Fishery Management Report No. 17-44

Sport Fisheries in the Prince William Sound Management Area, 2014–2016

by

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and

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November 2017

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

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SPORT FISHERIES IN THE PRINCE WILLIAM SOUND MANAGEMENT AREA, 2014–2016

by

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ABSTRACT

This report provides a detailed summary of the sport fisheries in the Prince William Sound Management Area for which the Alaska Board of Fisheries is considering proposals in December 2017. Included are a description and historical overview of each fishery, how the fishery is managed, and sport fishery performance for the years 2014–2016.

Key words: Prince William Sound Management Area, Alaska Board of Fisheries, sport fisheries, coho salmon, *Oncorhynchus kisutch*, sockeye salmon, *Oncorhynchus nerka*, Chinook salmon, *Oncorhynchus tshawytscha*, cutthroat trout, *Onchorhynchus clarki*, halibut, *Hippoglossus stenolepis*, rockfish, *Sebastes* spp., lingcod, *Ophiodon elongates*, shrimp, *Pandalus* spp.

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) Prince William Sound Management Area (PWSMA) includes all waters of the Gulf of Alaska and its drainages west of the longitude of Cape Suckling (long 143°53′W) and east of the longitude of Cape Fairfield (long 148°50′W), including waters of the Copper River drainage downstream of Haley Creek (Figure 1). Principal land managers in PWSMA include the United States Forest Service; various native corporations; the cities of Valdez, Cordova, and Whittier; the Bureau of Land Management; and the State of Alaska. Data pertaining to effort, catch, and harvest within the sport fisheries of Prince William Sound (PWS) are collected by the ADF&G Statewide Harvest Survey (SWHS), and all data presented in this report are obtained from the SWHS except where noted. The SWHS relies on a sufficient number of responses for any given site to generate reliable estimates of catch and harvest. As such, estimates are generally reported by larger areas, and stream-specific catch and harvest estimates are only available for a few of the more popular streams on the Copper River Delta (CRD). For reporting purposes (and in this report), catch and harvest estimates are separated into 4 geographical areas: Western PWS, Eastern PWS, Valdez Arm, and the Cordova road system–Copper River Delta (CRD). Western PWS and Eastern PWS marine waters are divided by line along longitude 147°W.

Angler effort is reported by geographical area as listed above and by port of landing for boat anglers. Averages for effort, catch, and harvest are given for years both prior and following the last Alaska Board of Fisheries (BOF) meeting for PWS finfish (2013). Throughout this report, PWS refers to all geographical areas excluding CRD.

In 2014, changes were made to the coding methodology and area definitions used to summarize the SWHS data that are used in this management report. These changes made it possible to include catches from PWS fisheries that were landed in Seward (main port in Area J); these catches had been previously listed as “unknown area J” in PWSMA reports prior to November 2014 (Thalhauser 2014). Anglers using the port of Seward often travel to Prince William Sound to harvest fish and so it is appropriate that these data are used in PWSMA fisheries management and included in this report. Tables in this report indicate instances where catch from “unknown area J” was either included or not. The changes made in methodology and definitions make recreation of past data possible and inter-year comparisons more robust, and table entries in this report may differ from previous reports (e.g., Hochhalter et al. 2011).

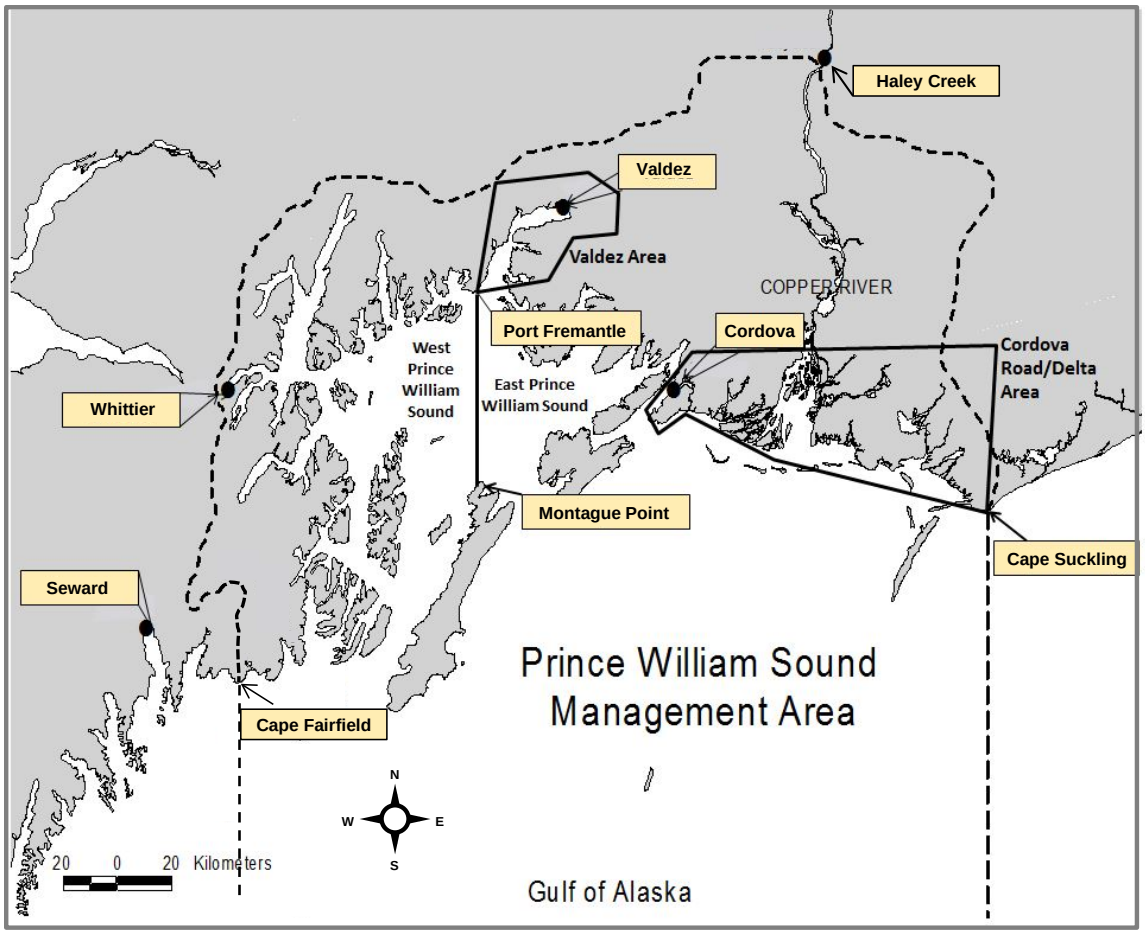

Figure 1.–Map of the Prince William Sound Management Area with defined reporting areas.

PWSMA offers sport anglers some of the most diverse angling opportunities available in Southcentral Alaska. Readily accessible marine waters with complex physical habitat provide anglers with opportunities to target halibut (*Hippoglossus stenolepis*), lingcod (*Ophiodon elongatus*), and rockfish (*Sebastes* spp.) in day trips from any of the 4 ports that provide access to PWSMA (Whittier, Valdez, Seward, and Cordova). Hundreds of streams and lakes throughout PWS combined with large-scale hatchery operations (e.g., Prince William Sound Aquaculture Corporation [PWSAC]) provide angling opportunities for 4 species of Pacific salmon during May through October: coho salmon (*Oncorhynchus kisutch*), sockeye salmon (*O. nerka*), pink salmon (*O. gorbuscha*), and chum salmon (*O. keta*). ADF&G provides Chinook salmon (*O. tshawytscha*) angling opportunities in the PWS salt waters through stocked fisheries. PWS supports a noncommercial, sport and subsistence shrimp (*Pandalus* spp.) fishery and provides opportunities to harvest several species of hardshell clams (Pacific razor clam [*Siliqua patula*], Pacific littleneck [*Protothaca staminea*], and Washington butter clam [*Saxidomus giganteus*]). Salmon sharks (*Lamna ditropis*) are present in PWS throughout the summer months and are targeted by a small number of anglers annually, but these fisheries are small and not enough data are collected from these to report. PWSMA represents the northern edge of the range of coastal cutthroat trout (*O. clarki clarki*), providing anglers with unique trout fishing opportunities. Rainbow trout (*O. mykiss*) and Dolly Varden (*Salvelinus malma*) are available year round throughout PWSMA.

Access to PWSMA is diverse and includes 3 road-accessible ports (Valdez, Whittier, and Seward); commercial aircraft and ferry services to Valdez, Cordova, Chenega Bay, and Tatitlek; and chartered float plane and boat shuttle services for remote drop-offs out of Whittier and Valdez. With the exception of some road-accessible streams in Cordova and Valdez, virtually all PWSMA sport fisheries are remote and relatively difficult to access.

Stocking of hatchery-raised fish has increased fishing opportunities available to sport anglers. These stocking activities consist of 2 types of programs. The goal of the first type is to increase harvest for commercial fisheries and incidentally enhance the availability of fish for sport anglers. The goal of the second type is sport fishery enhancement without regard to commercial fisheries. However, all hatchery-released salmon are the common property of all fisheries and are thus available to any fishery regardless of the target group. To allow for greater angling opportunities and larger harvests of fish, Terminal Harvest Areas (THA) have been established in some areas (Figure 2) for the return of hatchery fish that are meant for harvest, not reproduction, and to relieve pressure on nearby wild stocks of fish. Freshwater releases of resident trout or Arctic grayling (*Thymallus arcticus*) are exclusively harvested by sport anglers.

ADF&G's stocking program provides stocked fisheries for rainbow trout and has historically provided Arctic grayling in lakes near Valdez. ADF&G also provides a Chinook salmon stocking program that aims to increase opportunities for sport anglers near Cordova and Whittier. Historically, Valdez was also part of the Chinook salmon stocking program but this was put on hold in 2014 until a new release site is developed (there is none to date). In addition, 2 private nonprofit (PNP) hatchery corporations release coho salmon to provide sport fishing opportunities: Valdez Fisheries Development Association (VFDA) provides opportunities in Valdez Arm, and Prince William Sound Aquaculture Corporation (PWSAC) provides opportunities on Evans Island near the village of Chenega Bay, in Passage Canal near Whittier, and at Fleming Spit near Cordova. ADF&G also provides PWSAC with 50,000 eyed Chinook salmon eggs to rear to smolt size and release near Chenega Bay. These PNPs also release pink, sockeye, and chum salmon at various locations throughout PWSMA, primarily to enhance commercial fisheries, but these fish are also targeted by sport anglers. Pink salmon are released from 3 PWSAC hatcheries and 1 VFDA hatchery. Sockeye salmon are reared in 1 PWSAC hatchery and released at several sites in PWSMA. Chum salmon are reared in 2 PWSAC hatcheries and released directly from those 2 hatcheries, as well as at 2 remote locations. The Chinook salmon stocking program, conducted by PWSAC until 1998, has continued to the present under the support of ADF&G with releases in Whittier and Cordova, although the Whittier releases were temporarily halted from 2005 through 2008 due to budgetary constraints and reduced hatchery production. In addition, rainbow trout releases by ADF&G occur annually at Blueberry Lake, and Ruth Pond, all near Valdez with the goal of stocking approximately 2,000 rainbow trout and providing 400 angler-days of sport fishing effort annually (ADF&G Statewide Stocking Plan, 2017. Alaska Department of Fish and Game, Division of Sport Fish [cited October 2017]. Available from http://www.adfg.alaska.gov/static/fishing/pdfs/hatcheries/17region2.pdf).

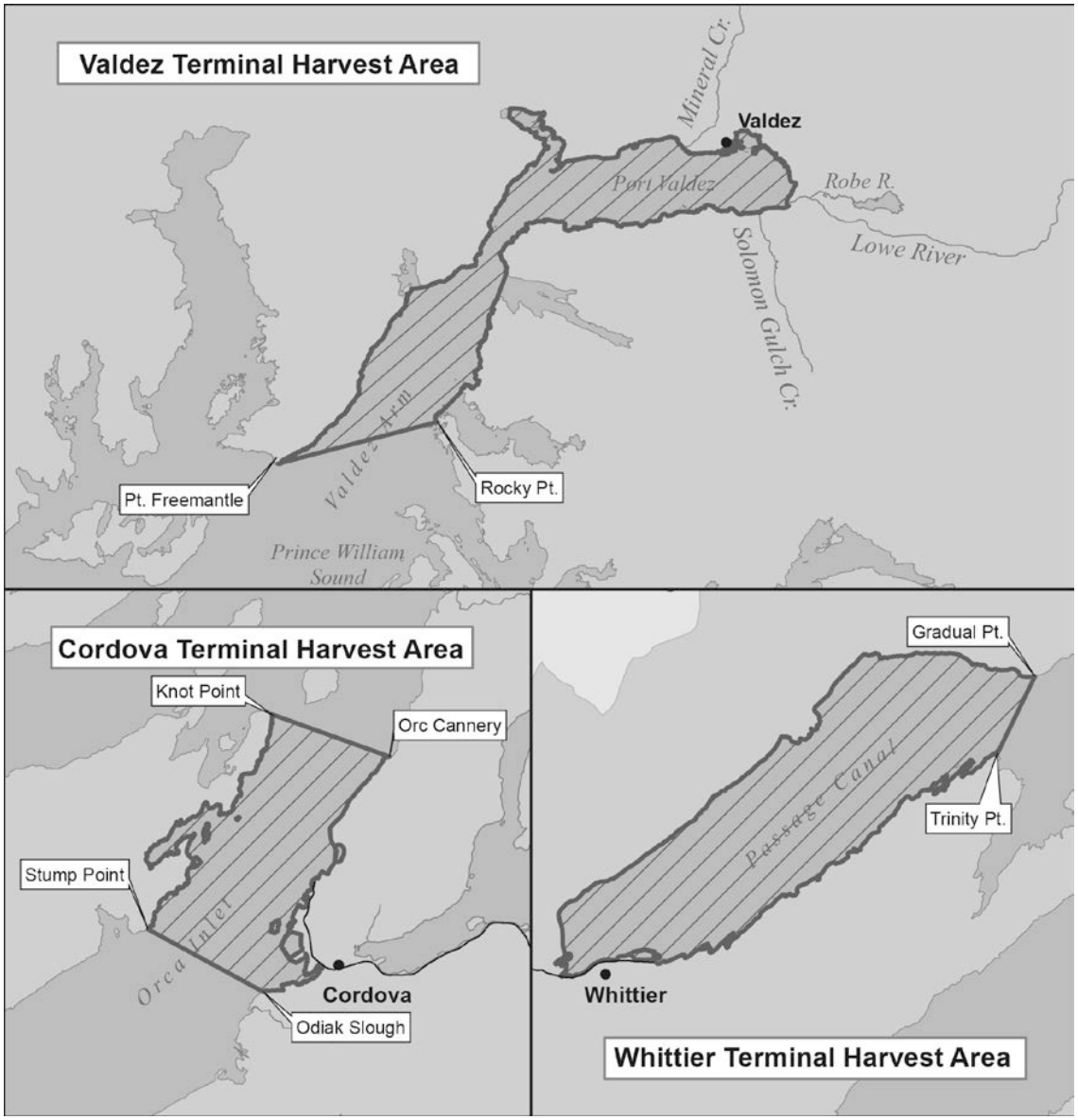

Figure 2.–Terminal Harvest Areas (gray hatching) in select locations of Prince William Sound.

SPORT FISHING EFFORT

Between 2001 and 2016, overall angler effort in PWSMA peaked in 2007 at 210,188 angler-days followed by a general decline over the next 5 years (Figure 3); in 2012, effort was the lowest observed since 2002. In 2013, effort jumped up but has since slowly decreased (Figure 3). Average angler effort in PWSMA from 2014 to 2016 was 162,377 angler-days (Table 1). The contribution of PWSMA angler effort to the total statewide effort has remained steady since 2007, accounting for approximately 7–8% of statewide effort annually (calculated from Table 1).

Total angler effort expended in eastern PWS has continued to decrease since the peak high observed in 2007 (91,401 angler-days; Table 1). An average of 74,977 angler-days of effort (range 61,228–91,401) was estimated for the 10 years prior to 2014 (2004–2013; Table 1),

whereas the average from 2014 to 2016 in eastern PWS has decreased by 15,629 angler days. Angler effort in western PWS also peaked in 2007 (96,247 angler-days) but the average number of angler-days has increased by 6,536 angler-days since 2013 compared to the prior 10-year average. PWSMA angler effort has mirrored statewide trends in effort with a decrease in 2012 followed by an increase in 2013 (Figure 3). In 2014, western PWS and the CRD both saw increases in angler days of effort, which was consistent with statewide trends, whereas eastern PWS and the rest of the PWSMA saw a decrease (Table 1). In 2015, angler effort in western PWS decreased, which was consistent with PWSMA and statewide trends, whereas record high angler effort was estimated for CRD and angler effort increased in eastern PWS (Table 1). Conversely, in 2016, angler effort in eastern PWS and CRD decreased, following the same trends observed for PWSMA and statewide, whereas angler effort increased western PWS (Table 1).

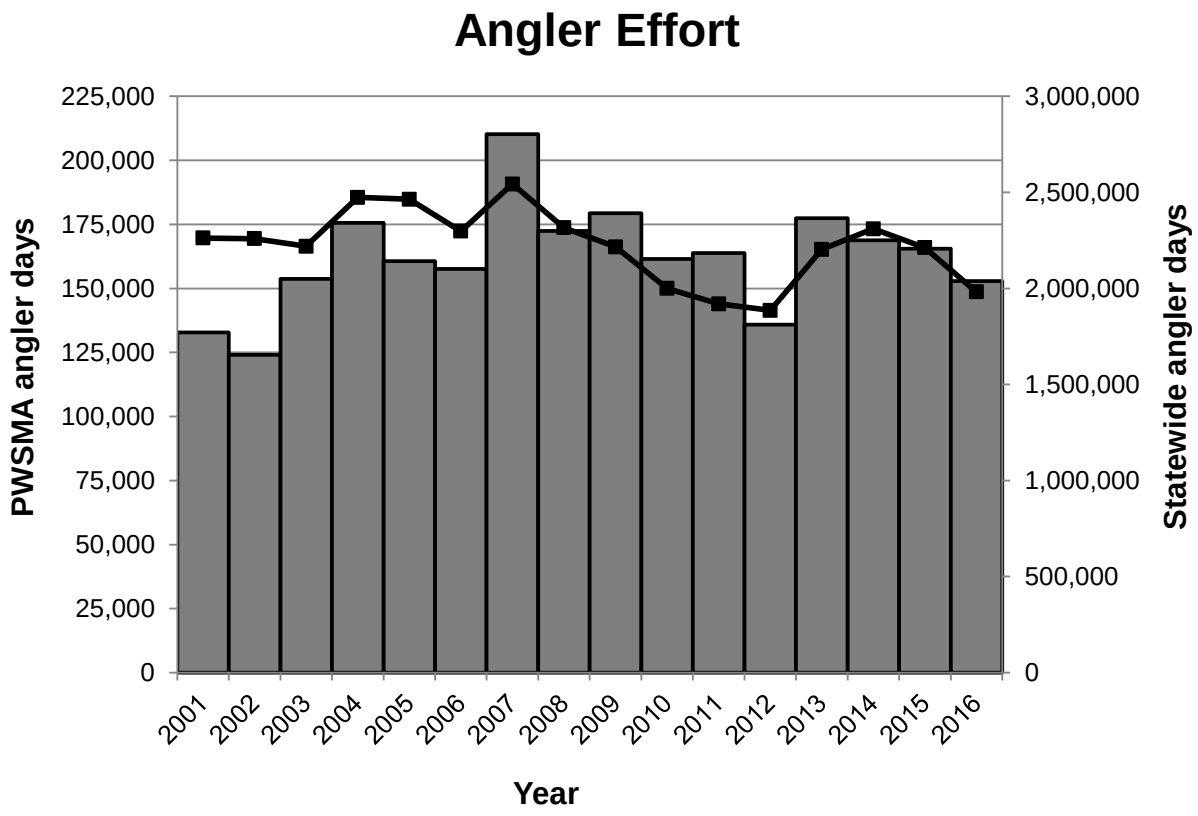

Figure 3.–Angler effort expended in PWSMA (bars) and statewide in Alaska (line), 2001–2016.
Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

Table 1.–Number of angler-days by geographical region expended in the PWSMA, 2001–2016.

Year [a]	Geographic region: Cordova road–delta [b]	Eastern PWS [c]	Western PWS [d]	Other-unknown [e]	PWSMA total	Total statewide
2001	15,784	73,117	35,339	8,555	132,795	2,261,941
2002	10,317	61,587	46,958	5,230	124,092	2,259,091
2003	17,989	77,116	49,894	8,686	153,685	2,219,398
2004	15,005	81,075	70,467	9,017	175,564	2,473,961
2005	11,870	76,060	66,946	5,813	160,689	2,463,929
2006	12,179	77,860	61,035	6,502	157,576	2,297,961
2007	18,961	91,401	96,247	3,579	210,188	2,543,648
2008	13,042	77,593	79,526	2,287	172,448	2,315,592
2009	17,022	78,206	81,798	2,324	179,350	2,216,436
2010	21,300	73,038	65,491	1,654	161,483	2,000,152
2011	18,282	61,880	80,286	3,409	163,857	1,919,312
2012	17,205	61,228	54,538	2,881	135,852	1,885,692
2013	16,125	71,433	84,858	5,018	177,434	2,202,957
2014	20,268	56,521	88,130	3,895	168,814	2,309,851
2015	22,037	66,008	73,006	4,425	165,476	2,212,331
2016	13,830	55,516	80,829	2,665	152,840	1,982,300
Average						
2004–2013	16,099	74,977	74,119	4,248	169,444	2,231,964
2014–2016	18,712	59,348	80,655	3,662	162,377	2,168,161

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

[a] To increase precision in data collection, SWHS changed from reporting area of harvest to port of landing in 2001. This had no effect on data for "PWSMA totals."

[b] Includes angler effort on Cordova road system and delta and for saltwater trips returning to Cordova.

[c] Includes effort of boat and shore anglers on the eastern side of PWS.

[d] Includes effort of boat and shore anglers on the western side of PWS.

[e] Includes effort of anglers in unknown and other areas of PWS.

Even though overall effort has been declining in recent years, boat angler effort in the PWSMA has increased since 2001 from a low of 63% to a high of 80% in 2016 (Table 2). Historically, Valdez was the only road-accessible port in the management area (Figure 1) and most boat anglers accessed PWSMA through this port. However, in 2000, the port of Whittier was linked to the state road system with the reconstruction of the Anton Anderson Memorial Tunnel. Since then, effort by boat anglers as a percent of total effort within PWSMA has increased greatly in Whittier. In 2001, Whittier accounted for only 27% of the total boat angler effort in the PWSMA but after the completion of the tunnel, boat angler effort reached a record high in 2014 of 51% of the total effort in the PWSMA. Concurrently, boat angler effort from Valdez dropped from 52% in 2001 to 28% in 2014, the lowest percentage on record (Table 2). In 2015, the percentage of boat angler effort from Valdez (42%) appeared to be increasing with boat angler effort exceeding Whittier for the first time in 5 years, but in 2016, boat angler effort declined to 32% of the PWSMA total (Table 2).

Table 2.–Angler-days of effort expended by boat anglers in Prince William Sound Management Area (PWSMA) by port of landing, 2001–2016.

