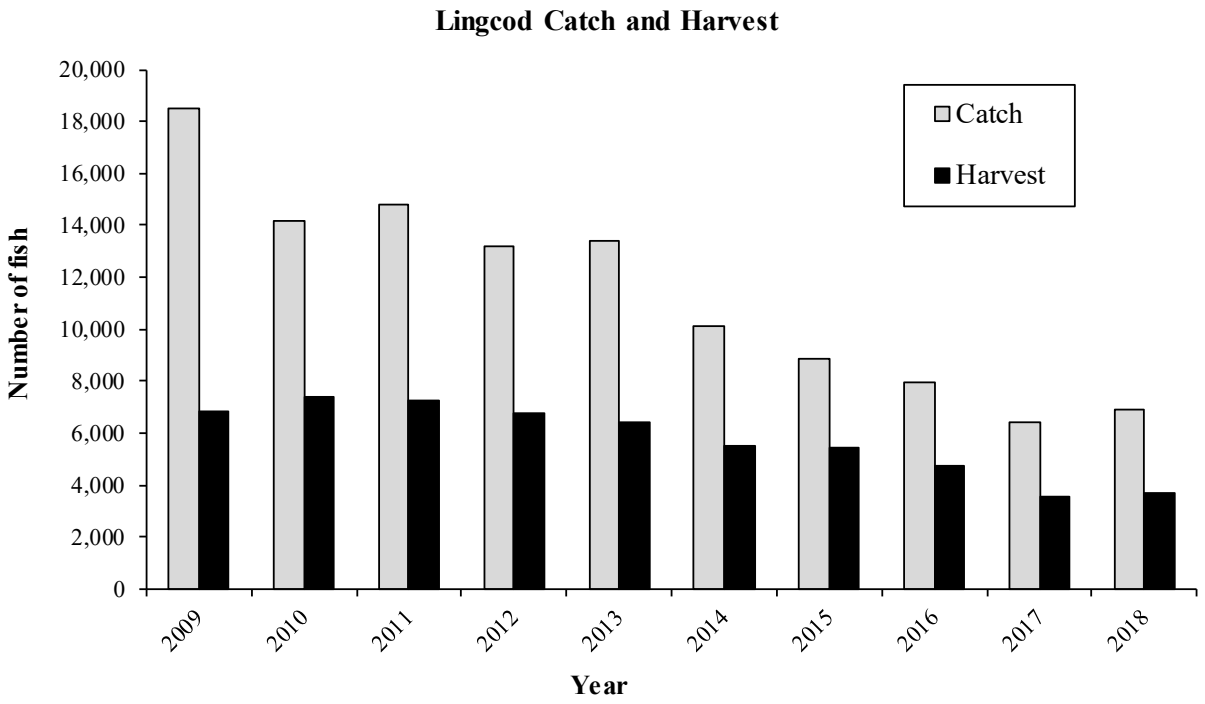

Figure 20.–Lingcod catch and harvest in the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

Table 25.–Number of lingcod harvested and released and percent of catch released from Guide Logbook data for Seward, 2006–2018.

	Lingcod		
Year	Harvested	Released	Percent of catch released
2006	4,327	3,683	46
2007	5,693	4,633	45
2008	6,536	4,314	40
2009	5,296	3,225	38
2010	5,489	2,216	29
2011	4,338	2,018	32
2012	5,754	2,279	28
2013	4,687	2,480	35
2014	4,213	1,397	25
2015	3,224	929	22
2016	2,932	746	20
2017	3,415	809	19
2018	2,582	960	27
Average			
2009–2018	4,193	1,706	28
2016–2018	2,976	838	22

Source: Sigurdsson and Powers (2009). Saltwater Logbook Database, 2nd edition. Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. [Accessed October 6, 2019]. URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.

Table 26.–Percent of lingcod catch released by unguided anglers in the North Gulf Coast sport fishery, 1999–2018.

Year	Percent released by unguided anglers
1999	61%
2000	69%
2001	71%
2002	80%
2003	68%
2004	77%
2005	78%
2006	74%
2007	81%
2008	66%
2009	74%
2010	81%
2011	73%
2012	77%
2013	74%
2014	71%
2015	66%
2016	66%
2017	83%
2018	91%

Source: Assessment of Pacific Halibut and Groundfish Sport Harvest in Southcentral Alaska (Martin Schuster, Fishery Biologist, ADF&G, port sampling program, Homer)

SHARKS

FISHERY DESCRIPTION

The 3 most commonly caught sharks in NGCMA are the salmon shark (*Lamna ditropis*), North Pacific spiny dogfish (*Squalis suckleyi*, previously *Squalus acanthias*; Ebert et al. 2010), and the Pacific sleeper shark (*Somniosus pacificus*). Although all 3 species are caught incidentally in other fisheries, typically anglers will target salmon sharks out of the Port of Seward if the goal is to catch a shark; however historically, spiny dogfish made up about 95% of the shark catch in the NGCMA (Meyer and Stock 2002). Pacific sleeper sharks have an inedible flesh that may be poisonous and these sharks are rarely kept. Anglers fishing for halibut and other bottomfish generally catch these sharks incidentally.

Salmon sharks and spiny dogfish are both slow-growing, late-to-mature species. Both are ovoviviparous, giving birth to live young called pups. The average litter size for salmon sharks is 4–5 pups but they do not reproduce annually, whereas spiny dogfish give birth to an average of 9 pups each cycle (every 2 years). Salmon sharks live to around 20 years old, whereas dogfish can live to be more than 100 years old (Tribuzio et al. 2008). Both species are pelagic and are known to move great distances.

During 2005 and 2006, the shark catch by anglers based out of the Port of Seward increased considerably because of a transient school of spiny dogfish that had moved into the North Gulf

Coast. However, based on the low percentage of spiny dogfish harvested (2% of the catch) by sport anglers, these fish are not desirable and there is potential for wanton waste. When locally abundant, spiny dogfish can be a nuisance for charter and private boat anglers.

FISHERY MANAGEMENT AND OBJECTIVES

Due to a lack of stock assessment data, no formal fishery objectives have been established for shark sport fisheries (species of the Orders Lamniformes, Squaliformes, or Carcharhiniformes) in the NGCMA. The statewide *Sport Shark Fishery Management Plan* (5AAC 75.012; Appendix A1) states that ADF&G shall manage shark sport fisheries for sustained yield. Within the sustained yield principle, SF goals seek to optimize social and economic benefits, and where possible, expand opportunity to participate in diverse fisheries on these stocks. The following are used as management tools:

1) a daily bag limit of 1 fish per day, 1 in possession, and an annual limit of 2 sharks with the exception of spiny dogfish, which have a daily bag limit of 5 fish per day, 5 in possession and no annual limit
2) sport harvest of all sharks covered under the annual limit must be recorded on a fishing license or harvest record card

The Division of Sport Fish groundfish catch sampling program (Failor 2016) in Southcentral Alaska collects information on age, length, sex¸ and spatial distribution of harvested salmon sharks, Pacific sleepers sharks, and spiny dogfish. No sampling objectives are established for sharks because harvests are too small to generate reliable estimates for any given year. To help manage these species, ADF&G is cooperating with other shark researchers to gain more information about age, growth, diet, migration, and the thermal biology of sharks. Although there are no formal objectives with respect to the shark fishery, it is hoped that the harvest of these species can be characterized in the future using several years of data.

The tendency for sharks to congregate in nearshore waters during the summer makes them particularly vulnerable to sport anglers. This, combined with more media coverage of shark fishing, has increased the popularity of this big game fish. The vulnerability of sharks to overexploitation is well documented (Walker 1998).

FISHERY PERFORMANCE

Since 1999, the catch and harvest of sharks peaked to a record high in 2005 followed by a decrease over subsequent years (Table 27). According to sport angler interview data from 1998 through 2000, only 1.6% of spiny dogfish caught by anglers were retained (Meyer and Stock 2002). Overall, the catch and harvest of sharks in the NGCMA appears to be declining; however, both catch and harvest vary from year to year. From 2016 to 2018, an average of 4.4% of all sharks caught in the NGCMA were retained, which is higher than the average historical harvest data (2.8%, 2009–2018). All estimated harvest from 2016 to 2018 was from charter anglers.