	Port											
	Valdez		Whittier		Cordova		Seward		Other / unknown [a]		Total boat effort in PWSMA	PWSMA boat effort as a percentage of all PWSMA effort [d]
Year	Effort [b]	% [c]	Effort [b]	% [c]	Effort [b]	% [c]	Effort [b]	% [c]	Effort [b]	% [c]		
2001	43,442	52%	22,373	27%	6,658	8%	6,231	7%	5,107	6%	83,811	63%
2002	40,850	46%	29,301	33%	6,528	7%	7,961	9%	3,941	4%	88,581	71%
2003	54,351	52%	28,761	28%	6,222	6%	9,616	9%	4,795	5%	103,745	68%
2004	60,713	46%	47,229	35%	7,907	6%	9,967	7%	7,317	5%	133,133	76%
2005	53,994	43%	49,940	40%	4,640	4%	11,388	9%	4,860	4%	124,822	78%
2006	56,689	48%	42,343	36%	4,912	4%	9,760	8%	5,224	4%	118,928	75%
2007	66,867	42%	71,967	45%	7,108	4%	11,632	7%	2,412	2%	159,986	76%
2008	55,784	41%	57,648	42%	7,840	6%	13,310	10%	1,487	1%	136,069	79%
2009	53,396	39%	61,733	46%	8,269	6%	10,756	8%	1,183	1%	135,337	75%
2010	51,753	44%	47,998	41%	4,999	4%	11,701	10%	569	0%	117,020	72%
2011	44,252	36%	46,563	38%	5,429	4%	23,476	19%	3,189	3%	122,909	75%
2012	37,420	38%	33,812	35%	8,095	8%	15,614	16%	2,387	2%	97,328	72%
2013	45,733	33%	61,632	45%	5,435	4%	20,615	15%	4,045	3%	137,460	77%
2014	36,856	28%	66,100	51%	6,513	5%	16,825	13%	3,585	3%	129,879	77%
2015	53,236	42%	48,949	38%	6,944	5%	14,545	11%	3,855	3%	127,529	77%
2016	39,562	32%	54,802	45%	7,848	6%	17,960	15%	2,159	2%	122,331	80%
Average												
2004–2013	52,660	41%	52,087	40%	6,463	5%	13,822	11%	3,267	3%	128,299	
2014–2016	43,218	34%	56,617	45%	7,102	6%	16,443	13%	3,200	3%	126,580	

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

[a] Unknown from North Gulf Coast (Seward).

[b] Effort in angler-days.

[c] Percent of total boat angler effort in Prince William Sound.

[d] Total PWSMA angler effort given in Table 1.

The port of Cordova has only a small portion of total effort expended by boat anglers (average 5% for 2004–2013, range 4–8%, Table 2).

After 2013, average boat angler effort over all PWSMA (2014–2016) declined slightly from the previous 10 years (2004–2013) from 128,299 to 126,580 angler-days. The average number of angler-days from Whittier, Cordova, and Seward actually increased but Valdez effort decreased, heavily influencing this overall decline (Table 2).

Shore anglers in the PWSMA typically target salmon species in the Terminal Harvest Areas near Valdez and Cordova. The port of Valdez typically sees more shore angler effort than other ports in the PWSMA (average 17,453 angler-days or 75% of total PWSMA effort, 2004–2013; Figure 4, Table 3). In 2016, 87% of the shore angler effort was in the Valdez area (Figure 4). During the 10 years prior to 2014, the average (2004–2013) of both the Cordova and Whittier areas was around 8% of the total PWSMA shore effort for each area. In 2016, there were too few respondents to determine the shore effort for Cordova.

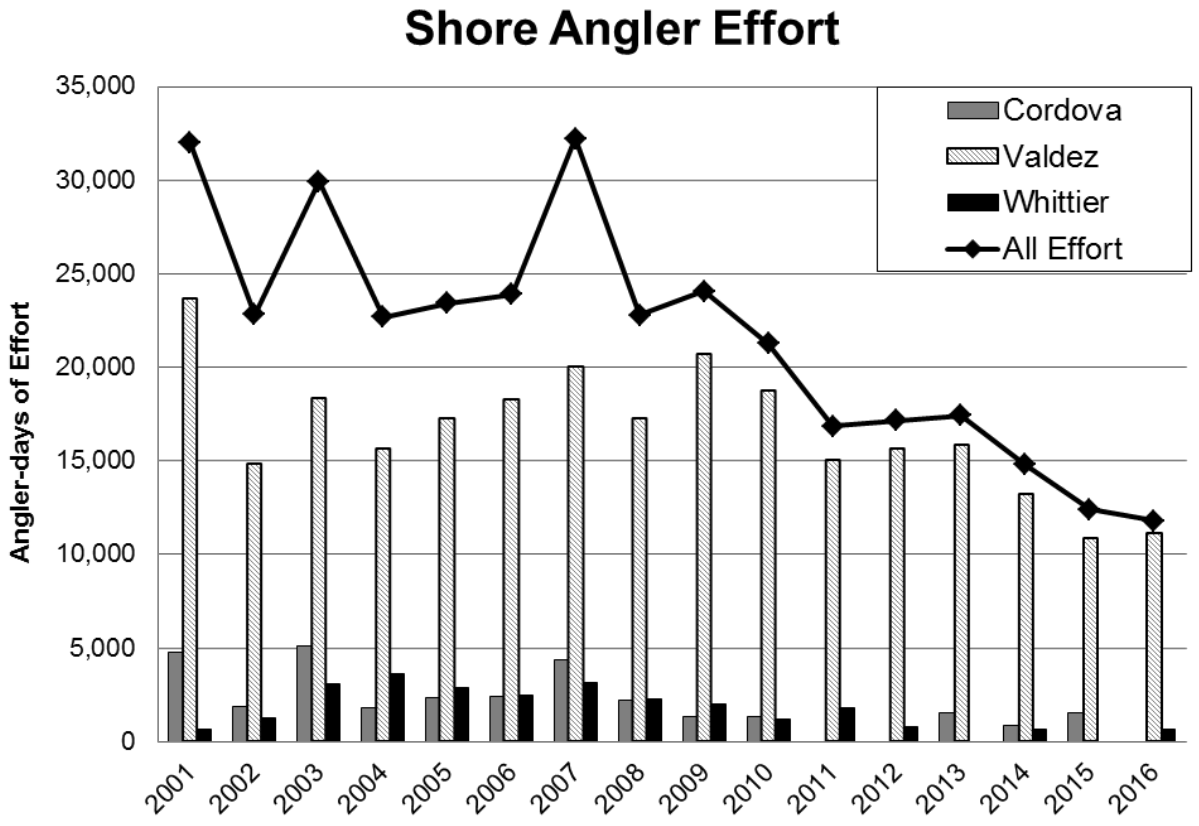

Figure 4.–Angler-days of effort by shore anglers in PWSMA, 2001–2016.

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

Table 3.–Angler-days of effort by shore anglers in PWSMA, 2001–2016

Year	Port or geographic region					
	Cordova	Valdez	Whittier	West PWS	East PWS	Total
2001	4,802	23,690	657	1,047	1,804	32,000
2002	1,883	14,878	1,244	2,104	2,703	22,812
2003	5,118	18,356	3,077	2,565	834	29,950
2004	1,781	15,639	3,661	1,606	[a]	22,687
2005	2,378	17,240	2,887	927	[a]	23,432
2006	2,421	18,294	2,477	707	[a]	23,899
2007	4,397	20,024	3,135	3,127	1,526	32,209
2008	2,221	17,294	2,278	[a]	983	22,776
2009	1,345	20,727	1,990	[a]	[a]	24,062
2010	1,311	18,741	1,221	[a]	[a]	21,273
2011	[a]	15,060	1,806	[a]	[a]	16,866
2012	[a]	15,623	789	755	[a]	17,167
2013	1,528	15,888	[a]	[a]	[a]	17,416
2014	880	13,235	687	[a]	[a]	14,802
2015	1,507	10,887	[a]	[a]	[a]	12,394
2016	[a]	11,151	651	[a]	[a]	11,802
Average						
2004–2013	2,173	17,453	2,249	1,424	1,255	23,414
2014–2016	1,194	11,758	669			14,384

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

[a] Data do not include a sufficient number of respondents to make an estimate.

CHARTER LOG DATA

According to log book data (collected from charter boat operators) the greatest number of charter businesses providing anglers access to PWSMA fishing opportunities come from the port of Seward followed by the ports of Valdez and Whittier, respectively (Table 4). The other ports or location of landings have very few businesses. All data collected in locations with fewer than 4 businesses are included into an "other" category to protect the confidentiality of respondents. Each business varies in the number of trips they take but the majority (53%, calculated from Table 4) of the charter trips in the PWSMA return to the port of Seward after fishing in the PWSMA. Most of the remainder of the charter trips return to ports in Eastern PWS. Of those ports in Eastern PWS, Valdez contributes the most trips followed by Whittier and then Cordova.

The majority of the trips in the PWSMA by charter operated boats report targeting bottomfish over salmon (Table 5). This same target preference is prevalent in charters returning to Eastern PWS. In contrast, charter boat trips returning to Western PWS tend to target both salmon and bottomfish. Western PWS has the fewest number of business and the fewest trips although targeted species can change and does not necessarily reflect what is caught during the trip.

Table 4.–Participation of charter businesses in the Prince William Sound Management Area by location in terms of number of businesses (bus.) and number of trips (trips), 2006–2016.

			Western PWS				Eastern PWS									
	Seward [a]		Chenega		Port Ashton		Cordova		Valdez		Whittier		Other [b]		Total in PWS	
Year	Bus.	Trips	Bus.	Trips	Bus.	Trips	Bus.	Trips	Bus.	Trips	Bus.	Trips	Bus.	Trips	Bus.	Trips
2006	66	2,222	0	0	0	0	9	203	44	1,832	27	632	6	96	152	4,985
2007	68	2,588	4	59	0	0	7	171	46	1,693	31	749	4	71	160	5,331
2008	67	2,203	0	0	0	0	5	102	40	1,410	28	752	9	107	149	4,574
2009	54	1,981	0	0	6	18	5	54	40	1,270	26	614	8	74	139	4,011
2010	48	1,945	5	46	5	17	5	84	35	1,229	25	683	4	82	127	4,086
2011	48	2,139	4	9	4	25	4	83	31	1,026	20	518	8	101	119	3,901
2012	42	2,073	0	0	7	42	5	68	25	702	19	616	5	41	103	3,542
2013	38	2,280	0	0	4	51	0	0	28	1,032	13	622	11	114	94	4,099
2014	39	2,026	0	0	9	52	0	0	27	730	18	577	7	136	100	3,521
2015	39	2,260	0	0	6	45	0	0	22	734	18	616	8	208	93	3,863
2016	35	2,247	0	0	7	43	0	0	16	731	14	720	10	160	82	3,901

Source: Saltwater Logbook Database (Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. Accessed November 1, 2017. [URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.])

[a] Fished in PWS and returned to Seward.

[b] "Other" includes locations in PWSMA where there are fewer than 4 businesses. These are reported separately to protect the confidentiality of respondents.

Table 5.–Number of trips targeting particular fish (salmon, bottomfish, or both) by location for charter businesses in the Prince William Sound Management Area, 2006–2016.

	Seward trips [a]			Western PWS			Eastern PWS			Other [b]			Total		
Year	Salmon	Bottom-fish	Both	Salmon	Bottom-fish	Both	Salmon	Bottom-fish	Both	Salmon	Bottom-fish	Both	Salmon	Bottom-fish	Both
2006	127	1,133	962				879	1,619	169	12	45	39	1,018	2,797	1,170
2007	60	1,337	1,191	6	5	48	752	1,583	278	7	12	52	825	2,937	1,569
2008	58	1,228	917				602	1,486	176	11	9	87	671	2,723	1,180
2009	68	871	1,042		2	16	423	1,292	223	8	16	50	499	2,181	1,331
2010	32	922	991		11	52	460	1,304	232	2	18	62	494	2,255	1,337
2011	76	747	1,316	2	7	25	486	969	172	19	18	64	583	1,741	1,577
2012	12	1,171	890		23	19	241	1,034	111		10	31	253	2,238	1,051
2013	23	948	1,309	1	15	35	483	995	176	7	37	70	514	1,995	1,590
2014	18	872	1,136		15	37	225	1,022	60	2	104	30	245	2,013	1,263
2015	34	581	1,645		3	42	303	725	322	23	54	131	360	1,363	2,140
2016	25	1,417	805	1	17	25	138	1,268	45	4	111	45	168	2,813	920
Average															
2006–2013	57	1,045	1,077	3	11	33	541	1,285	192	9	21	57	607	2,358	1,351
2014–2016	26	957	1,195	1	12	35	222	1,005	142	10	90	69	258	2,063	1,441

Source: Saltwater Logbook Database (Alaska Department of Fish and Game, Division of Sport Fish. 2006 to present. Accessed November 1, 2017. [URL not publicly available as some information is confidential. Contact Research and Technical Services for data requests.])

Note: Participation was determined by number of trips, not targeted species.

[a] Fished in PWS and returned to Seward.

[b] "Other" includes locations in PWSMA where there are fewer than 4 businesses. These are reported separately to protect the confidentiality of respondents.

COHO SALMON FISHERIES

AREAWIDE COHO SALMON FISHERY

Fishery Description

Prince William Sound has both wild and hatchery coho salmon runs. Wild stocks are scattered and runs are typically small. A large number of hatchery coho salmon return to Valdez, Cordova, and Whittier in most years. A majority of the PWSMA coho salmon catch and harvest occurs in saltwater fisheries except on the CRD where wild coho salmon stocks are predominately targeted in fresh water. PWSAC stocks coho salmon at Fleming Spit in Cordova, and near Whittier; the.VFDA stocks coho salmon in the Valdez area. Hatcheries place smolt in pens and then release them once they have had sufficient time to imprint on that location. These stocked coho salmon create popular shore fisheries and help reduce angler effort on wild stocks. Adult coho salmon typically return to freshwater streams to spawn from August through October and are caught in salt water during this time.

Fishery Management and Objectives

Most of PWSMA is open to the taking of coho salmon year-round. In all salt and fresh waters of PWSMA, the bag limit for coho salmon is 3 per day and 3 in possession (established in 1999 for PWS and 1989 for CRD), with the exception of the Terminal Harvest Areas (THA) encompassing the hatchery release sites in Valdez, Cordova, Chenega Bay, and Whittier (Appendix A1). Coho salmon bag limits in the THA are 6 per day and 12 in possession. Regulations restrict coho salmon harvest to 1 per day, 1 in possession in Shelter Bay on Hinchinbrook Island. Several streams or sections of streams in the Cordova area are closed to fishing for coho salmon: Eccles Creek, Eyak Lake and its tributaries (with the exception of Eyak River), Clear Creek upriver of the Carbon Mountain Bridge, and Hartney Creek above Whiteshed Road. In addition, all freshwater drainages to the Port of Valdez except for a portion of the Robe River and Solomon Gulch Creek are closed to fishing for salmon. In the Robe River near Valdez, the bag and possession limit is 1 coho salmon. Coho salmon removed from fresh waters crossed by the Copper River Highway must be retained and become part of the daily bag limit of the person who originally hooked the fish. A person may not remove a coho salmon from the water before releasing it. In addition from August 15 to September 15, bait may not be used in Copper River Highway streams to catch and release coho salmon if an angler has caught their daily bag limit.

There are no stock-specific management objectives for any of the wild coho salmon stocks that are found throughout PWS therefore escapement goals have not been established and there is no monitoring of inseason escapement. The Division of Commercial Fisheries monitors inseason escapement of coho salmon via aerial surveys in several streams on the CRD. A delta-wide coho salmon sustainable escapement goal (SEG—an indexed level of escapement known to provide sustained yield) of 32,000–67,000 coho salmon (Sheridan et al. 2013: Table 5) has been met or exceeded every year since 1989 (Donaldson et al. 1995: Appendix B15; Ashe et al. 2005: Appendix A12; Russell et al. 2017: Appendix A17).

Historical Fishery Performance

Based on SWHS data, the PWSMA coho salmon fishery is among the largest sport fisheries for coho salmon in the state of Alaska. Anglers target coho salmon in both salt water and fresh

water, and the fishery is supported by both wild and hatchery stocks. Hatchery coho salmon smolt are released in Whittier and Cordova as part of a sport fishery enhancement program run by PWSAC. Large-scale hatchery releases of coho salmon occur annually in Port Valdez (by VFDA) and Lake Bay (by PWSAC) that support both commercial and sport fisheries.

Prior to 2008, the lowest estimated harvest of coho salmon in the PWSMA was 90,436 fish (Thalhauser 2014). Since then, there have been 4 years when harvest fell below that number (2009, 2012, 2014, and 2016; Table 6, Figure 5). From 2001 to 2008, reflecting run sizes, the catch and harvest of coho salmon alternated between high and low years, with odd years higher than even years. In 2009 and 2010, this was reversed with the even year (2010) having a higher catch and harvest than the odd year (2009). The odd-high, even-low pattern returned in 2011 and continued through 2016 with an even more pronounced cycle between high odd-year catch and harvest and low even-year catch and harvest. Despite this overall PWSMA pattern, CRD has not shown the same pattern as the other areas; excluding the higher harvest in 2015, annual harvests have lacked a cyclic pattern and have been similar from year to year (Table 6).

Fishery Performance and Escapement 2014–2016

From 2014 to 2016, there was a dramatic reduction in average coho salmon catch and harvest (90,015 and 64,382, respectively) compared to the prior 10-year average catch and harvest (150,738 and 103,381, respectively; Table 6). From 2004 to 2013 44% (on average) of the coho salmon catch and harvest came from Valdez but from 2014 to 2016, only about 29% of the coho salmon harvest in the PWSMA came from Valdez (calculated from Table 6). In 2016, the PWSMA had unusually low catch and harvest of coho salmon. Even though the average coho salmon catch and harvest in PWSMA declined, the CRD had an increased average catch and harvest during 2014–2016 compared to the prior average (2004–2013).

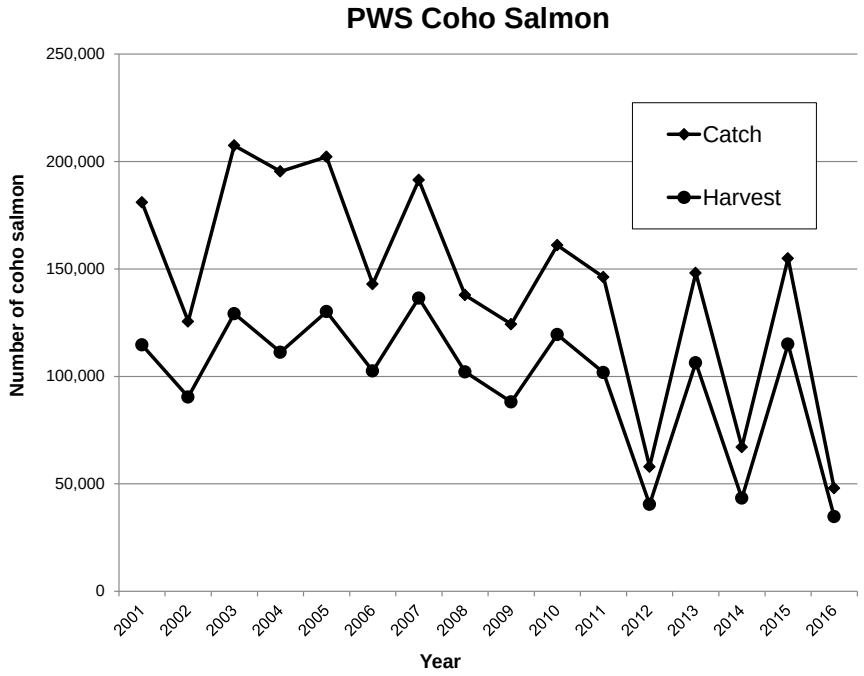

Figure 5.–Total catch and harvest of coho salmon by sport anglers by year, PWSMA, 2001–2016.
Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

Table 6.–Coho salmon catch and harvest by geographical regions, PWSMA, 2001–2016.

	Geographical region											
	Western		Eastern		Valdez		Cordova road–delta		Other unknown [a]		Total [a]	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	24,738	16,767	51,223	34,377	60,836	43,786	35,504	14,517	8,679	5,198	180,980	114,645
2002	33,729	24,109	62,041	48,898	7,823	6,568	16,435	7,896	5,554	2,965	125,582	90,436
2003	35,000	22,759	24,722	16,241	90,792	70,041	47,157	16,828	9,739	3,309	207,410	129,178
2004	33,294	21,374	27,966	19,301	70,346	49,680	54,602	17,052	9,146	3,834	195,354	111,241
2005	55,286	38,485	24,256	18,111	86,018	57,944	30,112	12,043	6,509	3,569	202,181	130,152
2006	28,151	20,891	22,176	17,586	70,833	52,505	16,674	8,014	5,142	3,543	142,976	102,539
2007	50,663	35,292	41,011	30,021	77,467	59,605	19,394	9,530	2,856	1,986	191,391	136,434
2008	26,335	22,119	28,647	21,724	60,022	48,451	21,301	9,351	1,525	457	137,830	102,102
2009	23,264	18,981	20,926	16,379	48,278	35,461	28,143	14,532	3,716	2,742	124,327	88,095
2010	28,480	23,277	19,768	15,800	80,199	62,631	30,535	16,663	2,057	1,084	161,039	119,455
2011	43,056	30,180	13,821	8,699	56,773	46,451	30,068	15,087	2,443	1,357	146,161	101,774
2012	11,486	8,953	5,428	4,450	11,717	10,648	28,123	15,654	1,218	751	57,972	40,456
2013	33,048	23,906	17,946	12,938	62,960	49,375	31,409	18,462	2,789	1,685	148,152	106,366
2014	15,593	13,262	7,328	2,550	12,094	10,088	31,405	16,925	717	537	67,137	43,362
2015	39,112	33,730	23,048	17,346	41,610	36,609	49,296	25,667	1,866	1,649	154,932	115,001
2016	7,949	6,871	3,138	2,662	13,253	11,395	23,308	13,682	327	172	47,975	34,782
Average												
2004–2013	33,306	24,346	22,195	16,501	62,461	47,275	29,036	13,639	3,740	2,101	150,738	103,861
2014–2016	20,885	17,954	11,171	7,519	22,319	19,364	34,670	18,758	970	786	90,015	64,382

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

[a] Includes unknown areas from all of Area J, including North Gulf Coast.

COPPER RIVER DELTA (CRD) COHO SALMON FISHERY

Fishery Description

The coho salmon fishery on CRD is composed of numerous road-accessible streams west of the Copper River (west delta) and both fly-out and boat-accessible streams east of the Copper River (east delta). Most angler effort on the west delta is expended on Eyak River, Ibeck Creek, and Alaganik Slough. Smaller streams on the west delta, such as those at 18-mile and 20-mile along the Copper River Highway, receive angler effort during the coho salmon season but the low number of SWHS respondents fishing these systems precludes reliable estimates of catch and harvest of coho salmon in these areas. As such, stream-specific estimates of catch and harvest are only available for Eyak River, Ibeck Creek, and Alaganik Slough. Major streams on the east delta include the Martin and Katalla rivers. Like the smaller systems on the west delta, catch and harvest estimates are not available for the Martin and Katalla rivers due to the low number of SWHS respondents fishing these systems. Streams east of the delta became less accessible in 2011 when a bridge at "37-mile" of the Cooper River Highway washed out. These streams are now accessible only by airboat and plane and receive even less fishing pressure as a result.

Fishery Management and Objectives

The management objective for the CRD coho salmon fishery is to achieve the sustainable escapement goal (SEG) of 32,000–67,000 fish (Russell et al. 2017: Table 5). Escapement for a given year is the sum of the peak aerial survey counts for index streams on the west and east sides of the CRD (Sheridan et al. 2013). There are no stream-specific escapement goals for coho salmon on the CRD.

Historical Fishery Performance

From 1996 to 2000, average catch and harvest of coho salmon on the CRD was 9,362 and 6,389 fish, respectively. Since that time it has risen with peak catch and harvest occurring in 2004 (54,602 and 17,052, respectively; Figure 6, Table 7). After a drop in 2005–2006, a gradual increase in catch and harvest has been observed.

Catch and harvest of coho salmon in the sport fishery on the CRD is most likely dependent on 3 variables: angler effort, stream conditions, and the size of the run. For example, low, clear stream conditions on the Eyak River and Alaganik Slough in 2004 (Sam Hochhalter, Fishery Biologist, ADF&G, Anchorage, personal communication) coupled with the largest aerial survey counts of coho salmon on record for these streams (Botz et al. 2010: Appendix A19; Sheridan et al. 2013: Appendix A20) led to a record catch and harvest of coho salmon in the sport fishery (Figures 6 and 7). Catch and harvest of coho salmon in the sport fishery can remain low despite large runs of fish if stream conditions are poor during a large portion of the season. Two independent 100-year floods during the coho salmon season of 2006 resulted in poor fishing conditions and the lowest catch and harvest of coho salmon since 2001 (Figures 6 and 7); however, the coho salmon run was the fourth largest since 1999 (Botz et al. 2010: Appendix A19; Sheridan et al. 2013: Appendix A20; Russell et al. 2017: Appendix A17). Differences in stream conditions between the Eyak River, Ibeck Creek, and Alaganik Slough, within a given year, seem to influence the proportional contribution of these streams to the total catch and harvest of coho salmon. For example, Ibeck Creek remained low and clear during the 2003 coho salmon season (B. Marston, Sport Fish Biologist, ADF&G, Cordova, personal communication), and it contributed greatly to

the total coho salmon catch and harvest in 2003 (Figure 7). Conversely in 2004, Ibeck Creek was highly turbid for most of the coho salmon season (B. Marston, personal communication), and there was very little contribution to the total coho salmon catch and harvest that year (Figure 7).

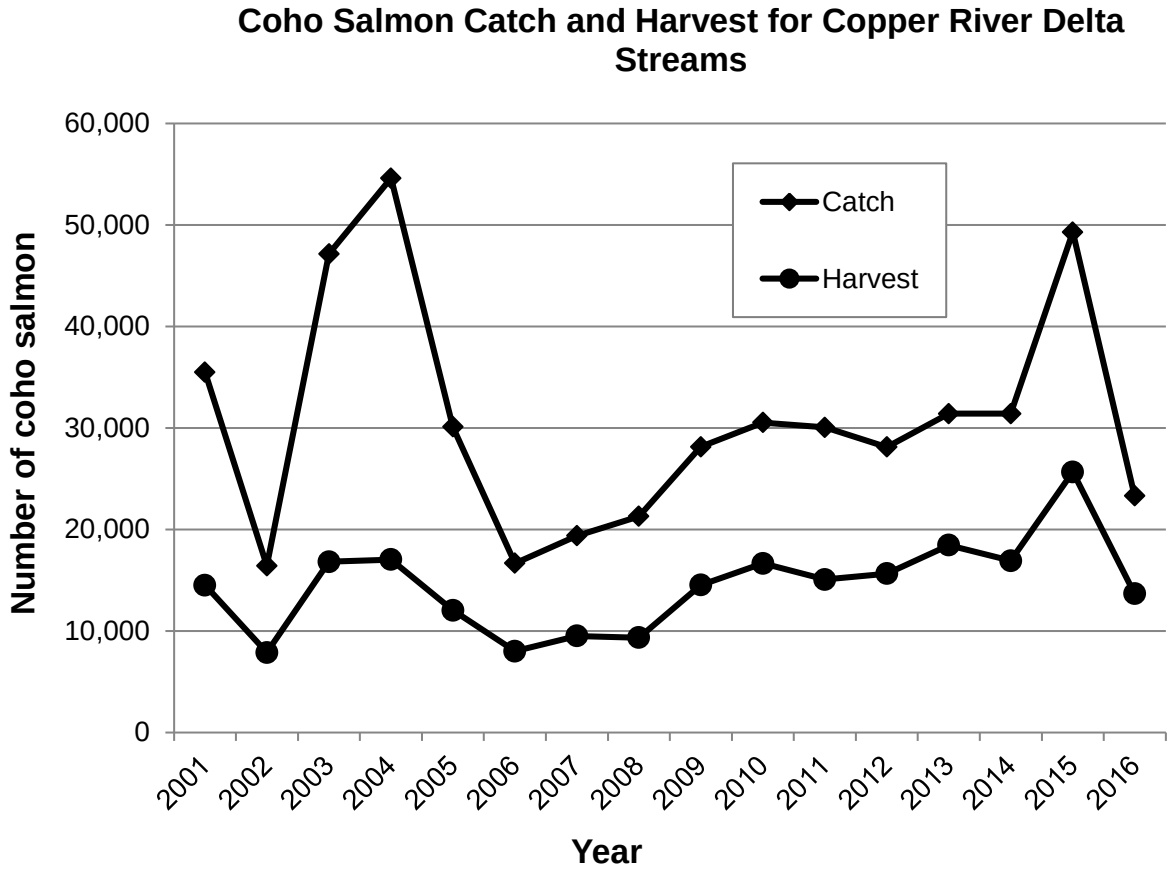

Figure 6.–Catch and harvest of coho salmon by sport anglers from streams on the Copper River Delta by year, 2001–2016.

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

Table 7.–Catch and harvest of coho salmon at selected sites of the Cordova road system and Copper River Delta, PWSMA, 2001–2016.

	Cordova area sites									
	Eyak River		Alaganik Slough		Ibeck Creek		Other Cordova sites		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	17,477	10,025	3,188	1,565	726	462	14,113	2,465	35,504	14,517
2002	9,345	5,547	1,681	663	662	297	4,747	1,389	16,435	7,896
2003	15,604	8,473	4,655	1,708	11,857	3,318	15,041	3,329	47,157	16,828
2004	25,746	10,235	13,032	3,843	377	135	15,447	2,839	54,602	17,052
2005	10,639	5,228	4,049	1,777	4,120	2,437	11,304	2,601	30,112	12,043
2006	6,579	3,328	2,237	1,236	1,803	913	6,055	2,537	16,674	8,014
2007	8,141	4,677	1,641	1,052	2,260	927	7,352	2,874	19,394	9,530
2008	8,103	4,714	3,994	1,738	1,811	620	7,393	2,279	21,301	9,351
2009	13,065	8,464	2,425	1,379	7,925	3,780	4,728	909	28,143	14,532
2010	15,052	8,379	3,554	2,208	7,321	4,818	4,608	1,258	30,535	16,663
2011	8,633	5,206	2,303	1,332	12,223	7,351	6,909	1,198	30,068	15,087
2012	11,775	7,010	949	623	10,345	7,430	5,054	591	28,123	15,654
2013	10,260	7,229	4,698	2,752	13,204	6,986	3,247	1,495	31,409	18,462
2014	13,093	7,857	2,815	1,728	10,890	6,274	4,607	1,066	31,405	16,925
2015	10,655	8,338	12,483	5,862	22,875	10,315	3,283	1,152	49,296	25,667
2016	6,794	5,217	4,817	2,413	8,868	5,464	2,829	588	23,308	13,682
Average										
2004–2013	11,799	6,447	3,888	1,794	6,139	3,540	7,210	1,858	29,036	13,639
2014–2016	10,181	7,137	6,705	3,334	14,211	7,351	3,573	935	34,670	18,758

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

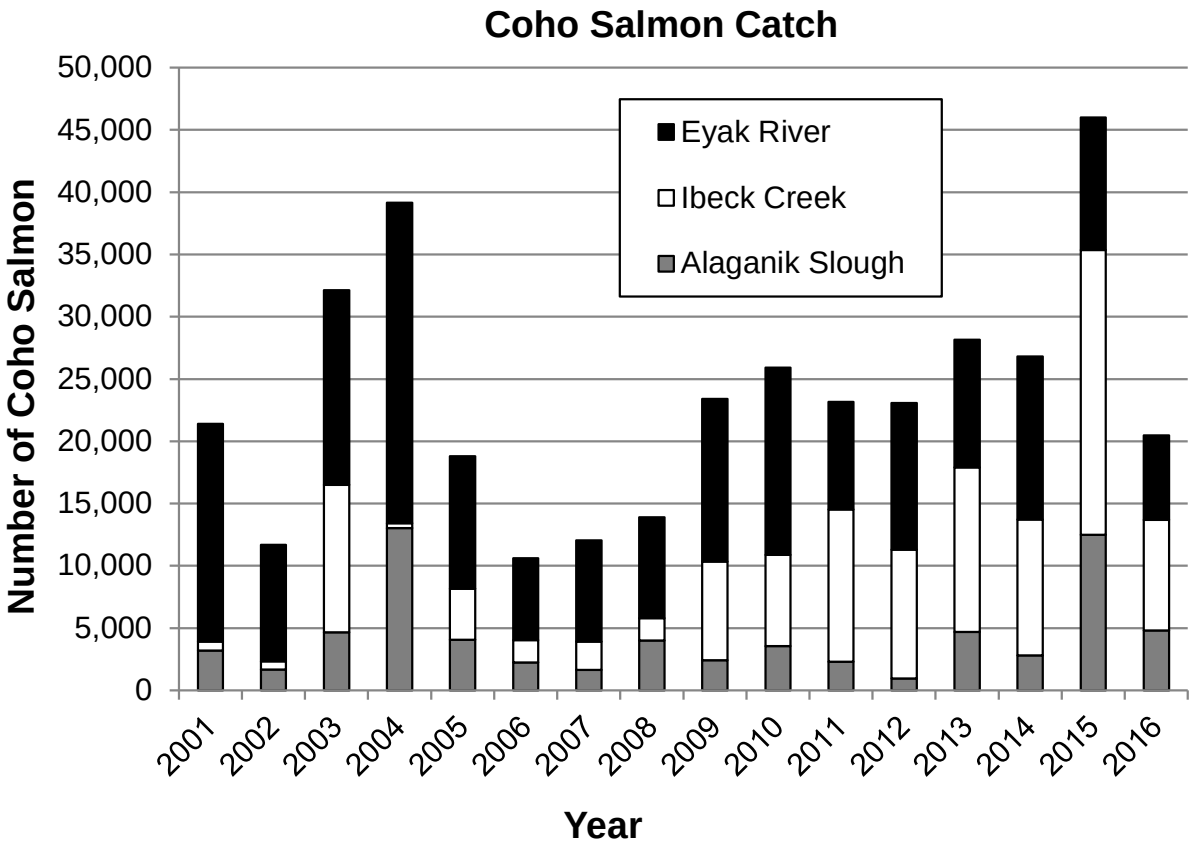

Figure 7.–Catch of coho salmon by sport anglers from selected streams on the Copper River Delta, 2001–2016.

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

Fishery Performance and Escapement 2014–2016

On average (2004–2013), the CRD coho fishery made up approximately 15% of the total PWSMA coho salmon harvest. From 2014 to 2016, this increased and average harvest from the CRD coho salmon fishery was approximately 33% of the total harvest. The second highest catch and harvest estimated between 2001 and 2016 was in 2015 (49,296 and 25,667 fish, respectively). However, in 2016, coho salmon catch and harvest from the CRD dropped significantly (23,308 and 13,682 fish, respectively) and was the lowest estimated since 2008. Although harvest in 2015 on the CRD was above average and the highest documented, escapement (42,165 fish, based on aerial survey indices) was slightly below the 2006–2015 average of 49,951 fish (Russell et al. 2017: Appendix A17) but well within the range of the lower bound of the SEG (32,000 fish). Conversely in 2016, coho salmon escapement in the CRD (76,400 fish) exceeded the upper bound of the escapement goal (67,000 fish) in 2016 (Russell et al. 2017: Appendix A17) but only an average-sized harvest occurred in the sport fishery (13,682 fish; Table 7).

The recent average (2014–2016) annual catch of CRD coho salmon was 34,670 fish and greater than the previous 10-year average (2004–2013) of 29,036 fish. The recent average (2014–2016) annual harvest of CRD coho salmon was 18,758 fish and greater than the previous 10-year

average (2004–2013) of 13,369 fish (Table 7). The 2014, 2015, and 2016 CRD coho salmon escapement indices of 44,400, 42,165, and 76,400 (average 54,188; Russell et al. 2017: Appendix A17) are based on aerial surveys that were affected by fair environmental conditions, so these results represent a minimum escapement to CDR streams (J. Botz, Fishery Biologist, ADF&G, Cordova, personal communication).

SOCKEYE SALMON FISHERIES

FISHERY DESCRIPTION

The major sockeye salmon fisheries in PWS include freshwater fisheries for wild stocks in the Coghill River and Eshamy Creek, and a saltwater fishery for hatchery stock at Main Bay. The sockeye salmon fishery on the CRD is focused on wild stocks in the Eyak River and Alaganik Slough. Numerous small streams throughout PWS support relatively small runs of sockeye salmon and anglers target these runs as fish stage in the estuaries. The SWHS relies on a sufficient number of responses for any given site to generate reliable estimates of catch and harvest. As such, estimates are generally reported by larger areas, and stream-specific catch and harvest estimates are only available for a few of the more popular streams. Catch and harvest estimates are reported by geographical region (Table 8).

FISHERY MANAGEMENT AND OBJECTIVES

Current bag and possession limits for sockeye salmon were established in 1973 and are 6 per day, 12 in possession (Appendix A1). In all freshwater drainages crossed by the Copper River Highway, the bag and possession limits for salmon other than Chinook salmon are 3 fish (established in 1989). In the Eshamy Creek drainage, the limits are 3 sockeye salmon per day, 6 in possession (established in 1989). In the Robe River near Valdez, the bag and possession limit is 1 sockeye salmon (established in 1989).

The ADF&G Division of Commercial Fisheries monitors inseason escapement of sockeye salmon into Eshamy Creek and Coghill River via weirs, and into index streams on the CRD via aerial surveys. The biological escapement goal (BEG, based on best biological information and set for maximum sustained yield) for Eshamy Creek is 13,000–28,000 sockeye salmon, the SEG for Coghill River is 20,000–60,000 sockeye salmon, and the SEG for the CRD is 55,000–130,000 sockeye salmon (Russell et al. 2017: Table 5). The BEG for sockeye salmon in the Eshamy Creek system has been within or above the existing goal in 19 of 20 years the weir was in operation between 1991 and 2011 (Sheridan et al. 2013: Appendix C3). Since 2013, the Eshamy goal has not been used because no human-monitored weir has been operated. Commercial fisheries staff have been trying to perfect the use of a remote video monitoring system over the last 3 years with limited success, and counts are incomplete and not comparable to historical weir data. Sockeye salmon escapements into the Coghill system have been above the lower bound of the existing SEG every year since 1995, with the exception of 2013, 2015, and 2016 (17,231, 13,584, and 8,708 fish, respectively). The 2016 escapement was the second lowest documented since 1990 (Sheridan et al. 2013: Appendix B3). Sockeye salmon escapement into index streams on the CRD has been within the SEG every year since 1999 with the exception of 2016 when 51,550 fish were counted, just 3,450 fish below the lower bound of the escapement goal (Botz et al. 2010: Appendix A12; Sheridan et al. 2013: Appendix A13; Russell et al. 2017).

Table 8.–Sockeye salmon catch and harvest by geographical location, PWSMA, 2001–2016.

	Geographical region											
	Western		Eastern		Valdez		Cordova road–delta		Other unknown [a]		Total [a]	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	6,305	3,992	1,428	1,055	1,677	923	919	340	747	133	11,076	6,443
2002	7,872	5,448	1,150	837	1,398	358	1,393	731	945	220	12,758	7,594
2003	11,155	6,469	862	541	1,074	289	1,565	441	482	270	15,138	8,010
2004	9,003	7,151	780	409	1,690	1,493	1,633	919	34	34	13,140	10,006
2005	4,941	4,029	404	292	2,641	1,155	974	668	229	168	9,189	6,312
2006	4,507	3,923	387	246	1,741	651	385	158	191	191	7,211	5,169
2007	11,398	9,500	800	660	2,695	764	3,073	1,748	1,086	548	19,052	13,220
2008	5,987	4,852	1,556	995	1,795	554	2,162	1,251	183	183	11,683	7,835
2009	8,900	7,473	1,005	465	1,063	470	1,961	993	170	170	13,099	9,571
2010	4,464	3,973	781	745	1,310	900	2,354	1,342	579	579	9,488	7,539
2011	5,692	4,645	1,281	940	1,690	1,105	1,206	838	77	77	9,946	7,605
2012	4,480	3,171	394	345	173	162	1,802	764	236	236	7,085	4,678
2013	9,091	7,599	336	274	1,178	240	424	386	744	744	11,773	9,243
2014	11,390	9,791	202	184	2,973	726	428	174	218	218	15,211	11,093
2015	5,639	4,046	278	278	136	94	929	130	368	368	7,350	4,916
2016	4,149	4,015	106	61	706	462	306	246	120	0	5,387	4,784
Average												
2004–2013	6,846	5,632	772	537	1,598	749	1,597	907	353	293	11,167	8,118
2014–2016	7,059	5,951	195	174	1,272	427	554	183	235	195	9,316	6,931

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

[a] Includes unknown areas from all of Area J, including North Gulf Coast.

The management objectives for the Eshamy Creek, Coghill River, and CRD stocks are to meet the escapement goal. For all other sockeye salmon stocks in PWSMA, there are no stock-specific management goals and no inseason monitoring of escapement.

HISTORICAL FISHERY PERFORMANCE

From 2001 to 2013, historical harvest of sockeye salmon in PWSMA was between 4,678 and 13,220 fish (Table 8, Figure 8). Peak catch and harvest (19,052 and 13,220 fish) occurred in 2007. The 10-year average catch and harvest prior to 2014 (2004–2013) was 11,167 and 8,118 fish, respectively.

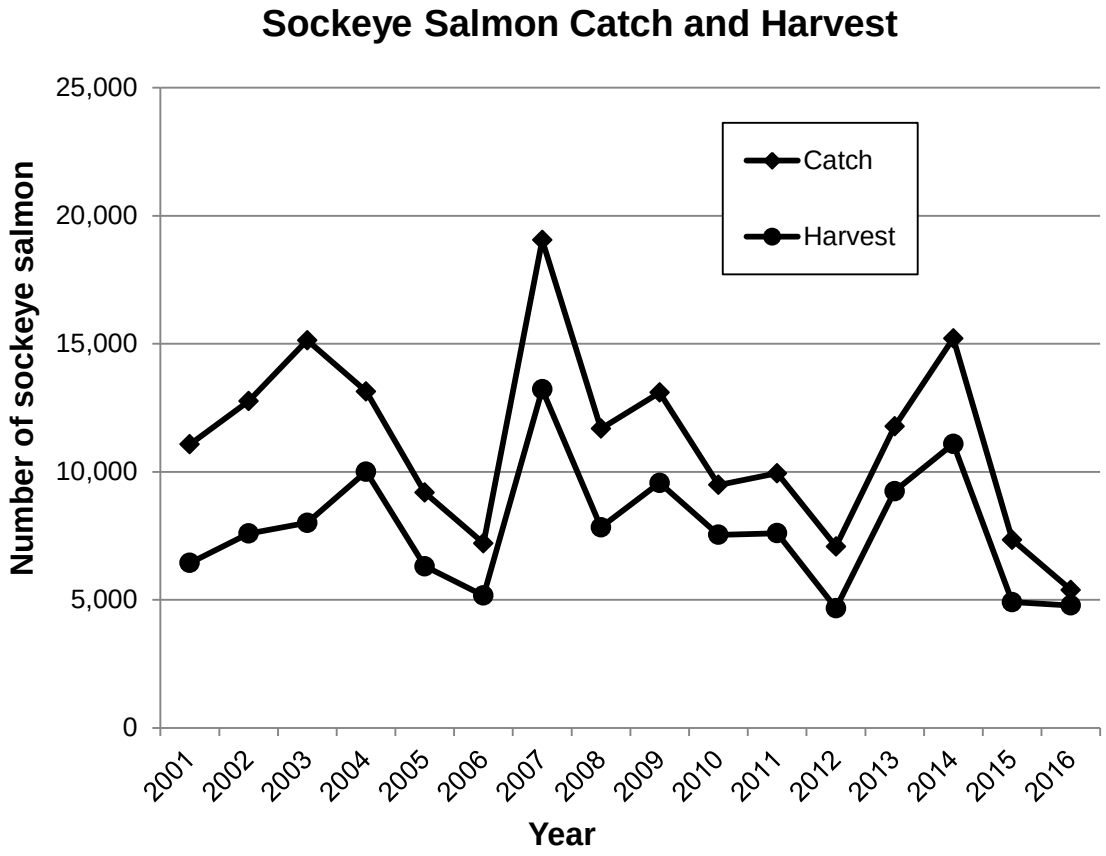

Figure 8.–Total catch and harvest of sockeye salmon by sport anglers by year, PWSMA, 2001–2016.
Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

FISHERY PERFORMANCE AND ESCAPEMENT 2014–2016

Total catch and harvest of sockeye salmon in PWSMA in 2014 (15,211 and 11,093 fish, respectively) was above the previous 10-year average (2004–2013; 11,167 and 8,118 fish, respectively); catch and harvest were below this average in 2015 (7,350 and 4,916 fish, respectively), and in 2016, the lowest catch and the second lowest harvest in the last 15 years was observed (5,387 and 4,784 fish, respectively; Table 8). Because there are usually fewer than 12 SWHS respondents per system within the PWSMA, system-specific catch and harvest estimates are not reliable (Mills and Howe 1992). A large percentage of the harvest is caught in

western PWS and can probably be attributed to the Main Bay snag fishery that occurs concurrently with the commercial fishery.

Since 2012, no real-time monitored weir has been installed in Eshamy Creek. Attempts have been made annually since 2013 to count fish with a video weir. No reliable estimates for sockeye salmon escapements have been made for Eshamy Creek since 2012 due to insufficient data collection. CRD escapement goals were met in 2014 and 2015 but not in 2016 (Russell et al. 2017: Appendix A11). Coghill River sockeye salmon escapement goals were not met in 2015 and 2016 (Russell et al.: Appendix B3).

CHINOOK SALMON FISHERIES

AREAWIDE CHINOOK SALMON FISHERY

Fishery Description

The saltwater fishery for Chinook salmon in PWSMA is small and occurs year-round. Much of the effort occurs during winter months. Chinook salmon harvested in the winter fisheries of Southcentral Alaska are suspected to be largely from stocks outside of the management area (i.e., from other Alaska management areas, British Columbia, Washington, and Oregon; Barclay et al. 2016).

Chinook salmon have been found periodically in several streams throughout PWS (Botz et al. 2010); however, with the exception of the Copper River stock, there are no known wild populations of Chinook salmon within PWSMA. Highly turbid water combined with seasonal restrictions on the use of bait (artificial lures only allowed from 15 April–14 June) prevent appreciable angler effort directed at the Copper River Chinook salmon stock downstream of Haley Creek (i.e., within PWSMA).

Fishery Management and Objectives

There are no management objectives for the Chinook salmon sport fishery in PWS. The saltwater and freshwater bag limits for Chinook salmon greater than 20 inches in length are 2 per day, 4 in possession (established in 1989; Appendix A1).

Historical Harvest

Historical harvest of Chinook salmon from 2001 through 2013 peaked in 2006 at 4,910 fish and has been as low as 1,770 fish in 2002 (Table 9, Figure 9). Annual harvests of Chinook salmon in eastern PWS and the Valdez area have shown much more variability than in western PWS (Table 9). This is probably due to the ending of the Chinook salmon stocking program in the Valdez area in 2013.

Fishery Performance and Escapement 2014–2016

Chinook salmon harvests in PWSMA during 2014 and 2015 (2,803 and 2,227 fish, respectively) were below the prior 10-year average (2004–2013) of 3,412, but harvest in 2016 (3,471 fish) was just above this average (Table 9). Since 2014, Chinook salmon harvests in western PWS have been declining, and in 2016, one of the lowest harvests in western PWS since 2001 (835 fish) was observed. Conversely, the largest estimated harvest since 2001 in Eastern PWS occurred in in 2016 (2,426 fish). In 2016, overall harvest in PWSMA increased due to the large harvest in eastern PWS.

Table 9.–Chinook salmon catch and harvest by geographical region, PWSMA, 2001–2016.

	Geographical region											
	Western		Eastern		Valdez		Cordova road–delta		Other unknown [a]		Total[a]	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	1,283	986	2,551	907	555	378	153	129	542	235	5,084	2,635
2002	1,397	852	1,142	464	291	125	607	204	370	125	3,807	1,770
2003	963	713	3,403	769	2,903	1,648	806	530	147	98	8,222	3,758
2004	2,891	1,166	391	174	1,879	922	499	152	548	404	6,208	2,818
2005	1,522	1,025	1,941	893	2,709	1,087	530	345	323	180	7,025	3,530
2006	1,989	1,576	350	209	4,666	2,846	16	16	532	263	7,553	4,910
2007	1,773	1,311	2,697	828	2,324	974	80	80	105	89	6,979	3,282
2008	2,732	2,027	966	748	1,883	1,069	606	42	152	91	6,339	3,977
2009	1,972	1,334	2,430	1,576	4,268	1,264	265	205	74	59	9,009	4,438
2010	1,896	1,429	1,241	435	1,980	1,455	158	158	13	13	5,288	3,490
2011	1,224	959	829	466	2,818	514	83	51	17	0	4,971	1,990
2012	1,395	1,148	639	516	489	265	0	0	145	145	2,668	2,074
2013	3,672	2,328	1,127	627	851	633	42	21	0	0	5,692	3,609
2014	2,412	1,809	767	676	327	235	31	31	408	52	3,945	2,803
2015	1,795	1,288	517	427	694	365	359	147	0	0	3,365	2,227
2016	1,126	835	3,122	2,426	73	73	286	123	14	14	4,621	3,471
Average												
2004–2013	2,107	1,430	1,261	647	2,387	1,103	228	107	191	124	6,173	3,412
2014–2016	1,778	1,311	1,469	1,176	365	224	225	100	141	22	3,977	2,834

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

[a] Includes unknown from all of Area J, including North Golf Coast.