The average annual catch during this reporting period (2016–2018) was 1,146 fish. In 2017, catch of sharks was the lowest ever estimated (874; Table 27, Figure 21).

Table 27.–Shark catch and harvest in the North Gulf Coast Management Area, 1999–2018.

	Charter		Private		Total		
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Percent harvest
1999	483	24	1,094	210	1,577	234	15
2000	1,637	108	2,276	118	3,913	226	6
2001	4,787	52	1,791	16	6,578	68	1
2002	1,160	133	998	44	2,158	177	8
2003	4,412	147	3,337	34	7,749	181	2
2004	3,796	23	1,548	87	5,344	110	2
2005	13,385	260	7,655	98	21,040	358	2
2006	9,124	47	3,402	69	12,526	116	1
2007	8,238	95	5,468	37	13,706	132	1
2008	2,704	43	3,167	92	5,871	135	2
2009	2,764	25	1,823	0	4,587	25	1
2010	2,548	8	2,896	15	5,444	23	0
2011	2,055	56	1,574	0	3,629	56	2
2012	1,224	6	442	0	1,666	6	0
2013	1,319	21	1,388	181	2,707	202	7
2014	3,632	228	1,677	0	5,309	228	4
2015	1,264	9	1,655	9	2,919	18	1
2016	744	77	712	0	1,456	77	5
2017	542	22	332	0	874	22	3
2018	741	59	368	0	1,109	59	5
Average							
2009–2018	1,683	51	1,287	21	2,970	72	2.8
2016–2018	676	53	471	0	1,146	53	4.4

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

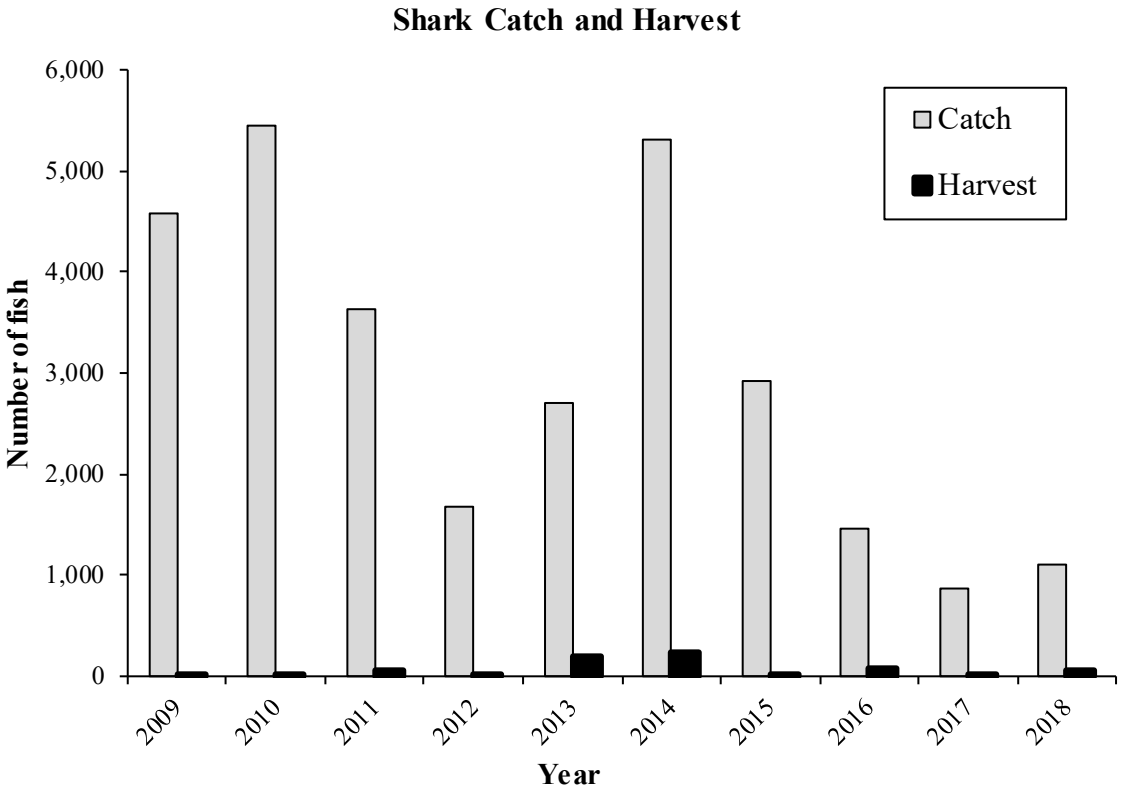

Figure 21.–Shark catch and harvest in the North Gulf Coast Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 11, 2019). Available from Division of Sport Fish, Research and Technical Services.

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APPENDIX A: NORTH GULF COAST MANAGEMENT PLANS

5 AAC 21.373 Trail Lakes Hatchery Salmon Management Plan

(a) The department, in consultation with the hatchery operator, shall manage the Resurrection Bay North Subdistrict, China Poot Subdistrict, Tutka Bay Subdistrict, and the Kirschner Lake Section of the Bruin Bay Subdistrict to provide for a common property fishery and to achieve the hatchery broodstock and cost recovery goals set by the hatchery operator and approved by the department for the Trail Lakes Hatchery. The department will manage the sport fisheries in accordance with regulations in 5 AAC 56–62 and 5 AAC 75. The commissioner may issue emergency orders to liberalize or restrict sport fisheries based on achievement of broodstock goals.

(b) The Trail Lakes Hatchery special harvest areas are as follows:

(1) Bear Lake Special Harvest Area: the marine waters of Resurrection Bay in the Eastern District north of the latitude of Caines Head at lat 59°58.93′N, and the fresh waters of Bear Creek, Salmon Creek, and Resurrection River downstream from, and including, the Bear Creek weir, excluding all freshwaters downstream from the Seward Highway and Nash Road to a line between the ADF&G saltwater/freshwater regulatory markers at lat 60°07.49′N, long 149°24.72′W and lat 60°07.25′N, long 149°22.54′W;

(2) China Poot and Hazel Lake Special Harvest Area: the marine waters of China Poot Bay Subdistrict in the Southern District inshore of, and enclosed by, a line connecting lat 59°34.66′N, long 151°19.27′W, then to lat 59°35.08′N, long 151°19.77′W, then to lat 59°33.09′N, long 151°25.22′W, and then to lat 59°32.84′N, long 151°24.90′W;

(3) Tutka Bay Lagoon Special Harvest Area: the marine waters of Tutka Bay Subdistrict in the Southern District southeast and shoreward of a line from lat 59°30.23′N, long 151°28.23′W to lat 59°28.63′N, long 151°30.37′W, including Tutka Bay Lagoon;

(4) Kirschner Lake Special Harvest Area: the marine waters of Bruin Bay Subdistrict in the Kamishak Bay District northwest of a line connecting lat 59°25.17′N, long 153°50.50′W and lat 59°23.17′N, long 153°56.90′W.

(c) Notwithstanding 5 AAC 21.320 and 5 AAC 21.330, and except as otherwise provided by emergency order issued under AS 16.05.060, the permit holder for the Trail Lakes Hatchery, and the permit holder's agents, contractors, or employees authorized under 5 AAC 40.005 (g) may harvest salmon in the

(1) Bear Lake Special Harvest Area, from 6:00 a.m. May 15 until 6:00 p.m. October 31 using weirs, purse seines, hand purse seines, and beach seines;

(2) China Poot and Hazel Lake Special Harvest Area, from 6:00 a.m. June 1 until 6:00 p.m. July 31 using purse seines, hand purse seines, and beach seines;

(3) Tutka Bay Lagoon Special Harvest Area, from 6:00 a.m. June 1 until 6:00 p.m. September 15 using purse seines, hand purse seines, and beach seines; (4) Kirschner Lake Special Harvest Area, from 6:00 a.m. June 1 until 6:00 p.m. August 15 using purse seines, hand purse seines, and beach seines.