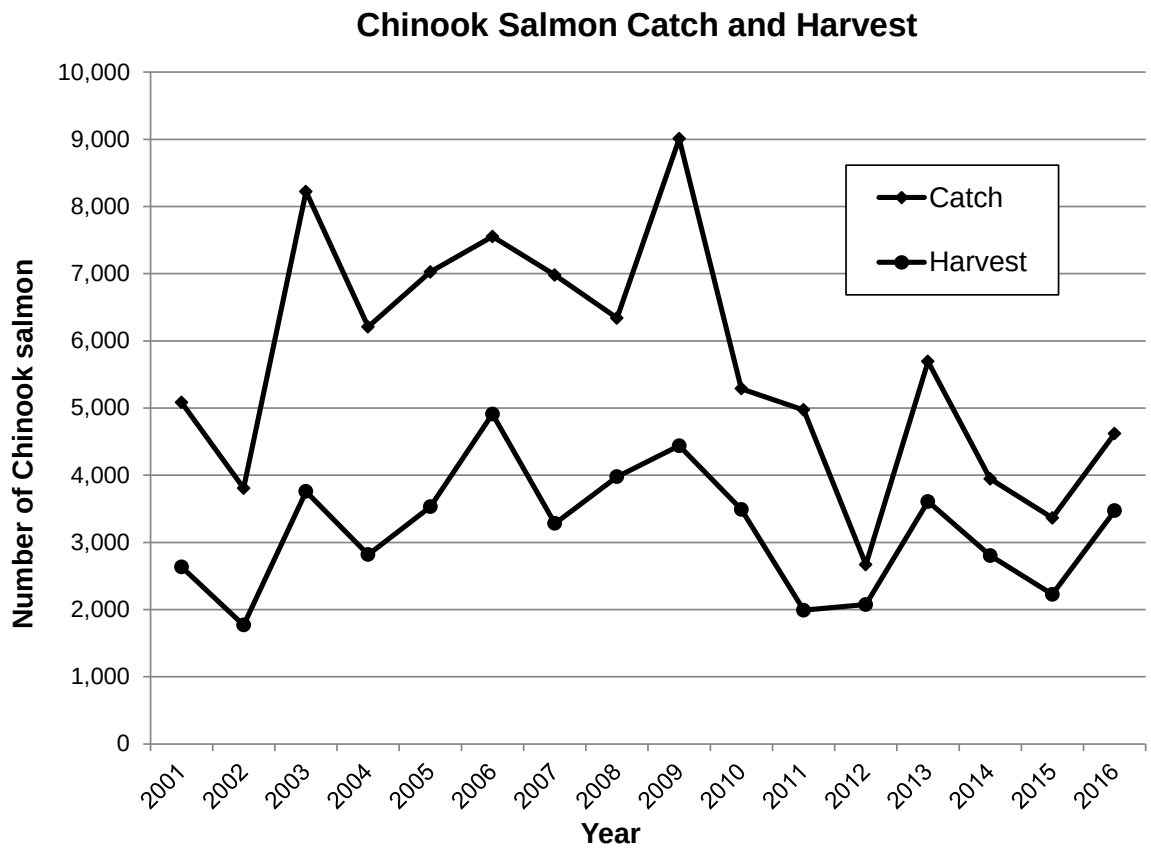

Figure 9.–Total catch and harvest of Chinook salmon by sport anglers by year, PWSMA, 2001–2016.
Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

STOCKED CHINOOK SALMON FISHERIES

Fishery Description

Stocking of hatchery Chinook salmon at Fleming Spit in Cordova began in 1990 and has occurred every year since. Chinook salmon have been stocked periodically in the Valdez area since 1985, with the most recent efforts conducted by ADF&G near the Old Town site. Hatchery Chinook salmon have been released at various locations around Whittier since 2000. In 2013, efforts were suspended in Valdez due to extremely low returns. ADF&G has attempted to identify a new site that may improve returns but the site has yet to be determined. The village of Chenega Bay is attempting to develop a Chinook salmon fishery by releasing smolt. The return from this stocking venture is not rigorously counted and so it is very difficult to determine the success of this stocking. All of these fisheries provide for a Chinook salmon fishery in an area where the population is limited.

Fishery Management and Objectives

Originally, the management objectives for each of the 3 stocked Chinook salmon fisheries in PWSMA were 1) to produce a return of 2,000 Chinook salmon to each location, and 2) to provide 3,500 angler-days of effort at each location. Since 2010, the objectives for each of the 3 fisheries were changed: 1) produce a return of 200 Chinook salmon to each location, and 2)

provide 500 angler-days of effort. The number of Chinook salmon smolt stocked at each location each year has varied annually depending on production (ADF&G Statewide Stocking Plan, 2017. Alaska Department of Fish and Game, Division of Sport Fish [cited October 2017]. Available from http://www.adfg.alaska.gov/static/fishing/pdfs/hatcheries/17region2.pdf).

Historical Fishery Performance

The successes in terms of sport fishing catch and harvest of the Prince William Sound Chinook salmon enhancement programs at the 3 stocking locations has varied since the first returns were expected in 1996 from stockings near Cordova, in 1997 from stockings near Valdez, and in 2000 from stockings near Whittier (Figures 10–12). Catch and harvest of Chinook salmon in the waters near Cordova peaked in 1997 at 946 and 534 fish, respectively (Figure 10), followed by a decrease through 2002. In 2003, a spike in both catch and harvest was estimated but since then catch and harvest estimates have been near zero excluding 2005 and 2015 (Figure 10). Catch and harvest of Chinook salmon in the Valdez and Whittier areas have been low and variable through time (Figures 11 and 12, respectively).

A creel sampling program during the 2006 and 2007 Chinook salmon season (1 May–15 July) was aimed at identifying the proportion of hatchery Chinook salmon in the sport harvest at the ports of Valdez and Cordova (prior to the cessation of hatchery releases in Valdez in 2013). Hatchery fish were identified by thermally marked otoliths. After 2 years of sampling, a total of 50 Chinook salmon were sampled at Valdez and 19 at Cordova. All 50 fish sampled at Valdez were of unknown origin (i.e., none had thermal marks), whereas all 19 fish sampled at Fleming Spit in Cordova had thermal marks identifying them as ADF&G hatchery fish. Despite the presence of hatchery fish at Fleming Spit (near Cordova), few fish have been caught there in recent years.

Between 2005 and 2010, ADF&G was unable to heat water at the Elmendorf and Ft. Richardson hatcheries resulting in few Chinook salmon smolt that reached the target stocking size. In 2011, ADF&G completed construction of the William Jack Hernandez Sport Fish Hatchery in Anchorage. This new hatchery uses well water, 95% recirculation, and heated water. This gives ADF&G the ability to rear Chinook salmon to smolt size in less than 1 year and rear to a target release size. Larger, healthier Chinook salmon smolt have been released into PWSMA since 2012. It is likely the slight increase in catch and harvest reported in Cordova since 2013 can be attributed to higher quality smolt released at Fleming Spit and thus better returns of adults.

Fishery Performance and Escapement 2014–2016

Poor performance of the enhanced Chinook salmon fisheries continued through the 2014–2016 seasons, although few statewide harvest surveys are returned to ADF&G mentioning use of these areas, making them difficult to track. Angler reports indicated that catch and harvest of Chinook salmon at Whittier and Fleming Spit near Cordova were on the rise between 2014 and 2016.

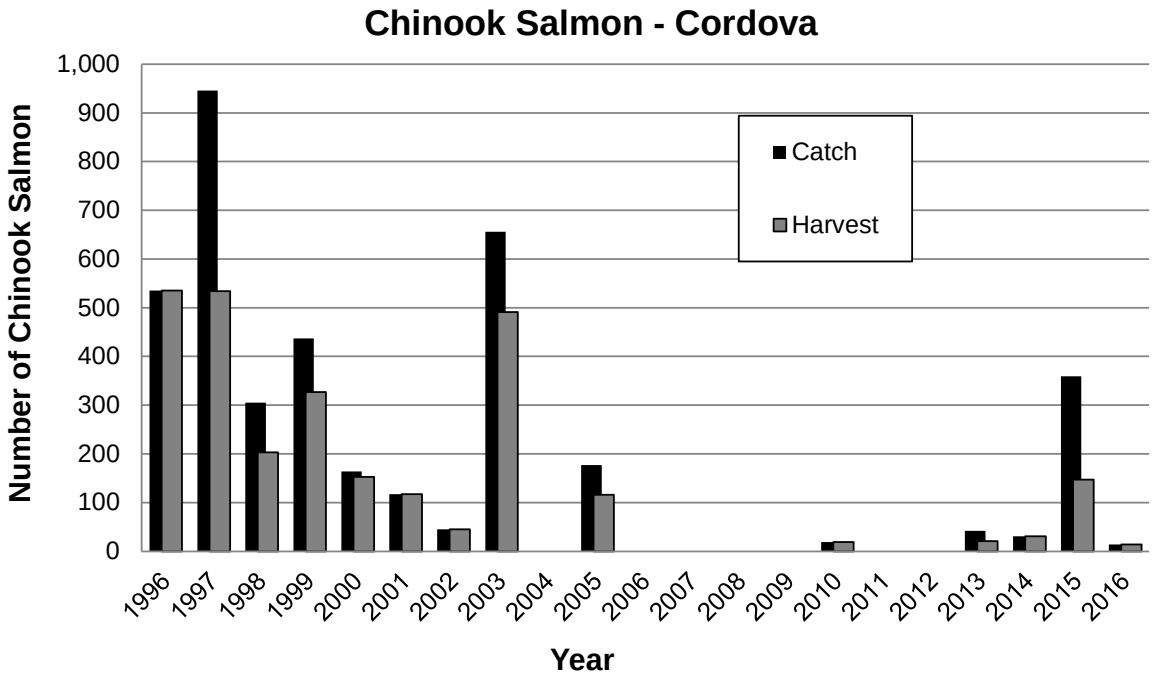

Figure 10.–Catch and harvest of Chinook salmon by shore anglers along Orca Inlet and at Fleming Spit near Cordova, 1996–2016.

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

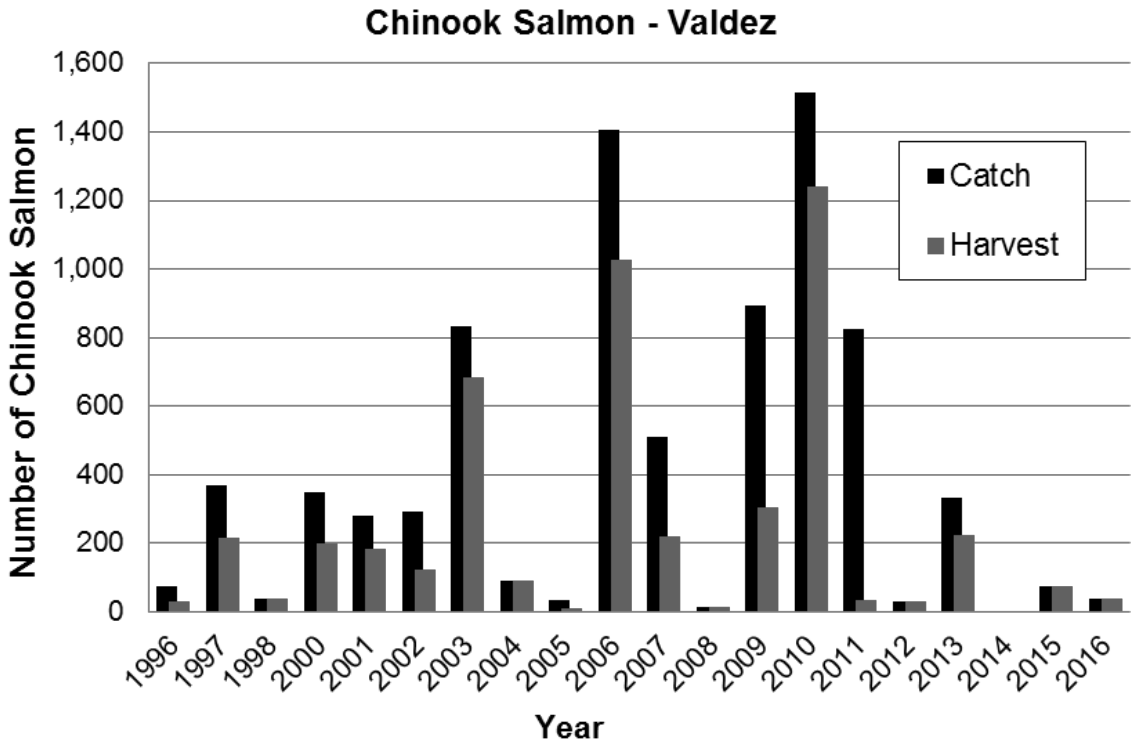

Figure 11.–Catch and harvest of Chinook salmon by shore anglers near Port Valdez, 1996–2016.

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

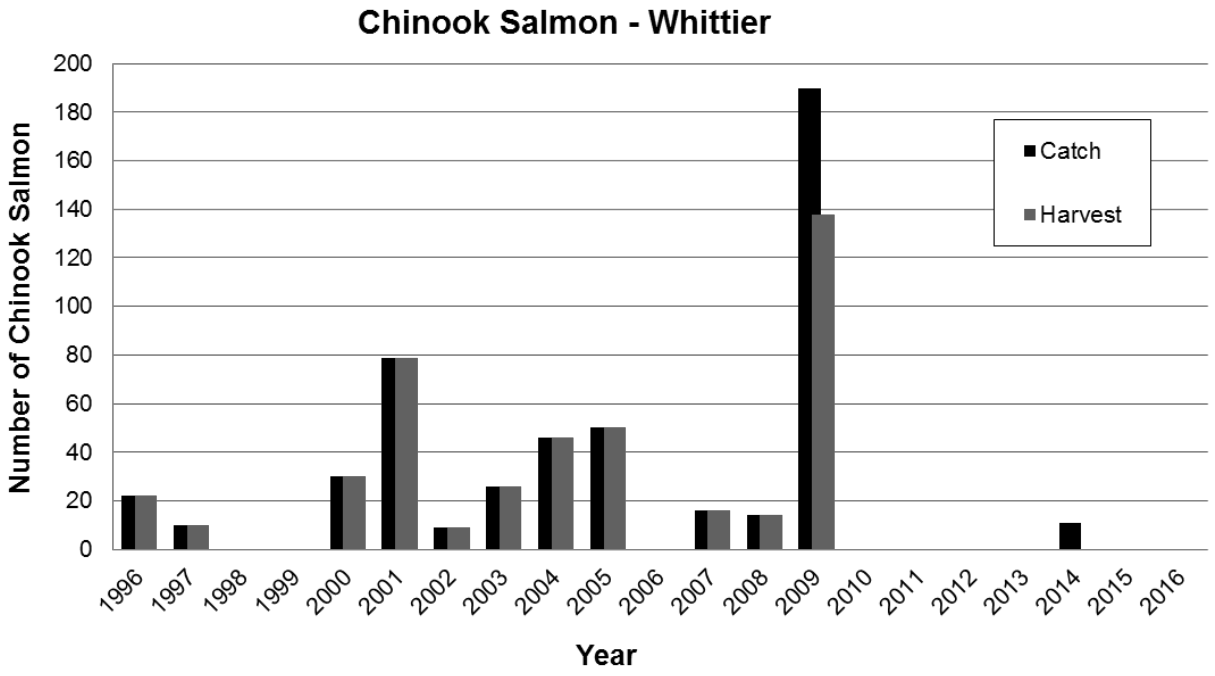

Figure 12.–Catch and harvest of Chinook salmon by shore anglers in Passage Canal near Whittier, 1996–2016.

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

CUTTHROAT TROUT FISHERIES

FISHERY DESCRIPTION

Prince William Sound represents the northern extent of the distribution of coastal cutthroat trout (CCT). This provides not only unique fishing opportunities for anglers but also unique management challenges for fisheries biologists. From the management perspective, CCT in PWS are a sensitive species because fish populations at the edge of their distribution may be more susceptible to environmental events and exhibit more variable vital rates (e.g., survival and recruitment). Additionally, CCT populations in PWS have limited genetic heterozygosity (Currens et al. 2003) and low abundance and density levels (Hepler et al. 1996), which raises concerns for the sustainability of even low levels of harvest.

Cutthroat trout are present in numerous streams and lakes throughout PWS. Although the extent of their distribution remains unknown, there have been no directed efforts to determine the presence or absence of cutthroat trout within most of the freshwater systems in PWS. It is not feasible to generate estimates of catch and harvest of CCT from specific systems within PWSMA, given the limitations of SWHS with small numbers of respondents (Clark 2009). However, occasional reporting of catch and harvest of CCT from Eyak River, Eshamy Creek and Lake, Alaganik Slough, and Green Island Creek suggests anglers either target CCT or incidentally catch CCT while targeting other species in these systems.

In 2014, the BOF adopted a proposal submitted to remove the *Copper River Delta Special Management Area for Trout* (CRDSMAT: all freshwaters south of Miles Lake and east of the

Copper River excluding Clear Creek) that was previously established in 1999. The special management area regulations included year-round use of only unbaited, single-hook, artificial lures, and no retention of cutthroat trout, rainbow trout, or steelhead. Effective in 2015, the CRDSMAT no longer exists and cutthroat bag and retention limits for this area now fall under general PWS regulations for cutthroat trout (Appendix A1).

FISHERY MANAGEMENT AND OBJECTIVES

Within PWSMA, CCT are managed under presumed conservative bag limits. Current limits are 2 per day, 2 in possession, with a minimum size limit of 11 inches and a maximum limit of 16 inches. Historically, there was no retention of trout allowed in the CRDSMAT but in 2014, the BOF passed a regulation removing the CRDSMAT and aligned the bag and possession limits for cutthroat trout already established in the PWSMA (effective in 2015).

HISTORICAL FISHERY PERFORMANCE

Between 2001 and 2013, catch is estimated to have ranged from 934 fish in 2013 to a peak of 4,228 fish in 2011 and averaged 1,842 fish (Table 10). Estimated harvest ranged from 180 fish in 2002 to a peak of 1,062 fish in 2003 and averaged of 409 fish (Table 10). On average (2004–2013), the CRD supported approximately 36% of the cutthroat trout catch and 41% of the harvest in PWSMA (Table 10). The average harvest rate for 2004–2013 (calculated as the percent of fish caught that were harvested from the average total harvest and average total catch) was 22% and reflects the catch-and-release nature of the cutthroat trout fisheries in PWSMA.

The abundance of CCT is unknown in any system within PWSMA. The only information gathered to date that pertains to CCT abundance in PWS was collected starting in 1989 by the Natural Resource Damage Assessment Program following the Exxon Valdez oil spill in 1989 (D. Bosch, ADF&G Fishery Biologist, personal communication).

ADF&G conducted a study to determine the impacts of exposure to hydrocarbons on CCT growth and survival within “oiled” and “unoiled” streams. Weirs were installed in 5 streams and outmigrating CCT were enumerated. In general, the project found that the anadromous components of each of these CCT populations comprised a few hundred individuals (Hepler et al. 1996).

FISHERY PERFORMANCE AND ABUNDANCE 2014–2016

Average annual total catch and harvest of CCT within the PWSMA from 2014 to 2016 was 1,650 fish and 229 fish, respectively, which was below the 10-year averages prior to that (2004–2013) of 1,842 fish and 409 fish, respectively (Table 10). The average harvest rate for 2014–2016 was 52%. On average (2014–2016), the CRD supported approximately 59% of the cutthroat trout catch and 52% of the harvest in PWSMA (Table 10). The average harvest rate for 2014–2016 (calculated as the percent of fish caught that were harvested from the average total harvest and average total catch) was 14% and reflects the catch-and-release nature of the cutthroat trout. Total harvest in 2016 was the lowest ever estimated (56 fish; Table 10, Figure 13). It is unknown why the harvest in 2016 was so low. Conversely, 2016 had the highest catch estimated since 2011.

Table 10.–Catch and harvest of coastal cutthroat trout by geographical region, PWSMA, 2007–2016.

	Geographical region											
	Western		Eastern		Cordova road–delta (CRD)		Other-unknown [a]		Total [a]		CRD percent of total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	122	46	332	115	661	52	399	212	1,514	425	44%	12%
2002	434	41	387	72	1,196	47	127	20	2,144	180	56%	26%
2003	1,578	298	722	326	1,273	225	648	213	4,221	1,062	30%	21%
2004	551	94	397	52	535	90	176	31	1,659	267	32%	34%
2005	43	33	967	383	358	46	86	33	1,454	495	25%	9%
2006	127	25	306	51	686	84	289	51	1,408	211	49%	40%
2007	720	130	47	18	418	102	35	26	1,220	276	34%	37%
2008	363	107	351	58	360	85	52	39	1,126	289	32%	29%
2009	793	115	324	300	1,127	217	272	0	2,516	632	45%	34%
2010	732	32	573	246	1,323	282	32	6	2,660	566	50%	50%
2011	2,989	192	398	86	706	355	135	54	4,228	687	17%	52%
2012	292	11	39	0	802	257	84	33	1,217	301	66%	85%
2013	119	22	424	129	337	161	54	54	934	366	36%	44%
2014	158	0	113	40	1,466	215	0	0	1,737	255	84%	84%
2015	292	0	381	264	716	113	32	0	1,421	377	50%	30%
2016	528	8	371	17	721	31	171	0	1,791	56	40%	55%
Average												
2004–2013	673	76	383	132	665	168	122	33	1,842	409	36%	41%
2014–2016	326	3	288	107	968	120	68	0	1,650	229	59%	52%

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

[a] Includes unknown from all of Area J, including North Golf Coast.

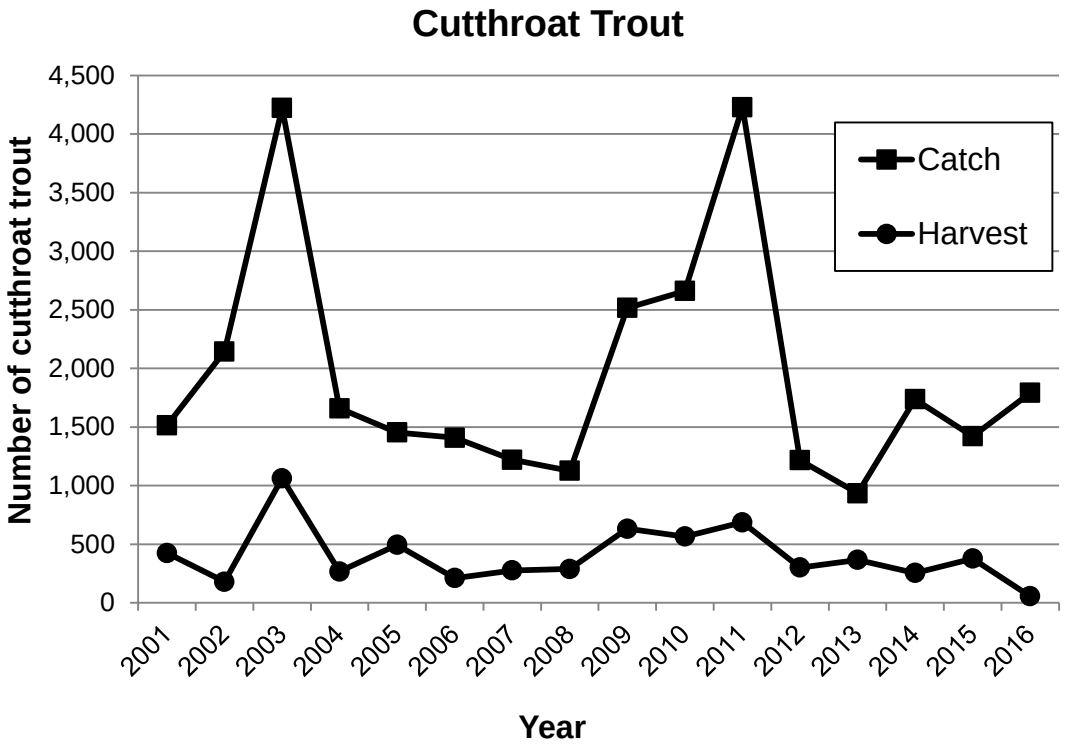

Figure 13.–Total catch and harvest of coastal cutthroat trout by sport anglers in PWSMA, 2001–2016.
Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

ROCKFISH FISHERY

FISHERY DESCRIPTION

Over 30 species of rockfish inhabit the Gulf of Alaska, with 6 species—black (*Sebastes melanops*), dusky (*S. variabilis*) [1], dark (*S. ciliatus*), yelloweye (*S. ruberrimus*), quillback (*S. maliger*), and copper (*S. caurinus*) rockfish—frequently captured in the sport fishery of PWS. For purposes of management, rockfish are divided into 2 assemblages (pelagic and nonpelagic) based on the biological and ecological characteristics of each species. Key life-history characteristics that differ between the 2 assemblages include longevity, age at first sexual maturity, and site fidelity, which are all greater for nonpelagic rockfish. However, both assemblages share the same physiological characteristics, including a physoclistic (closed) swim bladder that often leaves them susceptible to barotrauma and its associated injuries when brought to the surface. Rockfish are often unable to swim down after being brought to the surface.

ADF&G has management authority for sport rockfish fisheries in both state waters and the federal waters of the exclusive economic zone (EEZ). State regulations apply in the EEZ because the NPFMC's *Gulf of Alaska Fishery Management Plan* does not address any sport groundfish fisheries. Section 306 of the Magnuson–Stevens Fisheries Conservation and Management Act,

[1] In 2008, the Alaska Board of Fisheries regulations were modified to recognize light and dark-colored morphs of dusky rockfish *S. ciliatus* as 2 species: dusky rockfish *S. variabilis* and dark rockfish *S. ciliatus* based on information presented in Orr and Blackburn (2004).

amended in 1996, allows the State of Alaska to regulate sport vessels in federal waters in the absence of a plan for the sport fishery.

FISHERY MANAGEMENT AND OBJECTIVES

There is no documented harvest strategy for sport rockfish fisheries and no harvest targets for the fishery. Despite the lack of structured management, ADF&G and the Alaska Board of Fisheries (BOF) have attempted to take a conservative approach to management of rockfish fisheries in PWS and the rest of Alaska. Sport fishery bag limits have been reduced periodically during the last 2 decades in recognition of the failure of several Pacific rockfish fisheries in California, Oregon, Washington, and British Columbia. Their life history makes rockfish susceptible to overharvest. More restrictive bag limits have been set for the longer-lived and less productive nonpelagic species to discourage targeted harvest, while still allowing for retention of incidental catch. Seasons or size limits for rockfish have not been implemented because of concerns regarding high discard mortality attributed to barotrauma (decompression trauma).

Along with regulation changes, efforts have been made to educate anglers regarding the risks and consequences of rockfish overharvest, and to foster fishing practices that avoid bycatch and waste in the sport fishery. Most recently, ADF&G has developed a web page[2] that addresses the management challenges inherent in rockfish fisheries and provides sport anglers with a list of best practices that can be employed to minimize unintentional catch of rockfish and methods to reduce release mortality. Initiation of such public outreach efforts stem from the completion of a 3-year study that examined the efficacy of deepwater release at improving the release survival of yelloweye rockfish (Hochhalter and Reed 2011), a study assessing the ability of demersal rockfish to submerge unassisted (Hochhalter 2012), and a study assessing reproductive viability following recompression events (Blain and Sutton 2016). Each of these and other studies indicate that discard mortality can be reduced dramatically and future reproduction unaffected if rockfish are quickly released using deepwater release techniques.

The sport rockfish fishery in PWS had no bag limit until 1989 when limits of 20 fish per day and in possession, only 5 of which could be "red rockfish," were implemented (Appendix A1). Effective 1991, the bag limit was lowered to 5 rockfish per day, 10 in possession from 1 May to 15 September, and 10 per day and in possession for the remainder of the year. Effective 1997, the daily bag and possession limits were 2 nonpelagic rockfish species during both seasonal periods. Effective in 1998, the BOF revised the limits such that the total bag limit was unchanged, but anglers were restricted to 1 rockfish per day and 2 in possession during the period 1 May–15 September, and 2 per day and in possession during the period 15 September–30 April. Anglers were required to retain the first nonpelagic rockfish caught during the summer period and the first 2 caught during the winter period, regardless of size. Effective in 2000, BOF revised the nonpelagic species limit to 2 per day and 2 in possession, year round. This modification was made to reduce waste of nonpelagic rockfish caught after the bag limit of 1 fish had been reached. Even though increasingly conservative steps have been taken to curtail harvest and manage bycatch and waste, it is unknown whether these efforts are providing for sustained yield.

The status of rockfish stocks in PWS is, for the most part, unknown. No surveys have been conducted in PWS in order to obtain a fishery-independent estimate of abundance for any

[2] http://www.adfg.alaska.gov/index.cfm?adfg=fishingSportFishingInfo.rockfishconservation

species. Information on locations and quantity of rockfish habitat, and spatial or depth distribution by species are also lacking. There are, however, rudimentary indicators of the condition of the rockfish stock(s). Despite a steady growth in sport harvest (Figures 14–16), there is broad representation of ages in both the black and yelloweye rockfish harvests, limited truncation (loss of older individuals) of the yelloweye rockfish age distribution (Figures 17–19), and no apparent truncation in the black rockfish age distribution (Figures 20–22).

Age composition data show, however, that relatively large year-classes are at least 10 years apart. Recruitment variability is common in rockfish and reinforces the principle that allowable levels of harvest have to take natural variability into account. Managing the fishery to maintain a diversity of age classes of mature fish can serve to buffer the natural variability in production.

The potential for overfishing is the primary management concern for rockfish in PWSMA. This concern is largely based on the lack of a management strategy combined with life history characteristics that make rockfish vulnerable to overharvest, such as extreme longevity, relatively late age at maturity, high recruitment variability, and high discard mortality attributed to barotrauma.

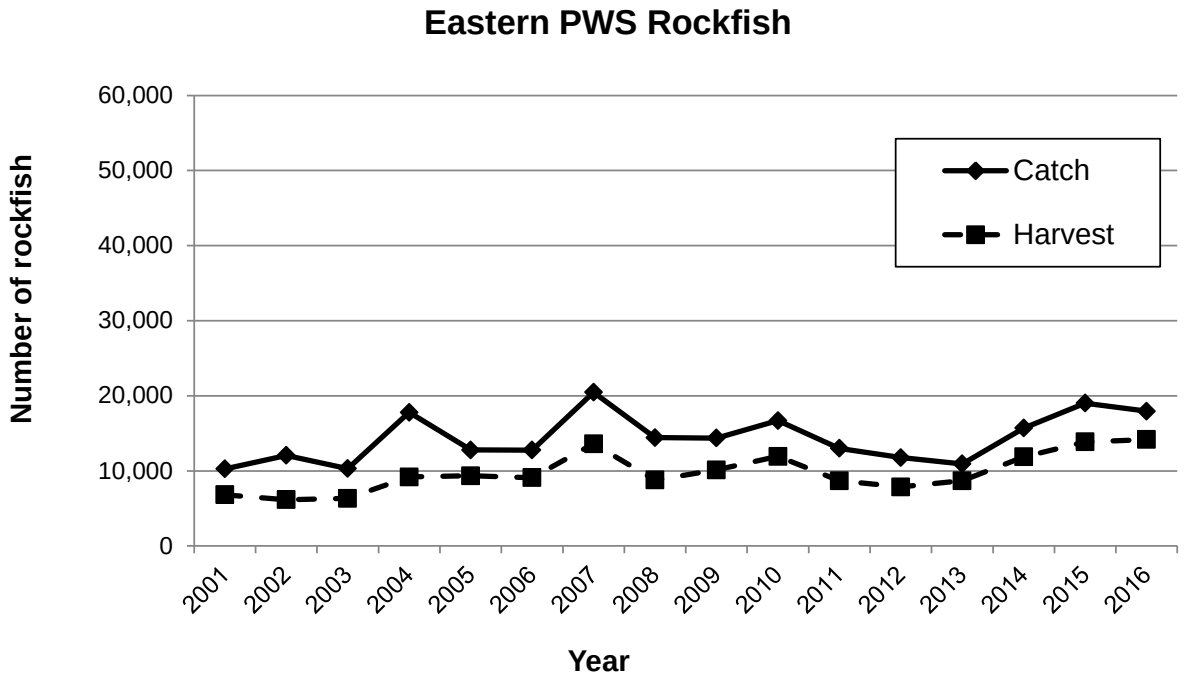

Figure 14.–Catch and harvest of rockfish in eastern PWS, PWSMA, 2001–2016.

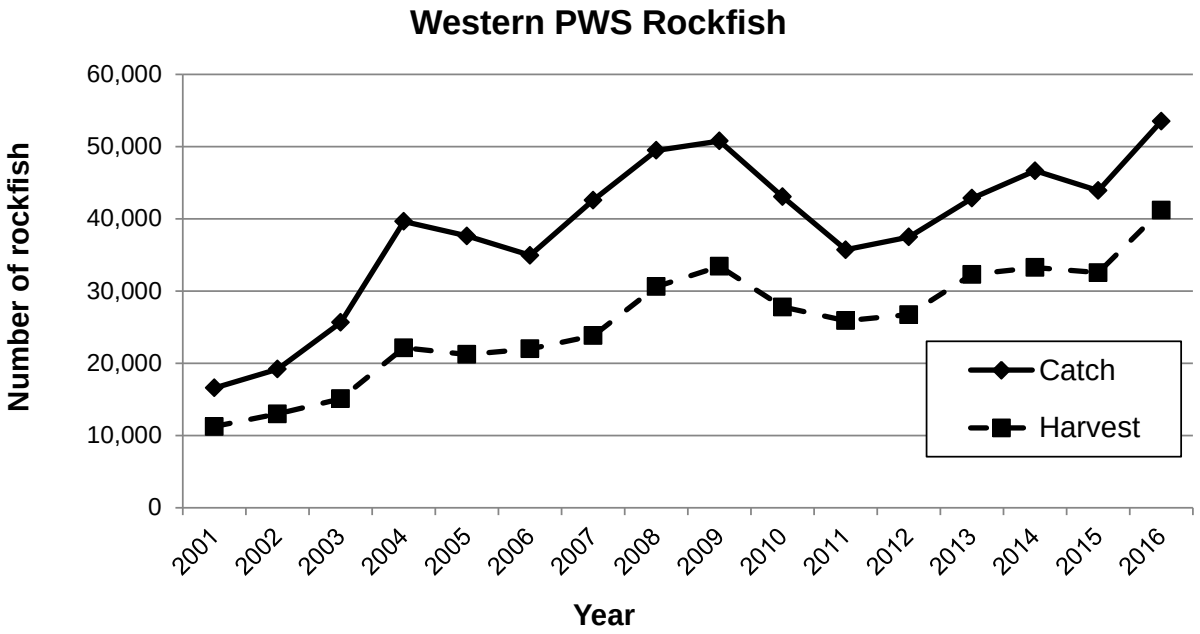

Figure 15.–Catch and harvest of rockfish in western PWS, PWSMA, 2001–2016.

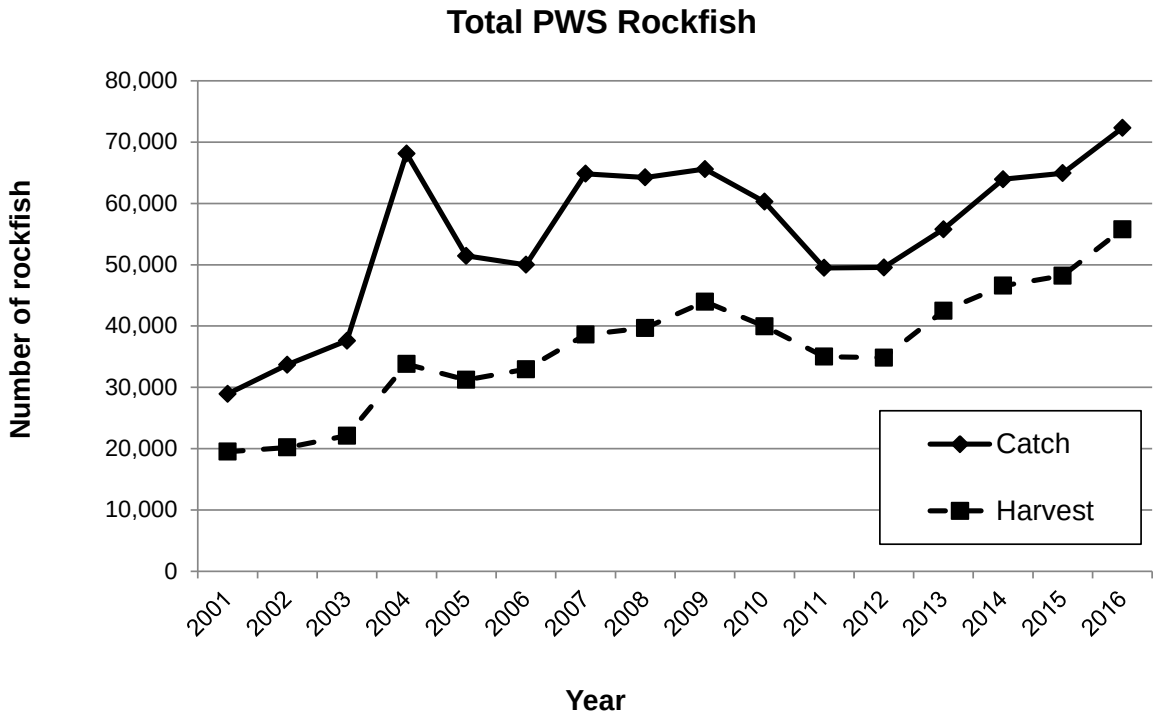

Figure 16.–Total catch and harvest of rockfish (all species) by sport anglers by year, PWSMA, 2001–2016.

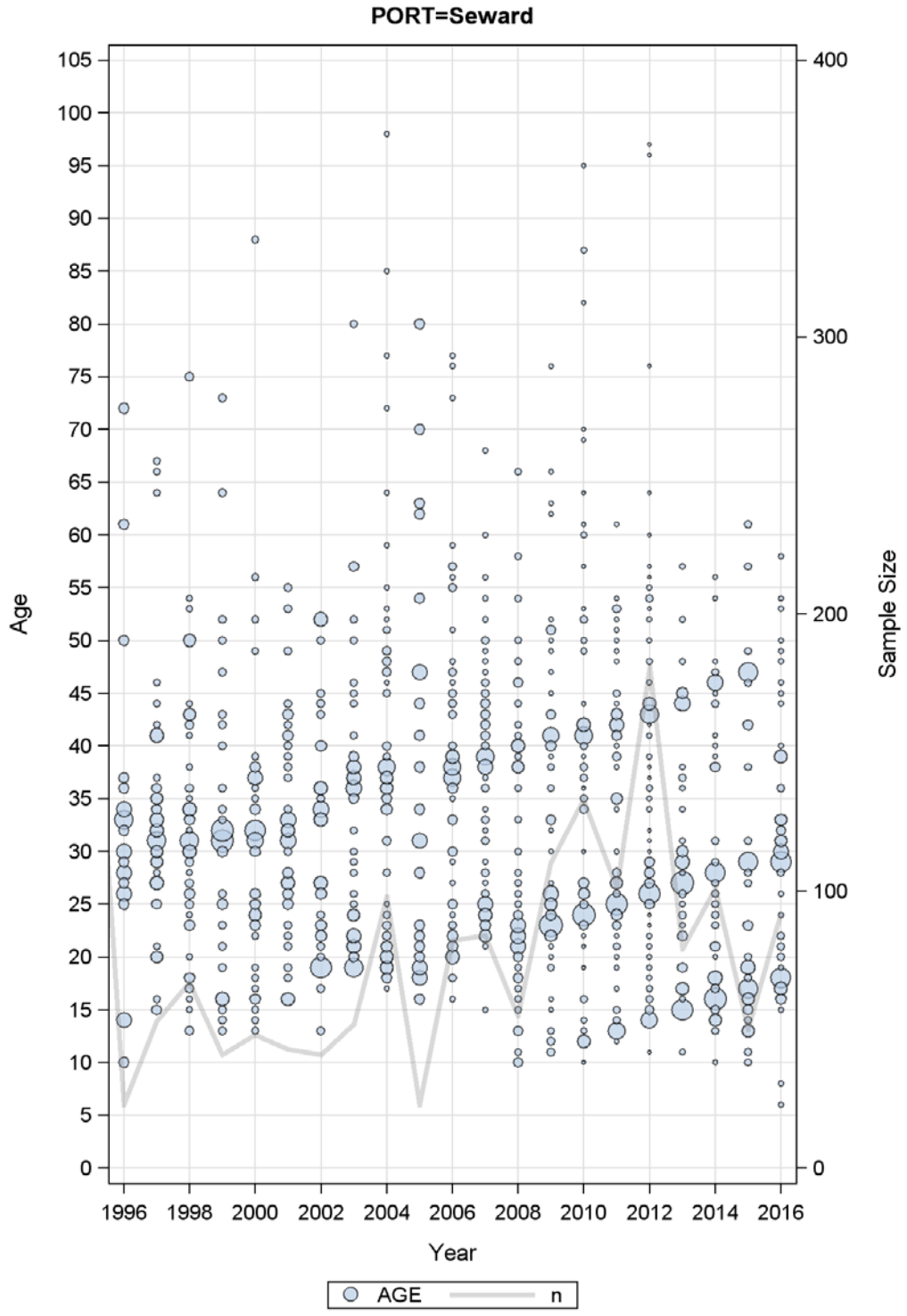

Figure 17.–Age composition of yelloweye rockfish sport harvest caught in PWS and landed at Seward, 1996–2016.

Source: Scott Meyer, Fishery Biologist, ADF&G, Homer, unpublished data.

Note: Bubble area is proportional to the percent of harvest by each age group within each year.

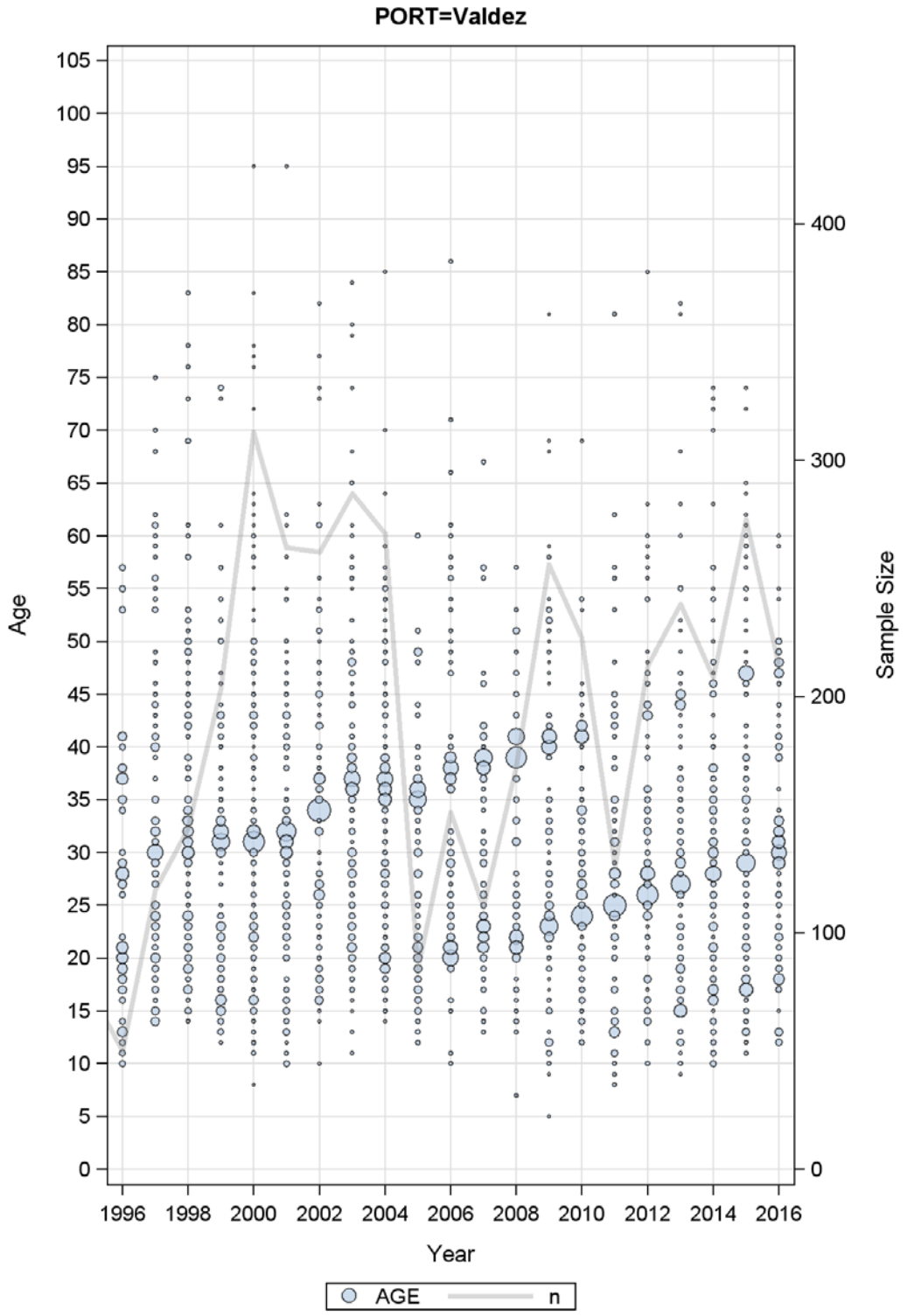

Figure 18.–Age composition of yelloweye rockfish sport harvest landed at Valdez, 1996–2016.

Source: Scott Meyer, Fishery Biologist, ADF&G, Homer, unpublished data.

Note: Bubble area is proportional to the percent of harvest by each age group within each year.