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[5] Note that in regulatory language, ADF&G is “the department” and Chinook salmon are “king” salmon.

5 AAC 21.375. Bear Lake Management Plan

Repealed. (Eff. 6/10/89, Register 110; am 2/13/2005, Register173; repealed 8/23/2009, Register 191)

5 AAC 21.376. Resurrection Bay Salmon Management Plan

(a) Since the beginning of significant commercial harvests of pink and chum salmon in Resurrection Bay, there have been some conflicts between recreational and commercial fishermen. The issues are the protection of coho and king salmon for the recreational fishery, and the management of surplus pink and chum salmon stocks in a manner that provides for a commercial fishery while minimizing the incidental catch of coho and king salmon.

(b) The commissioner shall, by emergency order,

(1) manage Resurrection Bay coho and king salmon stocks primarily for recreational use; (2) manage the indigenous pink and chum salmon stocks primarily for commercial use, insofar as that harvest does not interfere in time or area with the recreational fishery;

(3) manage the commercial fishery in Resurrection Bay in a manner that does not interfere with the recreational fishery.

History: Eff. 6/10/89, Register 110; 6/11/2005, Register 174

5 AAC 58.065. North Gulf Coast King Salmon Sport Fishery Management Plan

(a) The purpose of the management plan under this section is to meet the Board of Fisheries' goal of directing the king salmon sport fishing effort on hatchery stocks in Resurrection Bay and stabilizing the sport harvest of king salmon in the North Gulf Coast.

(b) In the king salmon sport fishery,

(1) from January 1 through December 31, outside of the Resurrection Bay Terminal Harvest Area, the bag and possession limit for king salmon is one fish, with no size limit;

(2) within the Resurrection Bay Terminal Harvest Area,

(A) from May 1 through August 31, the bag and possession limit for king salmon is two fish; with no size limit;

(B) from September 1 through April 30, the bag and possession limit for king salmon is one fish, with no size limit;

(3) in the North Gulf Coast, the annual limit and harvest record specified in 5 AAC 58.022 does not apply.

(c) For the purposes of this section, the

(1) North Gulf Coast consists of the salt waters between Gore Point at lat 59°12.00′N, long 150°57.85′W and the longitude of Cape Fairfield (long 148°50.25′W);

(2) Resurrection Bay Terminal Harvest Area consists of the salt waters north of a line between Cape Resurrection and Aialik Cape.

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5 AAC 58.065 (continued)

(Eff. 12/29/2002, Register 164; am 4/24/2009, Register 190; am 2/23/2014, Register 209)

Authority: AS 16.05.251

5 AAC 75.012. Sport Shark Fishery Management Plan.

(a) The department shall manage sport shark fisheries for sustained yield.

(b) Recognizing the lack of stock status information, the potential for rapid growth in the sport shark fishery, and the potential for over-exploitation, the following provisions apply to the sport shark fishery:

1) sharks may be taken from January 1 through December 31; the bag and possession limits for sharks in salt water is one fish;
2) the annual limit for sharks in salt water is two fish;
3) a nontransferable harvest record is required and must be in the possession of each angler sport fishing for sharks in salt water; the harvest record

    (A) for a licensed angler is located on the back of the angler's sport fishing license;

    (B) for an angler not required to have a sport fishing license may be obtained, without charge, from department offices and sport fishing license vendors throughout the state;

4) immediately upon landing a shark from salt water, an angler shall enter the date, location (water body), and species of the catch, in ink, on the harvest record; and
5) notwithstanding 1–4 of this subsection, the bag and possession limit for spiny dogfish is five fish, with no size or annual limit; a harvest record is not required for spiny dogfish.

(c) The provisions of (b) of this section also apply in the adjoining waters of the exclusive economic zone.

(d) For the purpose of this section, "shark" means a species of the orders Lamniformes, Squaliformes, or Carcharhiniformes. (Eff. 4/23/98, Register 146; am 6/10/2010, Register 194; am 6/1/2013, Register 206)

Authority: AS 16.05.251 AS 16.10.190