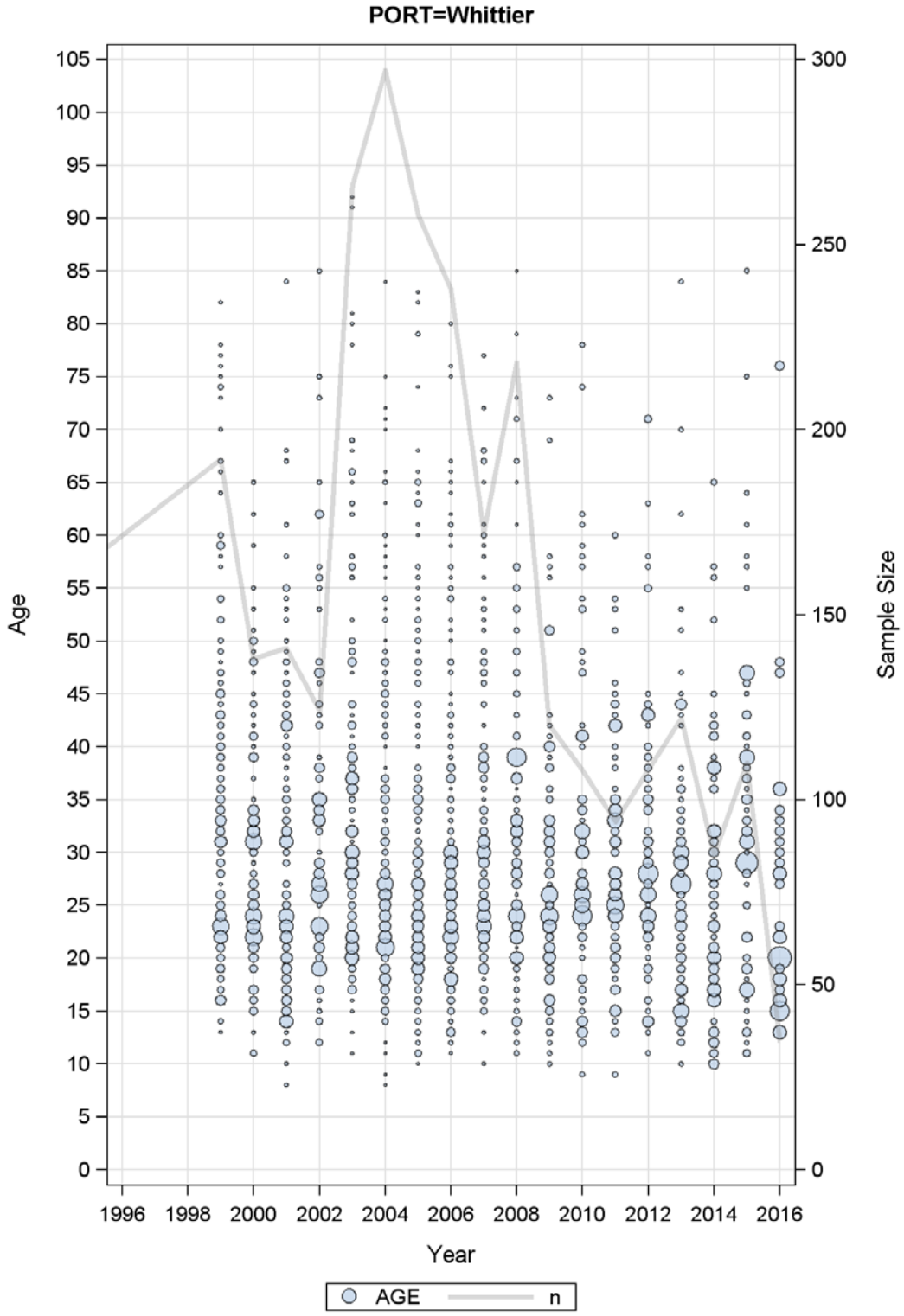

Figure 19.–Age composition of yelloweye rockfish sport harvest landed in Whittier, 1999–2016.

Source: Scott Meyer, Fishery Biologist, ADF&G, Homer, unpublished data.

Note: Bubble area is proportional to the percent of harvest by each age group within each year.

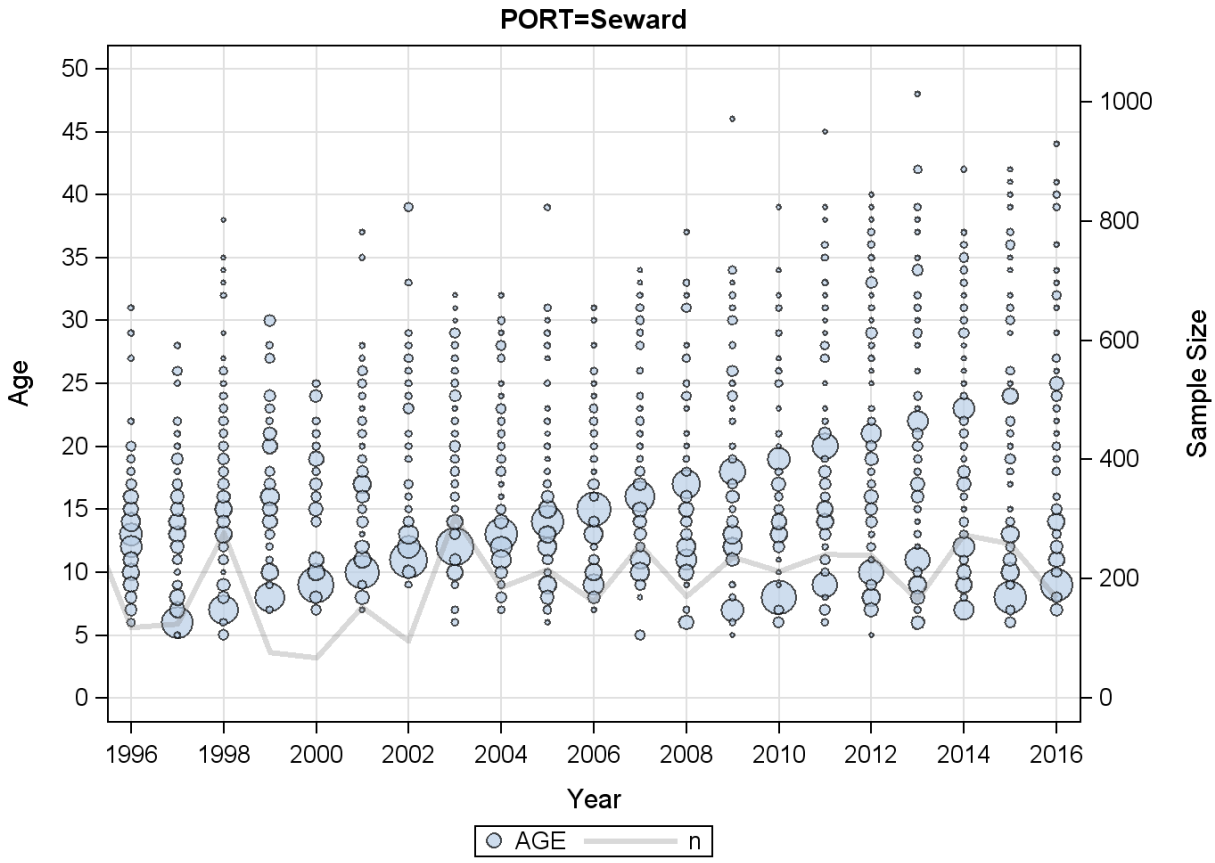

Figure 20.–Age composition of black rockfish sport harvest caught in PWS and landed at Seward, 1996–2016.

Source: Scott Meyer, Fishery Biologist, ADF&G, Homer, unpublished data.

Note: Bubble area is proportional to the percent of harvest by each age group within each year.

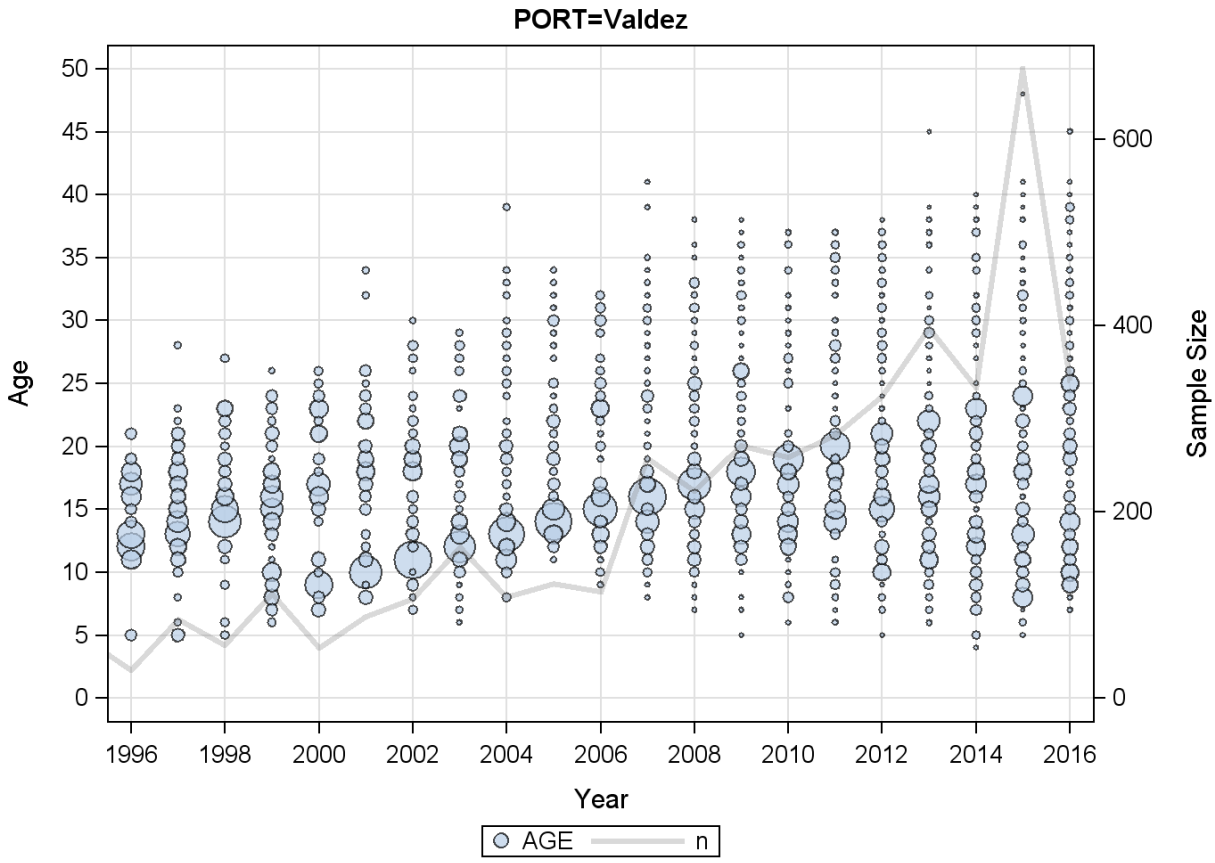

Figure 21.–Age composition of black rockfish sport harvest landed at Valdez, 1991–2016.

Source: Scott Meyer, Fishery Biologist, ADF&G, Homer, unpublished data.
Note: Bubble area is proportional to the percent of harvest by each age group within each year.

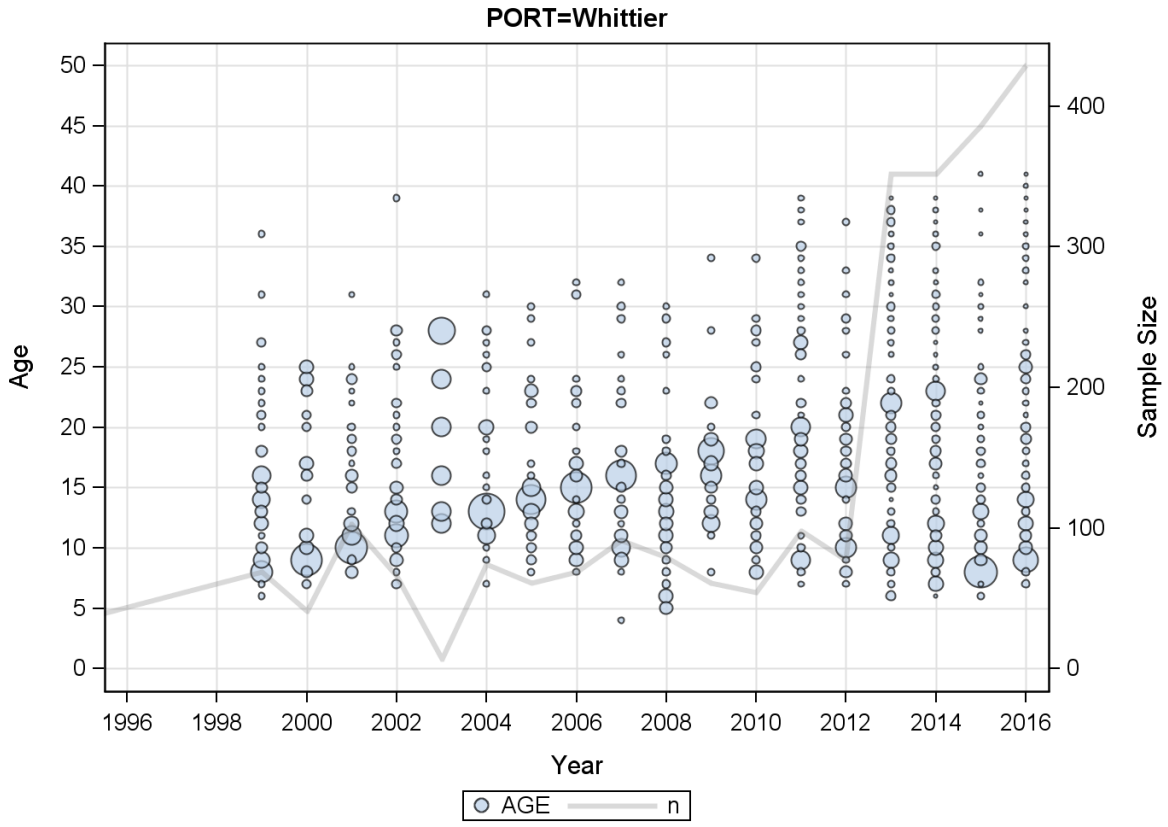

Figure 22.–Age composition of black rockfish sport harvest landed at Whittier, 1991–2016.

Source: Scott Meyer, Fishery Biologist, ADF&G, Homer, unpublished data.
Note: Bubble area is proportional to the percent of harvest by each age group within each year.

HISTORICAL FISHERY PERFORMANCE

Although rockfish catch and harvest in eastern PWS have remained fairly constant since 2001 (near 10,000 fish, Figure 14), after the Whittier Tunnel was opened in 2000, rockfish catch and harvest in western PWS tripled between 2001 and 2009 (Table 11, Figure 15). In 2009, rockfish catch and harvest in western PWS peaked and then began to gradually decline for a couple of years before increasing again (Table 11, Figure 15). After 2012, catch and harvest increased in western PWS (Figure 15) whereas angler effort leveled (Table 1). This pattern suggests that anglers may be targeting rockfish despite the relatively low bag limits imposed by current regulations.

Overall PWS catch and harvest of rockfish increased (with some fluctuations) from 2001 through the 2009 (Figure 16). Yelloweye, black, and quillback rockfish are the primary species in the harvest[3]. On average from 1996 to 2016, these 3 species accounted for 77% of the harvest landed at Valdez and 73% landed at Whittier. Yelloweye rockfish is the most common species in the harvest, making up an average of 38% at Valdez and 39% at Whittier. Black rockfish made up 29% of the harvest at Valdez and 17% at Whittier. Quillback rockfish made up 11% at Valdez

[3] Information on the composition of the rockfish harvest comes from Meyer, S. C., and B. J. Failor. *In prep.* Characteristics of the sport harvest of rockfishes *Sebastes* in Southcentral Alaska, 1996–2015. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.

and 16% at Whittier. In 2001, catch and harvest of rockfish in the PWSMA was 28,935 and 19,512 fish, respectively (Table 11). A high level of catch (68,142 fish) was observed in 2004 but catch remained between that level and 50,000 fish until 2015 (Figure 17). Rockfish catch and harvest peaked again in 2016 at 72,303 and 55,771 fish, respectively.

Table 11.–Catch and harvest of rockfish (all species combined) by geographical region, PWSMA, 2001–2016.

	Geographical region							
	Western		Eastern		Other unknown [a]		Total [a]	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	16,589	11,241	10,258	6,818	2,088	1,453	28,935	19,512
2002	19,191	12,983	12,059	6,154	2,449	1,059	33,699	20,196
2003	25,656	15,078	10,305	6,327	1,640	700	37,601	22,105
2004	39,638	22,137	17,791	9,190	10,713	2,473	68,142	33,800
2005	37,628	21,226	12,781	9,351	1,032	647	51,441	31,224
2006	34,951	22,002	12,776	9,085	2,256	1,871	49,983	32,958
2007	42,584	23,815	20,471	13,600	1,781	1,191	64,836	38,606
2008	49,482	30,609	14,421	8,785	329	290	64,232	39,684
2009	50,795	33,420	14,370	10,120	436	425	65,601	43,965
2010	43,061	27,788	16,702	11,926	506	239	60,269	39,953
2011	35,723	25,893	13,007	8,674	745	442	49,475	35,009
2012	37,491	26,729	11,777	7,856	282	265	49,550	34,850
2013	42,849	32,312	10,936	8,679	1,984	1,485	55,769	42,476
2014	46,652	33,258	15,704	11,868	1,589	1,441	63,945	46,567
2015	43,916	32,550	19,014	13,866	2,000	1,797	64,930	48,213
2016	53,531	41,200	17,941	14,177	831	394	72,303	55,771
Average								
2004–2013	41,420	26,593	14,503	9,727	2,006	933	57,930	37,253
2014–2016	48,033	35,669	17,553	13,304	1,473	1,211	67,059	50,184

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

[a] Includes unknown from all of Area J, including North Gulf Coast.

FISHERY PERFORMANCE 2014–2016

The 2014–2016 average annual catch of rockfish in the PWSMA was nearly 10,000 more fish (67,059) than the average catch in the 10 years prior to that (2004–2013) of 57,930 fish (Table 11). Similarly, the average harvest from 2004 to 2013 was 37,253 fish, which was nearly 13,000 fish less than the 2014–2016 average harvest of 50,184 fish. Since 2013, catch and harvest have increased and in 2016, rockfish catch and harvest reached record highs of 72,303 and 55,771 fish, respectively (Table 11, Figure 16). In 2016, 74% of the rockfish caught and harvested in the PWSMA were caught in western PWS (calculated from Table 11) whereas eastern PWS has maintained a relatively stable level of harvest since 2001 (Table 11, Figure 14). Over 77% of the rockfish caught in the PWSMA in 2016 were harvested, an increase from the 10-year average prior to 2014 (2004–2013) of 64% (calculated from Table 11). The high retention rate could indicate an increase in targeting, possibly in response to restrictions in the charter halibut fishery.

Most of the increase in harvest is made up of pelagic species, primarily black rockfish. In 2001, pelagic species accounted for less than 30% of the harvest at Valdez and Whittier. By 2016, the pelagic and nonpelagic assemblages each accounted for around 50% of the harvest (S. Meyer, ADF&G Fishery Biologist, personal communication).

Release (the difference between catch and harvest) of rockfish in the PWSMA has ranged from a high of 50% (2004) to a low of 23% (2016). The 2014–2016 average was 25% versus the prior 10-year average of 36%. Due to the high discard mortality associated with surface release of rockfish (at least 78% for yelloweye rockfish; Hochhalter 2012), ADF&G has been conducting outreach to educate the public about the positive effects of using deep water release versus releasing rockfish at the surface. Port sampling data has also been collected and indicates that more anglers are aware of and some are using deep water release methods to release rockfish. For example, in Whittier, the proportion of private anglers releasing yelloweye rockfish with a DRM has been increasing and nearly 75% of yelloweye rockfish were released with deepwater release techniques in 2016 (M. Schuster, ADF&G Fisheries Biologist, personal communication).

LINGCOD FISHERY

FISHERY DESCRIPTION

Lingcod are distributed from the Alaska Peninsula south to Baja California (Cass et al. 1990). In PWS, they are common along the ocean entrances from Cape Fairfield to Hinchinbrook Entrance. Lingcod are also captured around rocky reefs and underwater pinnacles that are common throughout PWS. Although adult lingcod can be found to depths of 1,200 ft, they typically inhabit nearshore rocky reefs from 30 to 300 ft in depth (Cass et al. 1990).

FISHERY MANAGEMENT AND OBJECTIVES

There is no documented harvest strategy and no specific harvest objective for the PWS sport lingcod fishery. Lacking estimates of stock status, ADF&G and BOF have adopted a presumed conservative approach to the management of the sport lingcod fishery. Current regulations for the sport lingcod fisheries in PWSMA were implemented in 1993 and allow for a harvest of 2 fish daily, 4 in possession (Appendix A1). A minimum size limit of 35 inches total length (28 inches without head) was implemented to allow female lingcod to spawn at least once prior to harvest. Lingcod retention is only allowed from 1 July through 31 December to protect spawning fish and nest-guarding males. The current harvest assessment program at Southcentral Alaskan ports has been effective at characterizing lingcod harvest in the sport fishery and provides a basis for evaluating the effects of regulatory proposals (e.g., Stock and Meyer 2005). Primary objectives for this program include estimation of age, length, sex composition, and spatial distribution of effort and harvest. However, this fishery-dependent information by itself is generally inadequate for assessing stock status and managing the fishery to respond to changes in abundance. The minimum size limit precludes harvest of fish less than 35 inches in total length, and there are no data on length composition of released fish. Fishery-dependent data can also be misleading when there are changes in fishing gear or when the proportion of effort spent targeting lingcod is changing.

Management of lingcod would benefit greatly from development of a harvest strategy with clear conservation and fishery objectives. One way to assess stock status would be through a standardized, fishery-independent index of abundance or biomass. Such an index could be used to tune age-structured assessment models, or used directly in a control rule to set future allowable catches. Depending on the method used, the cost, and available funding, an index may be obtained annually or periodically. Potential data sources for this index may include International Pacific Halibut Commission longline survey data, other jig or longline surveys, mark-recapture studies, or habitat-based remote operated vehicle (ROV) surveys (e.g., Byerly et

al. 2015). ADF&G, Division of Commercial Fisheries, conducted an ROV survey of portions of Prince William Sound in recent years but data are still being processed and density estimates are not yet available.

HISTORICAL FISHERY PERFORMANCE

Lingcod catch and harvest estimates were aggregated into 2 areas: Eastern and Western PWS. Eastern PWS includes lingcod caught anywhere in PWS but landed at sites east of longitude 147°W (primarily Valdez and Cordova). Western PWS includes lingcod caught anywhere in PWS but landed at sites west of longitude 147°W, including Whittier, Chenega Bay, and Seward. Between 2001 and 2007, total harvest of lingcod in PWSMA increased from 4,586 fish to a peak of 11,961 fish, a difference of 7,375 fish (Table 12, Figure 23). Most of the increase in harvest (5,130 fish, or 70%) was landed in Western PWS (Table 12, Figure 24). Catch and harvest remained relatively stable the following 3 years before declining after 2010 (Figure 23).

Table 12.–Catch and harvest of lingcod in the sport fisheries in PWSMA, 2001–2016.

	Geographical location of landing						
	Western		Eastern		Total [a]		Percent of catch
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	harvested
2001	5,310	2,606	4,307	1,980	9,617	4,586	48%
2002	6,011	3,094	3,116	1,447	9,127	4,541	50%
2003	6,692	3,283	3,864	1,810	10,556	5,093	48%
2004	8,246	3,547	4,088	2,487	12,334	6,034	49%
2005	10,173	3,193	5,234	2,887	15,407	6,080	39%
2006	10,232	5,321	5,898	2,635	16,130	7,956	49%
2007	17,546	7,736	8,364	4,225	25,910	11,961	46%
2008	15,578	7,888	5,851	2,980	21,429	10,868	51%
2009	15,252	6,819	5,106	3,437	20,358	10,256	50%
2010	14,230	8,071	5,369	3,357	19,599	11,428	58%
2011	12,340	7,255	3,802	2,344	16,142	9,599	59%
2012	12,815	7,081	3,685	2,001	16,500	9,082	55%
2013	12,009	5,960	2,998	1,672	15,007	7,632	51%
2014	10,600	6,075	3,382	2,170	13,982	8,245	59%
2015	6,359	3,448	4,178	2,505	10,537	5,953	56%
2016	8,406	4,745	2,201	1,293	10,607	6,038	57%
Average							
2004-2013	12,842	6,287	5,040	2,803	17,882	9,090	51%
2014-2016	8,455	4,756	3,254	1,989	11,709	6,745	58%

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed September 2017).

[a] Unknowns from lingcod landed in Seward apportioned through interview data, 2014–2016.

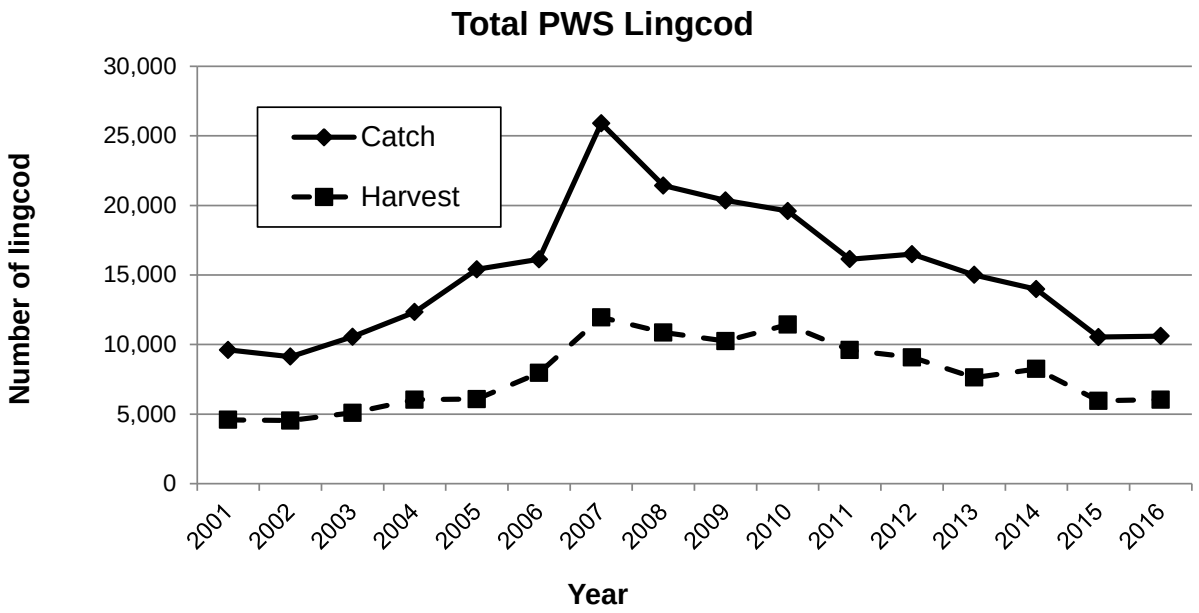

Figure 23.–Total catch and harvest of lingcod by sport anglers, PWSMA, 2001–2016.

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed October 2017).

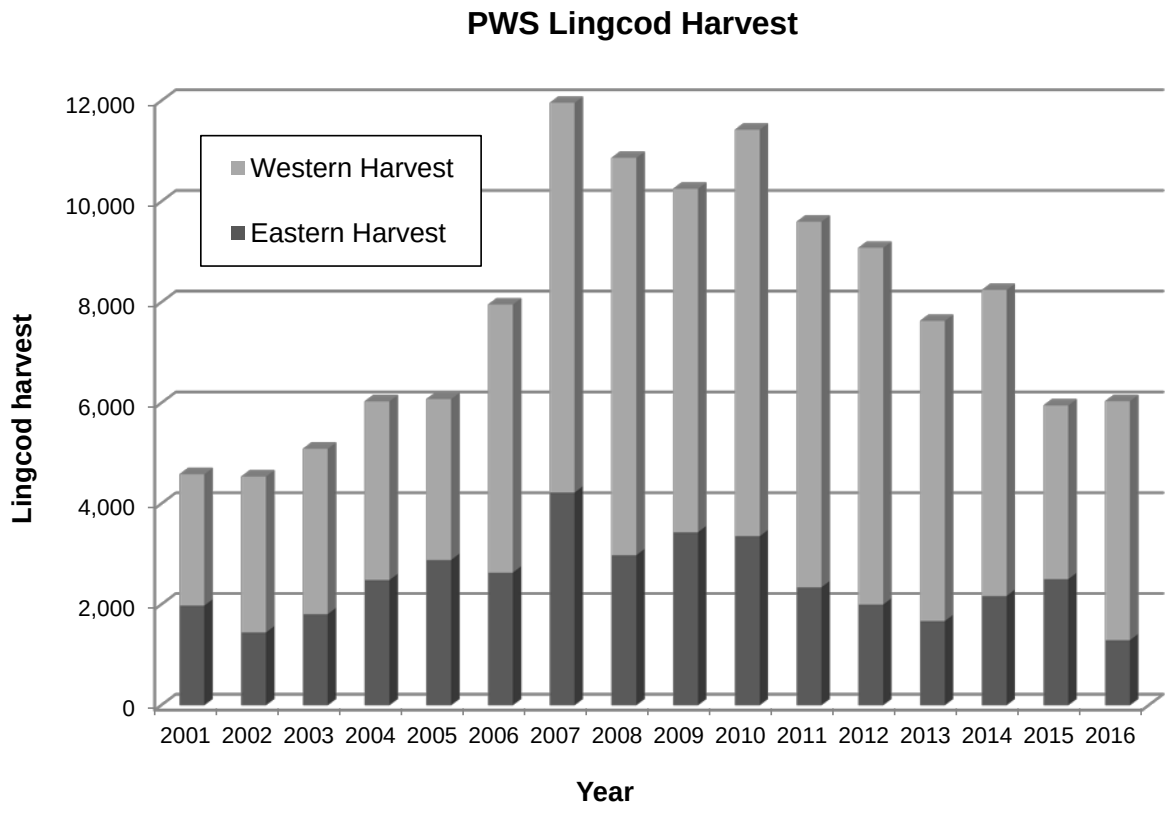

Figure 24.–Harvest of lingcod landed at sites in western and eastern PWS, 2001–2016.

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed October 2017).

FISHERY PERFORMANCE 2014–2016

The average catch and harvest of lingcod in 2014–2016 of 11,709 and 6,745 fish, respectively was lower than the prior 10-year (2004–2013) average of 17,882 and 9,090, respectively (Table 12). Lingcod catch and harvest has declined since the peak catch and harvest in 2007; the recent catch and harvest numbers are similar to those observed in 2003 and 2004. As in prior years, the majority of the lingcod caught (Figure 25) and harvested (Figure 24) during 2014–2016 were from western PWSMA.

The average percent of lingcod catch that was retained annually was 58% from 2014 to 2016, which is higher than the prior 10-year average rate of 51% (Table 12). In 2014, 13,982 lingcod were caught and 59% (8,245 fish) of those lingcod were harvested. Anglers typically release fish to comply with regulations (e.g., closed waters, size limits, bag limit met), to satisfy size preferences, or for conservation. ADF&G lacks information to discern whether higher retention rates in recent years could reflect a decrease in the proportion of sublegal-size lingcod in the population, a preference for harvesting trophy size fish, or some combination. Based on port sampler interview data, the proportion of sublegal-size lingcod caught and released in the PWSMA ranges slightly by port (Figure 26). However, approximately 70% of lingcod released by anglers from 2014 to 2016 were sublegal-size.

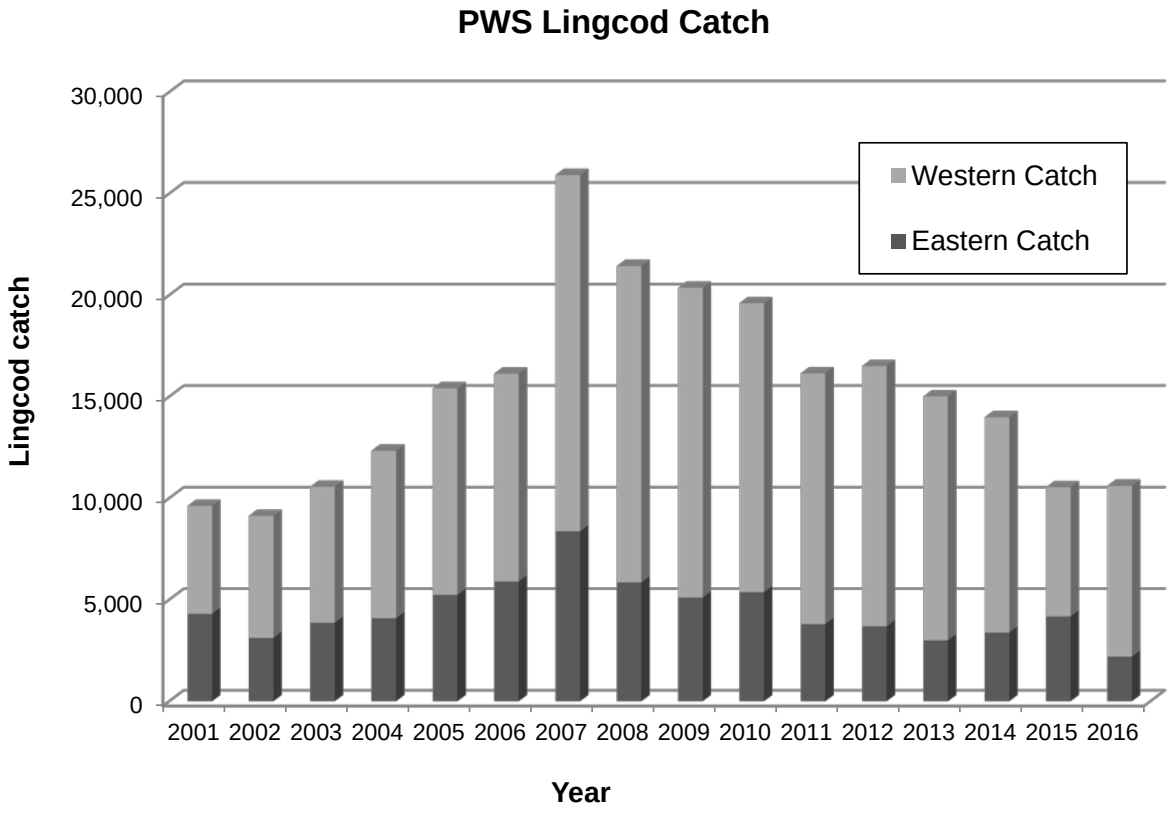

Figure 25.–Catch of lingcod landed at sites in western and eastern PWS, 2001–2016.

Source: SWHS database (http://www.adfg.alaska.gov/sf/sportfishingsurvey/ accessed October 2017).

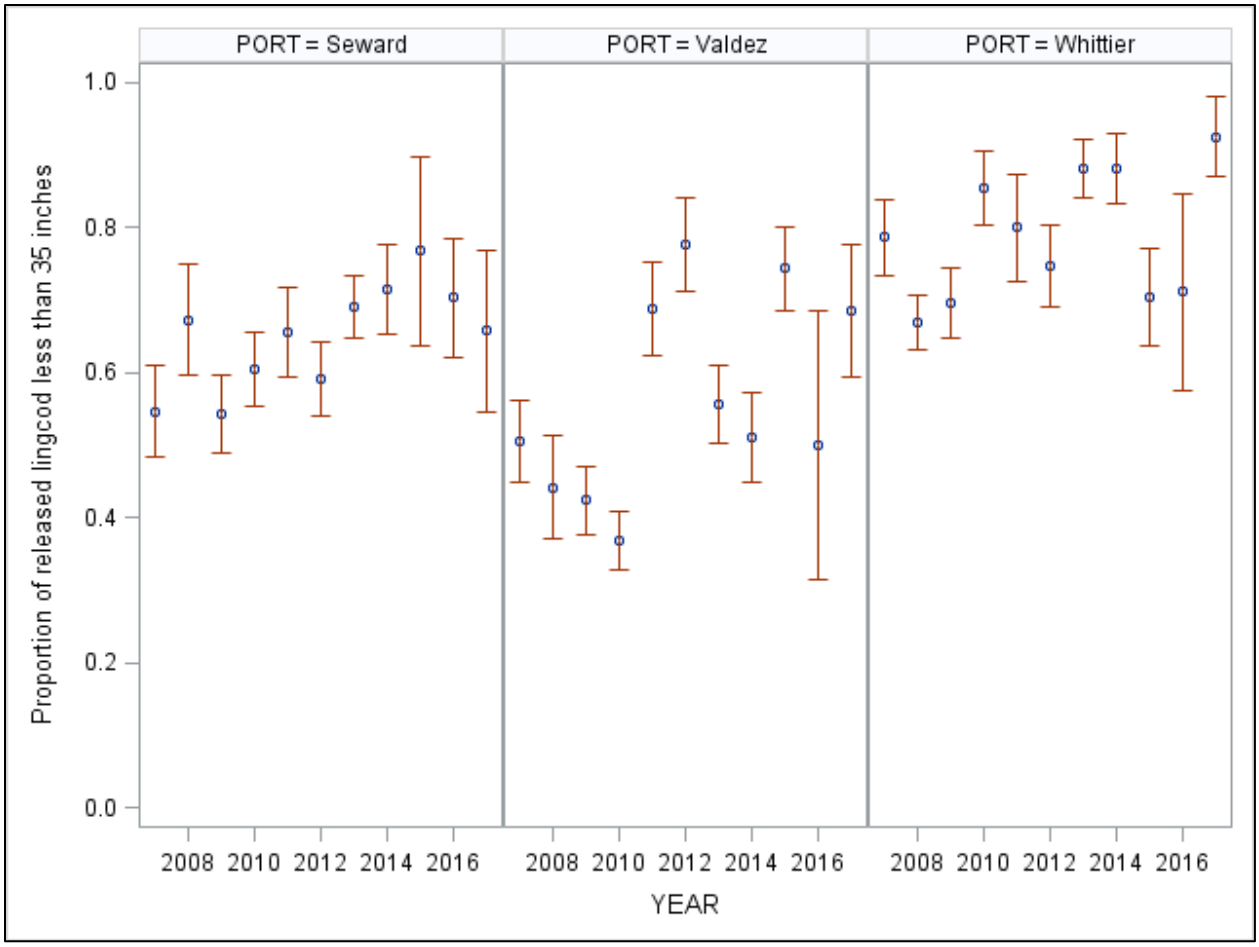

Figure 26.–Proportion of released lingcod less than 35 inches in length, PWSMA, 2001–2016.

Source: Scott Meyer, Fishery Biologist, ADF&G, Homer, unpublished data.

HALIBUT FISHERY

FISHERY DESCRIPTION

Halibut are one of the most popular targets of sport anglers fishing the marine waters of PWSMA. Most halibut are harvested from May through early September. Halibut are distributed widely across the continental shelf and in nearshore waters. The sport fishery is closed during January to protect spawning halibut and open the remainder of the year. The fishery is managed by federal agencies (see below).

FISHERY MANAGEMENT AND OBJECTIVES

Halibut fisheries are managed under a treaty between the U.S. and Canada: the Halibut Convention of 1982 and the 1979 Protocol. The International Pacific Halibut Commission (IPHC) was formed in 1924 under the first treaty to assure the optimal sustained yield of the North Pacific halibut resource. The IPHC does not, however, have the authority to allocate catch quotas amongst the various fisheries that exploit the halibut stock in either country's waters. In U.S. waters, that responsibility resides with the North Pacific Fishery Management Council (NPFMC) under the Magnuson–Stevens Fishery Conservation and Management Act of 1996.

ADF&G's Division of Sport Fish provides estimates of harvest, release mortality, and various other statistics from the sport fishery throughout the state to the IPHC and NPFMC to aid in management and allocation decisions. The State of Alaska does not have direct management authority over the halibut fisheries off Alaska.

The IPHC first regulated the sport fishery in 1973. After some contentious regulation changes, the bag and possession limit was set to 2 halibut for all sport anglers in 1975. The possession limit was increased to 4 fish in 1988 (Appendix A1). A limited access system was implemented for the charter sector in 2011 (Federal Register 75FR554), and the Catch Sharing Plan (CSP) was implemented in 2014 (78FR75844). The CSP allocates halibut between the commercial and charter sport sectors. Implementation of the CSP has resulted in numerous regulation changes for the charter fishery throughout Southcentral Alaska in an effort to keep the fishery within its allocation (Appendix A1). Meanwhile, the unguided sport fishery continues to be unallocated and enjoys a 2-fish bag limit with no size limit.

The current IPHC harvest strategy employs a constant harvest rate strategy to achieve most of a maximum sustained yield (MSY) and distribute removals spatially in proportion to current stock biomass. The current target harvest rate in Area 3A (which includes PWS) is 21.5% of the exploitable biomass. A control rule reduces the target harvest rate for directed fisheries linearly when female spawning biomass drops below 30% of the unfished level ($SB_{30\%}$), to zero at $SB_{20\%}$ (Hicks and Stewart 2017).

The IPHC currently assesses the halibut stock on a coastwide basis using an ensemble of 4 equally weighted models (Stewart and Hicks 2017). The overall biomass is apportioned among regulatory areas based on relative mean catch rates from a space-time model fit to longline survey data, and weighted by bottom habitat area. The survey index includes adjustments for timing of the survey and hook competition from other species (Webster 2017).

HISTORICAL FISHERY PERFORMANCE

Halibut are caught throughout most marine waters of PWS, although much of the directed effort and harvest occurs near the ocean entrances. Halibut harvest accounting does not follow PWSMA boundaries, but harvest from within the PWSMA would be included in estimates for trips ending at sites in Eastern PWS, Western PWS, or at Seward. Before 2014, the SWHS was used to estimate harvest for the guided and unguided sectors of the sport fishery. Since 2014, unguided harvest is estimated based on the SWHS, and guided harvest is based on ADF&G charter logbook data. Although not presented here, recent halibut harvest information is available for Eastern PWS, Western PWS, and Seward from annual summaries posted on the North Pacific Fishery Management Council web site at https://www.npfmc.org/halibut-charter-management (e.g., "2015 Sport Halibut Harvests Area 2C and 3A").

SHRIMP FISHERY

FISHERY DESCRIPTION

The Prince William Sound shrimp sport fishery is conducted mainly out of the ports of Whittier and Valdez. Effort and harvest by Whittier anglers is concentrated in the Passage Canal, Culross Island, and Port Wells areas whereas Valdez anglers tend to have more effort and harvest concentrated near Port Valdez and Valdez Arm.

FISHERY MANAGEMENT AND OBJECTIVES

Before 2001, there were no regulatory restrictions on the noncommercial shrimp fishery in PWS. In March 2000, BOF adopted regulations to restrict the noncommercial fishery (effective January 2001). The new regulations required a shrimp permit for all users (sport, personal use, and subsistence, effective during the 2002–2005 seasons), established maximum pot limits (no more than 5 pots per person, with a maximum of 5 pots per vessel), and established a shrimp fishing season (open from 15 April through 15 September). In March 2009, BOF adopted a *PWS Noncommercial Shrimp Fishery Management Plan* (Alaska Administrative Code 5 AAC 55.055) allowing for the possibility of a commercial pot shrimp fishery if the total allowable harvest (TAH) exceeds 110,000 lb (5 AAC 31.214; Wessel et al. 2015: Table 1). Data collected during the annual pot survey by the ADF&G Division of Commercial Fisheries is used in a model to determine the following year's TAH and guideline harvest levels (GHL) for both the commercial and noncommercial shrimp fishery. The BOF allocates 40% of the TAH to commercial users and 60% to noncommercial users (Wessel et al. 2015). In order to manage the noncommercial fishery allocation for a given year, it became necessary to reinstitute the noncommercial fishery shrimp permit beginning in 2009.

In 2010, an emergency order was issued to increase the maximum pot limit from 5 to 8 per vessel and as a result, effort and harvest increased that year (Hochhalter et al. 2011). Since 2010, the pot limit per vessel has not been liberalized.

HISTORICAL FISHERY PERFORMANCE

Relative abundance of spot shrimp (*Pandalus platyceros*) in PWS is monitored annually by ADF&G with a pot survey performed by the ADF&G Division of Commercial Fisheries in the Prince William Sound. Harvest is not reported in the SWHS and permit holders are required to keep records of harvest during the fishing season while gear is in the water. Postseason (by October 15) harvest reports for the full season are required to be turned in to ADF&G.

Total harvest of shrimp by noncommercial users in PWSMA has increased from 9,288 lb in 2002 to 102,785 lb in 2016 (Table 13). Effort in the noncommercial fishery has also increased since 2002 from 19,387 pot-days to 45,012 pot-days in 2016. Effort peaked in 2010 at 78,083 pot-days (Table 13), and it is likely this is due to an increase in the number of pots allowed in the noncommercial fishery.

FISHERY PERFORMANCE AND ABUNDANCE 2014–2016

The average harvest and number of PWS shrimp permits issued from 2014 to 2016 was slightly higher than the prior 5-year average (2009–2013) although average effort decreased. Average effort and harvest of shrimp for 2014–2016 was 47,272 pot-days and 94,671 lb, respectively, whereas average effort and harvest in the prior 5 years (2009–2013) was 48,682 pot-days and 85,153 lb, respectively (Table 13).

Effort in 2016 was the lowest (45,012 pot-days) since 2009 when permits were reinstituted (Figure 27). The low effort in 2016 can be attributed to an emergency order (EO 2-SHR-6-14-16) preseason action that reduced the maximum number of pots allowed to 4 per vessel. Even with the reduced effort, the pounds of shrimp harvested in 2016 (102,785) was the largest on record since 2002 (Table 13). This was also the first year (2016) that both PWS shrimp permits and harvest reporting were available online. This may explain why 2016 had the greatest number of

permits issued (3,592) and one of the highest response rates (91%) recorded since 2002, although similar numbers have been achieved in the past. Additional information on the PWS shrimp fishery will be reported in Rumble et al. (*In prep*.)[4]

Table 13.–Number of permits issued, total pot-days of effort, catch-per unit effort, and total harvest in pounds of whole shrimp in the noncommercial shrimp fishery, PWSMA, 2002–2016.

Year	Permits issued	Percent response	Effort [a] (pot days)	Catch per unit effort	GHL	Harvest (lb.) [b]	% of GHL (known) [b]
2002	717	84	19,387	0.48 [b]	[c]	9,288 [b]	[c]
2003	1,061	91	24,094	0.58 [b]	[c]	13,965 [b]	[c]
2004	1,649	90	30,694	0.84 [b]	[c]	25,694 [b]	[c]
2005	2,112	90	37,271	0.86 [b]	[c]	31,950 [b]	[c]
2006–2008	[d]	[d]	[d]	[d]	[d]	[d]	[d]
2009	2,733	89	47,631	1.18 [b]	57,900 [b]	56,120 [b]	97% [b]
2010	3,181	90	78,083	1.12 [b]	82,200 [b]	87,699 [b]	107% [b]
2011	3,309	88	56,543	1.05 [b]	79,200 [b]	59,182 [b]	75% [b]
2012	2,733	87	52,620	1.06 [b]	76,860 [b]	55,765 [b]	73% [b]
2013	3,181	89	48,976	1.76	99,450	85,988	86%
2014	3,309	86	48,283	1.85	99,900	89,155	89%
2015	3,098	87	48,521	1.90	100,000	92,072	92%
2016	3,101	91	45,012	2.28	70,500	102,785	146%
Average 2009–2013	3,084	88	48,682	0.00	89,342	85,153 [b]	97% [b]
2014–2016	3,169	88	47,272	0.00	90,133	94,671	102%

Source: Jay Baumer, Fishery Biologist, ADF&G, Anchorage, unpublished data.

[a] Effort is expanded to account for nonrespondents.

[b] Estimates using conversion factor known at the time. From 2002 to 2012, a conversion factor of 2.4 lb/gal of shrimp was used to estimate harvest in pounds. In late 2012, this conversion factor was re-evaluated and set at 3.89 lb/gal based on an ADF&G study (Maria Wessel, ADF&G Division of Commercial Fisheries, unpublished data). Footnoted (b) numbers were produced with a conversion factor of 2.4 lb/gal.

[c] No calculation was made because this was prior to the establishment of a GHL.

[d] No PWS shrimp permit was required from 2006 through 2008.

[4] Rumble, J., J. Baumer, P. A. Hansen, and X. Zhang. *In prep*. Prince William Sound shrimp pot fisheries, 2015–2017. Alaska Department of Fish and Game, Fishery Management Report, Anchorage.

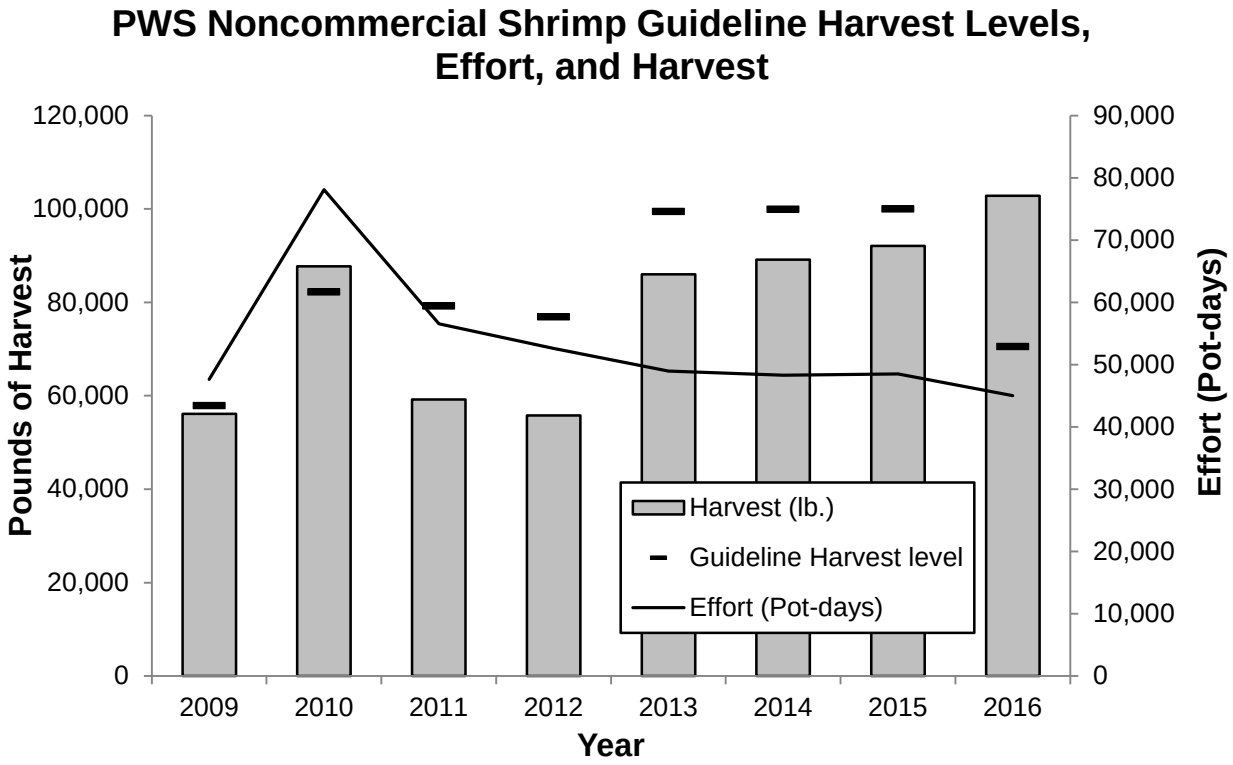

Figure 27.–GHL, effort, and harvest levels in the noncommercial shrimp fishery, PWSMA, 2009–2016.

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APPENDIX A: REGULATION HISTORY

Appendix A1.–Regulation history for the Prince William Sound Management Area.

Regulatory extent	Effective date (s)	Regulation [a]
Areawide		
	1994	In all fresh waters, only unbaited artificial lures may be used from 15 April through 14 June.
	2009	The western sport fish regulatory boundary moved from Cape Puget to Cape Fairfield. Now all regulatory boundaries (commercial, sport, personal use, subsistence) have the same western boundary.
Cutthroat trout		
	1957–1982	Were part of an aggregate freshwater limit of trout, grayling, and lake trout (later "char") of 15 per day, 30 in possession with a limit of only 3 over 20 inches. No saltwater limits.
	1983	Limits for each species were established. The limits for "trout" were set at 3 per day, 6 in possession over 20 inches and 15 per day, 30 in possession under 20 inches.
	1985	Trout limits were set at 5 per day, 10 in possession with only 1 over 20 inches.
	1991	The bag and possession limits were separated from rainbow trout and were set at 2 per day and in possession except along the Cordova road system where it was 5 per day and in possession, with only 1 per day and in possession over 10 inches.
	1994	A spawning season closure from 15 April through 14 June was put in place.
	1999	*Copper River Delta Special Management Area for Trout* (Alaska Administrative Code 5 AAC 55.033) was established: Only unbaited, single-hook, artificial lures were allowed year-round in all fresh waters south of Miles Lake Glacier and east of the Copper River (excluding the Clear Creek drainage), and all waters draining into the Gulf of Alaska west of Cape Suckling. In addition, no retention of rainbow/steelhead trout or cutthroat trout was allowed year-round.
	2002	New limits were established that combined rainbow and cutthroat trout as a single bag and possession limit for all trout. For Cordova road system streams, limits were 5 trout per day and in possession, with only 1 per day and in possession over 10 inches. For all other waters, bag and possession limits were 2 fish with only 1 over 20 inches.
	2006	Rainbow/steelhead/cutthroat trout bag and possession limits were 2 fish, only 1 may be 20 inches or greater per day; annual limit of 2 fish 20 inches or greater must be recorded on license. These regulations do not include the *Copper River Delta Special Management Area* specified in 5 AAC 55.033, or in stocked lakes.
	2012	Rainbow/steelhead/cutthroat trout bag and possession limits are 2 fish, with a minimum size of 11 inches and a maximum limit of 16 inches. These regulations do not include the *Copper River Delta Special Management Area* specified in 5 AAC 55.033, or in stocked lakes.
	2014	Bag limits established for rainbow/steelhead trout and cutthroat trout in the *Copper River Delta Special Management Area for Trout* (repealed 3/29/15) as 2 per day with 1 fish over 20 inches from June 15 through April 14.

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Regulatory extent	Effective date (s)	Regulation [a]
Rainbow trout		Bag and possession limits were included with cutthroat trout as "trout" limits (see cutthroat trout above).
	1991	Bag and possession limits were separated from cutthroat trout and set at 5 per day, 10 in possession, only 1 per day and 2 in possession over 20 inches.
	1999	*Copper River Delta Special Management Area for Trout* (Alaska Administrative Code 5 AAC 55.033) was established (repealed 3/29/15): Only unbaited, single-hook, artificial lures are allowed year-round in all fresh waters south of Miles Lake Glacier and east of the Copper River (excluding the Clear Creek drainage), and all waters draining into the Gulf of Alaska west of Cape Suckling. In addition, no retention of rainbow/steelhead trout or cutthroat trout is allowed year-round.
	2002	New limits established that combine rainbow and cutthroat trout as a single bag and possession limit for all trout. For Cordova road system streams, limits were 5 trout per day and in possession, with only 1 per day and in possession over 10 inches. For all other waters, bag and possession limits were 2 fish with only 1 over 20 inches.
	2006	Rainbow/steelhead/cutthroat trout bag and possession limits were 2 fish, only 1 may be 20 inches or greater per day; annual limit of 2 fish 20 inches or greater must be recorded on license. These regulations do not include the *Copper River Delta Special Management Area* specified in 5 AAC 55.033, or in stocked lakes.
	2012	Rainbow/steelhead/cutthroat trout bag and possession limits are 2 fish, with a minimum size of 11 inches and a maximum limit of 16 inches. These regulations do not include the *Copper River Delta Special Management Area* specified in 5 AAC 55.033, or in stocked lakes.
Dolly Varden/ Arctic Char		
	Early 1960s	Anglers were allowed 30 Arctic char in addition to the trout/grayling limit of 15.
	Mid-1960s (before 1969)	Dolly Varden and Arctic char were made part of the aggregate limit with trout and grayling.
	1983	Limits for each species were established. The limits for "char" were set at 3 per day, 6 in possession over 20 inches and 15 per day, 30 in possession under 20 inches.
	1991	Bag limits changed to 10 per day and in possession, with no size restrictions.
Arctic Grayling		
	1957–1982	Part of an aggregate freshwater limit of trout, grayling, and lake trout (later "Arctic char") of 15 per day, 30 in possession with a limit of only 3 over 20 inches. No saltwater limits.
	1983	Limits for each species were established. The limits for Arctic grayling were set at 15 per day, 30 in possession, no size restrictions.
	1991	Bag limits changed to 10 per day and in possession, with no size restrictions.

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Regulatory extent	Effective date (s)	Regulation [a]
Salmon		
	Prior to 1959	There were no salmon limits in fresh or salt waters prior to statehood.
	1960	The freshwater areas within Valdez Bay are closed to salmon fishing.
	1961	A saltwater bag limit was set of 8 coho salmon with a possession limit of 3 bag limits.
	1965	Cordova Road system (Steamship Dock to Million Dollar Bridge) freshwater limit was set at 6 salmon daily, with a possession limit of 2 bag limits. Eyak Lake, Power Creek, and Hatchery Creek were closed to salmon fishing beyond markers at the east end of Power Creek Arm.
	1967	A saltwater bag limit of 8 coho, 8 chum, and 15 pink salmon was set; possession limit was 3 daily bag limits
	1968	Fishing from the bridge across Eyak River at Mile 3 of the Copper River Highway was prohibited.
	1969	Upper limit of Cordova area salmon restriction moved from Million Dollar Bridge upstream to the Copper River below Woods Canyon.
	1970	Limit included 8 sockeye salmon with possession limit reduced to 2 daily bag limits. The following closures were established: Eccles Creek (Hartney Bay Road) closed to the taking of salmon; Hartney Creek above Hartney Bay Road closed to the taking of salmon.
	1973	Fresh and saltwater limits were reduced to 6 salmon daily, 12 in possession. Eyak River 200 yards above the weir and 200 yards below the bridge was closed to fishing.
	1975	Clear Creek closed to the taking of salmon. Eyak Lake and all tributaries closed to the taking of salmon.
	1979	Closure on Eyak River 200 yards above the weir and 200 yards below the bridge limited to 15 June through 1 October.
	1980	Dates of closure on Eyak River changed to 1 June through 1 October.
	1984	Eshamy Lagoon, inside ADF&G markers placed on the lagoon shore approximately one-half mile on either side of the ADF&G cabin, is closed to snagging until ADF&G announces the escapement goal will be met. The Robe River downstream of the Richardson Highway was established as fly-fishing only from 15 May through 14 June, with a bag limit of 6 per day and 12 in possession, only 1 of which could be a sockeye salmon.
	1987	Further restrictions were placed on Robe River, 15 May to 22 June; only 1 salmon of each species was allowed daily and in possession.
	1989	Further changes were made to Robe River fly fishing area regulations. Dates are extended to year round, the area is defined as extending from the highway downstream to 100 yards below the confluence with the Lowe River, bag limit is 3, only 1 may be a sockeye salmon and only 1 may be a coho salmon.

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Regulatory extent	Effective date (s)	Regulation [a]
Salmon (continued)		
	1989	Valdez Arm closed, area boundary changed to Allison Point to and including Mineral Creek. Eshamy lagoon, lake, and stream bag limits reduced to only 3 sockeye salmon per day and 6 in possession. Lake Bay (Esther Island) and all salt waters inside ADF&G markers located approximately 100 feet seaward of Esther Hatchery brood stock holding facility are closed to all fishing. In Cordova and in all freshwater drainages crossed by the Copper River Highway from and including Eyak River to the Million Dollar Bridge, and including Clear Creek (Mile 42), excluding the Martin River, the bag and possession limits are reduced to 3 salmon other than Chinook salmon (referred to as "king salmon" in the regulations). Clear Creek remains closed to king salmon fishing. In addition, Eyak River 200 yards above the weir and 200 yards below the bridge is opened to fishing year-round and as a fly-fishing only water from 1 June through 30 September. A limit is added of 2 king salmon (4 in possession) 16 inches or more, and 6 per day, 12 in possession less than 16 inches.
	1991	Eyak fly-fishing only area gear restrictions: only single-hook, artificial flies with gap between point and shank three-eighths inch or less and no additional weight attached to the line may be used. Solomon Gulch Creek, downstream of ADF&G marker located approximately 300 feet downstream of the Valdez Fisheries Development Association weir, opened to salmon fishing.
	1994	For Cordova, in the marine waters of Orca Inlet between Odiak Inlet and the Orca Cannery on Orca Road, snagging is prohibited from 1 June through 30 September, and in Fleming Spit Creek snagging is allowed from 1 October through 31 May. Salmon bag limits of 3 per day and in possession in Clear Creek and all freshwater drainages crossing the Copper River Highway are changed to include king salmon under 16 inches.
	1999	Daily limits for coho salmon are 3 per day and 3 in possession, except in designated Terminal Harvest Areas where the saltwater limit remains at 6 per day and 12 in possession. Daily bag and possession limits for coho salmon at Shelter Bay are 1 per day and 1 in possession. Clear Creek is closed to salmon fishing year-round upstream of the Carbon Mountain Bridge.

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Regulatory extent	Effective date (s)	Regulation [a]
Salmon (continued)		
	2001	Statewide, jack king salmon are defined as king salmon less than 20 inches in total length.
	2002	Coho salmon that are to be released cannot be removed from the water on streams crossed by the Copper River Highway.
	2009	Whittier Terminal Harvest Area for salmon now defined as the saltwater west of a line from Trinity Point to Gradual Point.
		Pink and chum salmon taken in the sport fishery may now be used as bait in sport, personal use, or subsistence fisheries. Fish used as bait are part of the bag limit of the angler that originally hooked the fish.
	2014	Repealed the Copper River Delta Special Management Area for trout.
		The use of bait is prohibited to fish for salmon once the bag limit has been reached on drainages crossing the Copper River Highway from August 15–September 15.
		Sport fishing in Main Bay, sport fishing from a vessel that is within 60 feet of the Prince William Sound Aquaculture hatchery barrier seine and from a vessel that is inland of the barrier seine to the head of the bay is prohibited.
Halibut		
	1973	There were no sport fishery regulations until 1973, when the IPHC set bag/possession limit of 3 halibut and open season of March 31-October 31. Legal gear was identified as a single hook attached to handline or rod.
	1974	Bag/possession limit changed to 1 fish, not recognized by the Board of Fisheries.
	1975	Bag/possession limit set to 2 fish (adopted by State of Alaska), spear added as legal gear. Open season changed to March 1–October 31.
	1978	The captain or operator of any vessel used in charter service for sport fishing for halibut shall be held responsible for violations of these regulations by any person on board said vessel.
	1981	Legal gear expanded to include 2 hooks attached to handline or rod, and spear.
	1984	IPHC established license requirement for charter vessels.
	1985	Open season changed to March 1–December 31.
	1986	Open season changed to February1–October 31.
	1987	Open season changed to February 1–December 31. IPHC established a prohibition on filleting, mutilating, or disfiguring a halibut in a manner that would prevenet determination of the number of fish caught, possessed, or landed. Also enacted prohibition on the sale, trade, or barter of sport-caught halibut.

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Regulatory extent	Effective date (s)	Regulation [a]
Halibut (continued)		
	1988	The halibut possession limit was raised to 4 fish.
	1991	Any halibut brought aboard a United States vessel and not immediately returned to the sea with a minimum of injury will be included in the daily bag limit of the person catching the halibut. The operator of a charter vessel shall be liable for any violations of IPHC regulations committed by a passenger aboard said vessel.
	1998	IPHC repealed the 1984 vessel license requirement because it was redundant with the State of Alaska CFEC license requirement.
	2003	Charter guideline harvest level (GHL) became effective for Area 3A (Southcentral Alaska).
	2007	ADF&G issued an emergency order (EO) to prohibit harvest of halibut by skippers and crew in Area 3A May 1–December 31 to help keep charter fishery within its GHL.
	2008	ADF&G issued EO to prohibit harvest of halibut by skippers and crew in Area 3A May 24–September 1 IPHC adopts regulations restricting possession of halibut cut into more than 2 ventral and 2 dorsal pieces, plus two cheeks, with some skin on all pieces.
	2009	ADF&G issued EO to prohibit harvest of halibut by skippers and crew in Area 3A May 23–September 1. IPHC regulation on possession amended to allow halibut in excess of the possession limit on vessels that do not contain any sport fishing gear.
	2011	NMFS implements the charter limited access program. All charter fishing must be done under authority of a Charter Halibut Permit (CHP) with associated angler limits (endorsement).
	2014	Halibut Catch Sharing Plan (CHP) becomes effective. The CSP allocates a combined catch limit between the commercial and charter sectors according to rules published in the CSP, and allows for inseason lease of IFQ to allow harvest in addition to sport bag/possession and size limits. (78FR75844). Bag and possession limit for the charter fishery set to 2/4 except that half of the fish must be 29 inches or smaller (U29). The carcasses of all U29 fish must be retained intact on board until fish are offloaded. Charter vessels limited to one tip per day on which halibut are retained.
	2015	Five-fish annual limit established for charter halibut (without a recording requirement. Charter harvest not allowed on Thursdays between June 15 and August 31.
	2016	Four-fish annual limit with recording requirement for charter halibut. Charter harvest not allowed on Wednesdays all year. CHP's may only be used on one trip per day.

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Regulatory extent	Effective date (s)	Regulation [a]
Rockfish		
	Prior to 1989	There was no limit on the harvest of rockfish by the sport fishery.
	1989	The bag limits were set at 20 per day and in possession, with no more than 5 being "red rockfish."
	1991	The bag limits were changed to 5 per day, 10 in possession 1 May through 15 September, and 10 per day and 10 in possession 16 September through 30 April, with no species restrictions. In addition, a rockfish, which is removed from the water, shall be retained and becomes part of the bag limit of the person originally hooking it.
	1997	The total bag limit was unchanged, but a provision was added that for "nonpelagic" rockfish, the limits were only 2 per day and 2 in possession all year.
	1998	The total bag and possession limits remain unchanged except that from 1 May through 15 September no more than 1 fish daily and 2 in possession may be non-pelagic species, and from 16 September through April 30 no more than 2 daily and 2 in possession may be nonpelagic species. Rockfish removed from the water become part of the bag limit of the person that hooked it.
	2000	The total bag limit is unchanged, but nonpelagic limits are reinstated of 2 rockfish per day and 2 in possession, year-round. In addition, the first 2 nonpelagic rockfish removed from the water must be retained and become part of the bag limit of the person originally hooking the fish.
	2009	Seasons and nonpelagic bag limits are unchanged, total bag limit is reduced to 4 per day and 8 in possession from 1 May through 15 September and 8 fish per day and 8 in possession 16 September through 30 April.
Lingcod		
	Prior to 1991	No bag or possession limits prior to 1991.
	1991	Bag limits are set at 2 per day and 4 in possession.
	1993	A minimum length of 35 inches with head attached or 28 inches with head removed is included, the season is closed from 1 January through 30 June, and lingcod can only be landed by hand or landing net (no gaffs).
	2004	Repealed requirement to land lingcod only by hand or with a landing net.
Sharks		
	Prior to 1997	Prior to 1997, no season or bag limits.
	1997	Daily bag and possession limits set at 1, with an annual limit of 2. Harvest must be recorded on license or harvest card. Regulations apply to all sharks of the orders Lamniformes, Squaliformes, or Carcharhiniformes.
	2010	Daily bag and possession limit for spiny dogfish liberalized to 5 fish and annual limit removed.

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Regulatory extent	Effective date (s)	Regulation [a]
Areawide shellfish		
		A valid sport fishing license is required to take shellfish.
		Legal gear:
		shrimp—pots and ring nets. crab—pots, ring-nets, diving gear, dip nets, and hooked or hookless hand lines. clams—rakes, shovels, manually operated clam guns.
		Marking of pots: first initial, last name, and address on a keg or buoy attached to unattended subsistence (after 1990, this includes sport) fishing gear.
	1981	A side wall of all shellfish pots must contain an opening with a perimeter equal to or exceeding one-half of the tunnel eye opening perimeter. The opening must be laced, sewn, or secured together by untreated cotton twine or other natural fiber no larger than 120 thread. Dungeness crab and shrimp pots may have the pot lid tie-down straps secured to the bottom at one end by untreated cotton twine no larger than 120 thread as a substitute for the above requirement.
	1988	No person may mutilate or otherwise disfigure any crab in any manner which would prevent determination of the minimum size restriction until the crab has been processed or prepared for consumption.
		No more than 5 pots of any type per person and 10 pots of any type per vessel may be used.
		Personal use regulations were adopted as sport regulations.
	1990	Criteria for escape mechanism are modified. Opening must equal or exceed 18 inches, except in shrimp pots where it must exceed 6 inches. Opening must be laced with 100% cotton twine no larger than 30 thread, knotted only at the ends, and cannot be tied or looped around the web bars. The opening must be within 6 inches of the bottom and parallel to it. Dungeness pots can substitute the above with the lid tie-down tied at one end with a single loop of 30 strand cotton twine such that when the twine degrades, the lid is no longer secure.
	1990	Thread count on cotton twine changed to 60.
	1992	Thread count on cotton twine changed to 30 thread for sewn opening and 60 thread for Dungeness crab pot lid closure.

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Regulatory extent	Effective date (s)	Regulation [a]
Razor clams		
	Prior to 1959	No specific regulations prior to statehood.
	1961	Season 1 January through 30 June and 15 August through 31 December; no bag limit. No razor clams may be taken with the aid of any device other than manually operated shovel, fork, or clam gun. Sport fishing license is required.
	1988	Personal use regulations (adopted as sport fish regulations requiring sport fish license after 1990): no closed season, no bag limit, no size limit except in waters east of longitude 149°W and south of a line from the southernmost tip of Point Bentinck to the southernmost tip of Point Whitshed, only razor clams 4.5 inches or longer in length of shell may be taken or possessed. In that same area a personal use permit from ADF&G is required.
	1990	Personal use regulations adopted as sport fish regulations.
Shrimp		
	1957	No bag limits, no size limits, and no closed season.
	1996	All shrimp pots must have at least 2 adjacent vertical or near-vertical sides, excluding tunnels, completely composed of uncovered net webbing or rigid mesh. A pot with no definable side (including round pots) must have net webbing or rigid mesh panels covering at least 50% of its vertical or near-vertical surface area. On all pots, the net webbing or rigid mesh must be large enough to allow unaided passage of a maximum 12-inch long, seven-eighths inch diameter round wooden peg without deforming the opening, except for the selvage.
	1999	Established a season from 15 April through 15 September. Reduced the number of pots allowed to 5 per person with a maximum of 5 per vessel.
	2001	A permit was required to harvest shrimp.
	2006	A permit was no longer required to harvest shrimp.
	2009	*Prince William Sound pot shrimp management plan* (5 AAC 55.055) requires a permit for all non-commercial users.
	2012	*Prince William Sound non-commercial shrimp fishery management plan* (5 AAC 55.055) requires that when ADF&G surveys for spot shrimp estimate a harvestable surplus of 110,000 pounds (or more), a commercial pot fishery is triggered for spot shrimp. Noncommercial users (sport, personal use, and subsistence) are allocated 60% of the surplus and are unrestricted as to where they can set pots. The permit system for the noncommercial sector is back in place. Put into regulation a limit of 5 pots per person with a maximum of 5 pots per vessel that cannot be modified by emergency order.
	2017	Personal-use shrimp was removed to simplify regulations and get rid of redundant regulations.

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Regulatory extent	Effective date (s)	Regulation [a]
Tanner crab		
	Prior to 1981	There were no closed seasons and no bag limits.
	1988	Personal use regulations set bag and possession limits at 20, only male crabs could be retained, minimum size limit was 5.3 inches, and there was no closed season.
	1990	Personal use regulations adopted as sport fish regulations.
	1999	Closed all waters of PWSMA to the taking of Tanner crab.
	2012	Opened PWSMA to taking of Tanner crab for subsistence use only (closed to sport fishing). Gear limit of 2 pots per person with no more than 2 pots per vessel with possession limit of 5 legal size (5½ inches or greater in carapace width) male Tanner crab per person per day.
	2017	If commercial fishery opens than a sport fishery will open under the same criteria.
King crab		
	1988	Personal use regulations set bag and possession limits to 6, only male crabs could be retained, no closed season, size limits 5.9 inches in width for blue king crab and 7 inches for red and brown king crabs.
	1990	Personal use regulations adopted as sport fish regulations.
	1999	All waters of PWSMA closed to the taking of king crab.
	2012	PWSMA waters west of longitude 147.20.00 are open to taking of golden king crab under subsistence use only (closed to sport fishing). Gear limit of 2 pots per person with no more than 2 pots per vessel with annual limit of 3 legal size (7-inch or greater carapace width) male king crab.
Dungeness crab		
	1981	Subsistence regulations set bag and possession limits to 20 Dungeness crab per day, crabs must be male only, 6.5 inches or more in carapace width.
	1988	Personal use regulations set bag and possession limits to 20 per day, only male crabs, 6.5 inches or more, may be retained.
	1990	Personal use regulations adopted as sport fish regulations.
	1998	All waters of Orca Inlet (see regulation for definition) closed to sport fishing for Dungeness crab.
	1999	All waters of PWSMA are close to the taking of Dungeness crab.

Note: Chinook salmon are referred to as “king salmon” or “kings” in the regulatory language.

[a] Underlined text indicates regulations that are currently in effect.